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KOMPETENCIJE UČENIKA

PHYSICAL EDUCATION IN THE 21ST CENTURY –
PUPILS' COMPETENCIES

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Pozvana predavanja
Invited lectures

Ken Hardman
University of Worcester, UK

Review

PHYSICAL EDUCATION, MOVEMENT AND PHYSICAL LITERACY IN THE 21ST CENTURY: PUPILS' COMPETENCIES, ATTITUDES AND BEHAVIOURS

INTRODUCTION

The European Union Bologna Declaration (June 1999) set in motion an agenda of policy reforms. The subsequent Council of Europe's Stockholm Meeting in March 2001 set three strategic goals including the quality and effectiveness of the educational system. In the improvement of the quality and effectiveness of education and professional preparation, it was envisaged that curricula would need to focus on key competences, appropriate to the context for lifelong learning. Arguably, this was a European Parliament and Council of Europe political response to align Education in Europe with emerging and established practices in other sectors, which had variously formulated competence frameworks embracing the provision of skills enabling learners to cope with increasing complexity in work tasks and linked with the notion of 'employability'. Employability is associated with work-compatible values and attitudes, including a desire to learn, to apply that learning, to adapt and to respond proactively to change; basic skills (literacy and numeracy); work needs' key skills (communication, application of number, information technology, improving one's own learning and performance, working with others and problem solving); other generic skills that are becoming 'key', such as modern language and customer service skills; relevant up-to-date knowledge and understanding; up-to-date job specific skills; and the ability to manage one's own career (CBI, 1998, cited in Hoffman, 1999). A European Union (EU) survey in 2002 of 'Key Competencies' found that all the then Member States included either explicit or implicit reference to the development of competencies, that identification was as much a matter of conceptualisation as terminology and that two motives fostered focus on key competencies: (i) quality in education, emanating from school to school variation in educational attainment; and (ii) internationalisation, scientific and technological progress and increasingly complex career paths (Scottish Qualifications Authority, 2003). This focus has been reflected in a marked shift in language and programme ethos and content of school subject curricula both in schools and in teacher training provider institutions. Syllabus and curricular aims are linked through subject content and pedagogical/didactical processes with ascribed and expected learning outcomes and competencies. Indeed,

during this period, research into the issue of „professional competence", as defined by sets of competencies, has become a prolific enterprise across the world. This shift is well illustrated in the domain of Physical Education.

PHYSICAL EDUCATION: PERCEIVED ROLE

Physical education is often advocated as a source of a range of positive developmental characteristics from early childhood to late teen-age and now, when it is perceived to be a lifelong process, throughout adulthood, epitomised in the notion of the 'physically educated person'[1]. Its perceived role has expanded over the years. Ostensibly as a school subject, physical education's broad brush scope and potential place it in a relatively unique and indispensable position with some responsibility in addressing many contemporary issues through characteristics not offered by any other learning or school experience. Indeed, the European Parliament (2007) has taken the view that physical education has the propensity to make significant and distinctive contributions to children's physical, mental, social, moral etc., development to include respect for the body, integrated development of mind and body, understanding of physical activity in health promotion, psycho-social development (self-esteem and self-confidence), social and cognitive development and academic achievement, socialisation and social (tolerance and respect for others, co-operation and cohesion, leadership, team spirit, antidote to anti-social behaviour) skills and aesthetic, spiritual, emotional and moral (fair play, character building) development, a panacea for resolution of the obesity epidemic, inactivity crisis and sedentary lifestyles, enhancement of quality of life etc. Fundamental questions arise here: a) where and what is the evidence to confirm the claims made on behalf of physical education?; and b) if the claims are legitimate, how can physical education deliver all that is claimed in its name when in some schools only 30 minutes per week are scheduled for physical education classes? But these questions are bases for discussion in another conference on another day.

Physical competence is a key aim of physical education and it is the acquisition of physical skills that most of us associate with the subject. Gallahue and Ozmun (2006) suggest there is a range of fundamental movement skills, which children are capable of acquiring by the age of around seven and many physical education programmes focus on providing the instruction, encouragement, opportunity and

[1] *Physically educated* persons might be described as being physically literate, having acquired culturally normative skills enabling engagement in a variety of physical activities, which can help to maintain healthy well-being throughout the full life-span; they participate regularly in physical activity because it is enjoyable; and they understand and value physical activity and its contribution to a healthy lifestyle.

context to develop these skills during the primary school years and beyond. However, attributes such as motivation, confidence, knowledge and understanding are as important as physical competence. It could be argued that they are more important than physical competence, if it is considered that children and young people are being helped to build a platform, which is the springboard to becoming lifelong participants in physical activity. Motivation is the attribute that will take them from the potato couch into regular exercise, or will take them from cyberspace into physical activity. Confidence is vital if competences are to be put to good use, because once they have the skills, they need to feel they are able to join in. Every child should leave a physical education lesson thinking 'I can do it!' (Rimmer, 2008). Knowledge and understanding are essential in helping to maintain an active lifestyle - if they know why physical activity is good for them; and if they appreciate it is helping them to be healthy, they are more likely to be motivated. These attributes need to be nurtured, taught, developed, practised and consolidated during compulsory schooling years. We need children and young people to move from year to year, through the age phases, with these attributes becoming increasingly embedded. This is the role of physical education.

PHYSICAL EDUCATION AND MOVEMENT

The very essence of physical education involves **movement**. In turn, movement education in the form of physical education makes, or can make a unique contribution to the education of **all** and is key in sowing the seeds in the formation of the **physically educated person**. As assumed in the European Parliament 2007 *Resolution*, the knowledge, skills and understanding acquired through school physical education prepare people for life. Whilst research evidence is not wholly conclusive, meta-analysis does suggest that when properly taught, arguably physical education can stimulate physical and mental development and through the physical education process young people can learn about the world and themselves, learn how to play and to respect others, how to cooperate and compete, and the differences between success and failure, what is fair and unfair, ethical and dishonest. The same knowledge and skills are necessary to perform a variety of physical activities, maintain physical fitness, and to value, as well as enjoy, physical activity, which, in itself, is an essential pre-requisite for enhancement of quality of life and good health over the full lifespan. Motor activity in physical education, sport and physical activity is an important irreplaceable phenomenon in physical, cognitive, functional, sensory-motor, psycho-social development, in wellness development of all age groups and especially of children and youth. It is a springboard for involvement in sport and physical activities throughout life. It is also a source of inter-personal communication and, in addition, can involve an appreciation of the natural environment as well contribute to moral

and aesthetic education and development. Physical movement education is the **only** educational experience where the focus is on the body, its movement and physical development. An over-riding aim of physical education is to develop physical competence so that all children are able to move efficiently, effectively and safely and understand what they are doing and why they are doing it as they begin the journey to becoming independent, confident and responsible citizens (Talbot, 2009). In summary, its outcomes embrace commitment, confidence, willing participation, knowledge and understanding and acquisition of generic and specific skills, positive attitudes, active lifestyle and activity enjoyment etc. Movement is the very core of physical literacy.

PHYSICAL EDUCATION AND PHYSICAL LITERACY

Physical literacy is a significantly important goal of physical education. An understanding of physical literacy helps to appreciate the special nature of physical education. It is not specifically about teaching children and young people to play sport (although there will be opportunities to do so); nor is it purely about finding those with the potential to become elite performers (although these individuals need help on their journeys as much as children and young people, who have difficulty catching a ball, or putting their head underwater, need help). Physical education is about encouraging every child and young person to become a lifelong participant in physical activity and supporting every child and young person on their physical literacy journey.

Physical literacy entails a commitment to the holistic nature of the individual with interaction of capabilities. As defined by Whitehead (2010) „As appropriate to each individual's endowment, physical literacy can be described as the motivation, confidence, physical competence, knowledge and understanding to maintain physical activity throughout the life course" (p.5), each attribute of which is as important as the other. It is the nurturing of a blend of the attributes that enables individuals to develop their physical literacy. Key to understanding physical literacy is to appreciate that movement is a fundamental part of being human and movement is essential for good health and making most of our lives. Being physically active facilitates maintenance and development of capacity to move and is, therefore, important from cradle to grave, i.e. physical literacy involves a life-long process: it is not just something that we 'do' in school physical education lessons. Physical education plays a vital part in the process, because this is the only time we can guarantee all children will be given the opportunity to receive guidance and encouragement to learn and practise, thereby developing their physical literacy. Every person is on a personal physical literacy journey and no two journeys are identical because of genetic make-up, socio-economic, socio-cultural and environmental factors, opportunity and a whole host of

other factors. Promoting physical literacy is not about finding individuals with the best skills, giving them extra tuition and ignoring the rest. Physical literacy as the goal of all physical activity recognises each individual will be travelling in different contexts, at different speeds and often in different directions. The role of the teacher, and/or significant others, is to guide the child or young person to make progress on his/her journey, giving support and direction where needed.

In schools, physical education curricula need to be based on the vision that the knowledge, skills and understanding acquired should benefit students throughout their lives and help them thrive in an ever-changing world by enabling them to attain physical and health literacy, as well as the comprehension, capacity and commitment needed to lead healthy, active lives and to promote the benefits of healthy active living. Physical literacy (the ability to move with competence in a variety of physical activities) and health literacy (the skills needed to obtain, understand and use the information to make good decisions for health) are key in curriculum development, which should be about helping students develop the necessary skills to make healthy choices! In essence this is a recipe which comprises competence(s) and positive attitudes and behaviours!

An important element of physical literacy is breadth of experience. Individuals who reach a high level of performance in one activity with no experience whatsoever of other spheres of activity and on say retirement thereafter drop out of any physical activity will not have travelled a particularly holistically challenging or satisfying journey. It is important that children and young people are provided with as wide a range of experiences as possible whilst they are at school. The wider the platform, the more stable it is, not forgetting that sufficient time is devoted to each experience to allow competence to develop. Good teachers want the best for the children and young people in their care. They want the children and young people to learn, to make progress and to fulfil their potential. This being the case, then the same teachers will want to play a significant role in helping the children and young people to develop their physical literacy. Everyone has the capacity to develop their physical literacy and hence, all school pupils have the potential to develop their physical literacy and being the best they can be.

'Significant others' play an essential part in the physical literacy journey in which **movement competence** enables individuals to participate effectively in multiple contexts or social fields, which contribute to an overall successful life for individuals and to a well-functioning society. It is a part of health care and disease prevention. It is connected not only with sport and recreation but also with everyday life activities and only secondarily with specific sports skills. Physical literacy development is unlikely to occur naturally as part of normal growth and movement education should be properly coordinated in order that everyone becomes both able to accommodate

and capable of accommodating changing human and ecological environments and managing active lifestyles and risks. It needs to be recognised that the development of physical literacy is not confined to one particular setting or indeed the responsibility of one particular provider. A range of individuals and organisations are required to:

- Encourage children to participate in all of these different opportunities in order for them to achieve their full potential; and
- Create and sustain a range of different opportunities for developing physical literacy.

Hence, movement competence can be learned, taught and developed (both indirectly and directly) in a range of institutions and other settings (educational, social and cultural public, private, commercial and voluntary systems and sub-systems). In the development of physical literacy, movement programmes, comprising physical and health education, are most effective when students' learning, values and healthy habits are shared and supported by school staff, families (parents and siblings), peers and communities. They should be characterised by (i) high quality teaching and relevant programmes' content; (ii) a healthy physical environment; (iii) a supportive social environment; and (iv) community partnerships.



Diagram 1. *Opportunities for developing physical literacy (adapted from Sport Northern Ireland, 2009).*

THE LEARNING TEACHING ENVIRONMENT

Physical activity is the key vehicle for student learning, a principle that students should learn about healthy activities by doing them. In this way, not only will they discover the joy of movement but they will develop skills that will lead to a lifetime of healthy active living. They will also come to understand how to apply the skills and principles they have learned to other things. The idea of teaching transferable skills and strategies is important to accommodate the growing number and range of activities available and accessible and where and when appropriate preserve traditional/cultural activities.

Physical and emotional safety is a pre-condition for effective learning in physical education and, therefore, there is a need for a supportive social environment. The physical and emotional development of pupils varies widely. Hence, the curriculum needs to shift from a content-focused approach to a more skill-based approach, which allows for differentiation of teaching methods/approaches with modification of lessons according to a student's readiness, interest and learning preference, ultimately, helping them to reach their full potential, i.e. learning should be student-centred and skill-based. This shift is intended to help students acquire and practise the skills needed to develop physical and health literacy, and to lead healthy active lives.

Learning in this physical education and health curriculum is balanced (addresses physical, cognitive and psycho-social needs *inter alia*), integrated (connections between all strands of the curriculum, Healthy Living, Active Living and Movement Competence: Skills, Concepts and Strategies, and between the content of the strands and the Living Skills are made whenever possible), and connected to real life (topics covered are meant to reflect the situations students face and the choices they have to make in today's world). Physical educators should aspire to create 'a culture of lifelong enjoyment and participation in physical activity including sport and recreation. Being physically active throughout life depends on an individual's ability to feel competent and confident in an activity setting. This competence and confidence normally comes from having developed physical literacy skills as a child. Physically literate children will be able to perform a range of fundamental movement skills appropriate to their capabilities. A child's movement confidence will develop as he/she becomes more competent in performing these skills.

In the pursuit of critical thinking skills, i.e. thinking reflectively (Ennis, 1993) physical literacy and healthy well-being need to be developed and applied in situation (Daniel & Bergman-Drewe, 1998), leading to a decision to be made on to what to believe or do and may develop. By no means is this an all encompassing view of what critical thinking is, but rather a starting point in understanding the effect it can have. Certainly in a physical education context, having critical thinking skills is advantageous given the direct link between the quality of the decision made by the

learner and the action outcome. At a more philosophical level, the assumptions held by an individual are guided by the values and beliefs this individual holds, which in turn shape the way the individual acts. In other words, how and what we think is a consequence of our values and beliefs; our values and beliefs determine how and what we think. Thinking is enhanced through decision-making, problem solving, interpreting information, creativity and reflection. These are activities, which develop awareness of how to think, to practise strategies for effective thinking and to develop intelligent behaviour for lifelong learning (Jones & Cope, 2011).

THE ILLUSORY AND ACTUAL PHYSICAL EDUCATION TEACHER

So in the pursuit of competencies development and attitudes and behaviours shaping, as a newly qualified, enthusiastic, committed young professional PE teacher do I turn up at school on my first day, dressed in my all-weather track-suit, worn over my swimming trunks, games kit, driving my go-kart with a trailer containing clothing and equipment for American rules football, badminton, basketball, cricket, handball, hockey, netball, petanque, rugby, squash, soccer, tennis, volleyball and multifarious other games, for dance, gymnastics and track and field activities, martial arts, combat sports as well as my mountain bike, inline skates and roller blades, cross-country and downhill skis, snow and sail boards, sand yacht, kayak, sailing dinghy, snorkel and deep-sea diving equipment, parachute, micro-light craft and ICT facilitation, carrying my manuals on old and new teaching and learning methods, legislation and litigation with guidance on risk assessments, empowerment of children, communication and interpersonal communication skills, especially on negotiation with students about what they are to do that day etc., texts on research and its application and armed with information to raise awareness of out-of-school and beyond school opportunities and providers? No! Of course this is both unrealistic and impossible. What I need to be armed with is a range of generic and specific competencies and strategies to optimise the holistic (including physical, personal and social) development of all pupils and enable them to make informed decisions on the need for, and relevance of, continuing physical activity engagement and choices as to when and where this can be continued in the wider community of which they are destined to be part. In essence, these competences and strategies relate to development of subject knowledge and application of teaching interventions, which are typical of an analytically reflective and professionally effective teacher.

The role of a teacher has changed/is changing. A physical education teacher should concentrate on the overall holistic development of motor (motor development), cognitive (moral, social and intellectual development) and behavioural patterns (attitudes and habits). In the teaching/learning process, a choice of content, use of a range of resources, variety of activities and teaching approaches needs to be employed

more effectively and extensively than hitherto. However, it should be remembered that too many changes can make pupils (who are used to 'traditional' teaching) feel uncomfortable and incapable of accomplishing the task. This may influence the progression of acquiring a skill or skills and eventually break down the structure of a process. A structured framework gives the pupil a sense of security and guidance, which provides physical and mental support. However, this does not challenge monotonous routines, which, when coupled with poor quality (i.e. unattractive content delivered in a command teaching style), results in children dropping out of after-school physical activity.

THE PLACE OF PHYSICAL EDUCATION

Modern physical education needs to be placed in a wider, holistic educational perspective. It should be 'flexible' in combining the best practices of the past with the best practice and initiatives of the present (though, created on firm foundations) and, it needs to prepare students for the life's challenges ahead in dynamically changing social and cultural conditions. Such education should be placed within a proper socio-educational context allowing for specific historical conditions and should play a crucial role in promoting one's independence in gaining knowledge and skills and ensuring a proper context for attaining values of social co-existence and co-operation.

For both the present and the future, there is a need to consider what education is and what it is for and the place of PE in it in a world that is „confusing, complicated and rapidly changing" (Claxton, 2002, p.46). There is also a need to encourage thinking about physical education in new ways, for which there are a number of fundamental questions, for example:

- How can physical education better serve the needs of pupils and society in a dynamic, ever changing world?
- What should we be teaching in physical education?
- How can teachers structure class experiences in a more effective format?
- What changes need to be made in schools and wider community settings and professional preparation programmes?
- What new challenges might we face in the future?

In the future, civilization, technology and employment opportunities will require skills as well as qualifications that today some may not even think of. Preparation for this must come through education. The educated person is the one „who has learned how to learn; ...how to adapt to change; ...has realized that no knowledge is secure, that only the process of seeking knowledge gives a basis for security"

(Rogers, 1983, p.120). Education is about developing values and character within learners (Claxton, 2002). It is not limited to the acquisition of measurable behaviours, understanding and knowledge reduced to implied components of competences and educators being turned into technicians (Pring, 1995). We should want young people to become „successful learners, confident individuals and responsible citizens" and enter adulthood as „confident and capable individuals" (QCA, 2007); „...pupils who are effective learners have the skills to learn on their own ...and work independently" (DfES, 2004, p.i.); they actively engage „in their learning (and) so make their own meaning" (DfES, 2004, p.ii). A good learner is about the whole person embracing skills and strategies as well as attitudes, values, self-image and relationships.

Therefore, the way in which pupils are taught in schools now needs to change with the times as many young people currently are lacking in positive attitude and social skills (flexibility, adaptability, inter-changeability of skills, punctuality, responsibility, own initiative, creativity as well as citizenship, self-management or communication skills) required in modern society. To respond to the changing environment, children need to learn elementary universal skills rather than detailed knowledge and they need to develop aptitudes enabling them to create those skills throughout their whole life span. Transferable skills are required to address different problems in different contexts at different times in their lives. Simultaneously, it is also important that all children should be able to take part in physical activity organized in school and out of school-based settings that foster fun and enjoyment, without promoting embarrassment, eroding confidence and self-esteem etc. related to their lack of technical ability. Thus, links between school and wider community are important in preparing young people for the challenges of the 'knowledge economy' and for coping with a world of growing complexity and rapid change.

CONCLUDING COMMENTS

Essentially, competencies are 'can do' statements. The world is full of people with sets of competencies, but how many of them are actually competent? What is useful sometimes obscures what is valuable. Intrinsic values are often overlooked. In our domain, i.e. Education, emphasis should perhaps be more on shaping attitudes and encouraging positive active healthy lifestyle behaviours. Changes in attitudes and behaviours should of course emanate from development of knowledge, skills and understanding in the form of accumulatively acquired competencies. These competencies, which are appropriately adjustable and over time adjusted, are derived from experiences provided by high quality teaching, defined by informed reflective practice attuned to ideals and values fostering true learning experiences in a dynamically changing world, and high quality physical education programmes in which learning is incremental.

If physical education is to sustain its presence both in formal and informal educational and socio-cultural settings, and continue to have a positive role as an instrument of socialisation, then practitioners should respond to the needs of optimally developing individuals' capabilities and provide opportunities for personal fulfilment and social interactions, essential in human co-existence. With the knowledge that educational experiences have a propensity to facilitate and help enhancement of life-span welfare and well-being, physical education should be focally involved with the process of personal fulfilment in the future. It is worth remembering, however, that it is not the activity, but the reason for taking part that sustains participation. Echoing the words of the Conference of Ministers for Culture (KMK) (1966) and the then German Sport Confederation (DSB, 1966), physical education's role in fostering such 'partaking' should be regarded „as an essential element of education" and as „indispensable for the upbringing and education of people". I would add that its role embraces the often overlooked intrinsic value of the 'sheer joy of participation in physical/sporting activity', a significant shaping influence on positive attitudes and behaviours!

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Pregledni rad

ŠKOLSKI ŠPORT U HRVATSKOJ I ZEMLJAMA EUROPSKE UNIJE

UVOD

Radi zadovoljavanja različitih potreba i interesa učenika, u školama se organiziraju izvannastavne aktivnosti. Jedna od izvannastavnih aktivnosti učenika je i šport te sukladno tome školski šport podrazumijeva športske aktivnosti učenika koje se odvijaju izvan nastave, a u sklopu škole, odnosno školskog športskog društva.

Zakon o športu (NN 71/06) propisao je kako radi provođenja izvannastavnih športskih aktivnosti učenika, školski odbori u osnovnim i srednjim školama osnivaju školska športska društva bez pravne osobnosti. Pored toga, isti zakon je propisao kako školska športska društva za svoj rad i aktivnosti koriste prostore škole te kako imaju prioritet u njihovom korištenju. Poseban status školskih športskih društava propisan je člankom 5. Zakona o športu koji govori kako sustav športa u Republici Hrvatskoj čine fizičke osobe, pravne osobe te školska športska društva bez pravne osobnosti.

Iz navedenih zakonskih propisa vidljivo je kako školska športska društva predstavljaju temeljnu organizacijsku jedinicu školskog športa u Republici Hrvatskoj te kako se školskim športom smatraju samo one izvannastavne športske aktivnosti učenika koje se provode u sklopu školskog športskog društva. Unutar školskog športskog društva postoje razne športske sekcije u kojima učenici treniraju izabrani šport ili športove te u sklopu kojih nastupaju na školskim športskim natjecanjima

Međunarodna školska športska federacija / International School Sport Federation (ISF) definira školski šport kao bilo kakvu športsku aktivnost koja se odvija u školama i koja je organizirana i odobrena od školskih vlasti. (International School Sport Federation, ISF, 2006) Pored toga, ISF kao ciljeve školskog športa navodi tjelesni, intelektualni, moralni, socijalni i kulturni razvoj svih učenika pod uvjetom da sve organizirane športske aktivnosti poštuju odgojne i obrazovne ciljeve.

Pod pojmom školski šport i u Hrvatskoj i u svijetu podrazumijevaju se gotovo identične aktivnosti s istim ili sličnim ciljevima i zadaćama. Bavljenje športom, posebno u današnje doba velike informatizacije, postaje najvažniji čimbenik zdravog

načina življenja, odnosno zdravog i cjelokupnog razvoja svake osobe, što je posebno istaknuto kod mladih osoba. Stoga je uloga školskog športa, zadovoljavanje nekih od osnovnih ljudskih potreba putem športa unutar odgojno obrazovnog sustava, izuzetno velika. (Milanović i sur., 2009)

Cilj je ovoga rada pregled sustava školskoga športa u Hrvatskoj i nekim europskim zemljama. Izabrane su zemlje za koje su nam u ovom trenutku podaci o školskom športu bili dostupni.

ISKUSTVA DRUGIH ZEMALJA

Međunarodna školska športska federacija

Međunarodna školska športska federacija (International School Sport Federation, ISF) osnovana je 4. lipnja 1972. godine u Luksemburgu, a danas ima 71 zemlju članicu s pet kontinenata te obuhvaća gotovo 500 milijuna djece. Vrhovno tijelo ISF-a je Generalna skupština koju čine predstavnici svih punopravnih zemalja članica. Pored Generalne skupštine postoje Izvršni odbor i Tehnička komisija, te Predsjednik i Glavni tajnik. (ISF, 2006)

ISF organizira svjetska školska prvenstva u 12 športova, a prvenstva se organiziraju svake dvije godine. U parnim godinama održavaju se prvenstva u: rukometu, odbojci, stolnom tenisu, badmintonu, krosu i skijanju. U neparnim godinama održavaju se prvenstva u: nogometu, košarci, tenisu, plivanju, atletici i orijentacijskom trčanju. Svake četiri godine održavaju se Gimnazijade koje uključuju individualna natjecanja u atletici, plivanju i gimnastici. Specifičnost Gimnazijade je da se natjecatelji biraju na nacionalnoj razini i ne moraju nužno biti iz iste škole. Gimnazijade se održavaju od 1974. godine, a na njima nastupa oko 3.000 sudionika te predstavljaju najveći školski športski događaj na svijetu. Sljedeća Gimnazijada, kao najveći događaja ISF-a, organizirat će se u Puerto Rico 2013. godine, a iduće, 2012. godine na rasporedu su svjetska školska prvenstva u sljedećim športovima: skijanje (Italija), stolni tenis (Italija), rukomet (Hrvatska), badminton (Portugal), kros (Malta), odbojka (Francuska). Pravo nastupa na Svjetskim školskim prvenstvima imaju školske ekipe koje moraju biti sastavljene od učenika iz iste škole te učenici u dobi od 15 do 17 godina. (http://www.isfsports.org)

Svjetsko školsko prvenstvo u rukometu 2012. godine održat će se u Hrvatskoj, u Varaždinskoj županiji te će to biti drugo Svjetsko školsko prvenstvo organizirano u Hrvatskoj. U Poreču je 2006. godine održano Svjetsko školsko odbojkaško prvenstvo. Svjetsko školsko rukometno prvenstvo spada među najmasovnija Svjetska školska prvenstva te okuplja 48 rukometnih ekipa, odnosno preko 900 sudionika.

Školski šport u Engleskoj

U Engleskoj se od 2002. godine provodi nekoliko nacionalnih programa s ciljem razvoja i povećanja uključenosti školske djece u nastavu tjelesne i zdravstvene kulture i školski šport pod zajedničkim nazivom „The national PE, School Sport and Club Links strategy". (Department for Education and Skills, DfES), Department for Culture, Media and Sport, DCMS, 2005) Jedan od programa je i „School Sport Partnership Programme" u koji je uključeno više od 21.000 osnovnih škola u Engleskoj. Kao rezultat provedbe tog programa svake godine analiziraju se različiti pokazatelji školskoga športa u Engleskoj te je objavljeno više dokumenata pod nazivom „School Sport Survay". (Department for children, schools and families, DCSF, 2007)

Prije pokretanja programa „School Sport Partnership Programme" u Engleskoj je svega oko 25% školske djece bilo uključeno u nastavu tjelesne i zdravstvene kulture i školski šport. U školskoj 2003/2004. godini program je obuhvaćao 8.105 škola i uključenost školske djece u nastavu tjelesne i zdravstvene kulture (2 sata tjedno) i dodatni sat školskoga športa u tim školama iznosila je 62% učenika. U školskoj godini 2006/2007. u program je bilo uključeno 21.745 škola i u program je bilo uključeno 86% učenika čime je dostignut strateški cilj o uključivanju 85% učenika u nastavu tjelesne i zdravstvene kulture i školski šport. U školskoj godini 2006/2007, najpopularniji školski šport u Engleskoj je bio nogomet. U čak 98% škola postojala je nogometna sekcija. Slijede atletika sa sekcijama u 92% škola te kriket sa sekcijama u 89% škola. U međurazrednim školskim športskim natjecanjima, sudjelovalo je čak 71% svih učenika, a 37% učenika je sudjelovalo na međuškolskim športskim natjecanjima. Škole u Engleskoj nude prosječno čak 16 različitih športskih sekcija, a svaka škola u prosjeku ima ostvarenu suradnju sa 6 različitih športskih klubova. (DCSF, 2007)

Školski šport u Izraelu

U sustavu školskih športskih natjecanja u Izraelu prisutni su sljedeći sportovi: košarka, rukomet, odbojka, nogomet, mali nogomet, atletika, kros, stolni tenis i odbojka na pijesku. Natjecateljske kategorije su im 5. i 6. razredi, zatim 7. i 8. razredi, 9. razredi te 10. do 12. razreda. Većina profesora TZK priprema svoje školske ekipe za natjecanja volonterski – samo nekolicina njih dobiva naknadu, ukoliko uspiju uvjeriti ravnatelja škole u njihovu važnost. Školski športski klubovi ustrojeni su na volonterskoj bazi, a treninge imaju u popodnevnim satima. Svaki školski športski klub mora imati jednu mušku i jednu žensku natjecateljsku sekciju te najmanje dvije amaterske sekcije, odnosno sekcije koje se ne natječu. Svaka natjecateljska grupa mora imati minimalno dva sata treninga i jednu utakmicu tjedno. U Izraelu postoji oko 3.500 škola, a samo u njih 280 postoji školski športski klub. (ISF, 2002)

Školski šport u Danskoj

Danski školski športski savez osnovan je 1946. godine, a danas savez ima 16 regionalnih školskih športskih saveza te 9 zaposlenika. Glavni cilj Saveza je promovirati školski šport kao način zdravog života. Pored niza aktivnosti u koje su uključene brojne škole, jednom godišnje organiziraju Nacionalna školska prvenstva u nogometu, rukometu, košarci, odbojci i atletici. Međutim najuspješniji projekt im je „Dan tjelesnog vježbanja za sve škole" tijekom kojeg je preko 700.000 učenika uključeno cijeli dan u određene športske aktivnosti. Danski školski športski savez organizira edukacije za športske trenere, izdaje svoj vlastiti časopis te izdaje brojne različite edukacijske materijale. (ISF, 2005)

Školski šport u Bugarskoj

Prema podacima iz publikacije ISF-a „Open Door", u Bugarskoj je za školski šport nadležna „Državna agencija za mlade i sport". Pored mnogih projekata kojima promoviraju i organiziraju školski šport, zanimljivo je istaknuti projekt „Školske športske igre". Školske športske igre održavaju se jednom godišnje, postoje 4 razine natjecanja, a održavaju se u 9 športova koji su dio nacionalnog edukacijskog kurikuluma tjelesne i zdravstvene kulture. (ISF, 2006a)

ŠKOLSKI ŠPORT U HRVATSKOJ

Hrvatski školski športski savez

Temeljem Zakona o športu, krajem 2006. godine osnovan je Hrvatski školski športski savez i od 2007. godine cjelokupni školski šport u Hrvatskoj odvija se pod ingerencijom Hrvatskog školskog športskog saveza.

Hrvatski školski športski savez (HŠŠS) je nacionalni školski športski savez u koji se udružuju županijski školski športski savezi i Školski športski savez Grada Zagreba, a radi usklađivanja aktivnosti svojih članica i organiziranja natjecanja školskih športskih društava. (Zakon o športu, čl. 57) HŠŠS je osnovan u svrhu razvoja školskog športa u Hrvatskoj. Zadaće HŠŠS-a su: poticanje i promicanje školskog športa u Hrvatskoj, usklađivanje aktivnosti školskih športskih društava u županijama i gradu Zagrebu i organizacija natjecanja školskih športskih društava. (HŠŠS, 2010) Dvije su glavne programske aktivnosti HŠŠS-a, koje ujedno predstavljaju i okosnicu školskog športa u Hrvatskoj, a to su: Državno prvenstvo školskih športskih društava Republike Hrvatske i djelovanje univerzalnih športskih škola.

Državno prvenstvo školskih športskih društava Republike Hrvatske

Kako je glavna zakonska obaveza HŠŠS-a organizirati natjecanja školskih športskih društava, glavna programska zadaća HŠŠS-a je organizacija jedinog službenog natjecanja školskih športskih društava – Državnog prvenstva školskih športskih društava Republike Hrvatske (Državno prvenstvo). U školskoj godini 2010/2011., HŠŠS organizira Državno prvenstvo u 11 športova za učenike osnovnih škola te 8 športova za učenike srednjih škola. (tablica 1)

Tablica 1. *Popis športova na Državnom prvenstvu školskih športskih društava Republike Hrvatske (Hrvatski školski športski savez, 2011.)*

Osnovne škole		**Srednje škole**	
dječaci	**djevojčice**	**mladići**	**Djevojke**
Mali nogomet		Mali nogomet	
Rukomet	Rukomet	Rukomet	Rukomet
Košarka	Košarka	Košarka	Košarka
Odbojka	Odbojka	Odbojka	Odbojka
Atletika	Atletika	Atletika	Atletika
Gimnastika	Gimnastika	Stolni tenis	Stolni tenis
Plivanje	Plivanje	Badminton	Badminton
Stolni tenis	Stolni tenis	Kros	Kros
Badminton	Badminton		
Šah	Šah		
Kros	Kros		

Državno prvenstvo sastoji se od nekoliko razina natjecanja: a) općinska i gradska natjecanja – natjecanja na razini gradova ili općina koja se, ovisno o broju prijavljenih ekipa, organiziraju za one športove za koje vlada veći interes, kup ili liga sustavom te sukladno tome i broj natjecateljskih dana varira od jednog do desetak dana, b) županijska natjecanja – natjecanja na razini županija koja se organiziraju u svim športovima Državnog prvenstva, a sustav natjecanja i broj natjecateljskih dana ovisi od županije do županije, odnosno, opet od broj prijavljenih ekipa na razini županije – natjecanja se održavaju u ingerenciji županijskih školskih športskih saveza c) poluzavršna natjecanja – natjecanja se održavaju u 6 regionalnih skupina (5 skupina po 4 županije, plus Grad Zagreb kao šesta skupina), a nastupaju isključivo pobjednici županijskih natjecanja – natjecanja se održavaju u ingerenciji HŠŠS-a i d) završnica Državnog prvenstva – finalna natjecanja Državnog prvenstva na kojoj nastupaju samo pobjednici poluzavršnih natjecanja - natjecanja se održavaju u ingerenciji HŠŠS-a.

U školskoj godini 2008/2009., na županijskim natjecanjima Državnog prvenstva nastupalo je čak 9.751 ekipa, odnosno 87.790 učenika. (tablica 2)

Tablica 2. *Broj učenika i ekipa uključenih u natjecanja školskih športskih društava na županijskoj razini u školskoj godini 2008/2009., po športovima (Hrvatski školski športski savez, 2009)*

sport		ukupno OŠ (m+ž)		ukupno SŠ (m+ž)		ukupno OŠ i SŠ (m+ž)		
		ekipa na natjecanju	broj učenika	ekipa na natjecanju	broj učenika	ekipa na natjecanju	broj učenika	broj učenika %
1	Rukomet	722	8.711	403	4.853	1.125	13.564	15,45%
2	Nogomet	732	8.662	321	3.956	1.053	12.618	14,37%
3	Košarka	621	7.309	397	4.834	1.018	12.143	13,83%
4	Odbojka	603	7.033	411	5.068	1.014	12.101	13,78%
5	Atletika	453	5.293	294	3.468	747	8.761	9,98%
6	Kros	555	3.855	365	1.616	920	5.471	6,23%
7	Stolni tenis	636	2.031	352	1.108	988	3.139	3,58%
8	Plivanje	234	1.913			234	1.913	2,18%
9	Šah	339	1.388			339	1.388	1,58%
10	Badminton	148	464	119	373	267	837	0,95%
11	Tenis	262	802			262	802	0,91%
12	Streljaštvo	181	575			181	575	0,65%
13	Gimnastika	124	616			124	616	0,70%
	ostali sportovi	276	2.167	198	1.530	474	3.697	4,21%
	od 4. do 6. raz	1.005	10.165			1.005	10.165	11,58%
ukupno:		6.891	60.984	2.860	26.806	9.751	87.790	100,00%

Prema podacima iz Godišnjaka HŠŠS-a za školsku godinu 2009/2010., na 214 poluzavršnih natjecanja Državnog prvenstva za školsku godinu 2009/2010. nastupalo je 782 ekipe, odnosno 6.354 učenika, a na Završnici Državnog prvenstva 214 ekipa, odnosno 1.685 učenika.

Temeljem svega navedenog možemo zaključiti kako je Državno prvenstvo najveće i najmasovnije športsko natjecanje u Hrvatskoj koje na svim razinama okuplja gotovo 100.000 učenika.

Univerzalna športska škola

Univerzalna športska škola namijenjena je djeci od šeste do desete godine života, tj. učenicima od prvoga do četvrtoga razreda osnovne škole. Program nije usmjeren na treniranje športova i natjecanje već na poticanje optimalnoga razvoja motoričkih potencijala djece u dobi od šest do deset godina. Cilj programa univerzalne športske škole uključivanje je što većeg broja najmlađih učenika u športske i tjelovježbene aktivnosti, odnosno stvaranje navika svakodnevnoga tjelesnog vježbanja kod najmlađih učenika. Učenici pod stručnim nadzorom kineziologa, igrajući se na zanimljiv i za njihovu dob pedagoški i kineziološki primjeren način, uče osnovne oblike kretanja, kao i osnovne elemente brojnih športova. Program se održava tijekom cijele školske godine 2 puta tjedno po 45 minuta, a pohađanje programa je za sve učenike potpuno besplatan. Ako se uzme u obzir broj potrošenih sredstava i broj uključenih učenika, dolazi se do podatka kako program univerzalne športske škole po jednom učeniku, godišnje košta samo 336,69 kuna (za odrađenih oko 65 školskih sati).

Program Univerzalne športske škole pokrenut je u školskoj godini 2007/2008. u 155 osnovnih škola u svim hrvatskim županijama i Gradu Zagrebu, a danas se održava kroz 287 odjeljenja u 245 osnovnih škola. Tijekom 2010. godine ukupno je odrađeno čak 17.805 školskih sati programa Univerzalne športske škole.

Tablica 3. *Broj odjeljenja, broj škola i broj djece u programu Univerzalne športske škole od školske godine 2007./2008. do danas*

školska godina	broj odjeljenja	broj škola	broj djece
2007/2008	157	155	3.588
2008/2009	209	202	4.645
2009/2010	283	258	6.228
2010/2011	287	245	6.350

Upravo Univerzalna športska škola može u budućnosti predstavljati temelj cjelokupnog športa u Hrvatskoj na način da postavlja temelje za stvaranje budućih vrhunskih športaša jer upravo stjecanje većeg broja motoričkih znanja u ranijim fazama športskog razvoja iz raznih športskih grana omogućuje uspješniju športsku specijalizaciju kasnije.

Uključenost učenika u školski šport

Kao što je vidljivo iz prethodno spomenutih podataka, u Državno prvenstvo i Univerzalnu športsku školu uključeno je oko 105.000 učenika. Pored toga još svakako

treba dodati određen broj učenika koji je aktivan na međurazrednim natjecanjima, odnosno koji su uključeni u školske športske aktivnosti na razini škole, ali zbog velike konkurencije ne nastupaju na službenim školskim natjecanjima.

U prikazanim podacima (tablica 4) možemo uočiti da je na području cijele Republike Hrvatske u treninge i natjecanja školskih športskih društava u osnovnim školama uključeno nešto više od 22% djece, odnosno nešto više od 21% učenika srednjih škola.

Tablica 4. *Uključenost učenika 1. - 4. razreda, 5. - 8. razreda, 1. - 8. razreda osnovnih škola i 1. - 4. razred srednjih škola u školski šport*

	Postotak učenika uključenih u ŠŠD	ŠŠD/m	ŠŠD/ž	Ukupno (m) / ŠŠD (m)	Ukupno (ž) / ŠŠD (ž)
OSNOVNA ŠKOLA 1. – 4. RAZRED	11,60%	61,11%	38,89%	13,73%	9,33%
OSNOVNA ŠKOLA 5. – 8. RAZRED	32,06%	60,32%	39,68%	37,21%	26,49%
OSNOVNA ŠKOLA 1. – 8. RAZRED	22,07%	61,06%	38,94%	26,08%	17,79%
SREDNJA ŠKOLA 1. – 4. RAZRED	21,27%	59,61%	40,39%	25,13%	17,34%

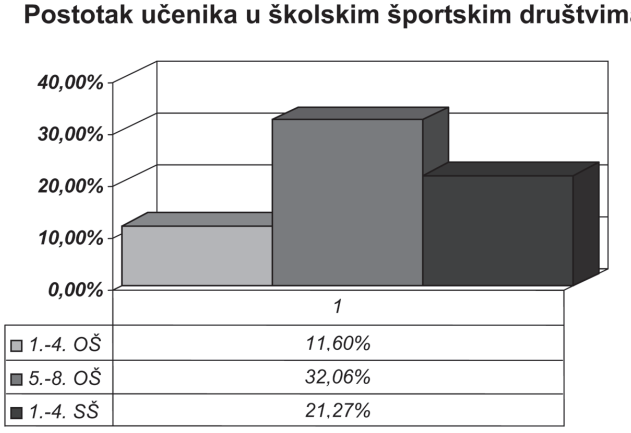
Legenda: ŠŠD/m – postotak dječaka uključenih u rad školskih športskih društava; ŠŠD/ž – postotak djevojčica uključenih u rad školskih športskih društava; UKUPNO (m)/ŠŠD(m) – postotak dječaka uključenih u rad školskih športskih društava u odnosu na ukupan broj dječaka; UKUPNO(ž)/ŠŠD(ž) – postotak djevojčica uključenih u rad školskih športskih društava u odnosu na ukupan broj djevojčica.

Od broja uključenih učenika u rad školskih športskih društava čak oko 61% otpada na dječake, dok je svega oko 39% djevojčica u osnovnoj školi što predstavlja značajnu razliku. Slična je situacija i u srednjim školama. Navedeno nam svjedoči o znatno manjem broju djevojčica uključenih u sustav školskoga športa u osnovnoj i srednjoj školi u odnosu na dječake.

Iz podataka u tablici 3 također je razvidno kako postoji značajna razlika u postotku učenika osnovnih škola uključenih u sustav školskoga športa između učenika mlađe školske dobi (od prvoga do četvrtoga razreda) i učenika koji pohađaju više razrede osnovne škole (od petoga do osmoga razreda). Potrebno je učiniti dodatne organizacijske napore i posebno stimulirati uključivanje učenika nižih razreda u sustav školskoga športa.

Ukoliko se usporedi postotak od oko 32% učenika od petoga do osmoga razreda osnovne škole koji su uključeni u osnovnoškolska športska društva, zapaža se da se postotak učenika uključenih u srednjoškolska športska društva smanjen za oko 35%,

odnosno na svega 21% učenika (Prikaz 1), što je statistički značajno (p=0,0000). Također značajna razlika je između srednjoškolske i populacije mlađe školske dobi (1. do 4. razred) gdje je p=0,0000. Taj trend smanjenja broja učenika u srednjim školama uključenih u treninge i natjecanja školskih športskih društava nije prihvatljiv te, štoviše, zabrinjava.



Prikaz 1. *Usporedni prikaz uključenosti učenika u školska športska društva 1.-4. razred osnovnih škola, 5.-8. razred osnovnih škola i 1.-4. razred srednjih škola u Republici Hrvatskoj*

Školske športske dvorane i školska športska igrališta

Školske športske građevine čine materijalnu bazu za razvoj školskoga športa. One se u pravilu grade za potrebe izvođenja nastave tjelesne i zdravstvene kulture u skladu s uvjetima utvrđenim nastavnim planovima i programima te državnim pedagoškim standardima.

U pogledu uvjeta za održavanje aktivnosti školskoga športa, tj. razine izgrađenosti školskih športskih dvorana i vanjskih športskih igrališta u osnovnim školama, situacija je prikazana u tablici 5. Najveći dio osnovnih škola u Republici Hrvatskoj odnosno 70% ima vlastitu školsku športsku dvoranu, a 83% škola vanjsko školsko športsko igralište. U tom pogledu najbolja je situacija u Varaždinskoj županiji i gradu Zagrebu gdje svega 5% odnosno 7% osnovnih škola nema vlastitu dvoranu.

Tablica 5. *Izgrađenost školskih športskih dvorana i vanjskih igrališta u osnovnim školama* (podatci Ministarstva znanosti, obrazovanja i športa Republike Hrvatske, ožujak 2009., prema Milanović i sur., 2009.)*

Županija	Ukupan broj škola	Školska športska dvorana				Vanjska športska igrališta			
		Ima	%	Nema	%	Ima	%	Nema	%
Bjelovarsko-bilogorska	27	14	52%	13	48%	26	96%	1	4%
Brodsko-posavska	33	27	82%	6	18%	31	94%	2	6%
Dubrovačko-neretvanska	31	15	48%	16	52%	14	45%	17	55%
Istarska	48	27	56%	21	44%	36	75%	12	25%
Karlovačka	29	16	55%	13	45%	26	90%	3	10%
Koprivničko-križevačka	25	13	52%	12	48%	23	92%	2	8%
Krapinsko-zagorska	33	24	73%	9	27%	32	97%	1	3%
Ličko-senjska	15	10	67%	5	33%	13	87%	2	13%
Međimurska	31	15	48%	16	52%	28	90%	3	10%
Osječko-baranjska	70	59	84%	11	16%	61	87%	9	13%
Požeško-slavonska	14	5	36%	9	64%	13	93%	1	7%
Primorsko-goranska	58	45	78%	13	22%	41	71%	17	29%
Sisačko-moslavačka	35	28	80%	7	20%	26	74%	9	26%
Splitsko-dalmatinska	92	47	51%	45	49%	72	78%	20	22%
Šibensko-kninska	21	13	62%	8	38%	16	76%	5	24%
Varaždinska	41	39	95%	2	5%	36	88%	5	12%
Virovitičko-podravska	17	12	71%	5	29%	15	88%	2	12%
Vukovarsko-srijemska	54	38	70%	16	30%	47	87%	7	13%
Zadarska	37	24	65%	13	35%	31	84%	6	16%
Zagrebačka	46	32	70%	14	30%	37	80%	9	20%
Grad Zagreb	117	106	93%	11	7%	98	85%	19	15%
REPUBLIKA HRVATSKA	**874**	**609**	**70%**	**265**	**30%**	**722**	**83%**	**152**	**17%**

* Bez područnih, glazbenih i plesnih škola i učeničkih domova

Ograničavajući čimbenik za daljnji razvoj školskog športa je 265 osnovnih škola ili njih čak 30% koji nemaj vlastitu školsku športsku dvoranu. Najlošija je situacija u Požeško-slavonskoj županiji gdje čak 64% odnosno devet osnovnih škola nema školsku športsku dvoranu. Slijede ju Dubrovačko-neretvanska i Međimurska županija u kojima 52% ili po 16 škola nema vlastitu dvoranu. Brojčano najgora situacija je u Splitsko-dalmatinskoj županiji gdje 45 osnovnih škola ili njih 49% nema školsku športsku dvoranu.

U pogledu vanjskih športskih igrališta situacija je znatno povoljnija. U cijeloj zemlji, 152 osnovne škole (17%) nema vanjsko športsko igralište. Potrebno je istaknuti Dubrovačko-neretvansku županiju u kojoj, osim što 52% škola nema izgrađenu školsku športsku dvoranu, čak 55% škola nema niti vanjsko športsko igralište.

Ovu sliku izgrađenosti školskih športskih građevina donekle ublažuje činjenica da dio škola koristi školske športske dvorane ili vanjska športska igrališta susjednih škola. Isto tako je činjenica da dio škola koristi i javne športske dvorane za potrebe nastave tjelesne i zdravstvene kulture odnosno školskog športa. Međutim, ostaje činjenica da znatan broj školskih športskih društava u osnovnim školama u Republici Hrvatskoj, nema osnovne materijalno-tehničke uvjete za razvoj školskoga športa.

Stanje izgrađenosti športskih građevina u srednjim školama prikazano je u tablici 6. Izvjesno je da je situacija lošija nego u osnovnim školama. Gotovo polovina srednjih škola u Republici Hrvatskoj, odnosno 176 srednjih škola ili 45%, nema vlastitu športsku dvoranu, 37 srednjih škola ili 9% koristi zajedničku dvoranu, dok 178 srednjih škola ili 46% ima vlastitu dvoranu. Najbolja situacija je u Ličko-senjskoj županiji gdje sve srednje škole imaju izgrađenu vlastitu športsku dvoranu. Najlošija situacija je u Dubrovačko-neretvanska gdje čak 79% srednjih škola nema športsku dvoranu, Slijede ju Istarska županija sa 71% i Međimurska županija sa 67% škola bez dvorana.

Što se vanjskih športskih igrališta tiče, situacija je još nepovoljnija. Čak 210 srednjih škola ili 54% u Republici Hrvatskoj nema izgrađena vanjska športska igrališta. Slično kao i kod osnovnih škola, nepovoljnu situaciju ublažava činjenica da neke srednje škole koriste športske dvorane i vanjska igrališta susjednih škola ili javne športske dvorane.

Tablica 6. *Izgrađenost školskih športskih dvorana i vanjskih igrališta u srednjim školama* (podaci Ministarstva znanosti, obrazovanja i športa Republike Hrvatske, ožujak 2009., prema Milanović i sur., 2009.)*

	Broj škola	Ima dvoranu	Nema dvoranu	Koristi zajedničku dvoranu	Ima igralište	Nema igralište	Koriste zajedničko igralište
Zagrebačka	14	11 (79%)	1 (7%)	2 (14%)	9 (64%)	5 (36%)	0 (0%)
Krapinsko-zagorska	9	5 (56%)	4 (44%)	0 (0%)	7 (78%)	2 (22%)	0 (0%)
Sisačko-moslavačka	13	7 (54%)	6 (46%)	0 (0%)	7 (54%)	6 (46%)	0 (0%)
Karlovačka	13	6 (46%)	7 (54%)	0 (0%)	9 (69%)	4 (31%)	0 (0%)
Varaždinska	15	8 (54%)	5 (33%)	2 (13%)	7 (47%)	6 (40%)	2 (13%)
Koprivničko-križevačka	8	4 (50%)	3 (37%)	1 (13%)	3 (38%)	5 (62%)	0 (0%)

Bjelovarsko-bilogorska	13	2 (15%)	8 (61%)	3 (24%)	4 (31%)	9 (69%)	0 (0%)
Primorsko-goranska	32	18 (56%)	12 (37%)	2 (7%)	16 (50%)	16 (50%)	0 (0%)
Ličko-senjska	5	5 (100%)	0	0 (0%)	2 (40%)	3 (60%)	0 (0%)
Virovitičko-podravska	8	4 (50%)	4 (50%)	0 (0%)	4 (50%)	4 (50%)	0 (0%)
Požeško-slavonska	7	2 (29%)	2 (29%)	3 (42%)	2 (29%)	2 (29%)	3 (42%)
Brodsko-posavska	11	6 (55%)	5 (45%)	0 (0%)	4 (36%)	7 (64%)	0 (0%)
Zadarska	20	9 (45%)	10 (50%)	1 (5%)	8 (40%)	10 (50%)	2 (10%)
Osječko-baranjska	29	12 (41%)	13 (45%)	4 (14%)	11 (38%)	18 (62%)	0 (0%)
Šibensko-kninska	12	4 (33%)	4 (33%)	4 (33%)	1 (8%)	11 (92%)	0 (0%)
Vukovarsko-srijemska	15	7 (47%)	5 (33%)	3 (20%)	9 (60%)	6 (40%)	0 (0%)
Splitsko-dalmatinska	46	12 (26%)	24 (52%)	10 (22%)	14 (31%)	26 (56%)	6 (13%)
Istarska	24	7 (29%)	17 (71%)	0 (0%)	9 (38%)	15 (62%)	0 (0%)
Dubrovačko-neretvanska	14	3 (21%)	11 (79%)	0 (0%)	4 (29%)	10 (71%)	0 (0%)
Međimurska	6	2 (33%)	4 (67%)	0 (0%)	2 (33%)	4 (67%)	0 (0%)
Grad Zagreb	77	44 (57%)	31 (40%)	2 (3%)	35 (46%)	41 (53%)	1 (1%)
	391	178 (46%)	176 (45%)	37 (9%)	167 (43%)	210 (54%)	14 (3%)

*Bez glazbenih i plesnih škola i učeničkih domova

Najveći broj osnovnih i srednjih škola, njih 80%, u provedenoj anketi izjasnilo se da uglavnom koristi dvorane, do 80% od ukupnog vremena, za potrebe provođenja redovite nastave tjelesne i zdravstvene kulture i izvannastavne športske aktivnosti, odnosno za rad školskih športskih društava.

Navedeni podaci o stanju školske športske infrastrukture ukazuju na nepovoljnu situaciju za daljnji razvoj školskoga športa. Opće stanje izgrađenosti i opremljenosti školskih športskih objekata u Republici Hrvatskoj nije na zadovoljavajućoj razini. Iako je situacija u proteklih nekoliko godina poboljšana, ipak je, u situaciji kada znatan postotak škola za nastavu tjelesne i zdravstvene kulture koristi prostore poput školskih hodnika, adaptiranih učionica ili iznajmljuje dvorane, odnosno kada su postojeći objekti u lošem stanju i loše održavani i bez osnovne športske opreme ili rekvizita, teško govoriti o perspektivi razvoja školskoga športa u tim sredinama. Bez još većega angažiranja svih dionika sustava u rješavanje problema materijalno-tehničke osnove, neće u potpunosti biti moguće ostvariti željeni razvoj školskoga športa.

Financiranje školskog športa

Školski šport se u Hrvatskoj, sukladno Zakonu o športu, gotovo u potpunosti financira iz Državnog proračuna, odnosno proračuna lokalnih uprava i samouprava. Na nacionalnoj razini, ukoliko promatramo izdvajanja iz Državnog proračuna, za školski šport se u ovom trenutku izdvaja gotovo 9 milijuna kuna, što predstavlja značajna sredstva.

Tablica 7. *Izdvajanja iz Državnog proračuna za školski šport u zadnjih 5 godina*

godina	Ukupno
2007.	13.522.115,00
2008.	15.628.923,80
2009.	13.517.285,57
2010.	8.626.329,39
2011.	8.409.508,00

Voditelji školskih športskih društava

Sukladno Zakonu o športu jedino osobe koje imaju odgovarajući stupanj obrazovanja na razini sveučilišnog studija i ispunjavaju uvjete za nastavnika, odnosno profesora tjelesne i zdravstvene kulture mogu raditi s učenicima u školskim športskim društvima.

Prema podacima iz Strategije razvoja školskog športa u RH 2009.-2014. u školskim športskim društvima osnovnih škola, samo je 41% voditelja bilo nastavnici tjelesne i zdravstvene kulture, dok je kod školskih športskih društava taj postotak bio nešto veći, odnosno 71% voditelja su bili nastavnici tjelesne i zdravstvene kulture. (Milanović i sur., 2009)

OTVORENA PITANJA I MOGUĆNOSTI RAZVOJA ŠKOLSKOGA ŠPORTA

Situacija u školskom športu u RH znatno se popravila u nekoliko proteklih godina, prije svega od osnivanja Hrvatskoga školskoga športskoga saveza, krajem 2006. godine. Međutim, podaci jasno govore da s postojećim stanjem ne možemo biti zadovoljni.

Jedan od najvećih problema školskoga športa jest nepostojanje sustavnih i organiziranih trenažnih aktivnosti unutar školskoga športskoga društva. U hrvatskom obrazovnom sustavu, za izvannastavne aktivnosti na području školskoga športskoga društva, predviđena su samo dva školska sata tjedno za nastavnike TZK u osnovnim

školama, dok u srednjim školama nije predviđen niti jedan sat za izvannastavne aktivnosti školskoga športskoga društva. Iz toga proizlazi problem organiziranja trenažnih aktivnosti, odnosno plaćanja ili honoriranja voditelja tih aktivnosti unutar školskih športskih društava.

Zbog navedenih razloga, na školskim športskim natjecanjima, većinom nastupaju učenici koji su aktivno uključeni u rad i trenažne procese isključivo u športskim klubovima, a samo se natječu za ekipu svoje škole, odnosno školskoga športskoga društva. Ta činjenica dovodi do ključnoga pitanja, a to je definiranje školskoga športa, odnosno njegove uloge uopće. Je li cilj samo organizirati školska športska natjecanja za onu djecu koja se športom bave u klubovima ili treba onim učenicima koji inače nisu uključeni u rad športskih klubova omogućiti bavljenje športom u školama, pa tako i nastupanje u školskim športskim natjecanjima?

Ako u obzir uzmemo da u Republici Hrvatskoh djeluje nešto više od 1.200 školskih športskih društava, i u prosjeku svako školsko športsko društvo ima sekcije u 5 športova u muškoj i 5 športova u ženskoj konkurenciji. Dolazimo do brojke od 10 sekcija po školskom športskom društvu. Da svaka sekcija ima treninge samo dva puta tjedno, to je 20 sati treninga tjedno. Postavlja se pitanje da li, u prosjeku dva nastavnika TZK, u pojedinoj školi, mogu uz sve svoje obveze u nastavi TZK, odraditi još dodatnih 20 sati treninga tjedno za potrebe školskoga športskoga društva? A to onda dovodi do ili zapošljavanja novih kineziologa u školama zaduženih za školski šport kao i honoriranja rada vanjskih suradnika u školama.

Posebno su pitanje objekti i oprema za rad školskih športskih društava. Iz podataka je vidljivo kako 290 osnovnih škola i 200 srednjih škola nema školsku športsku dvoranu. Postojanje školske športske dvorane glavni je preduvjet za postojanjem školskoga športa uopće.

U cilju daljnjeg razvoja školskoga športa u Republici Hrvatskoj potrebno je jasno definirati ciljeve i zadaće školskoga športa, omogućiti učenicima sustavan i organiziran trenažni proces unutar školskoga športskoga društva, propisati mjere koje će stručnim kadrovima omogućiti zapošljavanje, ili stalno ili honorarno, u sustavu školskoga športa kao i osigurati dovoljno financijskih sredstava za angažiranje novih stručnih kadrova, unaprijediti sustav natjecanja školskih športskih društava, izgraditi školske športske dvorane u svim onim školama koje nemaju svoju školsku športsku dvoranu te obnoviti školske športske dvorane koje nisu dovoljno kvalitetne te kvalitetnije riješiti pitanje financiranja školskih športskih društava, odnosno školskih športskih saveza.

ZAKLJUČAK

Iz navedenog vidljivo je kako ne postoje značajne razlike u organizaciji i sustavu školskog športa u Hrvatskoj i zemljama Europske unije. Vidljivo je kako su u Danskoj, Bugarskoj i Izraelu školski šport i školska športska natjecanja organizirana na gotovo identičan način kao u Hrvatskoj. Školska športska natjecanja se organiziraju na nekoliko regionalnih razina i to u onim športovima koji se nalaze u kurikulumu TZK, odnosno u najpopularnijim športovima. Zanimljivo je istaknuti kako Izraelci imaju propisanu obavezu minimalnih sati treninga tjedno u svakoj školskoj športskoj sekciji kako bi se uopće mogli natjecati. Sustav školskog športa u Engleskoj u određenoj mjeri je izuetak od navedenih zemalja. U posljednjem desetljeću učinjeni su značajni iskoraci, doneseni su strategija i program razvoja školskog športa te utrošena su značajna financijska sredstva što je rezultiralo procvatom školskog športa. Jedna od zanimljivosti Engleskog sustava je izuzetno veliki broj učenika uključenih u međurazredna školska športska natjecanja, što im predstavlja temelj školskog športa. Isto tako, u Engleskoj ne bježe od suradnje škola sa športskim klubovima, naprotiv potiču ju te tako svaka škola ima suradnju s, prosječno, 6 športskih klubova.

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Sekcija
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Original scientific paper

PHYSICAL ACTIVITY, PHYSICAL FITNESS AND HEALTH AMONG PRESCHOOL AGE CHILDREN IN LITHUANIA

INTRODUCTION

About 30% of six-year-old children in Lithuania are immature for school, fitness of the first-graders is low, dynamics of working capacity is unfavourable, different problems are very frequent among preschool age children and those in primary grades (Armonienė, 1997; Dilienė, 1999; Dailidienė et al., 2000; Birontienė, 2005; Juškelienė, 2008). Review of literature leads to the conclusion that only some components of children's physical condition and peculiarities in the development of physical activity have been analyzed so far (Blair et al., 2001; Dregval et al., 2008). Most of these works are methodological recommendations for pedagogues in preschool institutions (Šumskas et al., 2006; Malina et al., 2004; Šarkauskienė et al., 2008; Volbekienė et al., 2007). Therefore, we focused the research on the physical activity among preschool age children and attempted to reveal links between physical activity, physical fitness and health.

The aim of the research was to perform the analysis of physical activity among children of preschool age (5-6-year-old), its links with health state and physical fitness.

The tasks of the research:

1. Examine size and intensity of physical activity among 5-6-year-old children.
2. Define impact of physical activity upon physical fitness and health state.

Methods of the research: identification of the size and intensity of physical activity, health state, modified Eurofit tests, pedagogical experiment, questionnaire completed by children, their parents and tutors, mathematical statistics.

Organization of the research

The sample consisted of 127 children aged 4-5 who participated in the research. Experimental groups consisted of 35 boys and 46 girls, control groups – of 24 boys and 22 girls. First experimental (E_1) group was working according to our programme of physical activity and health improvement, which included conditions, stimulating

physical activity of children and satisfying each child's demand for movement. Physical activity was to be developed, but not impeded or forbidden. Children in E_2 group, unlike those in E_1 group, were provided with conditions for free-chosen type of activity. Control group (C) was working according to „Vėrinėlis" (Chaplet) programme, approved by the Ministry of Education and Science, which prescribes no organized forms of children's physical education. Pedagogues are free to choose when and how to educate children.

Three diagnostic researches were performed: in the medium group at the beginning of the school year and in the senior group at the beginning and at the end of the school year. We defined physical fitness of children by tests, evaluating agility, flexibility, power, precision and coordination of motions. For that purpose we employed modified Eurofit tests.

We analyzed the following parameters of physical activity: amount, intensity and content. We evaluated amount and intensity according to duration of motions and quantity of performed motions, whereas content was evaluated according to monitoring protocol and timing.

Health evaluation

We recorded childhood diseases and their time (when, how long), identified neurotic troubles, estimated impact of physical activity upon state and sleep. *Questionnaire completed by children, their parents and tutors* was introduced, which included questions about health state, physical activity, interest in physical activity, living conditions, education.

RESULTS OF THE RESEARCH

Results of 1st, 2nd and 3rd research stages showed how ***physical fitness*** of children in the experimental and control groups was changing. Physical fitness of children in all three groups improved in their 5th and 6th year. Improvement of agility and flexibility was insignificant, whereas indicators of power, motion precision and coordination improved considerably. A significant improvement of results in long throw with both left and right hands was discovered. They show that 6-year-old boys in E_1 group, compared to 5-year-olds, threw a 200 g sand-bag with their right hand 47.0 cm ($p<0.05$) further and 35.3 cm ($p<0.05$) further with their left hand. Greater positive changes were discovered also among indicators of long throw results in E_2 group. Boys and girls in all groups managed to throw the sand-bag considerably further with their right hand than their left hand. Children master right hand throwing motions easier than left hand motions. Though possessing a certain amount of power, they are not able to employ it in the process of motion performance. Results of the test

in a bound forward, sit and reach, 3 x 5 shuttle run and throw into vertical target also increased. Results of all these tests were better in E_1 group, compared to those in E_2 group and much better than in C group. It shows that physical fitness of children in E_1 group was better compared to that of children in E_2 and C groups. Children in E_1 group were very active and willingly participated in exercises of physical training. Besides, they were provided with conditions for satisfaction of motion demands; educators were developing their physical activity. It was not impeded or forbidden. Physical activity was planned and organized systematically and purposefully. Children in E_2 group were also provided with favourable conditions for physical activity and they could come to athletic fields at any time to exercise and play, however, organized classes in physical training were not exercised. Pedagogues were encouraging them to exercise, though it was done indirectly. Attention was basically focused on individual non-regulated physical activity, allowing children to choose spheres of activity and intensity of motions. Physical load was episodic.

It was found that ***physical activity*** of children attending preschool institutions made only 24.3% of daily wakeful time, though standard amount of physical activity has to be around 50 % of this time.

Average number of motions, performed each day by 5-year-old children in group E_1, was 16,049: girls – 14,041, boys – 18,057. Children in E_2 group performed daily about 14,992 motions: girls – 12,502, boys – 17,483. On the average, children in the control group were performing 11,618 motions: girls – 9,598, boys – 13,639. Physical activity of children in their sixth year increased in all groups, though greater positive changes were discovered in experimental groups, compared to those in the control group. Received data about physical activity show that physical activity of boys in E_1 group increased on the average by 12.1%. Increase of physical activity of children in the control group was smaller, compared to that of 5-year-old children and made 5.7% among boys and 5.1% among girls.

Table 1. *Level of basic indicators of physical activity of 5-6 year old children*

Year	Indicators of physical activity	Level of indicators (number of motions, minutes, number/per minute)		
		low	medium	high
5	amount	5024-6439	6440-8331	8332-11048
	duration	55-70	71-92	59.0-76.2
	intensity	29.2-49.0	48-58.0	59-76.2
6	amount	5326-7520	7521-9632	9633-12461
	duration	67-82	83-105	106-136
	intensity	30.2-50.0	51.0-65.0	66.0-90.0

Boys were more active than girls. However, when analyzing individual data about physical activity of children, it emerged that some girls were much more active than boys.

Table 2. *Distribution according to levels of physical activity*

(in the final stage of research)

Levels of physical activity	Groups		
	E1	E2	C
Low	1.0%	13.4%	35.2%
Medium	64.5%	79.9%	58.5%
High	34.5%	6.7%	6.3%

It was discovered that both boys and girls were more active in the first part of a day (a.m.). For example, girls in E1 group performed on the average 9,059 motions in the morning, boys – 13,487 motions, whereas in the afternoon that number was smaller (4,402 among girls and 5,150 among boys). Therefore, children were more active in the first half of the day. We also discovered that motion activity increased about 35% each time the number of children in groups decreased (no more than 12). It can be easily explained. Micro-climate in groups becomes better, there is enough space for children to move, it is much easier for the educator to achieve better quality of physical activity: motion diversity, intensity, etc.

Seasonal differences in physical activity of children were also identified. Physical activity of both 5 – 6-year-old boys and girls in spring – summer period appeared to be higher, compared to that of autumn – winter period. It is necessary to pay attention to the fact, when creating pedagogical conditions for physical activity of children.

Among basic indicators, identifying optimal motion mode, there were ***individual differences*** (amount and intensity) of physical activity among 5 – 6-year-old children throughout entire day. Actual individual data about physical activity throughout entire day and across seasons were following: among 5-year-old children – from 11,618 to 16,049 motions, among 6-year-old children – from 12,294 to 18,470 motions.

Children's morbidity

Research data show that diseases among children in the control group in their sixth year of life were more frequent than among those from experimental groups ($p<0.05$). After comparison of children's morbidity with the data about physical activity, we noticed that the more frequently they were ill, the lower their physical activity was. In the period of research individual number of children's cases in E1 group varied from 1 to 3 times, in E2 group – from 1 to 4 times, in C group – from 1 to 8 times. Number of girls among those cases is larger, though sexual differences are statistically unreliable ($p<0.05$). Cases among children with lower level of physical activity were more frequent ($p< 0.005$). 1-3 cases or more were recorded among children of low physical activity (54.3%), whereas in groups of medium and high physical activity it made 26.2% and 18.3% accordingly.

Analysis of data showed that some 6-year-old children experienced different neurotic troubles. They were more frequent among children from the control group (31.2%), compared to those from experimental groups (15.3%) ($p<0.05$). Least complaining about neurotic problems were physically active children (2.3%). Half of the questioned children from the control group stated they were feeling badly at kindergarten and 31% of them experienced insomnia in the evening. In the experimental groups only 12% of children were complaining about these troubles.

We found that children's mood was changing positively after physical activity. It was typical among 84% of children (40% of boys and 44% of girls ($p<0.005$)). Our research revealed that 94% of children were sleeping sound throughout entire time of afternoon sleep after active movement in the first half of day. 83% of them were sleeping restfully. On the average, sleep of children with lower motion rate was 35 min shorter. We also came across children who did not want to sleep at all; 3.3% of them were children of low physical activity, 0.8% - of medium physical activity and 1.5% - of high physical activity. Thus, optimal motion mode stimulates healthy sleep.

CONCLUSIONS

1. Physical activity of preschool age children has an individual character. A properly arranged movement regime and activity and stimulating educational environment help to increase children's physical activity.
2. Education system makes impact on physical activity, physical fitness and health of those trained. Important role in this process belongs to pedagogues and family.
3. Children's physical activity, physical fitness and health are closely interrelated.

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ABSTRACT

The aim of the research was to make analysis of physical activity among children of preschool age (5 – 6 year old), its links with health state and physical fitness. Methods of the research: identification size and intensity of physical activity, modified Eurofit tests, health state, pedagogical experiment, questionnaire completed by children, their parents and tutors, mathematical statistics. 127 4-5-year-old children participated in the research. The pedagogical experiment was organized in Klaipeda kindergarten. It was found that physical activity of children accounted for only 24 % of their daily wakeful time. Average number of motions performed each day by 5- year-old children was about 16 thousand: girls – about 13 thousand, boys – about 18 thousand. After comparison of children's morbidity with the data about physical activity, we noticed that the more frequently they were ill, the lower their physical activity was. Analysis of data showed that some 6-year-old children experienced different neurotic troubles. Least complaining about neurotic problems were physically active children. Conclusion: Children's physical activity and health are closely interrelated.

Key words: *physical activity, physical fitness, health*

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UTJECAJ VJEŽBANJA NA BOLESTI DIŠNOG SUSTAVA

UVOD

Onečišćenje naše životne okoline jedan je od vrlo važnih rizičnih faktora u nastajanju respiratornih bolesti, posebno kronične opstrukcijske bolesti pluća i raka pluća. Od 1930.g. prati se učinak onečišćenog zraka na pojavu respiratornih simptoma.

Bolesti respiratornog sustava alergijska su oboljenja zbog kojeg djeca školskog uzrasta najčešće ostaju u bolnici. Procjenjuje se da svako sedmo dijete i svaki dvadeseti odrasli stanovnik Srbije pate od ovih bolesti. S početkom školske godine napadi astme kod djece su učestaliji zbog brojinih faktora rizika koji do nje dovode. Prašnjavi tepisi i police, plijesan u kupaonicama i toaletima, prehlade i virusi, samo su neki od uzročnika. Ako se tome dodaju još i duhanski dim, pretilost, tjelesna neaktivnost, pelud i grinje, kao najčešći faktori rizika iz okruženja, preduvjet za pojavu ili buđenje respiratornih bolesti više su nego idealni. Na produkte grinja kod nas je alergično više od 80% djece koja imaju astmu.

Prilikom javljanja respiratornih bolesti dolazi do upale sluznice dišnih puteva. Upalni proces predstavlja reakciju na kontakt s virusima, alergijama i štetnim agensima iz zraka i životne okoline. U takvoj situaciji sluznica bronhija postaje crvena, otečena i prekrivena sa sluzi. Svi ovi simptomi dovode do sužavanja bronhija i otežanog protoka zraka koji ometa normalno disanje. Ponekad se stanje može zakomplicirati i doći do potpunog zatvaranja bronhija, što se manifestira simptomima pogoršanja astme u vidu kašlja, otežanog disanja, osjećaja stezanja i sl. Zato je vrlo važno, još u dječjem uzrastu, sprečavati kronične i teške simptome respiratornih bolesti, održavati normalne funkcije pluća i tjelesne aktivnosti i primjeniti pravilan pristup liječenju, zato što je astma bolest koja se može javiti kod bilo koga i u bilo kojem životnom razdoblju. U obiteljskom okruženju od astme obično boluje više članova obitelji, iako ima i pojedinačnih slučajeva gdje je samo jedna osoba asmatičar.

Djeca s bolestima respiratornog sustava trebala bi se što više baviti tjelesnim aktivnostima, a po njihovoj želji, treba im omogućiti i bavljenje vrhunskim sportovima. To zahtijeva redovitu suradnju s pulmologom. Može se navesti primjer vrhunskih sportaša: Mark Špic (plivanje), Pol Skols (nogomet), Pola Redklif (maraton), Denis Rodman (košarka), Sebastian Kou (atletika), Andrija Prleinović (vaterpolo) i dr.

PODACI O OBOLJELOJ DJECI USLIJED ONEČIŠĆENJA ZRAKA U EUROPI

U modernoj Europi karakteristike zagađenog zraka su različite, u prosjeku nivo standardnih polutanata (onečišćivača) niži je nego u prošlosti. Iako je njihova koncentracija niža nema sumnje u važnost onečišćenja okoline kao faktora rizika.

APHEA projekt „Air polution and Health: a European Approach" jedna je od epidemioloških studija u kojoj su praćeni kratkoročni učinci onečišćenja zraka na neke zdravstvene parametre, posebno na dnevnu varijabilnost plučne funkcije, učestalost bolničkog liječenja i smrtnost.

U Parizu se rizik smrtnosti od respiratornih bolesti povećao na 17% sa 100 μg/m³ povećanja koncentracije lebdećih čestica. Lebdeće čestice, crni dim i sumporov dioksid (SO_2) su povezani s hitnim hospitalizacijama respiratornih bolesnika.

Studija u Španjolskoj je utvrdila da su oksidi, posebno dušični dioksid (NO_2) i ozon, povezani sa smrtnošću od kardiovaskularnih bolesti posebno ljeti. Ovakvi su zaključci donešeni u studijama mnogih europskih zemalja.

Doprinos Švicaraca su studije iz 2003. godine u kojima su pratili pojavu bolesti zbog onečišćenja zraka u Austriji, Francuskoj i Švicarskoj. Autori navode da je onečišćenje životne okoline uzrok 6% ukupne smrtnosti ili 40.000 smrtnih slučajeva godišnje. Čak 50% ovih smrti pripada onečišćenju životne okoline uzrokovane saobraćajem, s čime se povezuje i više od 25.000 novih slučajeva kroničnog bronhitisa kod odraslih, više od 290.000 slučajeva akutnog bronhitisa kod djece, oko 500.000 napada astme ili 16 milijuna dana s ograničenim aktivnostima zbog respiratornih simptoma. Međutim, jedan od vrlo bitnih čimbenika zone čišćenja zraka je i duhanski dim. Studija provedena u Švicarskoj kod nepušača u 11 godišnjem praćenju, potvrdila je da izloženost duhanskom dimu utječe na razvoj kroničnih rescpiratornih simptoma kod zdravih odraslih osoba.

PODACI O OBOLJELOJ DJECI USLJED ONEČIŠĆENJA ZRAKA U SRBIJI

Točna učestalost astme u Srbiji nije poznata, ali nekoliko studija ukazuje da je ona slična kao u Europi. ISAACS studija (Živković i sar, 2002) pokazuje učestalost od oko 8%, a studija na 7 500 školske djece (Nestorović i sar, 2002) daje sličan postotak. Posljednje studije u svijetu ukazuju da njena učestalost raste.

U Smederevu, utjecaj onečišćenja zraka na učestalost respiratornih infekcija kod djece prikazan je promatranjem dviju osnovnih škola od kojih je jedna u blizini velikog onečiščivača zraka (Željezara US. STEEL), a druga na bližoj periferiji grada. Koristili su zdravstvene kartone djece i analizirali broj posjeta zbog respiratornih infekcija u periodu od 1. VII. 2007. do 30. VI. 2008. godine. U prvoj osnovnoj školi u

prosjeku je svaki učenik više od jedanput došao na pregled zbog respiratornih tegoba, a od toga 27,9% posjeta je zbog bronhitisa. U drugoj se školi zbog bronhitisa javilo 24,5% djece. U prvoj je školi 8,4% djece oboljelo od astme, a u drugoj 7,3%. U obje škole veća je učestalost astme kod dječaka i to u ranom školskom uzrastu od 7 godina. Zaključuje se da je veća učestalost respiratornih infekcija i oboljelih od astme u prvoj školi gdje je veća onečišćenost zraka. (Zdravstveni Centar „SV.LUKA" Smederevo).

U Pančevu je visoka stopa oboljenja predškolske djece – čak 6 000 oboljelja na 1 000 djece, što znači da se u toku jedne godine svako predškolsko djete razboli šest puta, najčešće (četiri do pet puta) od bolesti respiratornog sustava. Prema riječima dr. Siniše Baumana, pedijatra i pulmologa u pančevačkoj bolnici, onečišćenje zraka pogađa sve uzraste, ali su, ipak, djeca najosjetljivija. Dr. Bauman kaže da u Pančevu svakodnevno otkrivaju nove slučajeve djece s poremećajima recpiratornog sustava.: „Mi stalno imamo veliki broj djece koja oboljevaju od bronhijalne astme. Svakog dana imamo dosta novih sučajeva. Primjera radi, danas sam obavio 16 pregleda i imao tri nova slučaja djece s respiratornim opstrukcijama. To se stalno dešava." Pančevačka djeca pate od upale grla, ždrijela i bronhija, ali i kronočnih, opstruktivnim bolesti pluća kakve su astma, opstruktivni bronhitis i bronhiolitis, negativno utječu na rast i razvoj.

UTJECAJ VJEŽBANJA NA BOLESTI DIŠNOG SUSTAVA

U ovom području urađena su istraživanja koja dokazuju da bavljenje tjelesnom aktivnošću pozitivno utječu na bolesti respiratornog sustava.

Columbus, Ohio, svibnja 1998. doktor fiziologije na Ohio Fakultetu Charles Emery i suradnici, Rebecca Schein i Neil MacIntyre s Medicinskog fakulteta Duke i Emilz Hauck, dekan Medicinskog centra u Madisonu proveli su studiju „Redovito vježbanje pomaže pacijentima s ozbiljnim oboljenjima pluća" koja dokazuje da tjelesno vježbanje kod ljudi s ozbiljnim bolestima pluća smanjuje anksioznost, poboljšava izdržljivost i fiziološko stanje organizma.

Desetotjedna studija je obuhvatila 79 odraslih osoba s kroničnim opstruktivnim oboljenjima plućnog sustava. Rezultati su pokazali da su ispitanici iz grupe koja je vježbala pokazali smanjenje anksioznosti i depresije, a da grupa koja je sudjelovala samo u predavanjima nije pokazala rezultate. Jedan od razloga smanjenja anksioznosti može biti da vježbanjem ljudi postaju neosjetljivi na nedostatak daha sa kojim žive svakodnevno i s vremenom primjećuju da mogu ostati bez njega tokom vježbanja bez ikakvih negativnih posljedica. Ispitanici iz vježbačke grupe također su pokazali poboljšanja tjelesng stanja u vidu povećane izdržljivosti

Sudionici su u vježbanju pokazali još jednu od prednosti koje druge grupe nisu – bolje rezultate na testu verbalne komunikacije. Jedna teorija je da aerobno

vježbanje povećava oksigenaciju u krvotoku i mozgu, koja može potpmoći nekoj vrsti kognitivnog funkcioniranja kao što je verbalna komunikacija. Pacijentima s kroničnim bolestima pluća koji često imaju problema sa disanjem, vježbe pomažu u povećanju koncentracije kisika u krvotoku i mozgu.

Sve u svemu ova studija jasno podržava korist od vježbanja za kronične pacijente u fiziološkom, tjelesnom i kognitivnom pogledu. Tjelesna neaktivnost kod pacijenata s kroničnim opstruktivnim bolestima plućnog sustava nije od nikakve koristi.

U studiji „*Djeca s astmom i tjelesno vježbanje – utjecaji programa vježbanja*" koja je imala kao cilj da procijeni efekte tjelesnog vježbanja kod djece s respiratornim problemima – astomom provedenoj na Utreht Univerzitet, Holandija, 2000. godine sudjelovalo je četrdeset sedmero djece, od 8 do 13 godina starosti, s dijagnozom astme.

Rezultati pokazuju da djeca u eksperimentalnoj grupi imaju znatna poboljšanja tjelesnog stanja i tendenciju k smanjenju anksioznosti prema astmi. Hipoteza o doživljaju tjelesnih sposobnosti i samopouzdanja potkrepljena je kod dječaka koji su pokazali tendenciju povećanja tjelesne sposobnosti. Znatno povećanje V'O2max u ovoj studiji poklopilo se s većinom studija koje su se bavile tjelesnim vježbanjem djece s astmom. Djeca u eksperimentalnoj grupi su značajno povećala svoje maksimalne performanse (Watt max) na bicikl-ergometru i njihovu uspješnost na testu izdržljivosti, što ukazuje da su poslije ovih programa djeca bila u stanju duže vježbati. S poboljšanjem maksimalnog obima rada došlo je do adaptacije kardiovaskularnog i dišnog sustava u vidu povećanja O_2 plusa i V'Emax.

Zanimljiv nalaz ovog istraživanja bio je poboljšanje u psiho – socijalnim osobinama koje su se ogledale u povećanom samopouzdanju, društvenosti, raspoloženju i odnosu prema vježbanju. Program je specifično razvijen naučiti djecu kako da prepozanju signale astme i kako da se nose s njima u slučaju napada.

Program vježbanja ne samo da je povećao tjelesnu kondiciju, već je doprinio i poboljšanju drugih zdravstvenih problema i usavršavanju u psiho – socijalnom pogledu.

ZAKLJUČAK

Zdrave osobe, ali i mnogi s bolestima dišnih organa mogu sportom poboljšati svoje zdravstveno stanje. Trening je s jedne strane najbolji način sprječavanja bolesti, a s druge strane, pravilno rađen i u pravim količinama, može biti i dodatni lijek u terapiji ovih bolesti. Što je dobro za zdrave osobe, dobro je i za osobe s kroničnim bolestima pluća ili astmom. Problem je što se kod nekih kroničnih bolesti pluća (kao COPD) funkcija pluća konstantno smanjuje, a kada se teško diše, svaka tjelesna aktivnost je naporna i pokušava se izbjeći, pa zbog toga treba pokušati kontroliranim

vježbama izbjeći ovakve probleme. Čak i osobe koje se zbog bolesti izgubile polovinu funkcije pluća, mogu imati normalan život ako se redovito bave sportom. Iako imaju teško oštećenje funkcije pluća, kvaliteta života ovih pacijenata se može popraviti uz obaveznu tjelesnu aktivnost i odgovarajuće vježbe koje olakšavaju tegobe. Vrlo je važna primjena tjelesnih vježbi, koja obuhvaća i odgovarajuće vježbe disanja, a koje imaju kao cilj jačanje mišića dišnih organa, i povećanje vitalnog kapaciteta pluća.

Većina osoba koje imaju kotrolirane dišne probleme imaju koristi od redovitog vježbanja, koje pomaže smanjenju potreba za udisanjem zraka za različite zadatke, što im olakšava obavljanje normalne svakodnevne aktivnosti s manim gubljenjem daha i riješim napadima astme, ili neke druge respiratorne bolesti.

Kada govorimo o utjecaju treninga na bolesti dišnih organa moramo znati da su zadovoljeni osnovni ciljevi treninga:

- Pobošljanje funkcionalnog kapaciteta
- Poboljšanje funkcionalnog stanja
- Smanjenje težine subjektivnog osjećaja nedostatka zraka
- Poboljšanje kvalitete života

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IMPACT OF EXERCISING ON THE DISEASES OF THE RESPIRATORY SYSTEM

ABSTRACT

Diseases of the respiratory system are allergic diseases due to which school-age children usually stay in hospital. It is estimated that every seventh school-age child and every twentieth adult citizen in Serbia suffer from these diseases. Healthy people, but also many respiratory patients can improve their health condition by doing sports. Training is, on the one hand, the best way to prevent disease and, on the other hand, when it is properly done and in the right quantities, it can be additional remedy in the treatment of these diseases. The use of physical exercise which includes proper breathing exercises that have as the aim strengthening the muscles of respiratory organs as well as increasing the vital capacity of the lungs is very important. Most people who control their respiratory problems will benefit from regular exercising that helps to reduce the need for breathing air for different tasks, which helps them perform normal daily activities with less breath shortness and infrequent attacks of asthma or some other respiratory diseases.

Key words: *diseases, respiratory system, influence of exercise*

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Izvorni znanstveni rad

RAZLIKE U STRUKTURI SLOBODNOG VREMENA IZMEĐU UČENIKA URBANIH I RURALNIH PODRUČJA

UVOD

Život u suvremenom društvu prate nova otkrića, dostignuća, sveopći napredak. Način života ostavlja pozitivne i negativne posljedice. Sve se promjene odražavaju i na životu ljudi posebice na zdravlju. Preokupacija odgojnih sustava je priprema i osposobljavanje za život u suvremenim uvjetima. To povećava odgovornost škole i zahtijeva optimalne odgovore. Suvremeni uvjeti života posebice u urbanim sredinama nalažu prilagodbu programa prije svega u izboru odgovarajućih sadržaja. Koncentracija stanovništva u gradove i s demografskog stajališta nije povoljna okolnost ravnomjernog razvoja i nameće najvećem broju stanovnika Republike Hrvatske loše uvjete s ekološkog, ali i kineziološkog motrišta (Prskalo i Babin, 2008). Današnju civilizaciju označava specifičan način života, karakteristična koncentracija u gradove što niti s ekološkog niti s kineziološkog motrišta nije povoljna okolnost. Poremećaji i bolesti današnjice - prekomjerna težina i živčana napetost, sve su više prisutni i kod mladih, a slobodno vrijeme djece i mladeži sve se više koristi za aktivnosti kojima nije potreban gotovo nikakav mišićni napor (Prskalo i sur. 2010). Ako bi se slobodno vrijeme moglo definirati kao ono vrijeme koje subjekt slobodno izabire, autonomno i neovisno o bilo kakvim instancama ili institucijama. No kada bi i zanemario taj izbor ne bi se ništa bitno promijenilo u njegovoj egzistenciji. Međutim, ako bi zanemario aktivnosti i obveze koje *mora* dovršiti u obvezno radno vrijeme, prihvaćene kao zalog za preživljavanje i dotjerivanje egzistencije, doveo bi u pitanje kvalitetu svog života (Artić, 2009).

U suvremenom svijetu čovjek je sebi osigurao mnogo više vremena za slobodnije izražavanje nego što je to mogao u prijašnjim vremenima. Normalno, očekivano je da će toga biti sve više s daljnjim razvojem proizvodnje i sve većim stvaranjem društvenog bogatstva, posebice u nerazvijenom dijelu svijeta. Slobodno se može tvrditi da nijedno društvo danas u svijetu ne organizira na pravi način korištenje slobodnog vremena svojih građana (Božović, 2008).

Sadržaji slobodnog vremena djece i mladih važni su s aspekta koji pridonose formiranju njihova identiteta i kvalitete života u budućnosti. Djeca i mladi imaju znatno više slobodnog vremena od odraslih te zbog svog biopsihosocijalnog statusa u okolini i društvu, njihovo slobodno vrijeme mora biti specifično i organizirano, a ne prepušteno slučaju (Previšić, 1987). Da bi slobodno vrijeme djece uopće bilo kvalitetno organizirano mora se postaviti pitanje strukture vremena u jednom danu. U svakodnevnom životu najjednostavnija podjela pojma vremena je na radno vrijeme ili vrijeme koje se naziva neslobodno vrijeme te na slobodno vrijeme to jest vrijeme koje ostaje pojedincu na raspolaganju nakon što izvrši svoje obaveze.

Cilj je ovog rada utvrditi ukupnu strukturu vremena djece od 5. do 8. razreda, utvrditi strukturu slobodnog vremena tijekom radnog dana te utvrditi razlike u strukturi slobodnog vremena između djece koja žive na ruralnom i djece koja žive u urbanom području.

METODE RADA

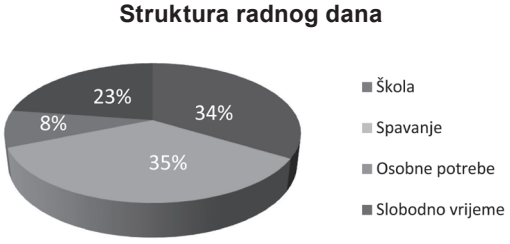
Istraživanje je provedeno na uzorku od ukupno 172 ispitanika, od toga 93 učenika i 79 učenica od petog do osmog razreda osnovne škole. Uzorak je formiran po načelu slučajnog odabira. Dob učenika kreće se od 11 do 15 godina. Uzorak obuhvaća učenike dviju osnovnih škola s područja grada Petrinje. Uzorak učenika koji žive u urbanom području činili su učenici 1. osnovne škole Petrinja, a uzorak učenika s ruralnog područja činili su učenici Osnovne škole Jabukovac. Istraživanje je provedeno u školskoj godini 2008/2009. Istraživanje je provedeno pomoću anketnog upitnika koji je konstruiran za potrebe ovog istraživanja. Anketni upitnik sastojao se od liste unutar dvdesetčetverosatnog fonda vremena. Lista je otvorenog tipa gdje su učenici samostalno upisivali aktivnosti kojima su se bavili u svakom satu tijekom jednog radnog dana. Sirove rezultate kodiralo se i kondenziralo u skup od 10 varijabli aktivnosti kojima su se učenici bavili tijekom 24 sata. Temeljem dobivenih podataka izvršena je analiza relativnih frekvencija za varijable 10 aktivnosti radnim danom. Tako su utvrđeni prostori učestalosti pojedinih aktivnosti i struktura radnog dana. Na dobivenim rezultatima izračunati su osnovni deskriptivni parametri: aritmetička sredina (x), standardna devijacija (SD), minimalni i maksimalni rezultat (min. i max.), postotak dobivenih odgovora. Normalitet distribucije utvrđen je Kolmogorov-Smirnovljev testom (K-S test). Za utvrđivanje razlike između učenika koji žive na urbanom i ruralnom prostoru korišten je neparametrijski Mann-Whitney U test. Statistička značajnost postavljena je na razini od 0.05. Podaci dobiveni istraživanjem obrađeni su pomoću statističkog programa STATISTICA 7.0.

REZULTATI

Tablica 1. *Deskriptivni parametri varijabli aktivnosti tijekom radnog dana*

	N	Mean	Minimum	Maximum	Std.Dev.	max D	K-S p
ŠKOLA	172	8,08	5,00	11,00	1,19	0,1703	p < ,01
IGRA	103	2,22	1,00	6,00	1,30	0,2673	p < ,01
TV; DVD	155	2,52	1,00	8,00	1,25	0,2279	p < ,01
KUCOBV	47	1,55	1,00	4,00	0,83	0,3647	p < ,01
KINAKTI	69	1,75	1,00	5,00	0,86	0,2721	p < ,01
IZŠKAKT	8	3,25	1,00	5,00	1,49	0,1929	p > .20
RACUNA	52	1,75	1,00	5,00	0,97	0,3001	p < ,01
SPAVA	172	8,42	5,00	14,00	1,29	0,1747	p < ,01
OSOBNE	164	2,05	1,00	4,00	0,73	0,2495	p < ,01
RAZONO	21	1,24	1,00	3,00	0,54	0,4802	p < ,01

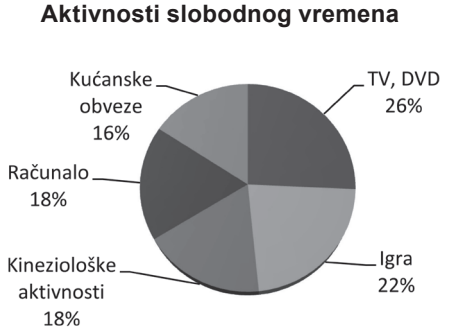
Pregledavajući tablicu 1. vidljivo je da učenici najviše vremena tijekom 24 sata provode u aktivnostima koje se mogu kategorizirati kao neslobodno vrijeme. Učenici provode nešto više od osam sati u školi te gotovo osam i pol sati koriste za spavanje. U neslobodno vrijeme mogu se svrstati aktivnosti koje su nazvane osobne potrebe koje podrazumijevaju vrijeme potrebno za uzimanje hrane i higijenu. Preostalo vrijeme koje učenici imaju na raspolaganju odnosi se prvenstveno na aktivnosti koje učenici mogu koristiti prema svojim interesima.



Slika 1. *Struktura radnog dana učenika*

Iz slike 1. vidljivo je da u ukupnoj strukturu radnog dana djece 77% vremena otpada na *neslobodno vrijeme*. Preostali dio od 23% vremena djeca mogu iskoristi po svojim interesima i preferencijama.

Ako se pogleda tablica 1. i slika 2. vidi se da od aktivnosti slobodnog vremena, djeca najviše vremena provode gledajući televiziju gotovo 2,5 sata i igraju se nešto više od 2 sata. Na kineziološke aktivnosti učenici potroše nešto više od 1,5 sat dnevno, a isto toliko vremena provedu u korištenju računala.



Slika 2. *Struktura aktivnosti u slobodnom vremenu*

Pošto je Kolmogorov Smirnov test pokazao nenormalnost distribucije za utvrđivanje razlika između subuzoraka definiranih prema mjestu stanovanja koristio se neparametrijski Mann-Whitney U test. U tablici 2. prikazani su rezultati za utvrđivanje razlika između učenika koji žive na urbanom području i onih koji žive na ruralnom području.

Tablica 2. *Razlike između subuzoraka prema području stanovanja (Mann-Whitney U test)*

	Urbano		Ruralno		*Mann-Whitney U test*		
	N	Mean	N	Mean	U	Z	p-level
ŠKOLA	113	7,77	59	8,68	**1821,00**	**4,88**	**0,00**
IGRA	74	2,45	29	1,66	**673,00**	**-2,93**	**0,00**
TV;DVD	98	2,56	57	2,44	2552,50	-0,89	0,37
KUCOBV	11	1,27	36	1,64	148,00	1,26	0,21
KINAKTI	54	1,89	15	1,27	**241,50**	**-2,38**	**0,02**
RACUNA	40	1,85	12	1,42	185,00	-1,19	0,23
SPAVA	113	8,35	59	8,56	2935,50	1,28	0,20
OSOBNE	108	2,12	56	1,93	2602,50	-1,46	0,14
RAZONO	14	1,21	7	1,29	47,00	-0,15	0,88

Iz rezultata u tablici 2. vidljivo je da statistički značajne razlike postoje u varijablama koje opisuju vrijeme provedeno u školi i školskim obvezama, igri i kineziološkim aktivnostima. Djeca ruralnih područja statistički značajno više vremena provode u aktivnostima koje su vezane za školu, dok djeca urbanih područja statistički značajno više vremena provode u igri i kineziološkim aktivnostima. U ostalim aktivnostima ne postoje statistički značajne razlike.

RASPRAVA

Analizom rezultata može se utvrditi da istraživana djeca tijekom radnog dana imaju na raspolaganju vrlo malo slobodnog vremena. Gotovo 77% vremena unutar 24 sata djeca koriste za spavanje, odmor, hranu i higijenu te boraveći u školi i izvršavajući školske obveze. Slične rezultate istraživanja dobio je i Arbunić (2006) gdje učenici tijekom radnog dana imaju na raspolaganju manje od sedam sati slobodnog vremena. Ilišin (2003) navodi da 25% djece raspolaže s 2 i manje sata slobodnog vremena na dan, dok ih 36% ima 3-4 sata slobodnog vremena na dan. Slobodno vrijeme koje je preostalo na raspolaganju za korištenje aktivnosti prema slobodnom odabiru, djeca najčešće provode u gledanju televizije, dvd-a ili sličnih aktivnosti (više od 2,5 sata dnevno). Slične rezultate koji pokazuju da djeca provode tijekom radnog dana više od 2 sata pred televizijom dobili su u svojim istraživanjima (Arbunić, 2006., Ilišin, 2003). Barr - Anderson i suradnici (2009) istražujući američku djecu dobili su podatke da 47,9% djece dnevno provede 2-5 sati ispred televizije, a gotovo 21% djece provode više od 5 sata dnevno pred televizijom. U igri djeca provedu nešto više od 2 sata dnevno, dok u korištenju neke kineziološke aktivnosti djeca provode između 1-2 sata. Ako se pogleda vrijeme provedeno u nekoj kineziološkoj aktivnosti može se vidjeti da gotovo identično vrijeme djeca provode i pred računalom ili igrajući video igrice. Gledajući strukturu vremena tijekom radnog dana između djece koja žive na urbanom i ruralnom području može se vidjeti da postoje statistički značajne razlike u nekim varijablama. Djeca koja žive u urbanom području više vremena provode u igri i kineziološkim aktivnostima od djece koja žive u ruralnom području. Razlog ovome se definitivno može pripisati činjenici da na istraživanom području učenici ruralnog prostora nemaju gotovo nikakve mogućnosti da se bave nekom vrstom organizirane kineziološke aktivnosti, a zbog slabe naseljenosti područja te velike udaljenosti između mjesta stanovanja, neorganizirano bavljenje kineziološkom aktivnosti svedeno je na minimum. Isto tako segment igre kao aktivnosti djece sveden je na manje vrijednosti nego kod djece koja žive u urbanoj sredini. Djeca ruralnog prostora značajno više vremena provode u ispunjavanju školskih obveza. Razlog leži u činjenici da učenici ruralnog prostora više vremena provedu na putovanje do škole i na povratku kući jer 95% istraživanih učenika ruralnog prostora putuju u školu autobusom. Na kraju se može zaključiti da učenici od 5. do 8. razreda tijekom

radnog dana nakon ispunjavanja svih obveza imaju vrlo malo slobodnog vremena. Ono vrijeme koje im je preostalo koriste na sedentarne aktivnosti i aktivnosti koje ne zahtijevaju gotovo nikakav mišićni aktivitet.

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DIFFERENCES IN THE STRUCTURE OF STUDENTS' FREE TIME BETWEEN URBAN AND RURAL AREAS

ABSTRACT

The paper aimed to determine the overall structure of the time during the workday, and on its basis determine the structure of free time of students from grades 5-8. Also, the authors wanted to identify differences in the structure of free time between children living in rural and those living in urban areas. The study included 172 students of two primary schools in the town of Petrinja. The sample of students who live in urban areas were the students of the First Primary School Petrinja, a rural

sample of students consisted of students of Primary school in Jabukovac. The results showed that children have very little free time. After completing their obligations, children have only 23% of the time for the activities that are according to their personal interests and preferences. Among the activities that children do most often in their free time is watching television. Research has shown that students who live in urban areas spend more time in kinesiological activities and games than students who live in rural areas.

Key words: *activities, free time, students, day, urban and rural areas*

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Abstract

OBESITY AND ASSOCIATED HABITS AMONG SCHOOL CHILDREN FROM MANAUS

Obesity in adolescence is considered a public health problem in modern society in Brazil, affecting 16% of children. This study aims to correlate sedentary habits, eating habits and physical activity with body weight of school children. The type of study was the cross sectional sample consisting of 156 students from six schools in Manaus, with a mean age of 11 years, 46% female and 54% male, the instrument used was a questionnaire containing variables related to sedentary habits, eating habits and weekly physical activities, along with anthropometric measurements: body weight (portable digital scale accurate to 100 g) and height (portable stadiometer precision of 0.1 cm), obesity and overweight were defined from body mass index (BMI), data were analyzed using descriptive statistics: relative frequency, mean, standard deviation. The results show prevalence of excess body weight 32%, 23% overweight and 9% obese. It was observed that young people with normal weight had an average of hours sitting lower (4.39 ± 1.72) than overweight young people (5.68 ± 2.14) and obese (6.10 ± 1.76); in relation to dietary habits, we found that young overweight and obese children had a higher consumption of salted / fried foods than young people with normal weight, a low consumption of vegetables and fruit was identified in all subjects. Furthermore, we observed that most young people are overweight and there is high non-participation in physical activities (55.5%), while those who do practice some activity have the activity less than three days a week. The school represents a place with real possibilities for professionally conducted physical education interventions among children and adolescents to promote a healthy lifestyle.

Key words: *adolescent, physical activity, obesity*

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Original scientific paper

SELECTED SOMATIC INDEXES OF THE UNDERGRADUATES

INTRODUCTION

Somatic indexes inform us about the outer visual image of the posture, about its dimensions and shape. In many research papers the correlation between image of the posture and health level of the human being is accentuated. The image and functionality of the human body represent basic factors of somatic and psychic states and manifestation of the personality in behaviour (Fialova, 2001). In the research at the IFBLR we decided to evaluate some attributes of somatic characteristics of the students in order to find out the extent of differentiation from the other students at universities throughout Slovakia.

MATERIALS AND METHODS

This research included 87 students of IFBLR UCM Trnava, of which 32 were male and 55 female. The research group consisted of full-time students. We divided the group into trained and untrained men and women. The average age was 21 years. The measurements were taken between 18th November and 16th December 2009 at IFBLR Piešťany.

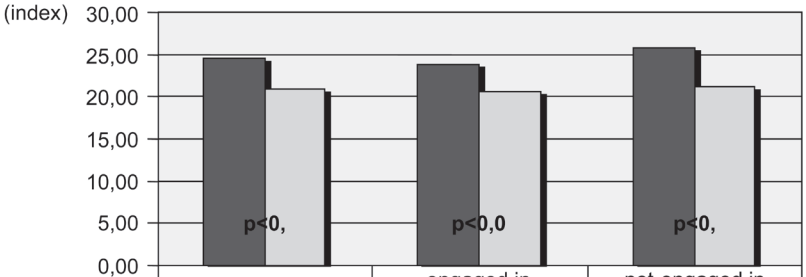
This published part of the research was aimed at evaluating selected somatic indexes of the students at IFBLR UCM involving body height and weight (and body mass index calculated from them), waist - hip ratio, percentage of the fat and some indexes relating to the students' posture. The body weight was measured with OMRON BF 400 and the body fat was examined with OMRON BF-306. The body posture was evaluated using Jaros and Lomnicka method. The results present average values of the measured parameters, and some of the relevant values were statistically analysed using t-test or chi-square.

RESULTS AND DISCUSSION

Body mass index (BMI)

In the whole group of subjects at IFBLR only normal values were present (index between 18.5. and 24.9). The average values of our students were 22.71. For men the index was much higher ranging to 24.59 while for women it was much lower (20.83). This difference was statistically significant (Figure 1).

The difference between trained men and women was smaller though still within the normal range of weight and again it reached higher values in men (23.9) compared to women (20.56). The hypothesis is that men are heavier than women due to greater proportion of muscles. Among untrained students, men reached higher value of the body mass index compared to other groups (25.75), which indicates slight overweight. In this group there is also the biggest difference in BMI between men and women (4.56), which is statistically significant. The higher value in the group of untrained men can be deduced as being the result of lower energetic output. The comparison of our BMI values and values from other universities did not differ much (Žídek 2009, Cepkova 2009, Bobrík 2007). According to the data from IFBLR and in comparison with other universities, the evaluated students had their BMI within normal range.



	total	engaged in sports	not-engaged in sports
men	24,59	23,89	25,75
women	20,83	20,56	21,10

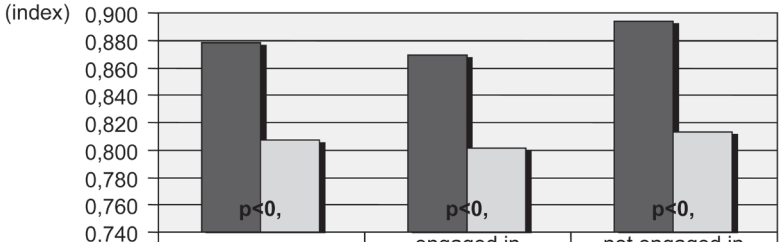
Figure 1. *Body mass index (BMI)*

Waist-hip ratio /Index WHR/

At present, WHR represents cardiovascular disease risk factor among adults and children as well. The higher the value is, the higher the risk of developing cardiovascular disease. Higher risk of disease in men is over 1.0 and in women over 0.8. In the whole group of the students at IFBLR we found that the average value of WHR was 0.842. In men, the value was within normal range and thus without the

risk of developing cardiovascular diseases (0.878), the index in women was within the range of mild risk to borderline of higher risk of cardiovascular disease (0.807). The difference was statistically significant (Figure 2).

In the group of trained students the WHR were slightly lower in men and women, for both genders they were within no risk of cardiovascular disease (in women tight). The difference between men and women was statistically significant. In the group of untrained students, while comparing the previous groups, we found higher WHR values both in men and women. In men, the values were within no risk range (0.894) while in women the values were within higher risk of cardiovascular diseases (0.813). The difference between men and women was statistically significant. There were no major differences between our students and students from other universities in WHR.

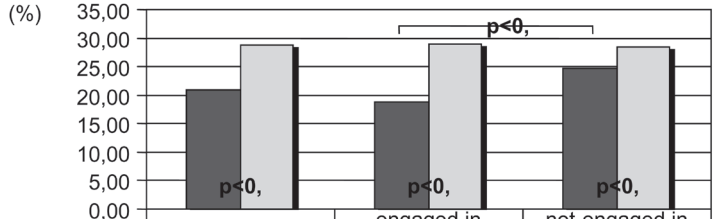


	total	engaged in sports	not engaged in sports
men	0,878	0,869	0,894
women	0,807	0,801	0,813

Figure 2. *Waist-hip ratio /Index WHR/*

The body fat percentage

The whole group of students had the average 24.85% of fat. In women the percentage was much higher (28.71%, in men much lower (21%) (Figure 3). The difference is statistically significant. Much higher difference was found among trained men and women. The men had 18.77% of fat and were within normal values; the women had 29.98% and were over the high percentage. This difference is also statistically significant. It would be interesting to find out which sport has higher influence on body fat. Among untrained men and women there was no big difference. It appears that their values were approximate. Men had 24.74% of the fat and were at the borderline between high and very high percentage, the women had 28.45% of fat and they were at the borderline between normal and high percentage. Evaluating the results it appeared that there was higher percentage of fat in our students comparing the students of other universities. This is not true, because the measurements on other schools were done using other methods (calculation, calliper, Omron older age).

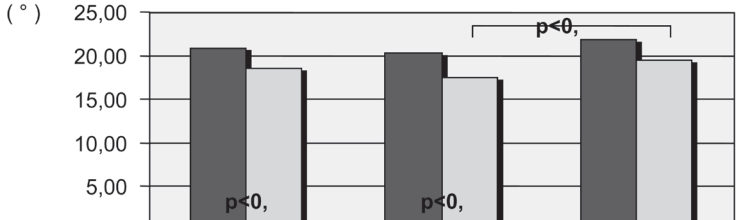


	total	engaged in sports	not-engaged in sports
men	21,00	18,77	24,74
women	28,71	28,97	28,45

Figure 3. *The body fat percentage*

Posture of the head and neck

In the whole group of subjects at IFBLR we found that the angle of the head posture was 19.70 in average. While in men the value was 20.90 degrees, in women it was 18.51 degrees. The difference between genders was 2.39 degree and was statistically significant. The difference between trained men and women was 2.87 degree and was statistically significant. According to this, the men had larger curve of cervical lordosis in average compared to women. There was also statistically significant difference in the angle between head and neck in trained and untrained students, thus the untrained men had larger cervical lordosis than women.



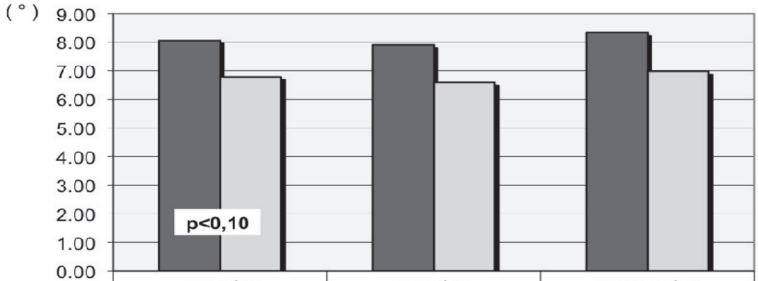
	total	engaged in sports	not-engaged in sports
men	20,90	20,35	21,83
women	18,51	17,48	19,51

Figure 4. *Posture of the head and neck*

The posture of the shoulders

In the whole group we found that average value of the shoulder angle was 7.42 degrees. The angle was 8.06 degrees in men and 6.79 degrees in women. Also in the group of trained subjects there were slightly higher values in men (7.9 degrees) than in women (6.59 degrees). Similar results were within the group of untrained students

but the difference between men and women was wider - 8.33 degrees in men and 6.98 degrees in women. Overall, the values of the average deviation of the shoulders in the whole group were really small as well as the differences between men and women and trained and untrained, suggesting that the students do not have incorrect body posture. It is a question to what extent the students were influenced by the knowledge acquired during their classes in anatomy, physiotherapy, exercise etc. We suggest that it was positive and thus they tried intentionally to push the shoulders backward (Figure 5).



	complet	sporting	not sporting
men	8.06	7.90	8.33
women	6.79	6.59	6.98

Figure 5. *The posture of the shoulders*

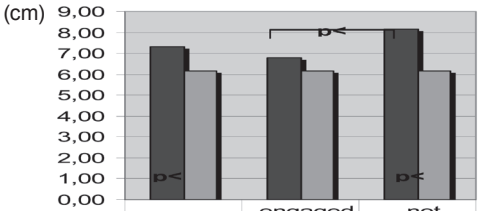
The spine shape in sagittal plane

a) The arc of cervical spine

In our group of subjects we found the average value of the curve in cervical spine was 6.73 cm and there were no major differences between men (7.3 cm) and women (6.17 cm). Even smaller differences were presented in the values of the curve for trained males (6.78 cm) and females (6.17 cm). Only the group of untrained students had major differences in cervical arc between men (8.17 cm) and women (6.18 cm). Thus, in the untrained group the arc was 2cm larger. This difference is statistically significant (Figure 6). Statistically significant is also the difference between trained and untrained subjects favouring the trained (with lower curve).

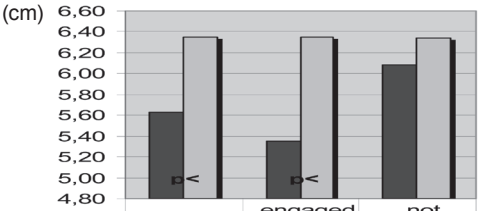
b) The arc in lumbar part

In the whole group we found the average value was 6 cm in the lumbar arc and there were no remarkable differences between men and women (0.78 cm). Similarly, there were small differences between trained men and women and minor differences between untrained men and women (Figure 7).



	total	engaged in sports	not engaged
men	7,30	6,78	8,17
women	6,17	6,17	6,18

a) ***Figure 6.*** *The arc of cervical spine*

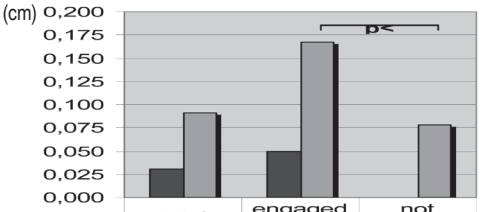


	total	engaged in sports	not engaged
men	5,63	5,35	6,08
women	6,35	6,35	6,34

b) ***Figure 7.*** *The arc in lumbar part*

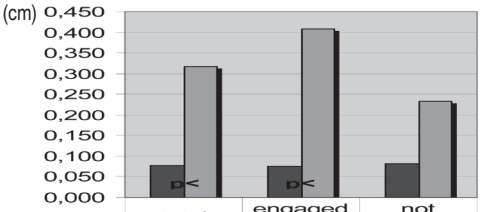
The spine shape in frontal plane

In the whole group the average value of deviation to the right was 0.061 cm and to the left 0.198 cm. The deviation to both sides was neglectable and the values to the right and left were most identical. Even the differences between men and women did not reach significance level (Figure 8 and 9). After all it can be deduced that the spine posture in frontal plane was very good.



	total	engaged in sports	not engaged
men	0,031	0,050	0,000
women	0,091	0,167	0,078

Figure 8. *The spine shape in frontal plane (spine to the right)*



	total	engaged in sports	not engaged
men	0,078	0,075	0,083
women	0,318	0,407	0,232

Figure 9. *The spine shape in frontal plane (spine to the left)*

The height of the shoulders

In the whole group of the students of IFBLR the average value of the height of the right shoulder was 142.9 cm and left 143.4 cm (almost identical). The differences between left and right shoulder among men was 0.5 cm and in women 1.5 cm favouring the left shoulder (the right was lower). The difference between men and women in the whole group was statistically significant. Similarly, there was significance in the height of the left shoulder. The differences between trained men and women were

not significant. While the difference of the shoulder height in men was 0.4 cm, in women it was surprisingly higher – 2.5 cm. It was confirmed that the right shoulder was lower. This corresponds with the results of several researches about the level of the left and right shoulder in women. The differences in the shoulder height in untrained men and women were 0.6 cm in men and 0.5 in women. These differences are not significant.

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ABSTRACT

In this article the authors are focused on evaluation of the selected somatic indexes of the students of the Institute of Physiotherapy, Balneology and Medical Rehabilitation (IFBLR) UCM in Trnava. The level of indexes was measured on 87 full-time students among which 32 were men and 55 women, with 47 trained and 40 untrained students overall. The average age was 21 years. The authors evaluate the results not only of the whole group, but separately for trained and untrained students and also for men and women. The results were compared with the results available from other universities in Slovakia. The research showed that average BMI values (22.71) place the students in the normal weight category; the values for men were much higher than for women. Similar results were obtained for trained and untrained men and women. The average WHR values for men can be set as „without risk“(0.878), for women with mild risk of cardiovascular disease (0.807). The average percentage of the fat in the whole group (24.85%) was influenced by the high values for women (almost

28.71%) in comparison to the men (21.0%). Even higher difference was found between trained men (18.77%) and trained women (28.97%). The values of certain components of the body posture were collected, but their levels were insufficient for descriptive and percent evaluation due to unavailable rating scales in adults. The results will be helpful for further research aiming to evaluate body posture in the future.

Key words: *somatic indexes of the students, body mass index, waist-hip ratio, fat percentage, body posture, students of Physiotherapy*

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Izvorni znanstveni rad

SPRINTERSKO TRČANJE DJECE MLAĐE ŠKOLSKE DOBI

UVOD

Nacionalni okvirni kurikulum za predškolski odgoj i obrazovanje te opće obvezno i srednjoškolsko obrazovanje predstavlja temeljni dokument koji definira okvir za stjecanje temeljnih i stručnih kompetencija djece i učenika u odgojno-obrazovnom sustavu Republike Hrvatske. U Nacionalnom okvirnom kurikulumu su definirana očekivana učenička postignuća za sva odgojno-obrazovna područja po ciklusima, a tjelesno i zdravstveno područje ima temeljni značaj za razvoj psihosomatskih osobina učenika, psihičkih osobina i motoričkih sposobnosti, usavršavanje biotičkih motoričkih i socijalnih motoričkih znanja te razvoj temeljnih kompetencija, posebno onih koje imaju značajan utjecaj na radno i životno okruženje. U okviru prvog ciklusa (od 1. do 4. razreda osnovne škole) jedan od ciljeva tjelesnog i zdravstvenog područja je, između ostalog, osposobiti djecu za primjenu prirodnih oblika kretanja u svakodnevnom životu i radu.

Trčanje spada u prirodne oblike kretanja i nije zahtjevno s obzirom na izvedbu, ali za postizanje uspjeha u trčanju nužno je ovladati dobrom tehnikom trčanja. Najbrži oblik trčanja predstavlja sprintersko trčanje, a glavni je cilj u sprinterskom trčanju postići maksimalnu brzinu trčanja u što kraćem vremenu i održati je što je moguće dulje.

Osnovu trčanja čine koraci s kojima je povezano kretanje ruku i tijela, a ti se koraci kontinuirano ponavljaju čime stvaraju cikličko kretanje u kojem jedan dvojni korak čini ciklus. U toku jednog ciklusa trkaćeg koraka razlikuju se dvije faze oslonca, dvije faze zamaha i faza leta. U fazi prednjeg oslonca postavljanje stopala na podlogu treba biti izvedeno preko prednjeg vanjskog ruba stopala, a noga se lagano savija u koljenu. Kontakt između stopala i podloge nalazi se ispred projekcije težišta tijela, a pritisak stopala na podlogu suprotan je smjeru kretanja. U suprotnom smjeru od pritiska stopala na podlogu dolazi do javljanja sile reakcije podloge i smanjenja brzine trčanja. Skraćivanjem udaljenosti između stopala i težišta tijela trkača dolazi do skraćivanja faze prednjeg oslonca, a to utječe na smanjenje sile reakcije podloge i na povećanje brzine trčanja. Stoga je vrlo bitno pri učenju pravilne tehnike trčanja

usmjeravati djecu na postavljanje stopala na podlogu, što je moguće bliže projekciji težišta tijela, preko prednjeg dijela stopala, da bi se izbjegao gubitak brzine i povećala efikasnost trčanja.

Predmet ovog istraživanja je proučavanje tehnike sprinterskog trčanja kod djece, posebno način postavljanja stopala na podlogu kao indikatora efikasnosti tehnike trčanja, a time i postizanja boljeg rezultata u sprinterskom trčanju.

CILJ RADA

Cilj je ovog istraživanja utvrditi modalitet trčanja (postavljanje stopala na podlogu preko prstiju, punog stopala ili pete) i razlike u antropometrijskim karakteristikama i postignutom vremenu u trčanju na 50 m između djevojčica i dječaka mlađe školske dobi.

METODE RADA

Uzorak ispitanika

Uzorak ispitanika čini 150 učenika i učenica prvog i drugog razreda jedne pulske osnovne škole (70 učenika i 80 učenica). Prosječna dob učenika je 8,12±0,63 godina, a dob učenica 8,08±0,61 godina.

Uzorak varijabli

Uzorak varijabli čine *varijable za utvrđivanje antropometrijskih karakteristika* (visina tijela, masa tijela, postotak masti), *varijable za utvrđivanje kinematičkih parametara sprinterskog trčanja* (modalitet trčanja) i *vrijeme trčanja na 50 m*.

Mjerenje *antropometrijskih karakteristika* obavljeno je u skladu sa standardima propisanima Međunarodnim biološkim programom, a postotak masti izračunat je na temelju jednadžbe za procjenu udjela tjelesne masti u ukupnoj tjelesnoj masi u populaciji školske djece prema jednadžbi Slaughtera i suradnika (1988).

Varijabla *modalitet trčanja* (KMT) dobivena je analizom tehnike postavljanja stopala na podlogu u sprinterskom trčanju maksimalnom brzinom (peta, puno stopalo ili prsti) na temelju video zapisa. Video zapis sprinterskog trčanja učinjen je kamkorderom Sony HDR-HC9E koji je bio postavljen bočno, okomito na ravninu trčanja i snimao frekvencijom od 50 Hz. Primjenom *Dartfish Connect* sustava izvršena je analiza postavljanja stopala na podlogu (prsti, puno stopalo, peta) u maksimalnoj brzini trčanja.

Vrijeme trčanja na 50 m izmjereno je primjenom sustava za elektronsko mjerenje koji se sastoji od baze i osobnog računala, a na sebi ima priključke za 10 parova fotoćelija. Prolaskom ispitanika pored fotoćelija, kroz polje zrake od 5 mm, registrira se vrijeme trčanja na 50 m.

Tablica 1. *Uzorak varijabli*

VARIJABLA	NAZIV VARIJABLE	MJERNA JEDINICA
ATV	Visina tijela	cm
ATM	Masa tijela	kg
% MASTI	Postotak masti	%
KMT	Modalitet trčanja (peta, prsti, puno stopalo)	
T50M	Vrijeme trčanja na 50 m	s

Metode obrade podataka

Za obradu prikupljenih podataka korišten je programski paket Statistica ver. 7.1. (StatSoft, Inc., TULSA, USA).

Za sve varijable *antropometrijskih karakteristika*, modaliteta trčanja i rezultata u trčanju na 50 m izračunati su osnovni deskriptivni parametri s obzirom na spol ispitanika.

Za utvrđivanje razlika između dječaka i djevojčica u antropološkim obilježjima, postignutom rezultatu u trčanju na 50 m i kinematičkim parametrima sprinterskog trčanja korištena je univarijatna analiza varijance i diskriminacijska analiza.

REZULTATI I RASPRAVA

Deskriptivnom analizom antropometrijskih karakteristika utvrđeno je da prosječna vrijednost visine tijela kod dječaka iznosi 133,5cm, masa tijela je 31,4 kg, a postotak masti 22,7%. Prosječna vrijednost visine tijela kod djevojčica je 132,1 cm, masa tijela je 29,9 kg, a postotak masti 21,5%.

Deskriptivnom analizom varijable *vrijeme trčanja na 50 m* utvrđeno je da prosječno vrijeme trčanja na dionici od 50 m kod dječaka iznosi 10,098 s, dok kod djevojčica iznosi 10,588 s.

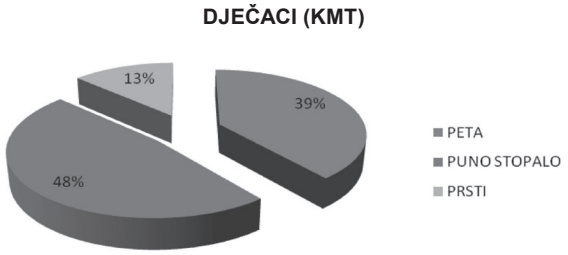
Varijabla *modalitet trčanja* (KMT) dobivena je analizom tehnike postavljanja stopala na podlogu u sprinterskom trčanju (peta, puno stopalo ili prsti).

Tablica 2. *Deskriptivni parametri varijable modalitet trčanja (KMT)*

KMT	DJEČACI (%)	DJEVOJČICE (%)
PETA	39,1	61,5
PUNO STOPALO	47,8	33,3
PRSTI	13,0	5,1

Deskriptivnom analizom navedene varijable *kod dječaka* utvrđeno je:

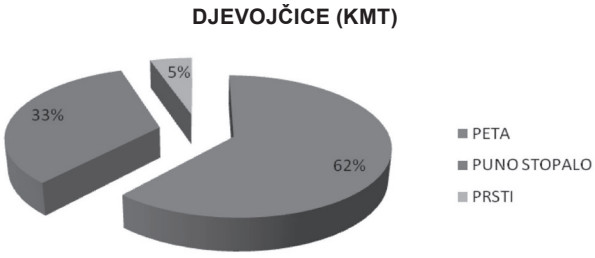
- 39,1% dječaka postavlja stopalo na petu,
- 47,8% dječaka postavlja puno stopalo na podlogu,
- 13,0% postavlja stopalo na prste, odnosno prednji dio stopala.



Slika 1. *Modalitet trčanja kod dječaka*

Kod djevojčica su dobivene sljedeće vrijednosti:

- 61,5% djevojčica postavlja stopalo na petu,
- 33,3% djevojčica postavlja puno stopalo na podlogu,
- 5,1% postavlja stopalo na prste, odnosno prednji dio stopala.



Slika 2. *Modalitet trčanja kod djevojčica*

Na temelju rezultata deskriptivne analize može se zaključiti da djevojčice u prosjeku više postavljaju stopalo na podlogu preko pete, dok dječaci postavljaju puno stopalo na podlogu. Najmanji postotak kod djevojčica i dječaka postavljao je stopalo na prednji dio, iako veći postotak dječaka, u odnosu na djevojčice, pravilno postavlja stopalo na podlogu. Mekano postavljanje stopala na podlogu preko prednjeg dijela omogućava efikasniji prijenos elastične energije od stopala prema tijelu, odnosno manji je gubitak energije ako se stopalo postavlja bliže vertikalnoj projekciji težišta tijela. Zbog smanjenog gubitka energije kretanja tehnika trčanja postaje racionalnija što u konačnici rezultira većom brzinom kretanja i boljim rezultatom u sprinterskom trčanju.

Za utvrđivanje razlika između dječaka i djevojčica u antropološkim obilježjima, postignutom rezultatu u trčanju na 50 m i kinematičkim parametrima sprinterskog trčanja korištena je univarijatna analiza varijance i diskriminacijska analiza (T*ablica 3.* i *Tablica 4.*).

Tablica 3. *Razlike u analiziranim varijablama između djevojčica i dječaka*

VARIJABLA	AS-M	AS-Ž	SD-M	SD-Ž	SS	MS	df	F	p
ATV	133,56	132,05	7,66	6,44	83,92	83,92	145	1,69	0,20
ATM	31,42	29,91	8,05	7,25	83,72	83,72	145	1,43	0,23
% MASTI	21,53	22,67	8,87	7,62	47,47	47,47	145	0,70	0,40
KMT	**0,73**	**0,43**	**0,67**	**0,59**	**8,76**	**8,76**	**144**	**11,60**	**0,00**
T50M	**10,09**	**10,58**	**0,80**	**0,92**	**3,37**	**3,37**	**145**	**8,35**	**0,00**

Prema rezultatima univarijatne analize varijance može se utvrditi da se dječaci i djevojčice statistički značajno razlikuju u varijablama *modalitet trčanja* (KMT) i vrijeme *trčanja na 50 m* (T50M).

Tablica 4. *Rezultati diskriminacijske analize između djevojčica i dječaka*

DF	λ	Rc	wλ	x^2	df	p
1	0,194	0,403	0,837	25,118	5	0,000

Tablica 5. *Korelacija varijabli s diskriminacijskom funkcijom i položaj centroida grupa u koordinatnom sustavu diskriminacijskih funkcija*

VARIJABLA	DF 1
ATV	0,23
ATM	0,21
% MASTI	-0,16
KMT	-0,64
T50M	0,55
M - 0	0,46
Ž - 1	-0,41

Rezultati diskriminacijske analize ukazuju da diskriminacijska funkcija statistički značajno razlikuje dječake i djevojčice u analiziranim varijablama i objašnjava 16% zajedničke varijance. U *Tablici 5.* prikazane su korelacije varijabli s diskriminacijskom funkcijom i položaj centroida grupa na diskriminacijskim funkcijama pomoću kojih je moguće opisati razliku između dviju skupina ispitanika. Varijable koje se nalaze na negativnom polu diskriminacijske funkcije determiniraju djevojčice, a varijable na pozitivnom polu diskriminacijske funkcije dječake.

Prema dobivenim rezultatima može se utvrditi da su kod djevojčica izmjerene više vrijednosti u varijablama *postotak masti* (% MASTI) i da djevojčice u većem broju postavljaju stopalo nepravilno na podlogu u odnosu na dječake. Djevojčice u prosjeku postavljaju stopalo na podlogu preko pete i punog stopala, dok se kod dječaka u prosjeku prvi kontakt stopala s podlogom odvija pravilno odnosno preko prednjeg dijela stopala (prstiju).

ZAKLJUČAK

Na temelju dobivenih rezultata u ovom istraživanju može se zaključiti da djevojčice u prosjeku više postavljaju stopalo na podlogu preko pete, dok dječaci postavljaju puno stopalo na podlogu. Najmanji broj djevojčica i dječaka postavljao je stopalo na prednji dio, iako veći broj dječaka pravilno postavlja stopalo na podlogu u odnosu na djevojčice. To znači da dječaci imaju racionalniju tehniku trčanja, a u prilog tome govori i činjenica da su dječaci postigli bolji rezultat u trčanju na 50 m. Analizom razlika između dječaka i djevojčica može se utvrditi da se dječaci i djevojčice statistički značajno razlikuju u vremenu trčanja na 50 m i modalitetu trčanja, dok su kod djevojčica izmjerene više vrijednosti u varijablama postotak masti i djevojčice u većem broju postavljaju stopalo nepravilno na podlogu u odnosu na dječake. Dobiveni rezultati kod djevojčica i dječaka mlađe školske dobi ukazuju da

veliki broj djece nepravilno postavlja stopalo na podlogu u sprinterskom trčanju, a to doprinosi većem gubitku brzine i smanjenoj efikasnosti trčanja. Dobivene razlike mogle bi se tumačiti oblikom i organizacijom igre odnosno načinom provođenja slobodnog vremena. Djevojčice mlađe školske dobi još su uvijek u igri koja je više stacionarnog tipa, dok su dječaci više fizički aktivni što se odražava na kvaliteti njihove muskulature. Iz navedenoga moglo bi se preporučiti učenje pravilne tehnike trčanja kao jedan od prioriteta u nastavi tjelesne i zdravstvene kulture kod djece u prvom obrazovnom ciklusu.

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SPRINT RUNNING OF CHILDREN IN YOUNGER SCHOOL AGE

ABSTRACT

The National Curriculum Framework defines the expected pupils' achievements for all educational areas in cycles. In the context of the first cycle of the physical and health area (from the first to the fourth grade of elementary school), one of the aims is to make children competent for the use of natural forms of movement in everyday life and work. Running is a natural form of movement and its performance is not challenging, but to achieve success in running, it is necessary to master a good running technique. A research has been conducted on a sample of 150 male and female pupils of an elementary school from Pula, with the aim to define the modality of running (placing the foot on the ground from toes along the full feet to the heel), as well as the differences in anthropometric characteristics and the 50 metres running time achieved between boys and girls of a younger school age. The results obtained with boys and girls of a younger school age show that a large number of children place the foot on the ground irregularly in sprinter's running and that the acquisition of a right running technique should be one of the priorities in Physical Education in the first educational cycle.

Key words: *sprint, National Curriculum, right running technique*

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RODITELJSKA POTPORA DJEČACIMA U INDIVIDUALNIM I EKIPNIM SPORTOVIMA

UVOD

Roditelji su u razvoju većine djece najvažnije osobe. Obitelj je najvažniji dio bazične okoline djeteta, mikrosustava koji je prvo i najutjecajnije socijalno okruženje (Bronfenbrenner, 1986.). Prema Woolgaru i Poweru (1993.), načini na koji se roditelji uključuju u sportsku aktivnost svoje djece očituju se kroz tri osnovna oblika. Prvi je roditeljska potpora koja se može prikazati kao emocionalna podrška (pomoć djetetu u stresu), pružanje informacija (davanje savjeta) te konkretna pomoć (materijalna i financijska podrška, prijevoz i sl.). Drugi tip roditeljske potpore koji se očituje kroz sudjelovanje roditelja u sportu su socijalno učenje i operantno uvjetovanje. Pri modeliranju, roditelj svojim ponašanjem u sportu pruža model djetetu. Pri uvjetovanju, roditelj na različite načine potkrepljuje dječje ponašanje u sportu. Treći oblik sudjelovanja roditeljska su očekivanja dječjeg postignuća u sportu. Ona su prihvatljiva tek kada su u skladu s djetetovim realnim mogućnostima, a ako su preniska ili previsoka tada su štetna za dijete.

Hellstedt (1987.) je prepoznao tri tipa roditelja u sportu. **Pretjerano angažirani roditelji** su u prevelikoj mjeri uključeni u trenažni proces i uspjeh djeteta. Svom djetetu postavljaju nerealno visoke ciljeve. Ne znaju odvojiti vlastite ciljeve od djetetovih i često se ponašaju kao da su i sami treneri. Pretjerano angažirane roditelje karakterizira redovita prisutnost na treninzima, česti razgovori s trenerom, neprestano zahtijevanje od djeteta da uloži više truda i rada, nemogućnost kontrole emocija na natjecanjima i kažnjavanje djeteta ako nije ispunilo njihova očekivanja na natjecanju. **Umjereno angažirani roditelji** imaju čvrsta uvjerenja i stavove u odgajanju djeteta, zadaju granice ponašanja i upućuju dijete što je dobro, a što ne. Pokazuju dovoljno razumijevanja djetetu za samostalno donošenje odluka o sportskoj karijeri. **Neangažirani roditelji** ne pružaju u dovoljnoj mjeri niti emotivnu niti materijalnu potporu djetetu. Takvi roditelji ne financiraju troškove treninga i natjecanja, ne brinu o prijevozu i prehrani djeteta, ne pokazuju interes za rad i napredak djeteta sportaša te ne dolaze na treninge i rijetko dolaze gledati dijete na natjecanju. Hellstedt (1987.) navodi da dijete neangažiranih roditelja često nalazi „zamjenskog roditelja" u treneru što ponekad može dovesti do pretjeranog emotivnog vezanja za trenera.

Premda svoj djeci u sportu treba emocionalna potpora, u različitim sportovima je različita potreba za angažmanom roditelja. Tenis i skijanje su primjer sportova u kojima je gotovo nemoguć napredak bez visoko angažiranih roditelja. Postavlja se pretpostavka da će u individualnim sportovima postojati veća potpora roditelja djetetu sportašu od one u ekipnim sportovima. Istraživanje Greblo i Lorger (2006) na dječacima različite dobi iz različitih sportova potvrđuje ovo gledište. Može se pretpostaviti da će u timskom sportu dijete imati priliku biti poduprto ne samo od vlastitih roditelja nego i od strane vršnjaka i njihovih roditelja pa će očekivanje potpore od očeva i majki biti niže. Drugim riječima, postavljena je hipoteza da će roditelji djece u individualnim sportovima iskazivati veću potporu djetetu u sportu od roditelja djece iz ekipnih sportova.

Cilj ovoga rada je na uzorku očeva i majki dječaka koji treniraju košarku, nogomet i taekwondo provjeriti hipotezu o razlici roditeljske potpore u ekipnom i individualnom sportu.

METODE

Uzorak ispitanika ovog istraživanja čine očevi i majke dječaka u dobi od 7 do 14 godina koji redovito treniraju najmanje godinu dana košarku, nogomet i taekwondo. Istraživanje je provedeno samo na dječacima da bi se isključio utjecaj spola djeteta na roditeljsku potporu, utvrđen u radu Matkovića i ostalih (2003). Ispitano je 220 roditelja od kojih je 217 uredno popunilo upitnik. Struktura uzorka s obzirom na sport djeteta i spol roditelja nalazi se u tablici 1.

Tablica 1. *Struktura uzorka s obzirom na sport djeteta i spol roditelja*

Sport djeteta	Frekvencija očeva	Frekvencija majki	Ukupno
Košarka	27	40	67
Taekwondo	31	40	71
Nogomet	37	42	79
Ukupno	95	122	217

U istraživanju je korištena Skala roditeljske potpore djeci u sportu (Bosnar, 2003)

u verziji od 25 čestica. Odgovori na čestice daju se na pet-stupanjskoj skali tako da je minimalni mogući rezultat 25, a maksimalni mogući rezultat 125 bodova. Skala registrira četiri oblika roditeljske potpore:

1. Roditeljska vjerovanja u dobrobit bavljenja sportom (9 čestica)
2. Osiguranje materijalnih uvjeta za bavljenje sportom (6 čestica)

3. Učenje prema modelu (3 čestice)
4. Pozitivna potkrjepljenja (7 čestica)

Roditelji su odgovorili na čestice skale dobrovoljno i anonimno, prilikom dovođenja djeteta na trening.

Razlike u roditeljskoj potpori očeva i majki dječaka koji treniraju košarku, nogomet ili taekwondo određene su univarijatnom dvofaktorskom analizom varijance na jednostavno sumiranom ukupnom rezultatu Skale roditeljske potpore djeci u sportu (Bosnar, 2003), s grupama definiranim spolom roditelja i sportom djeteta.

REZULTATI I DISKUSIJA

Tablica 2. *Aritmetičke sredine (AS), standardne devijacije (SD), minimalne (min) i maksimalne (max) vrijednosti odgovora u česticama Skale roditeljske potpore djeci u sportu*

Tvrdnja (verzija za majke)	AS	SD	min	max
1. Smatram da je za zdravlje moje djece bilo važno što su se bavila sportom.	4.75	0.455	3	5
2. Bilo mi je drago kad su mi djeca provodila vrijeme s društvom iz sporta.	4.57	0.573	3	5
3. Smatram da u sportu nitko nije mogao nauditi mojoj djeci.	3.65	0.931	1	5
4. Kad smo odlazili na izlet ili na odmor, redovito sam se sa svojom djecom bavila nekim sportom.	3.89	0.910	1	5
5. Rado sam gledala kako se moje dijete bavi sportom.	4.66	0.494	3	5
6. Pomagala sam da mi dijete uvijek ima čistu i urednu sportsku opremu.	4.38	0.822	2	5
7. Plaćala sam za izvanškolsku sportsku aktivnost mog djeteta.	4.61	0.627	1	5
8. Ponosna sam što su mi se djeca bavila sportom.	4.83	0.445	3	5
9. Željela sam da mi se djeca bave sportom da bi bila spretnija i snažnija.	4.57	0.612	2	5
10. Smatram da su sportaši dobro društvo za moje dijete.	4.34	0.679	3	5
11. Kad znam da je na sportu, ne brinem za svoje dijete.	3.83	0.842	2	5
12. U našoj porodici rado smo zajednički gledali sportske prijenose.	3.96	0.921	1	5
13. Kad mi se dijete takmičilo, ja sam bila redoviti navijač.	4.44	0.736	2	5
14. Pomažem djeci u organizaciji prijevoza, prehrane i sl. da uz druge obaveze ne zanemare sport.	4.35	0.702	2	5
15. Sportsku opremu naše djece financirali smo mi roditelji.	4.38	0.626	2	5
16. Kad pričam drugim ljudima o svojoj djeci, rado ističem da su se bavila sportom.	4.70	0.514	2	5
17. Htjela sam da mi djeca budu otporna na bolesti pa sam ih poticala da se bave sportom.	4.45	0.628	2	5

	Tvrdnja (verzija za majke)	AS	SD	min	max
18.	Bilo mi je drago kad se u našoj kući skupljalo društvo iz sporta moje djece.	4.38	0.662	1	5
19.	Bila sam sigurna da u sportu nitko neće nagovarati moje dijete da pije, puši ili uzima drogu.	3.74	0.830	1	5
20.	U našoj porodici smo se često zajednički bavili nekom sportskom aktivnosti, bez obzira na razlike u godinama.	3.94	0.904	2	5
21.	Uvijek sam opazila kad bi mi dijete postalo vještije u svom sportu.	4.11	0.765	2	5
22.	Ako je trener zatražio, rado sam pomagala u organizaciji treninga i takmičenja.	3.99	0.948	1	5
23.	Nisam nikada štedjela novac kad je bilo u pitanju bavljenje sportom moje djece.	4.49	0.645	2	5
24.	Rado sam razgovarala s djecom o njihovom sportu.	4.62	0.539	3	5
25.	Nije mi bilo drago kad mi je dijete kazalo da će se prestati baviti sportom.	4.34	0.804	1	5

Prosjeci rezultata u česticama Skale roditeljske potpore djeci u sportu su redom visoki, bez obzira na koji aspekt potpore se odnosili. Očekivano, i ukupni rezultat na skali vrlo je visok i upućuje na visoku razinu roditeljske potpore djeci u sva tri sporta.

Tablica 3. *Osnovni statistički parametri ukupnog rezultata Skale roditeljske potpore djeci u sportu (Bosnar, 2003) na ukupnom uzorku i subuzorcima definiranim spolom roditelja i sportom djeteta.*

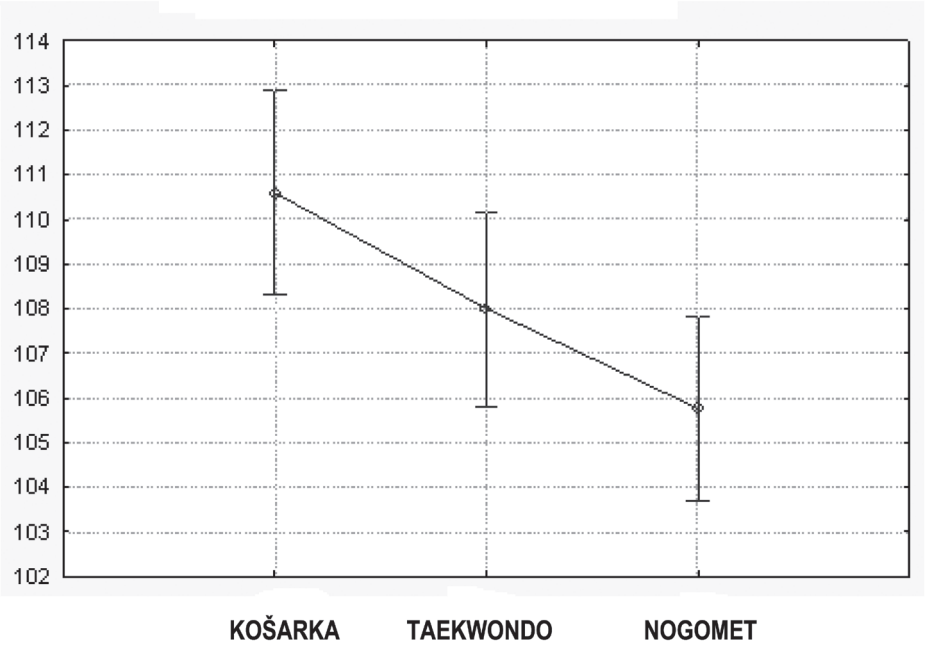
	Efektiv	Aritmetička sredina	Standardna devijacija
Ukupni uzorak	217	107.99	9.527
Košarka	67	110.79	7.621
Taekwondo	71	107.97	10.941
Nogomet	79	105.62	9.074
Očevi	95	108.43	9.985
Majke	122	107.64	9.181
Košarka - očevi	27	109.59	7.905
Košarka - majke	40	111.60	7.414
Taekwondo - očevi	31	108.13	11.386
Taekwondo - majke	40	107.85	10.729
Nogomet - očevi	37	107.84	10.281
Nogomet - majke	42	103.67	7.449

Dvofaktorska univarijatna analiza varijance (tablica 4.) grupa definiranih spolom roditelja i sportom djeteta, na ukupnom rezultatu Skale roditeljske potpore djeci u sportu je pokazala statistički značajnu razliku s obzirom na sport djeteta, i beznačajne razlike s obzirom na spol roditelja i u interakciji sporta djeteta i spola roditelja.

Tablica 4. *Rezultati dvofaktorske univarijatne analize varijance grupa definiranih spolom roditelja i sportom djeteta, na jednostavno sumiranom rezultatu Skale roditeljske potpore djeci u sportu (Bosnar, 2003).*

	Suma kvadrata	Stupnjevi slobode	Prosječni kvadrati	F - vrijednost	značajnost F testa
Sport djeteta	832	2	416	4.81	0.009
Spol roditelja	35	1	35	0.41	0.525
Interakcija sport * spol	353	2	176	2.04	0.132
Pogreška	18227	211	86		

Premda je razlika s obzirom na sport djeteta statistički značajna, ona nije u očekivanom smjeru i hipoteza o većoj potpori djeci u individualnom sportu se mora odbaciti. Najveći rezultat na skali su postigli roditelji djece iz košarke (tablica 3. i slika 1.), zatim iz taekwondoa, a najmanji rezultat su pokazali roditelji djece-nogometaša. Razlozi ovom poretku potpore mogu biti višestruki. U sredini u kojoj je vršeno mjerenje nogomet je vrlo popularan sport u kome se okušaju mnoga djeca, no u kojemu je i veliko osipanje. Moguće je da roditelji ovaj sport doživljavaju kao „još jednu aktivnost u nizu" pa premda daju veliku potporu, ne iskazuju pritom preveliki entuzijazam. U istoj sredini, košarka je elitni sport gdje je selekcija prisutna već u dječjoj dobi. Status sporta bi mogao biti faktor koji jača namjeru roditelja da pomognu djeci da ostanu u košarci što se očituje u višem stupnju roditeljske potpore procijenjene upitnikom.



Slika 1. *Grafički prikaz aritmetičkih sredina s 95-postotnim intervalima vjerojatnosti na Skali roditeljske potpore djeci u sportu roditelja s djecom iz tri sporta. Na ordinati su ukupni rezultati skale u bodovima.*

Mogući razlog opaženog ranga podrške u tri sporta mogla bi biti i socijalna klima u taekwondo klubovima koja ne mora nužno biti različita od one u timskim sportovima. Premda je to individualni sport on se trenira u grupama. U taekwondou postoje težinske kategorije i djeca nisu nužno suparnici jedan drugome. Lako je moguće da jednostavna podjela sportova u samo dvije grupe nije dovoljna već da bi se u daljnjim istraživanjima trebalo uzeti u obzir više karakteristika situacije u kojoj se sport odvija.

Rezultati ovog istraživanja su zanimljivi pokazatelj, no ne bi se smjeli generalizirati. Buduća istraživanja treba provesti u više različitih sredina, na većem broju sportova i na većim uzorcima ispitanika.

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PARENTAL SUPPORT FOR BOYS IN INDIVIDUAL AND TEAM SPORTS

ABSTRACT

Sport career of young athletes largely depends on parental support. The aim of this research was to identify the differences in the fathers' and mothers' support for boys in individual and team sports on the sample of 217 parents whose children practiced basketball, football and taekwondo. A questionnaire of parental support (Bosnar, 2003) was applied in the version consisting of 25 items. The results obtained indicated a high degree of parental support in all sports. Two – factor univariate analysis of variance showed a statistically significant difference in the parental support with regard to child's sport, but not in expected direction. The result showed that the greatest support for children was in basketball, then in taekwondo, and the lowest in football, so the assumption that there is a difference in support for children depending on whether they are involved in individual or team sport must be rejected.

Key words: *parental support, boys, basketball, football, taekwondo*

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Original scientific paper

CHANGES IN FUNDAMENTAL MOVEMENT SKILLS CAUSED BY A GYMNASTICS TREATMENT IN PRESCHOOLERS

INTRODUCTION

Learning is a process of acquiring the capability for producing skilled actions (Schmidt and Lee, 2005) and is a direct result of practice or experience. Motor learning, on the other hand, is not directly observable because the processes that underlie changes in capability are probably highly complex phenomena in the central nervous system. As such, they are rarely directly observable, and one must infer their existence from changes in motor behaviour. The term movement skill refers to the development of motor control, precision and accuracy in the performance of both fundamental and specialized movements (Gallahue and Donnelly, 2003). Movement skills are developed and refined to a point that children are capable of operating with considerable ease and efficiency within their environment. As children mature, the fundamental movement skills developed when they were younger are applied as specialized skills to a wide variety of games, sports and activities. Authors define fundamental movement skills as an organized series of basic movements that involve the combination of movement patterns of two or more body segments.

Generally, the differences between genders become noticeable in preschool period already. Boys' higher values of triceps muscle tissue and shoulder/hip ratio are well-known. Furthermore, boys score better at motor strength and endurance tests, as well as at running and jumping tests. On the other hand, girls outperform boys at rhythm-based and flexibility tests.

The differences in the fundamental movement skills learning dynamics are a topic of many researches (Burton and Miller, 1998; Goodway, Robinson and Crowe, 2010). As a rule, girls outperform boys at precise motor actions such as drawing, typing and tapping. They are also better at reaction speed (Burton and Miller, 1998), while the boys have an advantage in running, jumping and punching. Bruininks and Bruininks (2005) also found similar results: girls are better at precise motor actions and ambidexterity. Seefeldt and Haubenstricker's (1982) was the only research that focused on the fundamental movement skills learning throughout a period of time. The authors revealed that initially the girls were better than the boys in 4 out of 8

skills. Despite the initial advantage, the boys got ahead of girls in the acquisition of 5 out of 8 motor skills.

According to previously mentioned, the main aim of current research was to determine gender differences in fundamental movement skills acquisition under the influence of a specialized gymnastics treatment.

METHODS

A total of 58 preschool children (mean age 6±0.5 years) took part in this research. Two experimental groups consisted of 34 boys and 24 girls. They were chosen only for their preschool status and their parents gave informed consent. They averaged 122.0 cm in height, 24.27 kg in weight and 16.2 in body mass index. All children had to attend at least 80% of the total number of lessons and they were not to participate in any other training programme or activity.

„Bruininks-Oseretsky Test of Motor Proficiency 2" (BOT-2) was administered prior to and after the 10-week gymnastics treatment. BOT-2 is a screening tool for fundamental movement skills assessment (Bruininks and Bruininks 2005). As a long period of time is required for the administration of the complete form of the test (approximately 60 minutes per child), a short form was used in this study. Opposed to a complete battery of 53 tests, the short form consisted of 14 tests that best represent certain motor area. The test is divided into 8 motor areas (*fine motor precision, fine motor integration, manual dexterity, upper-limb coordination, balance, bilateral coordination, running speed and agility, strength*) that result in total motor composite which summarizes the child's overall motor proficiency. BOT-2 also includes score standardization according to the normative data separated by gender and age. The standardization was done and is displayed in this study.

The two experimental groups (boys and girls) underwent the same 10-week experimental treatment. They practiced 3 times a week for 35 minutes (according to the official preschool programme). The treatment was led by the same coach in the preschool gym and the groups consisted of 20 children. Six units (walking and maintaining balance; running; jumping and skipping; tossing, throwing, rolling; climbing and crawling; games) prescribed by the official preschool programme formed a part of the treatment. The other part consisted of specific gymnastics units. Each unit comprised 2 to 6 activities, while the total number of activities was 20.

Data were analyzed using the Statistica for Windows 7.0 package and the statistical significance was set at $p \leq 0.05$. Basic descriptive statistics were calculated separately for boys and girls (mean value and standard deviation). The independent-sample t-test was used to compare genders in all variables while dependent-sample t-test was used to analyze the differences between the initial and the final measurement.

RESULTS

Table 1. *Basic descriptive statistics (mean value ± standard deviation) separately for groups and measurements; t-test results between groups and between measurements*

	INITIAL		FINAL	
	B (n=34)	G (n=24)	B (n=34)	G (n=24)
Fine motor precision	7.65±2.73	9.79±2.73*	9.35±2.27¥	10.54±2.65
Fine motor integration	5.74±2.14	7.58±1.93*	7.21±2.51¥	7.75±1.89
Manual dexterity	3.56±1.13	4.33±1.24*	4.24±1.30¥	4.67±0.92
Upper-limb coordination	6.24±3.10	6.04±2.22	7.97±3.30¥	7.25±1.70¥
Balance	6.76±1.10	7.42±1.02*	6.79±1.17	7.38±0.77*
Bilateral coordination	5.97±1.27	6.46±0.78	6.65±0.73¥	6.96±0.36¥
Running speed and agility	3.82±1.99	5.46±2.28*	6.91±2.01¥	7.92±1.18*¥
Strength	3.68±2.47	3.29±2.12	5.65±2.46¥	5.83±1.40¥
Total motor composite	43.41±9.71	50.38±6.68*	54.76±9.98¥	58.29±6.56¥
STANDARDIZED RESULT	47.38±7.72	47.62±6.84	58.15±9.48¥	57.17±7.20¥

Legend: * differences between groups (p<0.05); ¥ differences between measurements (p<0.05)

Results (Table 1) show initial differences between genders in 5 out of 8 variables (motor areas) as well as in the total motor composite in favour of girls. Nevertheless, when observing the standardized score, the difference does not exist. Analyzing the influence of the treatment on the fundamental movement skills learning, the boys improved in all motor areas except *balance* while the girl's improvement was noted in only 4 motor areas. The final testing showed gender differences in *balance* and *running speed and agility* in favour of girls while no differences were found in the rest of the variables. Standardized results show that the boys got ahead of girls but with no significant differences according to t-test.

DISCUSSION

According to presented standardized scores, these groups of boys and girls can be classified in the group of average fundamental movement skills children considering that results of the participants fall in the range of 68% of the population that have one standard deviation of the mean score in either direction.

Initially, results indicate the girls' advantage in 5 out of 8 variables including the total motor composite. Their advantage in *fine motor precision*, *fine motor integration* and *manual dexterity* was expected according to previous research (Bruininks and Bruininks, 2005; Burton and Miller, 1998). It is assumed that these results represent

normal differences in motor development and do not reflect any difference between females and males in the prevalence of motor impairment in the population. Girls' higher scores in *balance* confirm previous research results. However, it is important to emphasize that only one test was used for balance assessment (standing on one leg on balance beam – eyes open) which is, in authors' opinion, not enough for quality judgment, so further interpretations could be doubtful. Girls' advantage in the test of *running speed and agility* was not expected due to the studied literature where boys precede in speed. The probable reason is the test itself which is used in the BOT-2 short form (one-legged stationary hop). The task was to perform as many one-legged hops as possible in 15 seconds maintaining the proper form. Girls performed the hops with minimal height and therefore scored better. This can be interpreted by culture differences. Girls from this region spend most of their outdoor free time in a traditional game of „rope jumping" which can be the reason of better test results. Finally, authors are of the opinion that this test is probably valid but not for our region. Therefore, it is advisable to substitute it with a test that can assess the area of *running speed and agility* more accurately.

The differences in the final testing occurred in two variables: *balance* and *running speed and agility*. So, comparing these results with the results of initial testing, girls kept their domination in two mentioned variables. However, the absence of significant differences in *fine motor precision*, *fine motor integration* and *manual dexterity* areas proves that the boys caught up with the girls. Additional evidence is the absence of significant differences in the total motor composite. The results of the study by Seefeldt and Haubenstricker (1982), where the boys' results exceeded the girls' results, are not totally consistent with the results from this research. However, it is important to emphasize that the current research consisted of 2.5-months treatment.

Analyzing the differences between the measurements, we notice that the boys advanced in 7 out of 8 motor areas. The only exception was the *balance* area whose validity is questionable due to the earlier statement. Naturally, significant improvement occurred in the boys' total motor composite which proves the adequacy of the treatment. On the other hand, the girls' improvement seemed to be incomplete. They demonstrated an improvement in 4 out of 8 motor areas and the total motor composite as well. So the positive learning transformation is inevitable, but the change seemed to be considerably smaller than in boys. Mazzardo (2008) suggests that the main reason for the existing differences is the fact that in early age, boys choose activities that develop manipulative skills (soccer, basketball, handball) while girls choose activities with the potential of developing locomotor skills (gymnastics, dance). Considering the latter, the question of adequacy of treatment for both genders arises: was the content of the treatment appropriate for both boys and girls? The explanation can possibly be found in specific gender-based activities practiced by the

children in this region. The traditional games that boys and girls play outdoors are very much different and that could probably be the reason why they learn fundamental movement skills with different intensity and dynamics. The influence of parents is not to be excluded either, mostly in the physical activity and sport selection where polarizing the activities into „male" and „female" sports is a common phenomenon. It is possible to conclude that the treatment was too easy for the girls and therefore was not challenging enough. Boys, on the other hand, found it stimulating and encouraging and it served for development of the movement skills that have been neglected by choosing different activities.

CONCLUSION

The sample of 58 preschool children observed in this study can be defined by a sample of average fundamental movement skills of children according to their results in BOT-2. The same results showed the advantage of girls over boys in initial testing, especially in the fine motor skills areas. It was also shown that the test which measures running speed and agility was probably not valid because of cultural differences. After the 10-week treatment, the final testing showed significant improvement in the fundamental movement skills among boys, while the progress was less noticeable among girls. It can be concluded that the treatment was not adequate for the girls and that they could not fully improve their level of fundamental movement skills. Also, the difference probably occurred because of the different type of activities that boys and girls practice in their free time, gender-based activities, respectively. That could be the reason of different level of skill acquisition in this research.

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ABSTRACT

The aim of this research was to determine gender differences in fundamental movement skills acquisition under the influence of a specialized gymnastics treatment. A total of 58 preschool children took part in this research and were divided in two groups (34 boys and 24 girls). „Bruininks-Oseretsky Test of Motor Proficiency 2" (BOT-2) for fundamental movement skills assessment was administered prior to and after the 10-week gymnastics treatment. Results showed initial differences between genders where girls outperformed boys in 5 out of 8 variables while the final testing showed differences only in the *balance* and *running speed and agility* tests in favour of girls. It can be concluded that the treatment was not adequate for the girls and that they could not fully improve their level of fundamental movement skills. The difference probably occurred because of the different type of activities that boys and girls practice in their free time.

Key words: *BOT-2, motor proficiency, cultural differences, gender differences*

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USVAJANJE MOTORIČKIH VJEŠTINA KROZ IGRU I POLIGONE

UVOD

Igra je prvo čovjekovo samostalno i stvaralačko iskustvo s okolinom. Razvijala se i usavršavala kao i čovjek, što se tiče funkcije i sadržaja. Igra i igranje najviši su stupanj dječjeg razvitka jer je igra aktivno predstavljanje unutrašnjosti (Bunčić,K., Janković, P. 2007.). Igra je najčistiji i najduhovitiji proizvod za sve uzraste, a istodobno uzor i kopija čitavog čovjekovog života.

Kako se igra odlikuje bogatstvom i jednostavnošću pokreta, vrlo dobro djeluje na tjelesni i na psihički razvoj učenika. Oslanjanje igara na utilitarne oblike kretanja (hodanje, trčanje, bacanje, skakanje) (Vukotić, E., J. Kramaršek 1951.) omogućuje da se igrom i kroz igru pozitivno utječe na usvajanje motoričkih vještina. Školski uzrast djece još je uvijek doba igre, to je doba kada motoričko gibanje predstavlja bazni oblik aktivnosti djeteta. S obzirom da je motoričko gibanje velika potreba s aspekta odgoja i obrazovanja nezamjenjiva je kao sredstvo za njegov razvoj. Nedovoljna motorička aktivnost u školskoj dobi ne utječe samo na razvoj sposobnosti i znanja učenika već i na zdravstveni status učenika. Danas se u školama traži samo znanje koje najčešće učenici poistovjete s informacijom, a znanje koje steknu na satu sve manje povezuju s razmišljanjem već vrlo često improviziraju. Na satu tjelesne i zdravstvene kulture ne smije biti improvizacije već strogo osmišljen sadržaj sata. (Zegnal, M. 2009.) Škole bi trebale biti autonomne odgojne sredine koje bi učenicima trebala ponuditi mogućnost odabira kineziloških sadržaja kako ne bi dolazilo do negativnih posljedica na zdravlje školskog djeteta (Findak, V. 1992.)

Stoga će se u ovom radu ponuditi kineziološke aktivnosti u vidu igara, a koje će se primijeniti na poligonima, a u svrhu razvoja kontrole primarnih biotičkih motoričkih vještina.

CILJ RADA

Cilj rada sastoji se u odabiru najpogodnijih kineziloških sadržaja koje će učenici implementirati u razne igre i tipove poligona. Kroz prakticiranje raznih modela i

tipova poligona utječe se na razvoj primarnih biotičkih motoričkih znanja i vještina u vidu svladavanja otpora, prepreka i snalaženja u prostoru.

ANALIZA PROBLEMA

Briga za normalni tjelesni razvoj i zdravlje učenika poznata je kao jedna od najvažnijih zadaća nastavnika tjelesne i zdravstvene kulture uz suradnju sa samim učenikom. Imajući u vidu tu konstataciju možemo reći da se rad u tjelesnom i zdravstvenom odgoju školskog djeteta odvija u dva smjera

1). Obrana organizma od štetnih vanjskih utjecaja u što ulazi pravilna prehrana, osiguranje higijenskih uvjeta i navika te zaštita zdravlja učenika.

2). Primjenom nastave tjelesne i zdravstvene kulture treba učvrstiti organizam te kroz korištenje prirodnih faktora kao što su sunce, voda i zrak.

Tjelesno vježbanje školske djece nije samo simulator njihovog razvoja već i izvor zadovoljavanja esencijalnih i egzistencijalnih potreba (Findak, V. 1995.). Tijekom školovanja dijete stječe mnoga iskustva, što utječe na razvoj njegovih socijalnih, emocionalnih i radnih mogućnosti. Prednosti koje donosi tjelesna aktivnost za njegov razvoj su: očuvanje i unapređenje zdravlja, bolje snalaženje u prostoru i vremenu, spoznaje kooperativnost i vrste natjecanja, razvija moralnu odgovornost, razvija sposobnost kontrole svog ponašanja. Svrha kvalitetnih kineziološkihaktivnosti kod djece školskog uzrasta sastoji se u stjecanju iskustva u učenju motoričkih gibanja i socijalizaciji između učenika.

Koristeći raznovrsne sadržaje utječemo na podizanje motoričkih vještina i znanja kao i na motoričkih dostignuća. Kao što je u dosadašnjim istraživanjima utvrđeno, (Tkalčić, S. 2000.) da su motorička znanja stupanj usvojenosti pojedinih motoričkih struktura koje mogu biti na različitim razinama. Motorička su dostignuća sprega motoričkih znanja i motoričkih vještina, a izražavaju se kroz spretnost učenika da u konkretnoj motoričkoj situaciji poveže i maksimalno iskoristi radi podizanja što boljeg rezultata.

Da bi se zadovoljila potreba za tjelesnim vježbanjem vrlo su prikladne vježbe na različitim spravama i uporabom raznih pomagala. Sprave i pomagala najčešće su standardnih dimenzija, što znači da nisu tipizirane za sve uzraste školske djece te su im stoga vrlo interesantni načini na koji mogu manipulirati nekom od sprava i pomagala. Važno je znati da svaka sprava privlači pažnju svakom učeniku pa je stoga potrebno omogućiti učenicima nižih razreda da se kližu, penju, provlače, da se bore s osobnom ravnotežom, provlače i slično. Svaka takva aktivnost utjecat će na razvoj mišićnih skupina, a u konačnici i na cijeli organizam. Hodanjem, trčanjem, skakanjem i poskakivanjem svaki će učenik obogatiti i razviti svoju motoriku, usavršiti osjet

ravnoteže, stječi znanja o vremenu i prostoru, a ujedno će ojačati odgovarajuće mišićne skupine te razviti pokretljivost zglobova.

Hvatanje, guranje, bacanje važno je za učenika jer usavršava baratanje s raznim pomagalima za vrijeme igre služeći se i rukama i nogama. Takve aktivnosti ponudit će se starijem uzrastu školske djece te uz navedene aktivnosti može se uključiti i aktivnost penjanja koja je važna za svakodnevni život jer aktivacijom velikih skupina mišića pomaže kod razvoja učenika.

Za vrijeme nastave tjelesne i zdravstvene kulture možemo kombinacijom raznih sprava (švedske ljestve, švedska klupa, švedski sanduk, vijače, palice, lopte, obruče) postaviti razne tipove poligona čije rješavanje zahtijeva od učenika njihovu veliku angažiranost. Radom na raznim tipovima poligona utječe se kod učenika na okretnost, eksplozivnu snagu nogu i ruku, psihomotornu preciznost, osjećaj za prostor kojim s ujedno razvija i koordinacija pokreta kao i sama ravnoteža, te točnost izvođenja samog pokreta.

Kroz igru radeći na poligonima kod učenika se razvija osjećaj zajedničke odgovornosti, osjećaj pripadnosti grupi, osjećaj smišljenog vođenja tijeka sata nastave tjelesne i zdravstvene kulture te potreba za uzajamnim čuvanjem i asistiranjem, što u konačnici utječe ne samo na zdravlje već i na podizanje nivo kompetencija učenika za vrijeme izvođenja sata tjelesne i zdravstvene kulture.

Kod planiranja i programiranja sata tjelesne i zdravstvene kulture svako se treba naći mjesta za kombiniranje sprava koje će se koristiti kao poligon u glavnom djelu sata.

Opis nekoliko poligona:

Poligon 1

Pomagala koja su potrebna za ovaj poligon: dvije švedske klupe, švedski sanduk, četiri strunjače, šest obruča.

Opis zadatka; učenici su podijeljeni u dvije iste kolone, sprave su poredane tako da svaka kolona ima iste zadatke. Prednost takvog zadatka je u tome što učenici dolaze brže na red tako da samo izvršenje zadataka ima svoju dinamiku. Učenici se kreću u dva kruga i rade iste zadatke. Počinju tako da hodaju po koso položenoj klupi na kojoj se zadaci tijekom rada mijenjaju, trčanje uz koso položenu klupu, skok u dubinu elastičnim doskokom na strunjaču, (visina sanduka 80 do 100 cm.) provlačenje kroz obruč, sunožni skok udalj.

Uputa: kod skoka u dubinu treba paziti da učenici doskoče elastično na prste kroz lagani počućanj kako bi se izbjegle moguće povrede koljena i skočnog zgloba, visina švedskog sanduka može biti do 100 cm.

Poligon 2

Pomagala koja su potrebna za ovaj poligon: dvije švedske klupe, švedske ljestve, konopac, dvije strunjače, stalci za skok uvis, letvica ili elastična traka, tri obruča.

Opis zadatka: svi učenici su u jednoj koloni te započinju zadatak penjanjem uz kosu klupu, pridržavajući se za konopac. U koliko razred broji veći broj učenika, a da se ne čeka na samom početku zadatka, poželjno je isti broj učenika odmah postaviti kod svake sprave.

Zadaci na poligonu su: penjanje po kosoj švedskoj klupi pridržavajući se za konopac koji je privezan za švedske ljestve, prelazeći sa švedskih ljestva na druge švedske ljestve, učenici se spuštaju po pritkama jednu po jednu do dna, prelazi se na skok uvis, učenici kosim zaletom preskaču letvicu sukladno njihovim motoričkim mogućnostima, provlačenje kroz tri obruča, penjanje na klupu i hodanje po istoj.

Uputa: na satu tjelesne i zdravstvene kulture ako postoje uvjeti (podloga u dvorani) treba se preporučiti učenicima da vježbaju bosi. Time direktno jačaju mišiće stopala i utječu na veliki broj dijagnosticiranih ravnih stopala (Pes planus).

Poligon 3

Pomagala koja su potrebna za ovaj poligon: švedske ljestve, četiri okvira od švedskog sanduka, niska greda, švedska klupa, lopte, koš za lopte.

Opis zadatka: učenici stoje u koloni i počinju zadatke provlačenjem i prelaženjem okvira švedskog sanduka. U koliko razred broji veći broj učenika, a da se ne čeka na samom početku zadatka, poželjno je isti broj učenika odmah postaviti kod svake sprave. Provlačenje i prelaženje okvira švedskog sanduka proizvoljno svakog učenika, penjanje po svakoj drugoj pritki na švedskim ljestvama, prelazak dokorakom do kose klupe i spuštanje trčeći po njoj, vježbe na niskoj gredi (hodanje po prstima, hodanje u čučnju, sunožno preskakivanje grede u uporu prednjem), bacanje lopta kroz obruč, pospremanje lopti u koš te krenuti ponovo na početak zadatka.

Uputa: prelaženja, provlačenja, penjanja i gađanje na ovom poligonu se ponavljaju, dok se novi zadaci izvode kod spuštanja ili kod prelaska grede. Vježbe na ovom poligonu mogu se ponoviti više puta kako bi se dobilo na zanimljivosti kod izvršenja zadataka.

Poligon 4

Pomagala koja su potrebna za ovaj poligon: švedska klupa, lopte, okviri švedskog sanduka, deset obruča, četiri košare za lopte, dva stola.

Opis zadatka: učenici su postavljeni u dvije jednake kolone, zadatak počinje bacanjem lopte kroz obruč na stalcima i svaka kolona izvršava iste postavljene

zadatke. Loptu naizmjenično bacati jednom pa drugom rukom kroz obruč na stalku, proći kroz okvir švedskog sanduka, uzeti bačene lopte, jednu staviti u košaru kraj klupe, a s drugom nastaviti vježbati na švedskoj klupi (hodati po klupi, bacati loptu sa strane u pod i uhvatiti je, hodati u čučnju i voditi loptu sa strane jednom pa drugom rukom, kotrljati loptu do postavljene prepreke (npr. ploča okrenutog stola) da se lopta odbije i vrati, sunožni poskoci iz obruča u obruč noseći loptu, hodajući bacati loptu u vis i hvatati, dolazi se ponovo na početak poligona.

Uputa: ovaj poligon sadrži šest zadataka, s obzirom da su svi zadaci vrlo jednostavni, pokušalo se većim brojem zadataka povećati zahtjeve kod same realizacije istih. Kineziolog kao stručna osoba mora voditi računa da na početku poligona bude uvijek dovoljno lopti, tako da će morat sam prenositi lopte kako bi se tijek i početak zadatka odvijao pravovremeno.

ZAKLJUČAK

Utilitarni oblici kretanja (hodanje, trčanje, bacanje, skakanje) omogućuje da se igrom i kroz različite tipove poligona pozitivno utječe na usvajanje motoričkih vještina.

Može se reći da su poligoni jedan od načina rada na satu tjelesne i zdravstvene kulture koji kod učenika pobuđuje interes za rad i vrlo često dovodi ih u situaciju da preispitaju nivo svojih kompetencija kod odabira postavke i težine poligona, a naročito je to vidljivo kod starijih uzrasta učenika. Razlozi koji pobuđuju interes su:

1. poligoni su jednostavni za izvođenje, a mogućnost im je da svaki drugi poligon ima nove zadatke, a koji su u potpunosti razumljivi i prihvatljivi za djecu školskog uzrasta što ujedno omogućava kvalitetnu i jednostavnu realizaciju,
2. učenici pokazuju izuzetnu motivaciju kod realizacije samih zadataka na poligonu,.
3. prakticiranjem postavljenih zadataka na poligonu učenici se uče discipliniranosti, pojavljuje se pozitivan način samodokazivanja kao i želja za uspjehom što će poboljšati i njihovu međusobnu komunikaciju i socijalizaciju,
4. poligon je takav rad kod kojega se koriste vrlo spretno izabrani kompleksi vježbi koji imaju utjecaj na cjelokupni razvoj učenikovih primarnih biotičkih motoričkih znanja i vještina.

Planiranju i programiranju sata tjelesne i zdravstvene kulture svako treba prići stručno i odgovorno te naći kvalitetan vremenski prostor za kombiniranje sprava koje će se koristiti kao poligon u glavnom djelu sata.

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THE ACQUISITION OF MOTOR SKILLS THROUGH PLAY AND TRAINING POLYGONS

ABSTRACT

Composing games based on utilitarian form of movement has proved itself to be one of the key positive factors for the acquisition of motor skills. The aim of the process is based on the selection of the most appropriate kinesiological principles and their implementation into different games and training polygons. Motor achievement is, in fact, the result of both motor knowledge and motor skills. In order to fulfil the need for physical exercise, it is ideal to use different kinds of devices and equipment. Working on different kinds of polygons will assure students' improvement in agility and explosive strength of arms and legs. While planning and programming each physical training, it is important to combine different devices organized as polygon. The training polygons are one of the most efficient ways to raise students' motivation and question their level of physical competence.

Key words: *polygon, game, students, motor skills, physical training*

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PHYSICAL EDUCATION AND INCLUSION OF PERSONS WITH DISABILITIES ACCORDING TO THE UNITED NATIONS CONVENTION (2006-2011)

INTRODUCTION

The Convention on the Rights of Persons with Disabilities (CRPD) was adopted by the United Nations General Assembly on 13th December 2006.

It is based on the United Nations Charter - Universal Declaration of Human Rights (1948) and it recalls and recognizes the dignity and equal and inalienable rights of all members of the human family for freedom, justice and peace in the world.

The World Health Organization (WHO) estimates about 10% of the world's population are persons with disabilities (over 650 million persons) and most of them (80%) are living in developing countries without basic services (health, school, job policy...).

In Europe, 17% of population suffer from a disability or a chronic illness. Unemployment rate of persons with disabilities is about three times the level for persons without disabilities. Employees with disabilities receive a lower salary and in many countries, they experience segregation through early experience in parallel education networks.

The CRPD purpose in the 1st article is „To promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity. Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others."

Aims

The CRPD is an instrument based on the human rights development and binding the full inclusion policy for person of disabilities in the society. It declares full human rights (all categories) and fundamental freedoms for persons with all types of disabilities.

With CRPD new „paradigm shift" was created based on the attitudes and approaches to persons with disabilities; they have changed from «„objects" of charity, medical treatment and social protection towards „subjects" with rights (capable of claiming those rights, making decisions; lives based on freedom and being active members of society)».

In accordance with ICF (WHO, 2000) the 1st CRCP article:

„Disability is an evolving concept, and that disability results from the interaction between persons with impairments and attitudinal, environmental barriers that hinders full and effective participation in society on an equal basis with others" (Preamble) and „Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others."

Disability results from an interaction between individuals and non-inclusive society and from this the new convention terminology „Person with disabilities" instead of „handicapped" was created.

The CRCP Guiding Principles are:

a. Respect for the dignity, individual autonomy and the freedom to make one's own choices, and independence of persons
b. Non-discrimination
c. Full and effective participation and inclusion in society
d. Respect for difference and acceptance of persons with disabilities as part of human diversity and humanity
e. Equality of opportunity
f. Accessibility
g. Equality between men and women
h. Respect for the evolving capacities of children with disabilities and respect for the right of children with disabilities to preserve their identities (Articles 3).

The Participation and the Inclusion in society became full and effective and it is declared in:

- the general principle (article 3); general obligation (article 4); rights (articles 29 and 30).

Participation, inclusion and accessibility are included under the general principles (article 3) and also under several provisions:

- The right to take part in the conduct of public affairs (article 29)
- The right to take part Participation in cultural life, recreation, leisure and sport (article 30)
- Inclusion is referred to in several articles e.g. right to education (article 24), right to live in the community (article 19), habilitation and rehabilitation (article 26)
- The needs and concerns of persons with disabilities have become clearer
- Persons with disabilities have the opportunity to raise issues and hold decision-makers accountable

The inclusion is a two-way process: persons with disabilities have become more visible and persons without disabilities have the opportunity to learn and change from the experience of persons with disabilities – and vice-versa.

All persons with disabilities must participate in all activities and according to the dictum: 'Nothing about us without us'.

Another important part of the CRCP is Non-discrimination principle, as declared in Human Rights Chart (UN, 1948). The Convention does not include any new rights but identifies the specific actions that States must take to protect against discrimination of persons with disabilities.

The Accessibility is another important general principle for the development of empowerment and inclusion by: justice (article 13); living independently and being included in the community (article 19); Information and communication services (article 21); education (article 24); health (article 25); habilitation and rehabilitation (article 26); work and employment (article 27) - human resource policies and practices; adequate standard of living and social protection (article 28); participation in political and social life (article 29); participation in cultural life, recreation, leisure and sport (article 30).

The CRCP structure is based on a Preamble and 50 articles:

Preamble			
Art. 1. Purpose	Art. 10. Right to life	Art. 19. Living independently and being included in the community	Art. 28. Adequate standard of living and social protection
Art. 2. Definitions	Art. 11. Situations of risk and humanitarian emergencies	Art. 20. Personal mobility	Art. 29. Participation in political and public life
Art. 3. General principles	Art. 12. Equal recognition before the law	Art. 21. Freedom of expression and opinion, and access to information	Art. 30. Participation in cultural life, recreation, leisure and sport
Art. 4. General obligations	Art. 13. Access to justice	Art. 22. Respect for privacy	Art. 31. Statistics and data collection
Art. 5. Equality and non-discrimination	Art. 14. Liberty and security of the person	Art. 23. Respect for home and the family	Art. 32. International cooperation
Art. 6. Women with disabilities	Art. 15. Freedom from torture or cruel, inhuman or degrading treatment or punishment	Art. 24. Education	Art. 33. National implementation and monitoring
Art. 7. Children with disabilities	Art. 16. Freedom from exploitation, violence and abuse	Art. 25. Health	Art.34 to 40. International monitoring mechanism
Art. 8. Awareness-raising	Art. 17. Protecting the integrity of the person	Art. 26. Habilitation and rehabilitation	Art. 41 to 50. Final clauses
Art. 9. Accessibility	Art. 18. Liberty of movement and nationality	Art. 27. Work and employment	Optional protocol

The right of persons with disabilities to education (article 24) declares the right of persons with disabilities to receive education through an inclusive education system at all levels and lifelong learning directed to:

a. The full development of human potential and sense of dignity and self-worth, and the strengthening of respect for human rights, fundamental freedoms and human diversity;

b. The development by persons with disabilities of their personality, talents and creativity, as well as their mental and physical abilities, to their fullest potential;

c. Enabling persons with disabilities to participate effectively in a free society.

Realizing this right shall ensure for the persons with disabilities general education system in the free and compulsory school from primary to the secondary education with other members of the communities in which they live.

The States Parties shall provide accommodation, individualized support and facilitation which will guarantee effective education and full inclusion of a person with disabilities.

The States Parties shall teach persons with disabilities about life and social skills to facilitate their full and equal participation in education as members of the community using appropriate methods (facilitating learning Braille, alternative script, augmentative and alternative modes and orientation to mobility skills, and facilitating peer support; mentoring; sign language).

The States Parties shall take appropriate teacher training programme for the inclusion (qualified in sign language and/or Braille, augmentative and alternative modes, means and formats of communication, educational techniques and materials to support persons with disabilities) and train professionals and staff who work at all levels of education; and employ teachers with disabilities.

The States Parties shall ensure that persons with disabilities are able to access general tertiary education, vocational training, adult education and lifelong learning without discrimination.

The right of persons with disabilities to Participation in cultural life, recreation, leisure and sport (Article 30).

The States Parties shall take all appropriate measures to ensure persons with disabilities the access to: cultural materials and programme (television, films, theatre and other cultural activities) through accessible format and participation at performance or service (theatre, museum, cinemas, libraries, tourism service, monuments and site of national cultural importance).

They will develop the artistic and intellectual potential and ensure laws protecting intellectual property rights, and support their specific cultural and linguistic identity (sign languages and deaf culture, Braille, augmentative and alternative modes …).

The States Parties shall take appropriate measures to ensure: participation in sport, recreation and leisure time activities on an equal basis with others by allowing participation in mainstream sporting activities at all levels; opportunity to organize, develop and participate in disability-specific sporting and recreational activities and encourage the provision of appropriate instruction, training and resources; access to sporting, recreational and tourism venues; that children with disabilities have equal access to participation in play, recreation and leisure and sporting activities, including those activities in the school system and consequently in Physical Education.

Article 17 declares protecting the integrity of a person with disabilities as the right to respect his or her physical and mental integrity.

Article 25 says that the States Parties shall ensure access for persons with disabilities to health services: gender-sensitive, including health-related habilitation

and rehabilitation (Art 26) with highest standard of health without discrimination on the basis of disability.

The Physical Activity access has become the right for all persons with disabilities during all life for: leisure time and sport practices (Art. 30); protecting the physical integrity (Art. 17); habilitation and rehabilitation (Art. (art 26); health prevention on an equal basis with others.

The CRCP declares the right for all persons with disabilities to attend Physical education and participate in the school sport (Art. 30), and inclusion in the free and regular compulsory primary and secondary school (Art. 24).

The Convention on the Rights of Persons with Disabilities (CRPD) was signed by 147 countries all over the world (Update on 30th January 2011).

DISCUSSION AND CONCLUSION

The CRPD is a human rights instrument and is legally binding in assuring full inclusion in the society for persons with disabilities.

Human rights and fundamental freedoms are recognized for persons with all types of disabilities.

The UN Convention (CRPD) signed by the States Parties, has become national adoption of general principle, obligation and juridical right, and with the ratification it has become a legally binding national law.

Inclusive education has become international right and it is becoming a national law in all the States Parties that ratified UN Convention (CRPD).

The realization of inclusive education for students with disabilities needs new cultural approach. The differences will translate the point of view from the functional model based on the medicine to inclusive model based on one- track approach: for all the students in the free and regular primary and secondary schools. The diversities in the regular schools should provide more opportunity (Cazzoli S. 2008). The „inclusion is a two-way process: persons with disabilities have become more visible and persons without disabilities have the opportunity to learn and change from the experience of persons with disabilities – and vice-versa".

All persons with disabilities must participate in all activities and according to the dictum: 'Nothing about us without us'

Also, inclusive Physical Education should be the right for all the students with the disabilities at all school levels. And it needs: structural resources (environment, tools, equipment, curricula,) and human resources (teachers, para-educators) trained in Adapted Physical Education (APE) (Cazzoli S, 2010). The APE is defined as „a sub-discipline of general Physical Education, concerning Physical Education for

students with disabilities“ (Block, 2000) and it is „allowing students with disabilities to experience safety, self-satisfaction and success“ (Winnick, 2005)(Hutzler Y., Sherrill C. 2007).

The APE should be a part of the Physical Education teacher training curricula at all levels (graduate, Bachelor/Master/Doctoral University System) (Bologna Process, 1999, Statement by the Bologna Policy Forum 2009) . The APE should be a part of lifelong learning from the pre-service to in-service teacher training (Cazzoli S, 2007) (LLP 2007-2013).

Participation in cultural life, recreation, leisure and sport should be enabled through structural resources (environment, financial tools, equipment, curricula) and human resources (trainer, and para-educator). Educators should be trained for working with persons with disabilities in the recreation and leisure time and also in the elite sport performance in the general sport federation and in the special sport federation (European Charter for Sport for All: Disabled Persons, 1987) (White Paper on Sport, 2007).

The implementation of the culture of the inclusion of persons with disabilities needs global action planning for monitoring the best practices for inclusion and attitudes of all the participants involved in the inclusion process (teachers, students, para-educators, managers and decision makers…)

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ABSTRACT

The United Nations (UN) adopted The Convention on the Rights of Persons with Disabilities (CRPD) in 2006.

According to the World Health Organization (WHO), persons with disabilities constitute 10% of the world's population (over 650 million persons) and most of them (80%) are living in developing countries without basic services (health, school, job...).

The UN Convention mission is „To promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity".

The UN -CRPD approach is in accordance with ICF (International Classification of Functioning, WHO 2000), and the term „handicapped person" has been changed into the „person with a disability/disabilities".

The human rights for persons with disabilities are based on: accessibility and inclusion in article 24 (education); article 25 (health); article 26 (habitation and rehabilitation); article 30 (participation in cultural life, recreation, leisure and sport).

The CRPD was signed by 147 and ratified in 97 States all over the world (Update on 30th January 2011).

Key words: *Physical education, human rights, persons with disabilities, inclusion in school and sport*

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EFFECTS OF AN EXTRA-CURRICULAR PHYSICAL EDUCATION PROGRAMME ON CHILDREN AND YOUNG ADULTS' MOTOR PERFORMANCE

INTRODUCTION

Within schools, physical activity and sport are an essential component of the educational process and a key factor of a person's social, motor, emotional and cognitive growth (Bailey, 2006). Several studies confirmed that physical activity is an essential factor for children's learning, motor and psycho-emotional development and has a positive influence on school success (Strong et al., 2005; Hellal et al., 2006; Castelli et al., 2007).

The „Global Recommendations on Physical Activity for Health" (World Health Organization, 2010a) is addressed to 5-17-year-old children and can be summarized as follows: **a.** children and young people should engage in at least 60 minutes of moderate- to vigorous-intensity physical activity daily; physical activity longer than 60 minutes provides additional health benefits; **b.** most of the daily physical activity should be aerobic; vigorous-intensity activities (such as strengthening muscle and bone) should be incorporated at least 3 times per week; **c.** children and youth should participate in a variety of enjoyable and age-appropriate activities designed to achieve optimal health, wellness, fitness, and performance benefits. Guthold et al. (2010) carried out a survey to compare different levels of physical activity and sedentariness of school-age children and young adults, coming from 34 countries of 5 WHO regions. It highlights the high percentage of students who do not respect the recommendations about physical activity, showing in fact high levels of sedentariness. Over the last years, PE classes at school have been reduced in many European countries (Hardman, 2008). Italian primary school provides physical activity syllabi, but teachers are not experts. Therefore, many institutions and associations propose extra-curricular programmes of motor and sport activities to schools and families, in order to face sedentariness and encourage sport practice. As a result of this increasing sedentariness, the levels of development of children and young adults' motor abilities and motor skills tend to be reduced. Researches carried out in many EU countries pointed out the decrease in the levels of regular physical activity and consequently the reduction of motor abilities and skills development (Tomkinson et al., 2007). This exposes the organism

in developmental age to the risk of diseases and restricts the opportunities of motor learning and social interaction. The survey by Kopecký et al. (2008) compares motor performances among girls (N: 562; age 7-15) at different periods (1966-1968-2002) and highlights a decline and a stagnancy in the levels of motor performance and an increase of BMI values. Several researches highlighted the reduction in the levels of physical activity and the decline in children and young adults' motor performances. Nevertheless, no efficient strategy of intervention encouraging physical activity at school age has been proposed. In addition, a gap between the research-intervention on physical activity and the delivery of programmes in the educational practice (good practices) was identified. Evaluation studies rarely lead to the adjustment of the interventions, as was evaluated afterwards on a wider scale (De Meij et al., 2010).

PARTICIPANTS

This work is aimed at evaluating the motor performances for strength, speed, motor coordination and the development of motor skills at different ages and at comparing the results of the participants of the extra-curricular (supplementary) PE programme with the results of pupils attending the traditional PE programme. The sample (Table 1) is composed of 491 children and young adults (M: 235, F: 256), attending primary and secondary school, divided into three age groups: 8-9, 10-11, and 12-13 years. It was assumed that pupils participating in a 6-month extra-curricular programme of physical activities would show a higher level of motor skills than the pupils involved in a traditional PE programme. Each participant carried out motor tests at the end of the attended programme (June 2010). Participants' BMI values were then compared.

METHODS

The following motor tests have been proposed: standing long jump (SLJ), 20-m sprint from a standing position and 20-m dribbling (Morrow et al., 2000). The internationally accepted cut off points published by Cole et al. (2000) have been adopted in order to determine predictable values of body mass index (BMI) for overweight (>25) and obesity (>30) in adult age.

Data analysis

Besides the descriptive statistics (M ± DS), t-test was used (Table 2) in order to highlight the possible significant differences related to the *group*. The significance level was set at $p < 0,05$. ANOVA 2 (group) x 3 (age: 8-9, 10-11, and 12-13 years) highlighted significant differences of motor performances on all the motor tests (Tab. 2; Fig. 1, 2, 3, 4) with regard to the practice of extra-curricular physical activities, not

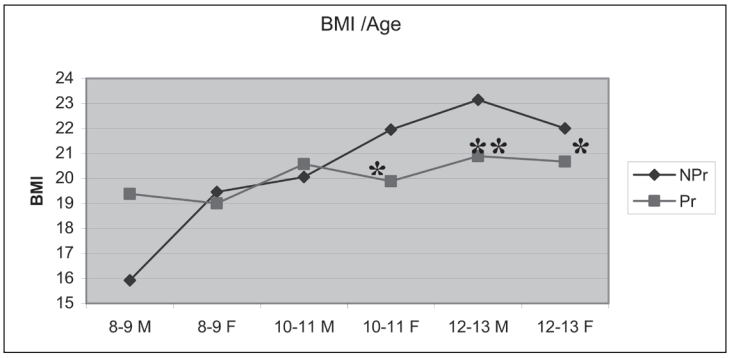
linked to gender differences. On the standing long jump test significant differences were found for males (age 8-9: p = 0,04; 10-11: p = 0,000; 12-13; p = 0,01) and females (age 10-11 p = 0,04). On the 20-m sprint test significant differences were found for females (age 8-9; 10-11; 12-13: p = 0,04) and males (age 10-11, 12-13: p = 0,000). In the 20-m dribbling test significant differences were found for males (age 8-9: p = 0,03; 10-11 p = 0,003; 12-13 p = 0,000) and females (age 8-9: p = 0,04; 10-11: p = 0,03; 12-13 p = 0,04).

Table 1. *Research sample*

Tab. 1- Sample			
Gender	**Group**	**Age (M± SD)**	**N**
Female	P	8-9 (8,47± 0,50)	35
	Np	8-9 (8,35 ± 0,49)	35
Male	P	8-9 (8,47 ± 0,50)	34
	Np	8-9 (8,52 ± 0,50)	25
Female	P	10-11 (10,7 ± 0,48)	35
	Np	10-11 (10 ± 0,50)	35
Male	P	10-11 (10,44 ± 0,50)	45
	Np	10-11 (10,33 ± 0,49)	45
Female	P	12-13 (12,75 ± 0,75)	58
	Np	12-13 (13 ± 0,7)	58
Male	P	12-13 (12,65 ± 0,72)	43
	Np	12-13 (12,88 ± 0,99)	43
Total			491

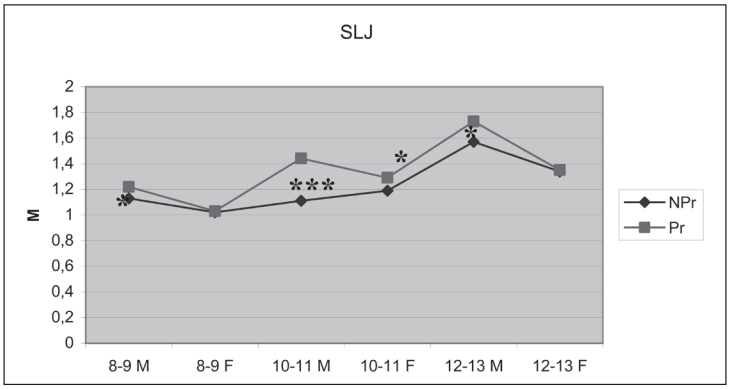
Table 2. *Results of descriptive statistics of all measures*

TAB. 2 - MEASURES										
Gender	**Group**	**Age**	**BMI**		**SLJ**		**20m sprint (sec)**		**20m dribbling**	
			MEAN	**SD**	**MEAN**	**SD**	**MEAN**	**SD**	**MEAN**	**SD**
Female	P	8-9	19	3,19	1,03	0,14	4,77	0,33	14,15	3,58
	Np	8-9	19,46	4,15	1,01	0,19	4,99	0,52	16,95	7,06
Male	P	8-9	19,37	4,00	1,22	0,17	4,53	0,38	11,31	5,61
	Np	8-9	15,91	4,09	1,34	0,14	4,56	0,47	14,39	5,41
Female	P	10-11	19,88	4,12	1,29	0,17	4,23	0,45	10,23	3,58
	Np	10-11	21,95	3,77	1,19	0,22	4,42	0,37	12,27	4,34
Male	P	10-11	20,57	2,90	1,44	0,20	3,99	0,25	10,03	8,02
	Np	10-11	20,05	4,07	1,11	0,25	4,71	0,51	15,0	7,70
Female	P	12-13	20,67	2,86	1,35	0,15	4,02	0,29	8,50	1,70
	Np	12-13	22,00	4,20	1,34	0,22	4,14	0,31	9,44	2,98
Male	P	12-13	20,89	2,71	1,73	0,26	3,71	0,29	6,06	1,13
	Np	12-13	23,14	4,53	1,57	0,27	4,09	0,61	7,74	2,22



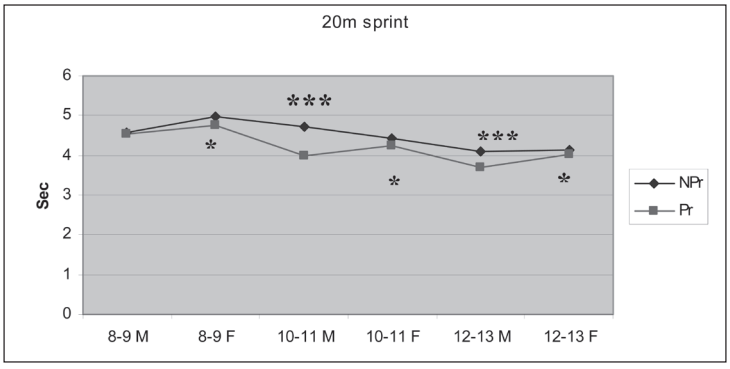
* p = 0,03 (F 10-11); * p = 0,04 (F 12-13);*** p = 0,007 (M 12-13).

Fig. 1.



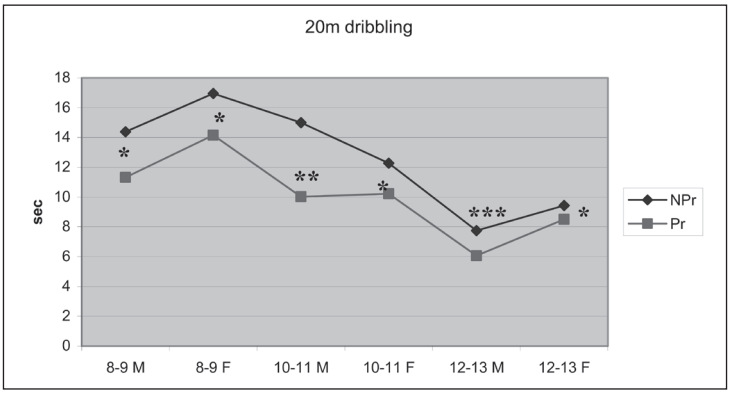
* p = 0,04 (M 8-9); *** p = 0,000 (M 10-11); p = 0,01 (M 12-13); * p = 0,04 (F 10-11).

Fig. 2.



* p = 0,04 (F 8-9); p = 0,04 (F 10-11); p = 0,04 (F 12-13); *** p= 0,000 (M 10-11); p = 0,000 (M 12-13)

Fig. 3.



* p= 0,03 (M 8-9) ; ** p= 0,003 (M 10-11) ; p= 0,000 (M 12-13) ; p= 0,04 (F 8-9); p= 0,03 (F 10-11); p= 0,04 (F 12-13)

Fig. 4.

DISCUSSION AND CONCLUSIONS

Children acquire motor abilities through the process of motor development. It is a continuous process of modification that involves the interaction of several factors: 1) the neuromuscular maturation; 2) the physical growth and behavioural characteristics of the child; 3) the tempo of physical growth, biological maturation and behavioural development; 4) the residual effects of prior motor experiences; and 5) the new motor experiences (Malina, 2004). This work confirms the results of previous studies that an extra-curricular PE programme, during or outside of school hours, can maximize the participants' levels of physical activity and motor performance. Also, Dobbins et al. (2009) demonstrated that school programmes promoting physical activities have a preventive effect, as they increase the time in which children are physically active and reduce the time they spend watching TV. These programmes enhance physical fitness, but show scarce impact on the reduction of body weight. The differences that emerged in the different age groups, for males and for females, in the 20-m dribbling test (motor coordination) could be explained by the variety of activities, while the differences on other tests could be ascribed to higher levels of physical activity and time of motor activities. Sollerhed & Ejlertsson (2008) compared the motor performance of resistance and coordination of children (N: 132; M: 73; F: 59) attending two primary schools where PE classes had different number of lessons (two hours versus four hours a week). In this study significant differences between the two groups were detected. The results showed that PE classes with a greater number of weekly hours can favour the increase of children's motor performance. The processes of motor maturation, development and learning can hide the effects of motor activities programmes on the performance during the developmental age. Therefore,

systematic studies are necessary to: (a) compare the effects of different programmes (e.g. sport, games, expressivity and dramatization) on pupils' motor performances; (b) evaluate periodically the variations of the levels of strength, speed, resistance, motor coordination, according to gender, group (BMI), intensity, duration and frequency; (c) evaluate the trends of motor performance at different ages (longitudinal study); (d) evaluate the relationships among motor performance, levels of physical activities and psycho-emotional factors (motivation and physical self-efficacy) according to gender, activity and age.

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ABSTRACT

This work is aimed at evaluating the motor performance for strength, speed, motor coordination and the development of motor skills during the developmental age. The sample is composed of 491 children and young adults (M 235, F 256) attending primary and secondary school, divided into three age groups: 8-9, 10-11, and 12-13 years. It was assumed that the pupils participating in a programme of physical activities outside of school hours show a higher level of motor skills and abilities with respect to the pupils involved in a curricular programme of physical education (PE). ANOVA 2 (group) x 3 (age, 8-9; 10-11; 12-13) highlighted significant differences in motor performance on all the tests, with regard to the practice of extra-curricular physical activities, not linked to gender differences. A supplementary syllabus of motor activities can determine an enhancement of motor performances and an increase of motor experiences.

Key words: *children, motor performance, physical education, school*

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Original scientific paper

SCHOOL MANAGERS' OPINIONS ABOUT PHYSICAL AND SPORT EDUCATION OF BOYS AND GIRLS

THEORETICAL ANALYSIS

The term management can be understood in three ways- management as a profession, management as a scientific discipline and management as a process (Rudy, Luptáková, Sulíková, Vargic, 2004).

Management is a profession, because it requires the special abilities, content, knowledge, skills and of course, experience. Management has been considered a profession since the 1940s.

Management as a scientific discipline also uses knowledge from other disciplines – economy, sociology or psychology. The disciplines include information which is applicable at schools in increasing the effectiveness of the institution.

Management is the process due to the fact that it covers 4 very important functions which are used by the school manager, or headmaster. There is planning, organising, leadership and control as the four main managerial functions. The process is never-ending and the managers have to assure permanent transformation of inputs to the outputs. It is also called process because one mission is controlling the process. There is also possibility that 3 functions will happen at one time and it is difficult to say if the headmaster is controlling or leading the people.

School managers

The headmaster is an employee, who coordinates the work of the rest of the staff in addition to being responsible for their results. The teachers are called immediate subordinates, or team members. The headmaster pressures the school for efficiency which could be measured by the quantity and quality of work done. The second thing is very important, too. It is to keep the best employees in the school or to hire new ones, suitable for work position. The work of school manager is a mixture of psychological and physical activities. An effective manager should communicate, support team decision making, listen and also hear, he/she should be humane, motivate others, intelligent, experienced and clever (Dutková, 2003).

A manager must also find the leadership style successful in work. It is important as the leadership style determines how effective a manager will be. It depends on managing and coordinating his/her subordinates, i.e. his responsibility is to motivate and communicate with other staff members (Svoboda, 2000).

Managers and school educational programme

The main idea of new education law (year 2008) is decentralization of schools. Schools are more responsible for educational content as well as the competences of teachers. The compulsory part of education is along these lines divided into state educational programme which is obligatory for school, and school educational programme which is made according to conditions, traditions and intentions of the school and interest of students. The school managers play an important role when making school programmes (Štátny vzdelávací program, 2008).

The position of physical education is nowadays created also by PE teaches. Their activities, attempts and quality work done in their subjects, as well as the students' interests result in the support of managers to create school programmes with potential subjects. The position of PE is, to a certain extent, also affected by headmasters and their deputies, who have an important role in creating programmes (Antala, Dančíková, Kyselovičová, 2008).

That is why we were interested in the chosen problems of PE and how managers see this new situation. Understanding their opinions is the precondition for PE experts to evaluate the reform and to predict the manager's attitude to PE (Dančíková, 2008).

THE AIMS, TASKS AND HYPOTHESIS OF THE STUDY

The aim of the study was to find out the opinions of secondary school managers– headmasters and their deputies about chosen problems of physical education. Understanding their opinions could be one of the sources for preparing the school educational programmes and could help in improving the management of PE in schools. We focused on comparing the opinions of managers who do sports regularly with those who do not do sports.

We assumed that managers who do sports will have more positive attitude to PE, compared to managers who are not engaged in sports.

METHODS

The research sample consists of headmasters and their deputies in secondary schools. We mainly focused on opinions of grammar school managers – they represented 95% of collected questionnaires. We obtained 231 questionnaires from

school managers in school year 2008/2009 - 94 headmasters and 137 headmaster deputies.

The main method of collecting the data was questionnaire. We paid attention to simplicity, understanding, unity, definiteness and completeness during writing the questionnaire. We were inspired by works of Česká školní inspekce (2003) and Česká kinantropologická společnost (2006). We conducted a pilot research in which the questionnaire was given to headmasters and deputy headmasters from 3 schools in Bratislava. On the basis of the pilot research results we finalised the questionnaire.

The main method was supplemented with the interview which was conducted with 3 headmasters and 4 deputy headmasters of 3 grammar schools in Bratislava.

For data processing we used basic statistical methods as frequency and percentage. To find out statistical significance we applied chi-squared distribution. We used the basic statistical method of data processing, a frequency response. In this report we only bring the statistically significant results in opinions of managers who do sports and those who do not do sports.

To interpret collected data we used logical methods such as comparison, induction, deduction.

Results are presented in graphs. Legend to these graphs is: Sport „yes" – managers engaged in sports, Sport „no" – managers not engaged in sports.

THE RESULTS AND DISCUSSION

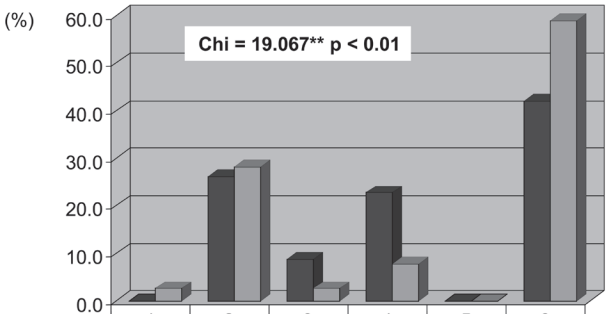
24.7% do sports regularly (57 managers of 231) and 39 managers have never done sports (16.9%). The majority are 50 year-old teachers and older (Antala, Dančíková, 2008).

THE EVALUATION SCALE

We found out statistical importance in opinions of managers according to the scale of evaluation (Fig.1). It is obvious that those managers who are not engaged in sports prefer not to evaluate pupils in PE (59%). On the other hand, those who are engaged in sports opt for four-grade evaluation scale (8.8%) and for five-grade scale (22.8%). Only one manager, not engaged in sports opted for four-grade scale and 3 managers for five-grade evaluation scale. Three-grade scale was chosen by 11 managers (28.2%), while two-grade scale was chosen by one manager who does not do sports. None of the managers engaged in sports opted for two-grade scale. Nobody opted for five and more grade evaluation scale.

Managers who do sports consider evaluation of PE like any other evaluated subjects at school. They like sports and they do not see any reason why evaluation

should not be used in PE. Those who do not do sports may consider PE as not being students' favourite subject and therefore, they opt against evaluation in PE. One of the reasons could be their negative personal experience with PE, or they just want to eliminate the possible stress of pupils rising from PE evaluation. 24 managers (42%) of 57 managers in total are engaged in sports regularly and opted against evaluation possibly for the following reasons: less stress, more pleasure, it is education, PE should build the relationship to sports not break it, etc.



	1	2	3	4	5	6
Sport "yes"	0.0	26.3	8.8	22.8	0.0	42.1
Sport "no"	2.6	28.2	2.6	7.7	0.0	59.0

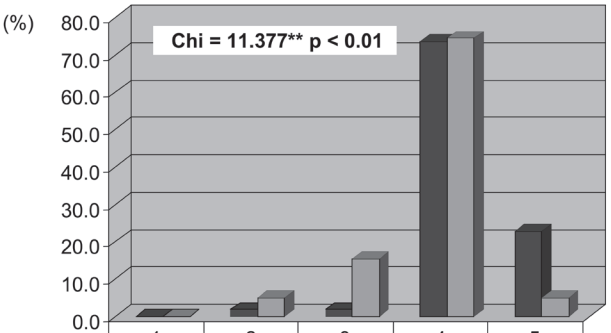
Note: 1 –2 grade scale 4 – 5 grade scale
2 – 3 grade scale 5 – 5 and more grade scale
3 – 4 grade scale 6 – do not evaluate PE

Fig. 1. *The evaluation scale from the managers' point of view*

THE IMPORTANCE OF PHYSICAL EDUCATION

PE is more important for managers engaged in sports. Two of the managers who are not involved in sports answered that PE is not a very important subject (5.1%) and six managers that it is equally important and unimportant (15.4%). PE is an important subject for 74.4% managers not engaged in sports and for 73.7% managers engaged in sports. No one consider PE as an unimportant subject.

Managers who do sports can feel positive effect on health. This may be the reason why they answered that PE is an important subject. It resulted in statistical significance for this question. Physical education is a kind of relaxation, energy maker, mind relaxing from other subjects at school. Those who do not do sports cannot recommend it, as they do not know the beneficial side effects of PE and sports in general.



	1	2	3	4	5
Sport "yes"	0.0	1.8	1.8	73.7	22.8
Sport "no".	0.0	5.1	15.4	74.4	5.1

Note: 1 – Unimportant subject
2 – Not very important
3 – Important/unimportant subject
4 – Important subject
5 – Very important subject

Fig. 2. *Importance of PE*

THE EVALUATION OF PUPILS IN PE

We found out that the majority of certificated managers (61.9%) is for evaluation in PE. Very interesting is also the attitude to evaluation of managers without PE. 55% opt against evaluating pupils (Fig. 3).

From our point of view, those mangers who are involved in PE prefer the evaluation. Some of them think that this is the only way to encourage pupils to exercise, while others think that it is a motivational factor. Those who are not PE certificated or do not exercise opt against evaluation in PE. They may be convinced that it causes too much stress for the pupils.

The contemporary curriculum still uses evaluation. We could discuss the method of evaluation. Then it will be only up to teachers and their individual approach to pupils. Teachers should evaluate overall effort and of course the improvement of pupil.

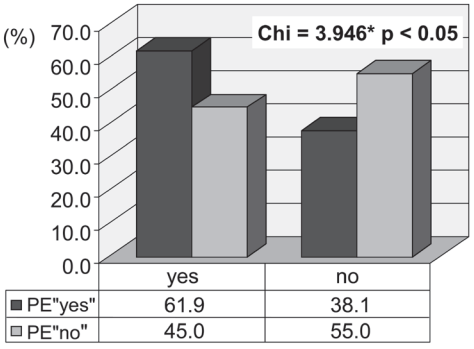


Fig. 3. *The evaluation of pupils in PE*

CONCLUSION

We assumed that managers engaged in sports have more positive attitude to PE than those managers who are not doing sports. Based on the chosen answers of managers we can state that the hypothesis was affirmed, because the answers of sports engaged managers were in majority statistically significant and show more positive attitude to PE.

Therefore, we recommend to PE teachers engaged in sports to be more involved in managerial positions at schools. The possibility of supporting PE will increase with more PE certified managers in school management. This will result in better conditions in education, improving the quality of education and increased student motivation for active engagement in subject. Only then may PE be more often included in school educational programmes.

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ABSTRACT

School managers consider physical education mostly as an important subject. Those managers who are engaged in sports have a closer relation to this school subject which resulted in more positive answers about satisfaction with physical education teachers, or in giving the opinion that physical education is as important subject as any other in school. Therefore, we recommend to physical education teachers who are engaged in sports to be more involved in managerial posts. The schools will have better conditions for education, the quality of physical education will also improve and students' motivation for active engagement in the subject and support of physical education will increase.

Key words: *school management, school educational programme, PE (physical education), managers engaged in sports, managers not engaged in sports*

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Izvorni znanstveni rad

ANALIZA DINAMIKE PROCESA UČENJA NEKIH GIMNASTIČKIH ZNANJA IZ PRVOG RAZREDA OSNOVNE ŠKOLE

UVOD

U školskom sustavu, u službenim planovima i programima, nalazi se određeni broj gimnastičkih motoričkih znanja. Ista su u važeće planove i programe pozicionirana pridržavajući se didaktičkih i metodičkih principa odnosno na način da svako znanje ima mogućnost svoje horizontalne i vertikalne progresije. Procesima učenja gimnastičkih znanja, kao i procesima učenja drugih motoričkih znanja predviđenih službenim programima, suprotstavlja se velik broj faktora ograničenja. Osim onih „uobičajenih", a zbog karakteristika sportske gimnastike, prilikom provedbe procese učenja gimnastičkih motoričkih znanja najčešće se javljaju nedoumice vezane za metode poduke i učestalost ponavljanja kako bi se s razine potpunog nepoznavanja ili poznavanja samo osnovnih struktura kretanja tih znanja došlo do određene razine znanja istih, objektivan način procjenjivanja razine naučenosti znanja te primjerenost određenih znanja dobi učenika kojoj su programom namijenjena. Zanemarujući, ali i uvažavajući navedena ograničenja postavlja se pitanje do koje je razine moguće usvojiti određena jednostavnije gimnastička znanja za vrijeme nastave tjelesne i zdravstvene kulture. Ako se uz navedeno oslonimo i na teorije motoričkih učenja, koje navode da „jednostavnija" gimnastička motorička znanja imaju veliki pozitivni transfer/prenosivost na složenija gimnastička motorička znanja (Schmidt i Lee, 2005; Burton i Miller, 1998), važnost njihove naučenosti na što kvalitetnijoj razini postaje neupitna.

Sukladno navedenim tezama cilj ovog istraživanja bio je utvrditi dinamiku procesa učenja istih tijekom eksperimentalnog kineziološkog tretmana.

METODE RADA

Uzorak ispitanika sačinjavalo je 76 učenika: 44 učenice i 32 učenika, prvog razreda Osnovne škole „Bijaći" iz Kaštel Novog, kronološke dobi 7 godina (± 6 mjeseci). Isti su tijekom nastavne godine u sklopu redovne nastave tjelesne i zdravstvene kulture (3 puta tjedno po 45 minuta) pod vodstvom istog voditelja i u istim uvjetima učenja

provodili eksperimentalni kineziološki program. Program tretmana obuhvaćao je veći broj nastavnih tema predviđenih važećim planom i programom i njemu pridodana motorička znanja iz područja sportske gimnastike. Od svih znanja koja su djeca učila, za potrebe ovog rada, analizirana je dinamika procesa učenja tri gimnastička znanja koja se nalaze u važećem planu i programu učenika prvog razreda osnovne škole (*stoj na lopaticama, kretanje u mješovitom uporu prema naprijed i kretanje u mješovitom uporu prema natrag*). Uz navedena analizirana je i dinamika procesa učenja znanja *koluta naprijed*, koji se nalazi u planu i programu za drugi razred osnovne škole, a čiji se metodski postupak *kolut naprijed niz kosinu* nalazi u planu i programu za prvi razred osnovne škole. Procjene naučenosti istraživanih znanja, putem video zapisa, izvodilo je 5 sudaca, prema Likertovoj skali i propisanim kriterijima za procjenu stupnja naučenosti gimnastičkih motoričkih znanja (Delaš Kalinski, 2009.)

Programskim paketom Statistica ver. 6.0 obrađeni su svi podaci i grafički prikazi. Burtovom metodom jednostavne sumacije izračunati su ukupni rezultati za svako istraživano motoričko znanje u pojedinoj točki procesa učenja, a istima su izračunati deskriptivni statistički parametri. Kolmogorov – Smirnovljevim testom analizirana je normalnost distribucija rezultata. T-testom za zavisne uzorke analizirana je statistička značajnost razlika između aritmetičkih sredina različitih točaka procesa učenja.

REZULTATI I DISKUSIJA

Generalno je moguće utvrditi da su utvrđene zadovoljavajuće vrijednosti parametara koji procjenjuju objektivnost i homogenost sudaca budući da se vrijednost IIR kretala u rasponu rezultata od 0,66 do 0,89, vrijednost Cα u rasponu od 0,90 do 0,97, a vrijednosti P.T. u rasponu rezultata od 0,72 do 0,90. Najniže vrijednosti navedenih koeficijenata vezane su uz rezultate sudaca za procjenjivanje razine naučenosti gimnastičkog znanja *kretanje u mješovitom uporu prema naprijed* ($KUMUNP_{1,2,3}$) što navodi na zaključak da su objektivnost i homogenost sudaca, prilikom procjenjivanja razine naučenosti ovog znanja bile nešto niže u usporedbi s procjenjivanjem razine naučenosti ostalih znanja.

Tablica 1. *Metrijske karakteristike i čestica i ukupnog rezultata gimnastičkog motoričkih znanja stoj na lopaticama (STL), kolut naprijed na ravnom (KNP), kretanje u mješovitom uporu naprijed (KUMUNP) i kretanje u mješovitom uporu natrag (KUMUNT)*

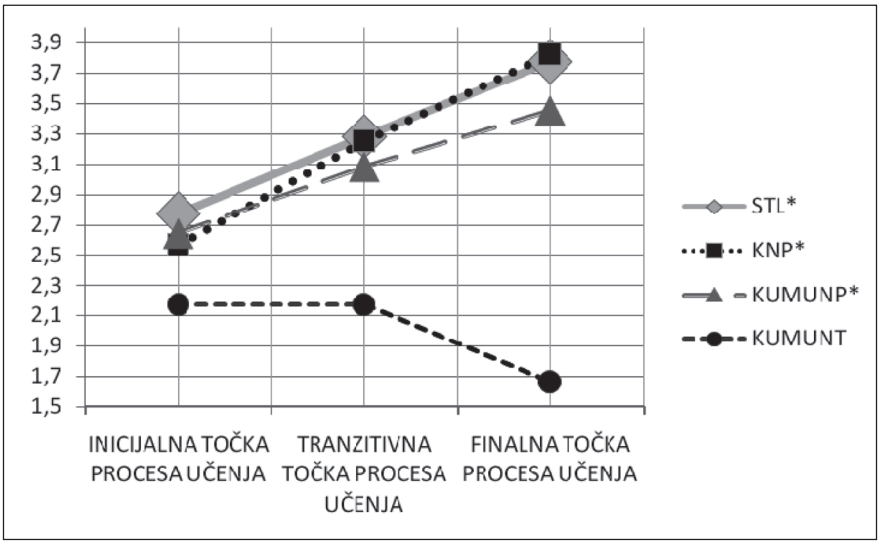
	IIR	Cα	P.T.	MIN	MAKS	AS	SD	ASIM	ZAKR	K-S (d)
STL 1	0,87	0,97	0,90	1,00	4,90	2,77	1,07	-0,03	-1,00	0,12
STL 2	0,89	0,97	0,91	1,10	5,00	3,28	1,04	-0,52	-0,72	0,11
STL 3	0,76	0,93	0,80	1,40	5,00	3,77	0,81	-1,16	1,41	0,14
KNP 1	0,83	0,96	0,86	1,00	5,00	2,56	0,78	0,20	1,17	0,10
KNP 2	0,80	0,95	0,84	***1,90***	5,00	3,25	0,72	0,31	-0,20	0,12
KNP 3	0,71	0,92	0,76	1,00	5,00	3,82	0,76	-0,86	1,63	0,08
KUMUNP 1	***0,66***	***0,90***	***0,72***	1,00	5,00	2,64	0,89	0,52	0,17	0,09
KUMUNP 2	***0,69***	***0,91***	***0,74***	1,20	4,90	3,08	0,84	0,15	-0,30	0,08
KUMUNP 3	***0,72***	***0,92***	***0,77***	1,00	5,00	3,45	0,89	-0,82	0,63	0,09
KUMUNT 1	0,75	0,93	0,79	1,00	***4,00***	2,17	0,72	0,25	-0,17	0,08
KUMUNT 2	0,83	0,95	0,85	1,00	***4,60***	2,17	0,97	0,46	-0,60	***0,16****
KUMUNT 3	0,89	0,97	0,90	1,00	***4,40***	1,66	0,87	1,32	1,01	***0,26****

Legenda: IIR – inter-item korelacija; Cα – Cronbach Alpha koeficijent; P.T. - postotak ukupne količine varijance sustava kojeg objašnjava pojedini faktor; AS - aritmetička sredina; MIN - minimalna vrijednost; MAKS - maksimalna vrijednost; SD - standardna devijacija, ASIM - mjera asimetrije distribucije; ZAKR - mjera zakrivljenosti distribucije; K-S - Kolmogorov- Smirnov test (*značajan na razini od 0,05 za d≥,15 i N=76)

Minimalne vrijednosti utvrđene kod gotovo svih istraživanih motoričkih znanja, u sve tri točke provjeravanja, imale su vrijednost koja je ekvivalentna školskoj ocjeni nedovoljan (MIN=1,00). Takav rezultat navodi na zaključak da su tijekom čitavog kineziološkog tretmana, odnosno tijekom procesa učenja postojali učenici koji navedena znanja nisu bili u mogućnosti izvesti samostalno, što je prema postavljenim kriterijima ocjenjivanja (Delaš Kalinski, 2009) bio minimalni uvjet za ocjenu dovoljan. Iznimku od navedenog predstavlja znanje *kolut naprijed* (*KNP*) kod kojeg je u tranzitivnoj točki procesa učenja bila utvrđena minimalna vrijednost ekvivalentna školskoj ocjeni dovoljan (MIN_{KNP2}=1,90). Takav rezultat vjerojatno je posljedica velike učestalosti ponavljanja ovog znanja u periodu između inicijalne i tranzitivne točke procesa učenja (učestalost od 15 ponavljanja). Smanjenje učestalosti ponavljanja u vremenu između tranzitivne i finalne točke (samo 7 ponavljanja) vjerojatno je uzrokovalo smanjenje ionako niske razine znanja, odnosno da određen broj učenika ne bude u mogućnosti samostalno izvesti *kolut naprijed* (MIN_{KNP3}=1,00).

Maksimalne vrijednosti utvrđene kod svih analiziranih motoričkih znanja, u svim točkama procesa učenja pretežno su bile ekvivalentne školskoj ocjeni odličan

(MAX≈5,00). Iznimku od navedenog predstavljaju maksimalne vrijednosti utvrđene kod znanja *kretanje u mješovitom uporu prema natrag* (*KUMUNT*) koje odgovaraju školskoj ocjeni vrlo dobar ($MAX_{KUMUNT1}$=4,00, $MAX_{KUMUNT3}$=4,40). Takvi rezultati navode na zaključak da su u svim točkama provjeravanja postojali učenici koji su znanja *stoj na lopaticama* (*STL*), *kolut naprijed* (*KNP*) i *kretanje u mješovitom uporu prema naprijed* (*KUMUNP*) izvodili bez ikakvih tehničkih i estetskih pogrešaka dok su najbolje izvedbe *kretanja u mješovitom uporu prema natrag* (*KUMUNT*) bile okarakterizirane takvim pogreškama.



* t – test za zavisne uzorke statistički je značajan na razini od 0,05

Graf 1. *Dinamika procesa učenja stoja na lopaticama (STL), koluta naprijed (KNP), kretanja u mješovitom uporu naprijed (KUMUNP) i kretanja u mješovitom uporu natrag (KUMUNT)*

Vrijednosti aritmetičkih sredina gimnastičkih znanja *stoja na lopaticama* (*STL*), *koluta naprijed* (*KNP*) i *kretanja u mješovitom uporu naprijed* (*KUMUNP*) povećavale su se tijekom procesa učenja odnosno od inicijalne do tranzitivne te do finalne točke procesa učenja. Takva povećanja prosječnih vrijednosti analizirana t-testovima za zavisne uzorke (Graf 1) utvrđena su kao statistički značajna te moguće zaključiti da je primijenjeni kineziološki tretman pozitivno utjecao na povećanje razine naučenosti tih znanja. Ukoliko se vrijednosti razina navedenih znanja sagledaju kroz njima ekvivalentne školske ocjene moguće je zaključiti da su učenici generalno ostvarili napredak sa školske ocjene dobar na školsku ocjenu vrlo dobar.

Za razliku od prethodno navedenog pozitivnog utjecaja kineziološkog tretmana na povećanje razine naučenosti kod znanja *kretanje u mješovitom uporu prema natrag* (*KUMUNT*) utvrđeno je zadržavanje početne razine znanja između inicijalne i tranzitivne točke procesa učenja te smanjenje razine naučenosti od tranzitivne do finalne točke procesa učenja ($AS_{KUMUNT1}=AS_{KUMUNT2}>AS_{KUMUNT3}$). Dobiveni rezultat nije logičan, budući da upućuje na zaključak da se s većom učestalošću ponavljanja ovog znanja njegova razina naučenosti smanjivala, ali nas upućuje na činjenicu da se vjerojatno radi o nešto drugačijem znanju. Sagledavajući osnovnu strukturu znanja *kretanja u mješovitom uporu natrag* važno je primijetiti kako ono vjerojatno spada u kategoriju biotičkih motoričkih znanja te da je kao takvo vjerojatno naučeno na vrlo visokoj, moguće na automatizacijskoj razini (Schmidt i Lee, 2005). Iz istog je razloga svako ispravljanje tehnike njegovog izvođenja vjerojatno dovodilo samo do narušavanja osnovne strukture izvedbe, a na taj način i na ispoljavanje sve niže razine naučenosti ovog znanja. Osim strukture kretanja ovog znanja nezaobilazno je pretpostaviti i da je razlog niskih vrijednosti aritmetičkih sredina ukupnih rezultata (AS_{1-3} u rasponu od 2,17 do 1,66) i statistički značajnog odstupanja od normalnih distribucija rezultata vjerojatno je moguće pripisivati i prestrogo postavljenim kriterijima ocjenjivanja. Njihovim olakšavanjem vjerojatno bi se postigle nešto više razine naučenosti i normalnije distribucije rezultata ovog znanja, ali isto ostaje da se istraži daljnjim istraživačkim postupcima.

ZAKLJUČAK

Na temelju rezultata istraživanja moguće je zaključiti da su znanja *stoj na lopaticama*, *kolut naprijed* i *kretanje u mješovitom uporu prema naprijed* generalno usvojiva od strane učenika prvog razreda osnovne škole. Primjenom kineziološkog tretmana generalno je moguće utjecati na povećanje razine njihove naučenosti, a ista je ekvivalentna napredovanju sa školske ocjene dobar na školsku ocjenu vrlo dobar.

Kod znanja *kretanje u mješovitom uporu prema natrag* nije utvrđen pozitivan utjecaj kineziološkog tretmana na povećanje njegove razine, a razlog istoga vjerojatno je usvojenost ovoga, ne gimnastičkog već vjerojatno biotičkog, znanja na automatizacijskoj razini.

Sumirajući dobivene rezultate ovog istraživanja moguće je zaključiti da su znanja *stoj na lopaticama*, *kolut naprijed* i *kretanje u mješovitom uporu prema naprijed*, kao i propisani kriteriji njihovog ocjenjivanja, primjenjivi u školskoj praksi te aplikativni kao reprezentativne teme nastavnih cjelina kojima pripadaju (višenja i upiranja, kolutanja).

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THE ANALYSIS OF THE LEARNING DYNAMICS OF SOME GYMNASTICS KNOWLEDGE IN THE FIRST GRADE OF PRIMARY SCHOOL

ABSTRACT

The aim of this research was to determine the dynamics of first-grade gymnastics skills learning process. The sample consisted of 76 first-grade pupils who took part in the experimental treatment during their physical education classes. Learning dynamics of the following skills was analyzed: *candle stick (STL), forward roll (KNP), „bear walking" forward (KUMUNP) and „bear walking" backwards (KUMUNT).* The results confirmed positive transformation since statistically significant increase in knowledge was found for *STL*, *KNP* and *KUMUNP*. According to that, it is suggested that the knowledge be used in practice with the aim to determine the level of acquired knowledge of the units to which these skills belong. With the KUMUNT skill, there was a decrease in the level of knowledge throughout the treatment. The obtained results raise the question of the validity of the classification of this knowledge into the group of simple gymnastics skills rather than as biotic knowledge, and the set criteria for assessment of the level of this type of knowledge.

Key words: *gymnastics skills, pupils, learning dynamics*

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Abstract

NEGOTIATING GENDER ISSUES AND PHYSICAL ACTIVITY IN SCHOOL YARDS

Schoolyards and outdoor areas become increasingly important for the social and the physical development of pupils. The results of a recent study (Diketmueller & Studer, 2007) show that girls and boys behave very gender stereotypically and different groups - especially girls - reduce their level of physical activity in schoolyards to a minimum. To promote encouraging environments for both genders and different age-groups, schools have to offer varied open spaces, as well as innovative pedagogical approaches to empower teachers and pupils to negotiate the issue on a daily basis.

Within the project 'School yards, physical activity and gender relations' teachers and pupils of 20 schools were sensitized to this issue. Based on the assumption that gender is socially constructed and embedded in daily routines and organizations (Lorber 1994), in a first step it was important to analyze the situation and to identify moments of construction and perpetuation. Pupils together with teachers observed systematically who uses the outdoor areas in which way, they discussed their experiences and results in focus groups, they developed strategies and stipulated use zoning plans to offer more pupils a broader access to physical activity. This requires, of course, a minimum of gender awareness of pupils, too.

Teachers as facilitators empower the pupils to participate in the process of planning, implementation and managing, considering the needs and interests of different groups and individuals. Raising gender and diversity awareness of pupils contributes to a broader sense of sustainable education.

The results lead us to the conclusion that gender awareness is not only important for teachers, but is an important competence for pupils to identify unbalanced situations and to have skills for dealing with situations and negotiating solutions.

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Professional paper

THE DEVELOPMENT OF QUALITY PHYSICAL EDUCATION RESPECTING ALL LEVELS OF ABILITY AND GENDER EQUALITY

INTRODUCTION

The inclusive term 'Physical Education and Sport' (PES) is used to refer to school-based structured, supervised physical activities that take place as a subject of study in the education system. The subject aims to systematically develop physical competence and confidence to enable all children to move efficiently and effectively, and with understanding. School-based provision forms a basis to access a wide range of movement competences and experiences.

The term „*Quality Physical Education and Sport (QPES)*" is well known in documents for some time. It became a widely spread developmental plan in the United States when there were focuses on policies to ensure the quality growth of physical education in school. The early stage of establishment indicated the desire to have better arrangement of curriculum, instruction, assessment and opportunities in learning. The QPES issue, when it came to UNESCO report in 2005, shifted from educational debate to essential criterion of establishment. The UNESCO report in 2005 indicated the desire to define QPES and outcomes, system development to support the establishment, training of professionals, research work on training, practices and collaboration, establishment of developmental and evaluation team to follow the QPES issues and environment building with special attention to gender issue, equality in learning, cultural practice and religious restriction. A time line was suggested with 2006 to 2008 focusing on the infrastructure for QPES in member states and the beginning of 2008 to 2015 focused on the development of QPES on different worksite:

„*Quality physical education is the most effective and inclusive means of providing all children, whatever their ability/disability, sex, age, cultural, race/ethnicity, religious or social background, with the skills, attitudes, values, knowledge*

and understanding for life long participation in physical activity and sport." (The Berlin Agenda for Action for Government Ministers, 1st World Summit on Physical Education, Berlin 1999)

Following the UNESCO Charter for PE and Sport and the Universal Declaration of the Rights of the Child: „*The practice of physical education and sport is a fundamental right for all*." (UNESCO 1978)

Fundamental criteria for evaluation and review

i. People
   - Governments support and disseminate PE and sport policy
   - Teachers of PE and sport have access to initial training and continuing professional development
   - Schools are linked to and supported by local, national and international networks

ii. Programme
   - Shared understanding of what constitutes PE and sport
   - A systematic and developmental approach to learning and teaching
   - Curriculum time
   - PE and sport adopt inclusive and differentiated approaches for all students

iii. Facilities and resources
   - Safe and clean space
   - Adequate equipment („adequate and sufficient facilities and equipment must be provided to meet the needs for safe and intensive participation…")

PURPOSE

The International Committee of Sport Pedagogy (ICSP) is a working group of International Council of Sport Science and Physical Education (ICSSPE). The involved international associations are: AIESEP, FIEP, IAPESGW, IFAPA, and ISCPES. The committee shares the mission of ICSSPE and acts as an advisory body for the Council. Thus, the committee shall be an organization structured for the purposes of promoting, stimulating, and encouraging the study, research, and scholarly activity of sport and physical education. The word „Pedagogy" refers to the discipline of study in sport and physical education which deals particularly with the education to, for and through sport and physical activities. In the furtherance of this understanding, the Committee shall endeavor to carry out works in areas of:

Sport Development
Quality Physical Education and Sport
Teaching of Physical Education
Health Development and Education
Professional Development in Physical Education and Sport
Coaching and the Preparing of Youth from Novice to Sport Excellence
(ICSP working paper: *Work Matrix*).

QPES was brought to the ICSSPE Association Board and related working groups for discussion in 2006. The International Committee of Sport Pedagogy (ICSP) (working group of ICSSPE) was then advised to take over the project and general study was conducted since then to assist the development of QPES in regions. The presidential election 2008 at Guangzhou during the ICSEMIS meeting confirmed the position of Dr. Walter Ho from University of Macau as the ICSSPE Vice-President in education from January 2009 to December 2012. Since then, he has assumed leadership on the strategical development of QPES. Plan for QPES was systematically established through the working group of ICSP.

The plan of 2009 development focused on the discussion of benchmark and position statement in QPES. It intended to define QPES and identify important substances for QPES to develop. The 2010 work scheduled on the cultural understanding and the diversified practice of QPES in various states. Forums were advised in different regions to collect information on the following: what makes high quality physical education / school sport; what are the challenges for physical education / school sport; and how do member states manage those challenges?

In order to expand this and some other fundamentals, it seems to be a global necessity to push forward attitudes and reflective consciousness of stakeholders, politicians as well as educators to improve physical education teachers' education. In the sequence of various attempts towards this aim the International Council of Sport Science and Physical Education (ICSSPE) recently compiled a position statement (P.S.) on physical education (PE). It states that PE is the only school subject whose primary focus is on the body, physical activity, physical development and health. PE helps children develop the patterns of and interest in physical activity, which are essential for healthy development and which lay the foundations for adult healthy lifestyles.

Parallel to this, a „Statement of consensus" (S.C.) has been launched as an outcome of the first Global Forum for Physical Education Pedagogy 2010 (GoFPEP 2010) with attendance by more than 70 renowned educators, professionals, administrators, business leaders and policy makers from 25 countries and representation from 64 universities, institutions and schools. The meeting focused on teaching health and physical education in a holistic approach, and it developed some recommendations

for the improvement of physical education programmes and PE teachers' education in the 21st century. „The consensus statement calls for action by students, physical educators, health and leisure professionals, policy makers, citizens and business leaders to encourage programmes that promote a committed effort to enhancing and maintaining the health and well being of individuals," said Cindy Sisson Hensley, president of HOPSports. (http://globalpeforumgc.org/consensus-statement).

Thus, QPES is one out of three priorites of the work of the ICSP members.

ICSSPE reaffirms the 1978 UNESCO International Charter on Physical Education and Sport and the Berlin Agenda for Governments, agreed at the 1st World Summit on Physical Education in 1999 in Berlin, and endorsed by the Declaration of Punta del Este at MINEPS III in the same year, which calls on governments' commitment to:

- *implement policies for physical education as a human right for all children;*
- *recognise that good quality physical education depends on well qualified educators and scheduled time within the curriculum, both of which are possible to provide even when other resources like equipment are in short supply;*
- *invest in initial and in-service professional training and development for educators;*
- *support research to improve the effectiveness and quality of physical education;*
- *work with international financial institutions to ensure physical education is included as part of their aid programmes in education;*
- *recognise the distinctive role of physical education in health, overall development and safe, supportive communities.*

(ICSSPE: *International Position Statement on Physical Education*).

AIM OF THE FORUM

The aim of this session is the development of still more relevant arguments by collecting global voices about the promoting and the hindering factors for quality physical education. The involved international associations (AIESEP, FIEP, IAPESGW, IFAPA, and ISCPES) decided to collaborate in this intention and provide forum discussions, round tables and symposia in the frame of their international conferences which are appointed on all different places around the world. The process of opinion making is structured by three questions:

From your perspective as a professional working in physical education / school sport:

1. What makes high quality physical education / school sport?

   (*E.g. – curriculum development, knowledge, skills and understanding for teachers, for children; engagement with life-long learning*)

2. What are the challenges for physical education / school sport?

   (*E.g. - facilities, resources, social stratification – gender, disability, cultural / religious diversity*)

3. How do you manage those challenges?

   (*E.g. – strategies, interventions, policies*)

The promoting team is expecting to have authentic feedback by professionals in theory and practice in the field and will apply a qualitative analyzing method on the gathered answers. As it is the intention to get still more relevant impressions about these important factors, this qualitative research in which the data is collected from the audience will be used with semi-structured interviews. Once it is all gathered, the analysis will be done. The data will be classified in categories.

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ABSTRACT

The inclusive term ‘Physical Education and Sport’ (PES) is used to refer to school-based structured, supervised physical activities that take place as a subject of study in the education system. The subject aims to systematically develop physical competence and confidence to enable all children to move efficiently and effectively and with understanding. School-based provision forms a basis to access a wide range of movement competences and experiences. The aim of this session is the development of relevant arguments by collecting global voices about the promoting and the hindering factors for quality physical education. The involved international associations (AIESEP, FIEP, IAPESGW, IFAPA, and ISCPES) decided to collaborate in this intention and provide forum discussions, round tables and symposia in the frame of their international conferences which are appointed on all different places around the world.

Key words: *Quality physical education, criteria and fundamentals, benchmarks, global voices*

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Professional paper

PUPILS' ROLE IN THE APPLICATION OF MORE EFFICIENT DIDACTIC AND METHODOLOGICAL PROCEDURES IN PE TEACHING

INTRODUCTION

The problem of the intensification of working processes in PE teaching is in the constant focus of experts in its various aspects, mainly from the point of optimizing the curricula, i.e. application of more efficient didactic and methodological operations in the PE class and recently the application of up-to-date technical and information technology, all leading to a more successful realization of PE class objectives in general. It is evident, however, that the pupils' active role of in the teaching process is neglected, not only by the teachers themselves but also in the interaction of teachers and pupils.

This paper represents a synthesis of several scientific papers dealing with the effects of those organizational and didactic and methodological procedures in learning and practicing the PE curricula aiming at the optimizing of the technology of working processes in PE classes and emphasising the significance of the active role of the pupils in it.

I

1. The teaching process, as the most organized form of education, encompasses three factors: a teacher and a pupil, who make up a type of sociological form of work meant to implement the designed curricula as the third factor of this process. The teacher is, of course, indispensable when talking about managing the technology of PE teaching process. In terms of optimizing, foremost didactic and methodological basis of working processes, one of the basic tasks of the teacher is to plan the implementation of the more rational didactic and methodological procedures in the class, such as braver abandoning of didactic formalism in structuring the class, opting for the more educationally valid exercises, timely application of basic forms of work, appreciating individual differences of the pupils as a criterion for a more differentiated choice of exercises, etc.

In this process, the vital role is ascribed to pupils' personal engagement and their wish to acquire the necessary knowledge, skills, and habits envisaged by the

school curricula, which in turn will bring about their higher motivational aspirations to be active in the process of teaching and practicing, and the significance of inner motivation is also to be stressed:

- curiosity for the learning materials which should be attractive and interesting for the pupils
- academic achievement motive as an aspiration to master contents of the curricula and the challenge to open up and present all the abilities, to fulfil the wish to compete, and to be better than others
- to aspire to the ultimate aim to master the given task and different levels of performance.

Curiosity, first of all, inquisitive and creative person is stimulated by the information about the contents that will be learned through given didactic material taught in class, these being: sketches and contourgrams of the biomechanical structure of the planned tasks including short instruction texts appropriate to the age of the pupils (sports gymnastics), films (rhythmic gymnastics, athletics, sports games), working files with the methods of improving physical abilities by means of individualized dosing and the charts of the referential values for these abilities.

For the pupil to invest personal effort in order to complete the assigned tasks, it is necessary to urge his or her motivation for the *academic achievement* so as to develop knowledge of the personal abilities and the wish to affirm himself or herself and to compete with others. Having this as the aim, several already mentioned studies conducted different organizational, and didactic and methodological procedures of which we want to emphasise the one conducted on the sample of elementary schoolchildren (30-33 pupils per class in six schools of the North Banat and North Middle–Banat regions).

First of all, the pupils were divided into three homogenous groups by means of discriminative analysis based on the measurement of motor abilities relevant for the sports gymnastics (static strength of the shoulders, repetitive strength of the trunk, explosive strength of the legs). Cognitive abilities were estimated on the basis of the results of the balance, coordination and general achievement of the pupils. By forming homogenous groups, pupils develop awareness of group belonging- group of people with similar abilities and needs to achieve the goal mutually.

Initial motor status of the pupils represents the basis for the pupils' curiosity about the target values of this status and the obligation of the teacher to provide the pupils with this information. In order to achieve this, charts with the preliminary values of motor abilities according to the standard group method were drawn up and they contained standard points – norms – expressed according to numerical grading scale.

Thus pupils were able to determine their possible achievements in relation to the target ones.

Then, as already mentioned, pupils were acquainted with the didactic and methodological procedures for the accomplishment of the set objectives in relation to the target values of the motor abilities shown in the charts, and through the working files, containing programmed exercises for the single large groups of muscles. These were ordered in such a manner to alternatively burden certain groups of muscles while the intensity and volume of exercising is individually dosed.

As for the academic achievement, motive as an aspiration to master the contents of the curricula, a set of tasks with different levels of complexity was designed for each group in addition to didactic material – sketches and contourgrams showing tasks (gymnastics elements as a whole and with the individual parts), so as to indicate to the pupils the ultimate aim of the achievement and the methodological procedures to accomplish them. During exercising, pupils could change their groups according to their own estimation. Apart from the contourgrams, during the class, films were played from time to time.

Different types of objectives during exercising determine the level of pupils' aspirations, which means that in a way, they decide themselves what exactly they want to achieve and thus determine their willingness and readiness to achieve these aspirations without any compulsion or control.

2. Frontal organizational form of work was used, and then depending on the mastering of the single tasks, group form of work was introduced with different tasks. For each group, besides the main task, additional three tasks were set from the working files for those muscle groups responsible for the completion of that task. In this way the contents of the work at each working station were consistent with the defined objective of the achievement in respective working stations. Thus structured contents into certain units represent strong motivational factor for the pupils' leaning, especially if the teacher directs the pupils to grasp the principles and laws governing the performance of the mentioned tasks.

II

On the basis of the research in psychology and pedagogy, inner motivation of the pupils is one of the basic prerequisites of achieving good results in the teaching process, and supposing all conditions for the active role of pupils in the teaching process are met, they will be willing to master all the contents from the PE curricula, thus providing PE to achieve the results that are expected from the physical education as an educational area.

To estimate the effects of the applied didactic and methodological operations used to stimulate motivational readiness of the pupils to achieve desired accomplishments, the following parameters were considered:

- Mark for the accomplishment of the curricula contents in sports gymnastics;
- Results of the motor abilities estimated from the point of the defined standard points;
- Interviewing;
- Notes with the applied technique of observation and registering the progress of pupils who used sketches and contourgrams to better familiarize themselves with the task.

Results of the mastering the *curricula contents* show that the first group of pupils mastered the exercises of more complex composition with high marks, while in the second group one notices greater variability in the level of task mastering, showing girls as more successful and earning higher marks in rhythmic gymnastics exercises (floor and beam) and showing boys more successful in the exercises requiring strength in all its forms (parallel beams, jump over).

Academic achievement of the pupils in both first and second group was excellent and very good, which points to the significance of the cognitive factor in the process of acquiring tasks of the psycho-motor type. The pupils in the third group mastered exercises of low complexity planned on the basis of the initial motor status and the cognitive factor as well. These pupils mainly showed academic excellence.

In *motor abilities* significantly better results were achieved in all three groups, which is explained foremost by the individual dosing and the readiness to achieve desired values in these abilities shown in the tables.

The purpose of the administered interview was to determine the extent to which the applied organization of the teaching process exerted any effect on the pupils to get motivated and to show greater engagement in achieving desired results which implied the following:

- informing the pupils on the desired achievements in motor abilities and acquisition of the curricula contents;
- respecting the individual differences in programming of the contents, and didactic and methodological procedures in the class.

The following results were obtained:

o Showing a wish to know the desired results and thus determine their personal level of aspiration and respectively their engagement in the class was a response of almost all the pupils – 99,9%;

- Technical solution of presenting the curricula contents adapted to their individual abilities stirred their curiosity to master the contents, was a response of 96% of the pupils in all three groups;
- Favouring the inclusion into a homogenous group was a response of the girls making up 92%, while 62% of the boys revealed that they tended to cling with better pupils as a means to stimulate them to master the set tasks and smaller percentage 22% said they would like to be better than the rest of the pupils (group leaders).
- The overall organization of the classes has mainly enhanced their initiative, independence and self reliance in their work without any excessive verbal direction on the side of their teachers, was the answer of 93,4% of the first group pupils (excellent mark records), 78,3% of the second group pupils (excellent and very good mark records) and 58% of the third group pupils (good mark record) which was expected to have in mind the significance of the cognitive factor in the teaching process.

Observation technique helped register more frequent approaches of the pupils in all groups during the class to the drawings and contourgrams with short textual instructions if new contents were taught, and later smaller interest while in the phase of marking the pupils would only notice charts with values of the motor abilities.

CONCLUSION

The aim of this paper was to draw the attention of the expert audience, primarily of the practising PE teachers to the vital role of the pupils in the phase of the implementation of more efficient working procedures in PE teaching process if all conditions for the stimulation of their motivation are met in such a way to stir them to master the curricula contents according to the desired achievement.

To accomplish this, a teacher is trusted with a serious obligation to plan the technology of the working process during the class itself and these are:

- Determination of the initial status, forming homogenous working groups and different approach in the choice of the curricula contents tailored according to the homogenous groups and individual exercising;
- The right choice of the methodological procedures while teaching new contents for each separate group;
- Drawing up technical material in order to make pupils familiar with the level of their desired engagement in the teaching process.

To sum up, favourable results in the teaching process shown in this paper point to the need of the engagement not only of the PE teachers but pedagogues and

psychologists as well in the endeavour to find possible methods to motivate pupils to engage in the physical education teaching process.

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ABSTRACT

The problem of the intensification of working processes in PE teaching is in the constant focus of experts in its various aspects, mainly from the point of optimizing curricula, i.e. application of more efficient didactic and methodological procedures in the PE class and recently the application of up-to-date technology and information technology, all leading to more successful realization of PE class objectives in general. It is evident, however, that the pupils' active role in the teaching process is neglected, not only by the teachers themselves but also in the interaction of teachers and pupils.

The teaching process, as the most organized form of education, encompasses three factors: a teacher and a pupil who make up a type of sociological form of work meant to implement the designed curricula as the third factor of this process. The teacher is of course indispensable when talking about managing PE teaching process. In terms of optimizing, one primarily refers to didactic and methodological basis of working processes during PE classes, such as braver abandoning of didactic formalism in structuring classes, opting for more educationally valid exercises, timely application of basic forms of work, appreciating individual differences of the pupils as a criterion for a more differentiated choice of exercises, etc.

In this process, it is important to acknowledge the personal engagement of the pupils and their wish to acquire necessary knowledge, skills and habits envisaged by the school curricula, which in turn will bring about their motivational aspirations to be active in the process of teaching and practicing. Another important point that

needs to be emphasised is the significance of internal motivation: being curious about the learning materials which should be attractive and interesting, academic achievement motive in the sense of aspiring to master the contents of the curricula and the challenge to open up and expose all the abilities, to fulfil the wish to compete, and to be better than others, to aspire towards the ultimate aim to master the given task and to achieve different levels of performance.

Abundant scientific papers cite the effects of applied organizational and didactic and methodological procedures in learning and practicing PE curricula aiming at the optimizing the technology of working processes in PE classes and the significance of the active role of the pupils in it.

Key words: *pupils' role, didactic and methodological procedures, PE teaching process*

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Izvorni znanstveni rad

ANALIZA RAZLIKA FUNKCIONALNIH KARAKTERISTIKA STUDENTICA UPORABOM TRI RAZLIČITE SPRAVE ZA DOZIRANO OPTEREĆENJE

UVOD

Dijagnostika u sportu podrazumijeva utvrđivanje razine treniranosti, sposobnosti i osobina sportaša koje su bitne za uspjeh u sportu. Dijagnostikom funkcionalnih sposobnosti, odnosno spiroergometrijskih parametara, mogu se precizno vrednovati sposobnosti srčano-žilnog i dišnog sustava. Također, mjerenjem funkcionalnih sposobnosti mogu se dobiti podaci o specifičnim fiziološkim i biokemijskim reakcijama tijekom trenažne ili natjecateljske aktivnosti u konkretnoj sportskoj grani (Meyer i sur., 1996). U znanstvenoj i stručnoj praksi najčešće korišteni parametri u procjeni aerobnog energetskog kapaciteta su apsolutni i relativni maksimalni primitak kisika (VO_{2max}, VO_{2max}/kg), dok se za procjenu anaerobnog kapaciteta najčešće koristi koncentracija laktata u krvi (Svedahl i MacIntosh 2003, Christopher i Rhodes 1993). Za analizu funkcionalnih karakteristika sportskih disciplina u kojima je uspjeh određen sposobnošću transportnog sustava za kisik, najčešće se koriste maksimalni progresivni testovi opterećenja (Wasserman i sur. 1999). Potrebno je naglasiti kako se kao sprave za dozirano opterećenje najčešće koriste biciklergometar i pokretni sag, iako se posljednjih godina sve više koriste i specifični ergometri za pojedine sportove (veslanje, kajak, plivanje, skijaško trčanje) koji vjerno reproduciraju dinamički stereotip kretanja specifičan za pojedini sport. Nadalje, danas se pretežno koriste kontinuirani testovi opterećenja na biciklergometru i na pokretnom sagu gdje se porast opterećenja postiže ili povećanjem brzine saga ili povećanjem nagiba saga ili se pak i brzina i nagib progresivno povećavaju. U pravilu se test izvodi do iscrpljenja ispitanika, ukoliko nema kontraindikacija ili limitirajućih faktora (Rowland, 1996). U ovom istraživanju za mjerenje funkcionalnih karakteristika studentica pored dvije standardne sprave za dozirano opterećenje korištena je i orbitrek sprava koja se u sportskoj stručnoj i znanstvenoj praksi do sada nije koristila kao mjerni instrument. Stoga je cilj istraživanja odrediti i objasniti razlike u funkcionalnim karakteristikama mjerenjem na tri različite sprave: bicikl-ergometru, pokretnom sagu te na orbitrek spravi. Nadalje, potrebno je naglastiti da unatoč rastućoj zastupljenosti korištenja

sprava za dozirano opterećenje, dosadašnja znanstvena istraživanja nisu se bazirala na analizi razlika funkcionalnih karakteristika.

METODE RADA

Uzorak se sastojao od 30 studentica Kineziološkog fakulteta Sveučilišta u Splitu, a testirane su na 3 različite sprave (orbitrek sprava, bicikl-ergometar, pokretni sag). U istraživanje su bile uključene sljedeće varijable: apsolutni maksimalni primitak kisika (VO_{2max}), relativni maksimalni primitak kisika (RVO_{2max}), maksimalna minutna ventilacija (VE_{max}), maksimalna frekvencija disanja (RF_{max}), maksimalna frekvencija srca (HR_{max}), apsolutni primitak kisika pri anaerobnom pragu (VO_{2max}/AT), relativni primitak kisika pri anaerobnom pragu (RVO_{2max}/AT), minutna ventilacija pri anaerobnom pragu (VE/AT), frekvencija disanja na anaerobnom pragu (RF/AT), frekvencija srca pri anaerobnom pragu (HR/AT), koncentracija laktata u mirovanju (LAK_{mir}) i koncentracija laktata na kraju testa (LAK_{max}). U skladu s mjerenim varijablama, primijenjen je progresivni protokol opterećenja sve do iscrpljenosti ispitanica. Prvo su sve varijable u svim mjerenjima podvrgnute testiranju normaliteta distribucije korištenjem KS testa te su se izračunali deskriptivni statistički parametri: aritmetička sredina, standardna devijacija, minimalni rezultat, maksimalni rezultat te KS vrijednost. Za analizu razlika među mjerenim varijablama korištena je ANOVA za ponovljena mjerenja s Fisher LSD post-hoc testom.

REZULTATI I RASPRAVA

Tablica 1. *Deskriptivni statistički parametri na orbitrek spravi (AS – aritmetička sredina, Min – minimalni rezultat, Max – maksimalni rezultat, SD – standardna devijacija, KS – vrijednost Kolmogorov-Smirnovljevog testa)*

	AS	Min	Max	SD	KS
$VO2_{max}$	2,58	1,72	3,36	0,50	0,12
$RVO2_{max}$	42,66	30,72	57,62	7,15	0,10
VE_{max}	85,96	59,50	123,40	15,80	0,10
RF_{max}	45,37	32,40	66,40	7,34	0,08
HR_{max}	186,26	175,00	202,00	6,60	0,12
$VO2_{max}$/AT	1,95	1,26	2,79	0,41	0,12
$RVO2_{max}$/AT	32,12	22,44	44,62	5,50	0,09
VE/AT	49,73	31,80	72,60	11,64	0,08
RF/AT	29,67	17,50	41,70	5,73	0,10
HR/AT	164,63	147,00	181,00	7,95	0,10
LAK_{mir}	2,07	1,30	3,10	0,43	0,09
LAK_{max}	9,50	5,50	18,10	2,77	0,12
					MaxD=0,24

Tablica 2. *Deskriptivni statistički parametri na bicikl ergometru (AS – aritmetička sredina, Min – minimalni rezultat, Max – maksimalni rezultat, SD – standardna devijacija, KS – vrijednost Kolmogorov-Smirnovljevog testa)a*

	AS	Min	Max	SD	KS
$VO2_{max}$	2,41	1,44	3,43	0,45	0,06
$RVO2_{max}$	39,47	29,62	53,74	6,02	0,20
VE_{max}	82,18	48,20	124,10	19,80	0,10
RF_{max}	43,64	31,50	61,90	7,80	0,10
HR_{max}	180,36	169,00	191,00	5,58	0,14
$VO2_{max}$/AT	1,66	1,04	2,33	0,31	0,10
$RVO2_{max}$/AT	27,26	20,66	35,20	3,99	0,10
VE/AT	43,47	25,70	64,90	8,76	0,06
RF/AT	27,02	16,40	37,10	5,08	0,12
HR/AT	152,86	135,00	166,00	6,90	0,12
LAK_{mir}	2,00	1,20	3,00	0,42	0,13
LAK_{max}	10,39	5,20	14,90	2,16	0,08

MaxD=0,24

Korištenjem KS testa je pokazano kako su sve varijable na svim spravama normalno distribuirane. Analizom dobivenih parametara deskriptivne statistike može se uočiti kako su numerički najviše vrijednosti zabilježene na pokretnom sagu, zatim na orbitrek spravi pa na bicikl ergometru (Tablice 1, 2 i 3).

Tablica 3. *Deskriptivni statistički parametri na pokretnom sagu (AS – aritmetička sredina, Min – minimalni rezultat, Max – maksimalni rezultat, SD – standardna devijacija, KS – vrijednost Kolmogorov-Smirnovljevog testa)*

	AS	Min	Max	SD	KS
$VO2_{max}$	2,84	1,94	3,87	0,45	0,14
$RVO2_{max}$	46,67	34,35	64,66	6,66	0,17
VE_{max}	98,82	54,10	127,10	17,26	0,16
RF_{max}	50,63	34,90	64,30	8,34	0,16
HR_{max}	185,23	176,00	196,00	4,48	0,19
$VO2_{max}$/AT	2,16	1,45	2,91	0,35	0,15
$RVO2_{max}$/AT	35,49	27,71	45,56	4,42	0,17
VE/AT	59,72	43,80	80,80	10,36	0,18
RF/AT	39,25	16,50	54,30	7,34	0,13
HR/AT	168,53	157,00	178,00	5,91	0,16
LAK_{mir}	2,00	1,20	2,70	0,38	0,10
LAK_{max}	10,02	6,20	13,70	1,91	0,11

MaxD=0,24

Tablica 4. *Analiza varijance za ponovljena mjerenja između tri različite sprave za dozirano opterećenje (Repeated measures ANOVA)*

	Orbitrek	Biciklergometar	Pokretni sag
	AS±SD	AS±SD	AS±SD
$VO2_{max}$	**2,59±0,50***	**2,42±0,45†††**	**2,84±0,46³**
$RVO2_{max}$	**42,66±7,16****	**39,47±6,03†††**	**46,68±6,66³**
VE_{max}	85,96±15,81	**82,18±19,81†††**	**98,82±17,26²**
RF_{max}	45,37±7,35	**43,64±7,81†††**	**50,63±8,34¹**
HR_{max}	**186,27±6,60*****	**180,37±5,59†††**	185,23±4,49
$VO2_{max}$/AT	**1,95±0,42*****	**1,67±0,32†††**	**2,16±0,35³**
$RVO2_{max}$/AT	**32,12±5,50*****	**27,27±3,99†††**	**35,49±4,42³**
VE/AT	**49,73±11,64****	**43,48±8,76†††**	**59,72±10,36³**
RF/AT	**29,68±5,74***	**27,02±5,08†††**	**39,25±7,34³**
HR/AT	**164,63±7,96*****	**152,87±6,91†††**	**168,53±5,92¹**
LAK_{mir}	2,07±0,44	2,00±0,43	2,00±0,38
LAK_{max}	9,5±2,78	10,39±2,16	10,02±1,91

Legende: Analiza varijance-Repeated measures ANOVA s Fischer LSD post-hoc testom
*p<0,05; **p<0,01; ***p<0,001 – značajnost razlika između orbitrek sprave i biciklergometra
†p<0,05; ††p<0,01; †††p<0,001 – značajnost razlika između biciklergometra i pokretnog saga
¹p<0,05; ²p<0,01; ³p<0,001 – značajnost razlika između orbitrek sprave i pokretnog saga

Koncentracija laktata u krvi često se koristi kao pokazatelj anaerobne proizvodnje energije. Jedan od razloga tome je jednostavnost i primjenjivost mjerenja koncentracije laktata. Iz tablice 4. uočljivo je kako u varijablama laktata, koje su u granicama referentnih vrijednosti za stanje mirovanja, nema statistički značajnih razlika između 3 mjerenja. To nam kazuje kako kod ispitanica na sva tri testa opterećenja nije bilo razlika u aktivnosti prije samog uzorkovanja, odnosno da je uzorak ispitanica bio relativno homogen. Nadalje, vrijednosti laktata poslije opterećenja se statistički značajno ne razlikuju, a zabilježene vrijednosti govore kako su ispitanice postigle svoj maksimum.

U svim ostalim primijenjenim varijablama postoje statistički značajne razlike između sve tri sprave za dozirano opterećenje. Srčana je frekvencija tijekom opterećenja veoma važan fiziološki pokazatelj. Frekvencija srca odmah nakon početka opterećenja ili vježbanja počinje se povećavati. Povećanje srčane frekvencije upravo je razmjerno razini opterećenja, što je potvrđeno i ovim istraživanjem. Naime, zabilježene vrijednosti maksimalne srčane frekvencije, kao i srčane frekvencije na

anaerobnom pragu statistički značajno su veće na pokretnom sagu i orbitreku u odnosu na biciklergometar. U tijeku tjelesne aktivnosti povećava se i dubina i frekvencija disanja pa se proporcionalno intenzitetu i trajanju rada povećava i minutni volumen disanja, odnosno minutna ventilacija. Ventilacija pri maksimalnim opterećenjima dosiže vrijednosti tzv. maksimalnog minutnog volumena disanja. Kada mjerimo ventilaciju, mjerimo zapravo minutni volumen disanja. Plućna ventilacija koja se povećava tijekom opterećenja, u izravnom je razmjeru s tjelesnim metaboličkim potrebama (Wilmore i Costill, 1999), što se slaže s dobivenim rezultatima istraživanja. Većina znanstvenika maksimalni primitak kiska (VO_{2max}) smatra kao najbolje, odnosno, najobjektivnije mjerilo kardiorespiratornog kapaciteta. Dobiveni rezultati apsolutnog i relativnog primitka kisika, kao i navedeni parametri na anaerobnom pragu statistički značajno se razlikuju na sve 3 sprave. Najniže zabilježene vrijednosti postignute su na biciklergometru, a najviše na pokretnom sagu. Tijekom opterećenja, primitak kisika se povećava i raste gotovo linearno s povećanjem intenziteta rada. Aktivnosti koje zahtijevaju premještanje odnosno pokretanje vlastitog tijela u prostoru (orbitrek, pokretni sag), troše i više energije (više kisika) za pokretanje tijela u odnosu na biciklergometar, što objašnjava dobivene rezultate. Nadalje, najniže prosječne vrijednosti svih istraživanih varijabli zabilježene su na bicikl ergometru, što je vjerojatno posljedica manjeg udjela aktivne mišićne mase gdje često lokalna, a ne opća mišićna izdržljivost ograničava doseg u testu. Test opterećenja na biciklergometru je nešto duže trajao pa su vjerojatno uslijed dehidracije, povećane temperature tijela, nelagode u mišićima ili pada motivacije vrijednosti primitka kisika niže u odnosu na orbitrek i pokretni sag što je potvrđeno u prethodnim istraživanjima (Barros i sur., 1999). Uočljivo je kako su izmjerene maksimalne vrijednosti primitka kisika na pokretnom sagu i orbitrek spravi, u odnosu na biciklergometar, veće za oko 5 -15% što je konzistentno sa dosadašnjim istraživanjima (Shephard, 1984., Rowland, 1996., Loftin i sur., 2004). U skladu s tim može se uočiti kako orbitrek sprava također omogućava korištenje više mišićnih skupina u odnosu na bicikl ergometar jer su dodatno aktivirane mišićne grupe ruku i ramenog pojasa i trupa dok to nisu na biciklergometru što se slaže s dobivenim rezultatima istraživanja.

ZAKLJUČAK

Sve veći zahtjevi modernog sporta za razvojem funkcionalnih sposobnosti sportaša nameću potrebu za unapređenjem modaliteta trenažnog procesa i metoda pomoću kojih bi se unaprijedila tražena svojstva. Jedan od mogućih pristupa zadovoljavanja visokih standarda predstavlja mogućnost naprednog korištenja sprava za dozirano opterećenje kao kinezioloških operatora. Stoga u ovom radu kroz deskriptivnu i analizu varijance prezentirana nova sprava može dati velik doprinos u znanstvenoj i stručnoj praksi. Zaključno, iako sprave za dozirano opterećenje

imaju sve veću primjenu u znanstveno-stručnoj praksi njihova primjena nije dovoljno istražena. Stoga bi se u budućim istraživanjima ovog tipa trebalo bazirati na homogenim uzorcima vrhunskih sportaša te bi dobiveni rezultati vjerojatno bili od fundamentalnog značaja za programiranje i kontrolu treninga.

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ANALYSIS OF FUNCTIONAL CHARACTERISTIC DIFFERENCES OF FEMALE STUDENTS BY USING THREE DIFFERNT MACHINES FOR DOSED LOAD

ABSTRACT

The aim of this research was to determine and explain the differences in functional characteristics by using three different machines for dosed load. Thereat, two standard and one new unused machine were used in scientific-professional practise. Spiroergometric testing with progressive load protocol was made. Following variables were involved in the research: the absolute maximum oxygen uptake, relative maximum oxygen uptake, maximum minute ventilation, maximum heart rate, maximum respiration rate and above mentioned variables on anaerobic border, same as lactate concentration at the beginning and the end of testing. The results show that in most variables there is a statistically significant difference between measured parameters on differnt machines. Specifically, often local, and not general muscular endurance limits the reach of test on a cycloergometer because of the lower share of active lean body mass. Also, due to dehydration, increased body temperature, muscle discomfort or a drop of motivation, the oxygen uptake values are lower.

Key words: *analysis of variance, orbitrek, cycloergometer, treadmill*

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Pregledni rad

KINEZIOLOŠKA PARADIGMA KOMPETENCIJA UČENIKA U 21. STOLJEĆU

„Škola nije samo mjesto učenja, nego i odrastanja i pripreme za život" (V.F.)

UVOD

Govoriti danas, dakle, na početku 21. stoljeća o kineziološkoj paradigmi kompetencija učenika u tom stoljeću nemoguće je bez sagledavanja uloge škole, kineziologije i tjelesnog i zdravstvenog odgojno-obrazovnog područja (čitaj: tjelesne i zdravstvene kulture) na početku ovog milenija.

Prvo, ekspanzija znanstvenih i tehnoloških otkrića, ubrzana globalizacija i informatizacija traže korjenito i trajno transformiranje odgoja i obrazovanja. To je razlog što dinamična i složena stvarnost traži školu koja se lako i brzo može prilagoditi svim životnim situacijama. Zbog toga suvremeno društvo traži kvalitetnu školu ili, točnije, školu u koju će učenici rado odlaziti, u kojoj mogu optimalno razvijati svoje osobine i sposobnosti, stjecati korisna znanja, poboljšavati svoja postignuća i stjecati spoznaje o općim ljudskim vrijednostima. To nije nevažno, naprotiv pogotovo ako se slažemo da je upravo vrijeme koje najmlađi i mladi provode u školi idealna prilika da ih osposobljavamo i osposobimo za život. (Hardman, 2008.).

Drugo, polazeći od kineziološkog ideala čovjeka koji podrazumijeva dobro zdravlje, harmoničan razvoj i održavanje svih čovjekovih osobina i sposobnosti te usvojenje znanja neophodnih za učinkovit život i rad u suvremenom društvu, valjanim sustavom tjelesnog vježbanja može se smatrati samo onaj kojem je cilj unapređenje zdravlja najmlađih i mladih, optimalan razvoj njihovih osobina i sposobnosti, usvajanje teorijskih i motoričkih znanja važnih u svakodnevnom životu i urgentnim situacijama, poboljšanje motoričkih postignuća i osiguravanje primjerenih odgojnih učinaka. (Findak, 2003.)

Treće, iz tako definiranog motrišta kineziologije na tjelesno vježbanje proizlazi i uloga tjelesnog i zdravstvenog odgojno-obrazovnog područja, a na taj način i uloga tjelesne i zdravstvene kulture,koja se očituje u tome da ovo područje, odnosno predmet ima temeljni značaj za skladan razvoj psihosomatskih karakteristika djece, učenika i mladeži, za stjecanje i usavršavanje biotičkih motoričkih znanja i socijalnih motoričkih znanja te za stjecanje i razvoj temeljnih kompetencija, a poglavito onih

koje proizlaze iz potrebe primjerenog i stalnog prilagođavanjima novim radnim i životnim situacijama (Findak, 2009.).

Ako se slažemo da prethodno naznačena pitanja predstavljaju dobru orijentaciju u traženju puteva do odgovora na istaknuti naslov, onda ćemo se vjerojatno suglasiti s tim da ih treba sagledati ne samo s aspekta općeg kineziološkog gledišta, nego i s gledišta opće prihvaćenih znanstvenih postignuća vezanih uz kompetencije učenika.

TEORIJSKE PRETPOSTAVKE ZA UTVRĐIVANJE KOMPETENCIJA UČENIKA U TJELESNOM I ZDRAVSTVENOM ODGOJNO-OBRAZOVNOM PODRUČJU

Radi lakšeg razumijevanja i nadamo se kasnije uspješnijeg sporazumijevanja potrebno je, govoreći o kineziološkoj paradigmi kompetencija učenika u 21. stoljeću uz ostalo, ukazati na temeljne čimbenike koji u većoj ili manjoj mjeri determiniraju utvrđivanju kompetencije u tjelesnom i zdravstvenom odgojno-obrazovnom području. Naime, da bi se mogle utvrditi kompetencije koje svaki učenik mora steći tijekom školovanja, treba uvažavati temeljne teorijske pretpostavke, koje su istodobno uvjet za njihovu efikasniju implementaciju u praksi.

Prva teorijska pretpostavka proizlazi iz spoznaje prema kojoj su u suvremenom društvu bitno promijenjeni uvjeti života i rada, što praktički znači da treba koncepciju, ciljeve i zadaće cjelokupnog odgojno-obrazovnog sustava pa analogno tome i svakog odgojno-obrazovnog područja, uključujući i tjelesno i zdravstveno odgojno-obrazovno područje, maksimalno podrediti zahtjevima koji prate život i rad djece, učenika i mladeži u suvremenom društvu (Findak, Prskalo, 2005.).

Druga, treba voditi brigu o tome da koncepcija, ciljevi i zadaće svakog odgojno-obrazovnog područja bude kongruentna s koncepcijom, ciljevima i zadaćama cjelokupnog odgojno-obrazovnog sustava.

Treća se očituje u potrebi objektivnog sagledavanja uloge i značenja tjelesnog i zdravstvenog odgojno-obrazovnog područja lociranih na postignućima kineziologijske znanosti, njegovih komparativnih prednosti i shodno tome u definiranju takve koncepcije, ciljeva, zadaća i kompetencija koje su u potpunosti okrenute autentičnim potrebama djece, učenika i mladeži.

Četvrta, treba respektirati činjenicu da se ovo odgojno-obrazovno područje bitno razlikuje od svih drugih odgojno-obrazovnih područja i po tome što se upravo putem sredstava kojima raspolaže može i mora utjecati na morfološke karakteristike, motoričke sposobnosti, funkcionalne sposobnosti te kognitivne i konativne dimenzije djece, učenika i mladeži.

Peta, u cilju da se poboljša učinkovitost odgojno-obrazovnog sustava ili, još konkretnije, da se podigne kvaliteta nastave, odnosno škole na višu razinu,

kurikulumska vizija temelji se, uz ostalo, na tome da se sagleda kraj procesa školovanja učenika, tj. da se utvrdi što se očekuje od učenika na kraju osnovne i srednje škole treba, uz već spomenutu koncepciju, ciljeve i zadaće, utvrditi i odgojno-obrazovne ishode, odnosno kompetencije koje djeca i učenici moraju steći tijekom cjelokupnog školovanja. To je razlog što orijentacija na stjecanje kompetencija učenika ima središnje mjesto u svim školskim sustavima u cijelom svijetu pa analogno tome i u svakom odgojno-obrazovnom području, odnosno nastavnom predmetu (Rosandić, 2008.). Da bi se, međutim, to i postiglo na što efikasniji način potrebno je, uz ostalo, input orijentaciju (polazeći od programskih sadržaja), zamijeniti output orijentacijom (utvrditi koje znanje i sposobnosti učenici moraju ostvariti tijekom školovanja). Dakle, umjesto standardizacije sadržaja koje bi trebalo tijekom školovanja usvojiti, orijentacija treba biti na standardiziranju kompetencija koje učenici trebaju tijekom školovanja steći. Dakako s tom orijentacijom bitno se mijenja i uloga nastavnika, to jest umjesto dosadašnje orijentacije na poučavanje sadržaja, odnosno na svladavanje programskih sadržaja, odgovornost se prenosi na proces učenja, odnosno na obrazovne ishode, to jest kompetencije učenika. Dakle, smisao nastave nije samo realizacija programa, nego i razvoj potencijala svakoga učenika i njegovo upućivanje u to kako taj potencijal koristiti u realnom životu. Tako npr. sasvim je sigurno da sudjelovanje djece, učenika i mladeži u sportu, odnosno odraslih ljudi u nekoj od sportsko-rekreativnih aktivnosti ovisi, uz ostalo, o njihovom znanju o sportu, odnosno o sportskoj rekreaciji. Isto, kako o njihovom praktičnom znanju koje im omogućava veći ili manji angažman u izabranoj grani sporta, tako i o teoretskom znanju koje im omogućava razumijevanje razloga za njihovo uključivanje u sport, odnosno u sportsku rekreaciju.

S obzirom da kompetencija znači doslovnu osposobljenost da se koristi znanje, vještine i sposobnosti u situacijama učenja ili rada te u profesionalnom i osobnom razvoju, pri utvrđivanju kompetencija koje bi učenici trebali steći tijekom školovanja ili, točnije, na pojedinoj razini odgoja i obrazovanja pa i u svakom kurikulumskom ciklusu, potrebno je voditi brigu o nekoliko čimbenika. Iako su odgojno-obrazovni ishodi, odnosno kompetencije zapravo ostvareni ciljevi, kompetencije treba utvrditi tako da su „mjerljive" i to kako interno, tako i eksterno. Dalje, pri utvrđivanju kompetencija prednost treba dati tzv. temeljnim kompetencijama, a to su kompetencije koje su s jedne strane kongruentne s ciljevima i zadaćama odgojno-obrazovnog područja kojem pripadaju, a s druge strane s ciljevima i zadaćama pojedine razine odgoja i obrazovanja te s općim ciljevima odgojno-obrazovnog sustava (Baranović, 2005.).

Shodno do sada izloženom ili, točnije respektirajući prethodno naznačene teorijske pretpostavke utvrđivanja kompetencija u tjelesnom i zdravstvenom odgojno-obrazovnom području, u daljnjem razmatranju prezentirat ćemo, primjera radi, samo onaj dio kurikuluma tjelesnog i zdravstvenog područja u Republici Hrvatskoj koji se odnosi na osnovnu školu (Findak, 2009.).

Da bi se mogle utvrditi kompetencije koje svaki učenik mora steći tijekom školovanja trebaju biti jasni, pored općeg cilja odgoja i obrazovanja, i ciljevi svakoga odgojno-obrazovnog područja. Shodno tome, pored definiranja općeg cilja tjelesnog i zdravstvenog odgojno-obrazovnog područja ukazala se potreba ne samo za definiranje ciljeva ovoga odgojno-obrazovnog područja za predškolu, osnovnu školu i srednju školu nego i određivanje posebnih ciljeva tjelesnog i zdravstvenog odgojno-obrazovnog područja u predškolskom odgoju, osnovnoj i srednjoj školi. Tako je opći cilj tjelesnog i zdravstvenog odgojno-obrazovnog područja podmirenje biopsihosocijalnih motiva za kretanjem, poticanje pravilnog rasta i razvoja, optimalan razvoj osobina i sposobnosti, stjecanje i usavršavanje kineziološkiх teorijskih i kineziološkiх motoričkih znanja, poboljšanje motoričkih postignuća i postizanje primjerenih odgojnih učinaka (Findak, 2009.).

Cilj je tjelesnog i zdravstvenog odgojno-obrazovnog područja u osnovnoj školi poticanje pravilnog rasta i razvoja učenika mlađe i srednje školske dobi, čuvanje i unapređivanje njihova zdravlja, optimalan razvoj njihovih antropoloških obilježja, usvajanje i usavršavanje temeljnih kineziološkiх teorijskih i kineziološkiх motoričkih znanja, poboljšanje motoričkih postignuća i postizanje primjerenih odgojnih učinaka. Definiranje posebnih ciljeva tjelesnog i zdravstvenog odgojno-obrazovnog područja proizašlo je iz potrebe uvažavanja biopsihosocijalnih karakteristika učenika osnovne škole koji pripadaju pojedinim kurikulumskim ciklusima: I. ciklus od 1. do 4. razreda, II. ciklus od 5. do 6. razreda, III. ciklus od 7. do 8. razreda (xxx, 2009.)

Posebni ciljevi jesu:

- zadovoljavanje potreba za kretanjem, odnosno vježbanjem i stvaranje navika o potrebi svakodnevnog vježbanja,
- razvijanje antropometrijskih karakteristika, motoričkih i funkcionalnih sposobnosti u skladu sa zakonitostima rasta i razvoja učenika,
- upoznavanje sa zakonitostima rasta i razvoja i značenje redovitog i pravilnog tjelesnog vježbanja u tome,
- razvijanje svijesti o važnosti tjelesnog vježbanja za očuvanje i unapređenje zdravlja,
- osposobljavanje učenika za primjenu temeljnih prirodnih oblika kretanja u različitim tjelesnim aktivnostima,
- osposobljavanje učenika za odgovoran i objektivan odnos prema sebi i razvoju vlastitih sposobnosti,
- razvijanje zdravstvene kulture učenika u svrhu čuvanja i unapređivanja vlastitog zdravlja i zdravlja drugih,
- osposobljavanje učenika za primjenu temeljnih kineziološkiх znanja u svakodnevnom životu i radu,

- osposobljavanje učenika za primjenu usvojenih temeljnih kineziloških znanja u različitim sportskim aktivnostima,
- razvijanje suradničkog ponašanja i osposobljavanje za timski rad,
- usvajanje i usavršavanje znanja plivanja,
- savladavanje osnovnih tehnika plivanja,
- razvijanje ekološke svijesti o čuvanju i zaštiti okoliša,
- osposobljavanje za smisleno provođenje slobodnog vremena koristeći se sredstvima tjelesnog vježbanja i sporta,
- prepoznavanje nadarene djece i učenika i njihovo uključivanje u sport (Findak, 2009.).

Na temelju prethodno definiranog općeg cilja tjelesnog i zdravstveno odgojno-obrazovnog područja, cilja ovoga odgojno-obrazovnog područja u osnovnoj školi i posebnih ciljeva, utvrđeni su odgojno-obrazovni ishodi ili kompetencije učenika u tjelesnom i zdravstvenom odgojno-obrazovnom području u osnovnoj školi:

- stečene temeljne kineziološke kompetencije o pravilnom korištenju kineziloških operatora,
- poznavanje i razumijevanje temeljnih zakonitosti o utjecaju tjelesnog vježbanja na organizam,
- razvijena svijest o potrebi provođenja tjelesnog vježbanja u čistoj obući i odjeći,
- usvojena temeljna kineziološka znanja o pravilnom provođenju tjelesnog vježbanja,
- razvijena svijest o potrebi provođenja tjelesnog vježbanja u primjerenim zdravstveno-higijenskim uvjetima,
- usvojena temeljna znanja o motoričkom izražavanju i stvaralaštvu,
- razvijena svijest o potrebi održavanja stanja antropoloških obilježja na optimalnoj razini,
- osposobljenost za samopraćenje učinaka tjelesnog vježbanja,
- razvijena svijest o vlastitom zdravlju i zdravlju drugih,
- osposobljenost za rad u grupi i poštivanje dogovorenih uputa,
- razvijena svijest o potrebi poštivanja različitosti među ljudima,
- razvijena svijest o potrebi očuvanja prirode i zaštiti okoliša, (Findak,2009., xxx, 2009.).

Dakle, sve upućuje na zaključak da je temeljna zadaća svakoga kineziologa da ostavi „trag”! Taj tako potreban „trag” ostvarit će se utoliko prije ukoliko svakom sudioniku u nastavnom procesu osiguramo najbolju odgojno-obrazovnu priliku, a

najbolja prilika za svakoga učenika je ona koja maksimalno uočava njegove autetične potrebe, mogućnosti i interese. Kineziološki smisao takvog pristupa nastavi je da svaki učenik u svakom trenutku vježba u uvjetima koji su njemu najprimjereniji, što istodobno predstavlja i jedan od temeljnih uvjeta ne samo za stjecanje prethodno naznačenih kompetencija, nego i mnogo više od toga. Naime, omogućiti učenicima da se na vlastitom iskustvu uvjere u korisnost tjelesnog vježbanja predstavlja najviši stupanj osposobljenosti djece i učenika da tjelesno vježbanje prihvate kao trajnu vrijednost, da ne kažemo kao sastavni dio kulture življenja ne samo danas, nego i sutra, dakle, nakon završenog školovanja, odnosno tijekom cijeloga života.

ZAKLJUČAK

U ovom radu pokušali smo ukazati na samo neke aspekte kompetencija učenika u 21. stoljeću kroz prizmu kineziološke paradigme. Dakako, navedena viđenja vezana uz kompetencije učenika u tjelesnom i zdravstvenom odgojno-obrazovnom području nisu jedina, naprotiv, treba ih shvatiti kao jedno od postignuća kineziologijske znanosti, odnosno kineziološke metodike.

To znači da treba u narednom razdoblju uz pomoć znanstveno potvrđenih spoznaja procijenjivati ne samo pozitivne strane ponuđenih rješenja, nego i njihove manjkavosti. Shodno tome, zadaća je i nastavnika da stalno valoriziraju i analiziraju praksu te na temelju dobivenih rezultata preispitaju i istodobno mijenjaju teoriju u svim onim dijelovima koji se pokažu kao uzročnici slabe ili slabije efikasnosti u stjecanju predloženih kompetencija.

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KINESIOLOGICAL PARADIGM STUDENTS' COMPETENCE IN THE 21ST CENTURY

ABSTRACT

The expansion of scientific and technological breakthroughs, rapid globalization and the development and application of information technology seek radical and permanent transformations in education. This is why the dynamic and complex reality requires school that can easily and quickly be adapted to all life situations. Therefore, contemporary society requires a quality education or, more accurately, a school that students will be happy to go to, a school where they can develop their abilities and characteristics to an optimum, acquire useful knowledge, improve their performance and gain insight into general human values. Instead of standardization of the content that should be acquired during education, the focus should be on standardizing competences that students should acquire during their education. With this change of focus there are significant changes in the role of the teacher, that is, instead of the focus being on teaching the content, i.e. on mastering the content, the liability is transferred to the learning process itself, and educational outcomes, that is, students' competence. The significance of teaching is not only the realization of the syllabus content, but also the development of each student's potential and instructing individual students on how this potential can be used in real life. Naturally, the above perceptions regarding the students' competence in the field of physical education are not the only ones, on the contrary, they should be seen as one of the achievements of kinesiological science or kinesiological teaching methods. This means that in the forthcoming period, with the help of scientifically validated knowledge, not only the positive aspects of the given solutions, but also their shortcomings should be evaluated. Accordingly, the task of the teacher is to constantly evaluate and analyze teaching practice and based on the obtained results, examine and simultaneously change the theory in all those parts which prove to be a cause of poor or lower efficiency in the acquisition of the proposed competencies.

Key words: *students' competence, kinesiological paradigm, 21st century*

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Izvorni znanstveni rad

RAZLIKE MORFOLOŠKIH I FUNKCIONALNIH ZNAČAJKI UČENIKA U ODNOSU NA URBANO – RURALNU PRIPADNOST

UVOD

U modernom načinu življenja prisutna je suprotnost između sela i grada. Ta se suprotnost očituje u načinu življenja rezidencijalnog stanovništva te u različitostima klimatskih i atmosferskih prilika (Sijerković, 2006). Djeca, odnosno učenici koji žive u ruralnim naseljima, mnogo više borave na otvorenom i koriste vanjske sportske terene od učenika koji žive u urbanim sredinama (Petrić i Novak, 2007). Ova bi činjenica u današnje vrijeme mogla biti ogromna prednost za generalno bolji razvoj antropoloških obilježja, a time i zdravlje djece (učenika) koja žive u ruralnim naseljima.

Negativan učinak pretilosti na zdravlje, odnosno mogućnost oboljenja pretilih osoba od raznih bolesti potvrđeno je od mnogobrojnih znanstvenika (Cheng i sur. 2007; Hunter i sur., 2000; Wang i sur., 2006; Warner, 2005; Westcott, 2006; Pucarin-Cvetković i sur., 2006 i dr.) koji se bave upravo ovim problemom te će se gotovo svi složiti da je bavljenje tjelesnom aktivnošću jedno od mogućih rješenja problema pretilosti. Tjelesna aktivnost znatno utječe na smanjenje prekomjerne tjelesne težine i pretilosti te se smatra najprirodnijim načinom za trošenje energije i regulator tjelesne mase. Hill i Wyatt (2005) tvrde da tjelesna aktivnost održava energetski balans u organizmu te tako sprječava pojavu suvišnih kilograma. Svojim djelovanjem tjelesna aktivnost utječe na smanjenje potkožnog masnog tkiva te na ubrzanje metabolizma, a značajno utječe i na hormonski sustav koji opet svojim djelovanjem sprječava pojavu suvišnih kilograma (Hackney, 2006).

Mnogobrojni su autori do sada istraživali razlike u nekim antropološkim obilježjima između učenika koji žive u različitim podnebljima i klimatskim uvjetima (Reyes, Tan, Mallina, 2000; Tsimeas i sur., 2005; Ozdirenc i sur., 2005; Tognarelli i sur., 2004; Felton i sur., 2002; Petrić i sur., 2007 i dr.). Ustvrdili su da razlike postoje, a posebice u tjelesnoj težini te da je ruralna populacija generalno „boljih" antropoloških obilježja. Cilj je ovog istraživanja utvrditi postoji li rizik za zdravlje učenika (kronološke dobi 13 godina) u odnosu na njihovu uhranjenost (procijenjeno ITM) te statistički značajna razlika u nekim antropometrijskim karakteristikama

(tjelesna visina, tjelesna težina, opseg podlaktice) i funkcionalnim sposobnostima između njih s obzirom na njihovu urbano – ruralnu pripadnost.

METODE RADA

Uzorak ispitanika

Uzorak ispitanika sastavljen je od ukupno 212 učenika koji imaju 13 godina (108 u urbanoj i 104 u ruralnoj sredini). Uzorci su podijeljeni prema mjestu stanovanja na urbanu i ruralnu sredinu i prema životnoj dobi. Uzorak učenika u urbanom naselju formiran je u osnovnoj školi „Kralja Tomislava" u Zagrebu, dok je uzorak učenika u ruralnoj sredini formiran u osnovnim školama Općine Marčana: „Vladimir Nazor" u Krnici , „Divšići" u Divšićima i „Marčana" u Marčani.

Ispitanici su izmjereni u razdoblju od 01.09.2008. do 15.09.2008. godine. Tijekom mjerenja bili su zdravi i uključeni u redovitu nastavu. Mjerenje je provođeno u isto vrijeme dana (± 2 sata).

Uzorak varijabli

Ispitanici su mjereni pomoću 5 standardnih testova za procjenu antropoloških obilježja u školstvu. Za procjenu antropometrijskih karakteristika izmjerena je tjelesna visina (ATV), tjelesna težina (ATT), opseg podlaktice (AOP) te je za utvrđivanje usporedbe tjelesne težine u odnosu na visinu tijela i procjenu utjecaja uhranjenosti na zdravlje izračunat indeks tjelesne mase (ITM).

Procjena funkcionalnih sposobnosti mjerila se testom kontinuirano trčanje šest minuta (F6').

Metode obrade podataka

Za sve varijable izračunati su osnovni deskriptivni statistički parametri (aritmetička sredina (AS), standardna devijacija (SD), minimalna (MIN) i maksimalna (MAX) vrijednost, a razlika između nekih pokazatelja antropoloških obilježja učenika dviju regija iz jednog urbanog područja i jedne ruralne sredine utvrđena je Studentovim t-testom za nezavisne uzorke.

REZULTATI

Analizirani su osnovni deskriptivni parametri mjerenih antropoloških obilježja kod učenika kronološke dobi 13 godina koji žive u Zagrebu i Općini Marčana s prosjekom u Republici Hrvatskoj i međusobno te rezultati razlika među njima dobivene Studentovim t – testom za nezavisne uzorke.

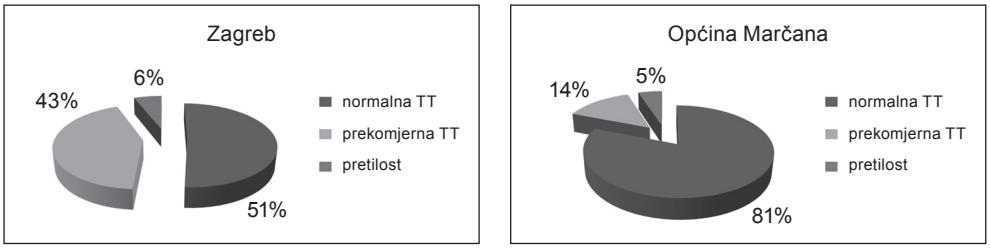
Tablica 1. *Osnovni deskriptivni parametri antropoloških obilježja učenika iz Zagreba i Marčane sa 13 godina starosti: aritmetička sredina (AS), standardna devijacija (SD), najveći postignuti rezultat (MAX), najmanji postignuti rezultat (MIN)*

	GRAD ZAGREB				OPĆINA MARČANA				RH	
	AS	**SD**	**MAX**	**MIN**	**AS**	**SD**	**MAX**	**MIN**	**AS**	**SD**
ATV	160,74	7,60	174	144	**160,75**	10,40	203	144	**159.4**	6.6
ATT	**53,81**	11,17	88	34	**50,27**	13,87	99	32	**48.0**	10.0
AOP	**23,51**	2,01	30	20	**23,02**	2,54	33	19	**22.0**	1.9
ITM	**20,92**	3,82	32	14,8	**19,27**	3,65	32,7	14,3		
F6'	**1249,7**	190,06	1580	750	**1371,8**	203,58	1700	1000	**1186**	190.0

Antropometrijske karakteristike: tjelesna visina (ATV), tjelesna težina (ATT), opseg podlaktice (AOP), indeks tjelesne mase (ITM); Funkcionalne sposobnosti: kontinuirano trčanje šest minuta (F6')

Analizirajući rezultate osnovnih deskriptivnih parametara (tablica 1.) antropometrijskih karakteristika, može se uočiti kako se učenici iz Zagreba i Marčane u varijablama tjelesna visina (160 cm) i opseg podlaktice (23 cm) nalaze na prosjeku sa rezultatima na razini RH. U varijabli tjelesna težina nalaze se ispod prosjeka. Učenici iz Zagreba gotovo su 6 kg u prosjeku teži (54 kg) od prosjeka RH, dok su učenici iz Marčane prosječno 2,3 kg teži (50,3 kg) od prosjeka RH. Rezultati u varijabli indeks tjelesne mase (Zagreb ITM=20,9, Marčana ITM=19,3), ukazuju da, obje skupine učenika s obzirom na njihovu kronološku dob (13 godina), imaju u prosjeku normalnu tjelesnu težinu u odnosu na visinu tijela. Iako, gledajući pojedinačno, kod učenika s 13 godina starosti u obje skupine imamo djece s ITM većim od 32, koji spadaju u skupine pretilih osoba.

Funkcionalne sposobnosti nalaze se kod obje skupine učenika znatno iznad prosjeka RH. Učenici iz Zagreba na testu F6' postižu u prosjeku (1250 m) 65 m bolje rezultate od prosjeka RH, dok učenici iz Marčane postižu (1372 m) 168 m bolje rezultate od prosjeka RH.



Grafikon 1. *Grafički prikaz rezultata (u postocima) varijable indeks tjelesne mase (ITM) za ispitanike kronološke dobi 13 godina iz Zagreba i Općine Marčana klasificiranih prema Coleu i suradnicima.*

U grafikonu 1. možemo uočiti kako u uzorku ispitanika iz Zagreba imamo 51% djece s normalnom tjelesnom težinom, 43% s prekomjernom i 6% je pretilih. Dok kod uzorka iz Općine Marčana imamo 81% djece s normalnom tjelesnom težinom, 14% s prekomjernom i 5% je pretile djece.

Tablica 2. *Rezultati razlika između učenika iz Zagreba i Marčane s 13 godina starosti, dobiveni Studentovim t – testom za nezavisne uzorke: aritmetička sredina (AS), vrijednost t-testa (t), stupnjevi slobode (df), pogreška (p)*

	AS ZAGREB	AS MARČANA	t-vrijednost	df	p
ATV	160,74	160,75	0,01	209	0,98
ATT	**53,81**	**50,27**	**-2,04**	**209**	**0,04**
AOP	23,51	23,02	-1,57	206	0,12
ITM	**20,92**	**19,27**	**-3,19**	**209**	**0,00**
F6'	**1249,72**	**1371,84**	**4,50**	**209**	**0,00**

Antropometrijske karakteristike: tjelesna visina (ATV), tjelesna težina (ATT), opseg podlaktice (AOP), indeks tjelesne mase (ITM); Funkcionalne sposobnosti: kontinuirano trčanje šest minuta (F6')

Analizirajući rezultate t – testa za nezavisne uzorke u tablici 7, može se uočiti kako se učenici iz Zagreba i Marčane s 13 godina starosti statistički značajno razlikuju u tri mjerene varijable.

Kod antropometrijskih karakteristika može se vidjeti da se učenici statistički značajno razlikuju (p=0,04) u varijabli tjelesna težina. Učenici iz Zagreba u prosjeku (54 kg) su gotovo 4 kg teži od učenika koji žive u Marčani (50 kg). U varijablama tjelesna visina i opseg podlaktice gotovo su podjednaki te analizom nije dobivena statistički značajna razlika.

U varijabli F6' za procjenu funkcionalnih sposobnosti, dobivena je također statistički značajna razlika (p=0,00) između ove dvije skupine učenika. Učenici iz Marčane pretrče u prosjeku 120 m više nego učenici iz Zagreba, što ukazuje na izuzetne aerobne sposobnosti učenika iz Marčane.

RASPRAVA I ZAKLJUČAK

Sagledavši dobivene rezultate može se zaključiti kako su generalno obje skupine učenika u mjerenim varijablama za procjenu antropometrijskih karakteristika u tjelesnoj visini nešto iznad prosjeka, a u tjelesnoj težini i opsegu podlaktice ispod prosjeka Republike Hrvatske (Primijenjena kineziologija u školstvu-Norme, 1996). Funkcionalne sposobnosti su kod obje skupine učenika znatno iznad prosjeka RH. Generalno bolji rezultati ispitanika u odnosu na prosjek Republike Hrvatske zasigurno su i posljedica toga što su norme s kojima su uspoređivani objavljene prije četrnaest godina.

Uspoređujući učenike iz Zagreba i Marčane uočljive su značajne razlike. Ovaj uzrast posebno kod dječaka je period kada su prisutne izuzetno velike razlike vezane uz biološko sazrijevanje (Rowland, 2005). Ispitanici iz Zagreba su relativno niži i teži od ispitanika iz Marčane, iako su u težini i jedni i drugi ispod prosjeka Republike Hrvatske (Medved i sur.,1989). Brojna su istraživanja već pokazala (Reyes, Tan, Mallina, 2000; Tsimeas i sur., 2005; Ozdirenc i sur., 2005; Tognarelli i sur., 2004; Felton i sur., 2002) da su ispitanici urbanih sredina niži i teži od ispitanika ruralnih naselja.

Doseg u testu kontinuirano trčanje šest minuta (F6') ukazuju na odličan aerobni kapacitet ispitanika iz Marčane koji je već na nivou rezultata učenika koji se sustavno bave nekim sportom. U istraživanjima Ozdirenc i sur., (2005.) te Petrića i sur., (2007.) dokazano je da ruralna djeca preferiraju igru momčadskih sportova poput nogometa, košarke i rukometa, gdje se znatno razvija aerobni kapacitet, dok gradska djeca tendiraju ka dvoranskim sportovima poput hrvanja, juda, gimnastike.

Rezultati testiranja naših ispitanika pokazali su izrazito heterogen status antropoloških obilježja. Uočeno je da ispitanici ruralnih naselja (Marčana) generalno imaju viši nivo pripremljenosti od ispitanika urbanih sredina (Zagreb). To je vjerojatno rezultat nedovoljne količine kretanja i vježbanja učenika urbanih sredina što zbog nedostatka sportskih terena, što zbog nepovoljnih atmosferskih prilika, a što zbog nedovoljne upućenosti o važnosti tjelesnog vježbanja (Plotnikoff i sur., 2004).Također, ovo nam je istraživanje pokazalo kako postoje i iznimke te da kod jednih i drugih ispitanika ima učenika koji su pretili (prema klasifikaciji Colea i sur., 2000), a na taj način i ugroženog zdravlja. Pretila djeca u ovoj dobi mogu imati ozbiljne psihičke poremećaje (Bosnar, 2007), što ukazuje da se moramo uistinu ozbiljno posvetiti

ovome problemu. Stoga, bilo bi od velike koristi daljnje istraživanje usmjeriti prema pretilim učenicima i vidjeti da li se bave organiziranim sportskim aktivnostima i eventualnim usmjerenjem i poticanjem za bavljenje sportom doprinijeti poboljšanju njihova zdravlja.

Može se zaključiti da klimatski uvjeti i atmosferske prilike mogu pridonijeti samo djelomično u korist boljem stanju antropoloških obilježja i zdravlju te da bi se puno više pažnje moralo posvetiti poduci o važnosti tjelesnog vježbanja.

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VARIATION OF MORPHOLOGICAL AND FUNCTIONAL CHARACTERISTICS OF STUDENTS WITH RESPECT TO THEIR URBAN - RURAL BACKGROUND

ABSTRACT

This study sought to examine the relationship between anthropometric characteristics (body height, body weight, forearm volume) and functional capacity of 212 students aged 13 (108 in urban and 104 in rural areas) with respect to their urban - rural background. The subjects were measured using 5 standard tests for the assessment of anthropological features in education while the functional abilities

were assessed with the six-minute continuous running test (F6 '). Anthropometric measurements showed that students from Zagreb (54 kg) were on average nearly 4 kg heavier than the students who live in Marčana (50 kg). The variables of body height and forearm volume are almost equal and the analysis showed no statistically significant difference. For the variable F6', used for the assessment of functional abilities, there was a statistically significant difference (p = 0.00). Students from Marčane ran on average 120 m more than students from Zagreb. The test results showed an extremely heterogeneous status of the anthropological features. It was noted that respondents in rural areas (Marčana) generally had a higher level of physical fitness than the urban respondents (Zagreb). This is probably due to insufficient movement and training among students in urban areas, caused by either the lack of sports facilities, unfavourable atmospheric conditions, or partly because of insufficient understanding of the importance of physical exercise.

Key words: *urban-rural differences, secondary school students, anthropological status*

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Stručni rad

PRIMJENA MINI RUKOMETA U NASTAVI TZK-A I ŠKOLSKOM SPORTU

UVOD I CILJ

Još od ranih godina 20. stoljeća školski programi tjelesne i zdravstvene kulture širom svijeta bili su fokusirani na učenje osnovnih vještina koje su direktno omogućavale djeci da uspješnije participiraju u pojedinim sportskim igrama (Lumpkin, 1998). Iako su se pristupi u spomenutom području mijenjali i razvijali, uloga i važnost igre zadržala je prioritet u radu s djecom tijekom fizičke aktivnosti.

Važnost igre u psihofizičkom razvoju djece jako je velika. Igra pruža mnogobrojne mogućnosti povoljnog utjecaja na svestran razvoj ličnosti, ali i na ukupni antropološki status djeteta. Igrom dijete zadovoljava svoju prirodnu potrebu za kretanjem te razvija motoričke sposobnosti i energetske kapacitete (Foretić & Rogulj, 2006).

Potrebito je naglasiti da pedagoški zadaci nisu jednaki u svakoj dobi te da je igra primjerenija metoda rada s mlađom djecom. Djeca mlađe školske dobi nalaze se u egocentričnom stadiju u kojem imaju svoje osobno poimanje stvarnosti – „svijet se vrti samo oko njih". Posjeduju vrlo malo odgovornosti i poštivanja prema pravilima igre i pritom, sami izmišljaju pravila igre kako im to odgovara. U kasnijem dijelu ovog perioda razvoja pojavljuju se jače socijalne potrebe i želja za grupnom interakcijom. Igra u kojoj postoji suradnja dovodi dijete u situaciju da postaje član grupe i da usvaja stavove različite od svojih osobnih.

Upravo ovaj sociološki aspekt stavlja timske igre na prioritetno mjesto kada je u pitanju izbor sportskih igara u nastavi TZK-a (Graham i sur. 2001). Iako se u planu i programu TZK-a nalazi veliki broj sportskih igara potrebno je tražiti nova rješenja koja bi mogla pozitivno utjecati na kvalitetu nastave i školskog sporta.

Stoga je cilj ovog rada predstaviti mini rukomet i mogućnost primjene ove zanimljive i dinamične igre u okviru nastave TZK-a i školskog sporta.

OSNOVNA PRAVILA MINI RUKOMETA

Dimenzije igrališta za mini rukomet su 20 x 13 metara, a golova 2,4 x 1,7 m. Vratarov prostor udaljen je 5 m od sredine gola. Lopta je spužvasta i obujma 48-50 cm.

Kazneni udarac izvodi se 6 m od sredine gola. Trajanje utakmice ovisno je o sustavu natjecanja, a najčešće se igra 2 x 10 minuta. Početno bacanje izvodi vratar iz vratareva prostora kao i ubacivanje lopte u igru nakon postignutog pogotka. Svaka ekipa ima 10 igrača, od čega 4 igraju u polju, a 1 je vratar koji ne smije prijeći polovicu igrališta. Isključenje igrača je 30 sekundi. Igra se po pravilima 3 sekunde, 3 koraka i 3 metra. Obvezna je igra „čovjeka" u obrani za dobnu skupinu „super mini rukomet". U dobnoj skupini „mini rukomet" mogu se igrati sve vrste obrana uključujući i zonsku. Izmjene igrača mogu se obavljati na bilo kojem dijelu uzdužne linije igrališta, na strani gdje se nalazi klupa za rezervne igrače.

FILOZOFIJA MINI RUKOMETA

Mini rukomet najuspješnija je inačica rukometne igre u smislu rada s djecom i mladima. Nastao je u skandinavskim zemljama (Norveška, Danska i Švedska), a u Hrvatskoj je organiziran u okviru Nacionalnog rukometnog saveza (HRS-a) kroz takmičenja klubova iz cijele zemlje. Hjorth (2010) konstatira da je „mini rukomet više filozofija nego igra". Prilagođen je djeci do 10 godina starosti. Igra se na manjem terenu, manjim golovima, s manjom loptom i po pravilima koja su djeci lako razumljiva. Glavni je cilj zadovoljiti dječju potrebu za kretanjem kroz prirodne oblike kretanja i motivirati malu djecu na kontinuiranu fizičku aktivnost. U utakmici nije važan konačan rezultat koliko je važno da u njoj djeca testiraju svoje vještine i steknu pozitivno iskustvo igre bez obzira na pobjedu ili poraz. Ni taktika ni pobjeđivanje nisu od velike važnosti. Najveća se važnost pridaje razumijevanju igre, *fair-play*-u i međusobnoj suradnji.

MINI RUKOMET U NASTAVI TZK-a

Garcia (2010) smatra kako je neophodno kod svakog djeteta maksimalno razvijati biološke i psihološke kapacitete putem kojih podrazumijeva poštivanje određenih socijalnih normi što je najučinkovitije uz pomoć timske sportske igre. U okviru nastave TZK-a mini rukomet može biti kvalitetan i osvježavajući model rada kada se nastavnik susretne s problemima materijalno-tehničke i organizacijske naravi, ali i u situacijama u kojim postoje isključivo kineziološki problemi. U narednom će tekstu oni biti opisani.

Poznata je činjenica da velik broj osnovnih škola u RH nema svoju sportsku dvoranu ili je ona neodgovarajućih dimenzija za većinu sportskih igara. Kao što je spomenuto u prethodnom tekstu dimenzije igrališta za mini rukomet su 20 x 13 metara, ali je igru, s manjim brojem igrača, moguće prilagoditi i na igralištu manjih dimenzija. U slučaju da ne postoje golovi s propisanim vratnicama (2,4 x 1,7 m) postojeće vratnice moguće je pregraditi ili umjesto njih postaviti strunjače koje su sastavni dio opreme u većini škola.

Iako se mini rukomet igra s relativno malim brojem igrača u polju (4+1) dinamika igre i mogućnost brze zamjene omogućava sudjelovanje velikog broja igrača istovremeno, poglavito ako postoji više igrališta na jednom terenu ili dvorani (na jednom rukometnom igralištu moguće je označiti 3 terena za mini rukomet).

Zbog jednostavnosti pravila djeca mogu sama suditi što nastavnika stavlja u ulogu supervizora koji presuđuje samo u spornim trenutcima, a djecu u situacije u kojima moraju razvijati odgovornost prema suigračima i pravilima igre.

U nižim razredima osnovne škole postoji problem stručne neusavršenosti nastavnika razredne nastave koji često izbjegavaju sportske igre zbog kompliciranosti pravila, nepoznavanja tehnike igre i neaktivnosti djece. Ovdje se mini rukomet savršeno uklapa zbog toga što od nastavnika ne zahtjeva veliko rukometno znanje, pravila igre su jednostavna, a igra je dinamična i brza te igračima omogućava optimalno sudjelovanje koje se temelji više na slobodnom kretanju nego na tehničkom znanju rukometa. Također je moguće, u ovoj dobnoj kategoriji (1. do 4. razred) mini rukomet prakticirati u miješanim grupama: dječaci i djevojčice zajedno.

S ciljem razvoja pojedinih motoričkih sposobnosti mini rukomet može poslužiti kao integralni pristup treniranja zbog toga što se ova igra temelji na brzini, agilnosti, prostorno-vremenskoj orijentaciji, ritmu i koordinaciji općenito. Sve spomenute sposobnosti nalaze se u svojim senzibilnim fazama koje predstavljaju najbolje vrijeme za njihov razvoj (Bompa, 2000). Treba naglasiti da mini rukomet obiluje prirodnim oblicima kretanja kao što su trčanje, bacanje, hvatanje, skakanje, itd.

Iako je rukomet igra u kojoj je zastupljeno najviše prirodnih oblika kretanja pa se zbog toga i relativno jednostavno uči, praksa TZK-a je pokazala da sva djeca nisu u mogućnosti podjednako uspješno participirati u ovoj igri. Pri tome se limitirajući faktori odnose na razlike u biološkoj zrelosti djece pri čemu su oni zreliji ujedno i uspješniji u igri te u znanju tehnike rukometa. Zbog ovakvih razlika bilo bi poželjno uvoditi mini rukomet u nastavu prije rukometa kako bi djeca lakše savladala osnovnu tehniku i imala pozitivna iskustva u igri. Kod mlađih učenika preporučljivo je da se ne inzistira strogo na pravilima duplog vođenja i koracima, a kod svakog prekida igre primjereno bi bilo objasniti djeci razlog prekida i što učiniti nakon toga.

MINI RUKOMET KAO ŠKOLSKI SPORT

Ako se očekuje od školskih sportskih klubova i natjecanja u kojima ti klubovi sudjeluju, da okupljaju što veći broj djece, na neki način promoviraju sport i omasovljuju ga, onda je mini rukomet svakako sportska igra koja u okviru ovog sustava ima svoje mjesto. Kao što je opisano u prethodnom poglavlju prostor za igru, pravila igre i način rada prilagođen je dobi djece i samim time olakšan pedagoški rad nastavnika/trenera dok je igra približena sposobnostima djece. Valja istaknuti

nekoliko pozitivnih informacija koje mini rukomet čini pogodnim za uključivanje u sustav školskog sporta.

Većina zemalja koje ostvaruju rezultate u vrhunskom rukometu ima masovan i organiziran mini rukomet, a tom se segmentu razvoja rukometaša pridodaje izniman značaj. Danska i Njemačka npr. uvele su mini rukomet u nastavu TZK-a i u sustav školskog sporta, a praksa je pokazala da su djeca ovaj sadržaj zavoljeli i prihvatili (Christensen, 2010). Popularnost i uključivanje djece u ovaj oblik sportskog bavljenja pridonio je da rukomet postane jedan od najzastupljenijih sportova u spomenutim zemljama.

U okviru školskog kluba lako je organizirati trening koji djeca vole jer se temelji uglavnom na igri i zadovoljavanju njihovih bioloških i psiho-sociooloških potreba.

Ukupno gledajući školska natjecanja ne pružaju mnogo prilika učenicima razredne nastave što kod mini rukometa nije slučaj. Naprotiv, mini rukomet upravo je namijenjen ovoj dobnoj kategoriji.

Kada se organiziraju natjecanja u mini rukometu potreban je manji broj sudaca, a istovremeno se može natjecati više ekipa na jednom terenu što olakšava organizaciju i financiranje takvog događaja.

ZAKLJUČAK

Mini rukomet oblik je rukometne igre koji je prilagođen djeci razredne nastave i obzirom na deficite u kineziološkim aktivnostima spomenute dobi svakako pruža mogućnosti koje mogu unaprijediti nastavu i omogućiti djeci da više uživaju tijekom njenog provođenja.

Iskustva su pokazala da djeca rado prihvaćaju mini rukomet jer je svojim dimenzijama i pravilima prilagođen uzrastu. Sama se igra lako uči jer nema zahtjevnu tehniku i pravila pa je moguće ravnopravnije sudjelovanje većine djece tijekom igre.

Organizacija treninga i natjecanja u mini rukometu prilično je jednostavna i ne zahtjeva oveće stručno rukometno znanje jer je sama filozofija ove igre temeljena na *fair-play*-u i suradnji, a ne na taktici i pobjeđivanju. Od nastavnika/voditelja treninga i natjecanja stoga se iziskuje da naglašava važnost zajedništva i pomaganja, a djeci prepusti odgovornost odlučivanja u igri i kreativnost izvedbe.

Ovaj je rad prikazao mini rukomet kao inačicu rukometa koja je pogodna za popularizaciju spomenutog sporta stoga bi osim takmičenja koja su organizirana od HRS-a sustav natjecanja Hrvatskog školskog sportskog saveza s jedne strane doprinio razvoju i popularizaciji naše najtrofejnije timske sportske igre, a s druge strane obogatio školski sportski sustav.

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APPLICATION OF MINI HANDBALL IN PHYSICAL EDUCATION AND SCHOOL SPORTS

ABSTRACT

Respecting the importance of game in psychophysical development of children, this paper presents team game that is completely adjusted to children from 8 to 12 years - mini-handball. Rules, field dimensions and size of the ball are designed to engage children's maximum motor and functional as well as psychosocial potentials. The technique is easy to learn, and the emphasis is on participation, fair play and cooperation while the tactics and winning are not so important. Boys and girls can play mini handball together and the game dynamics and ease of play allow most children to participate equally in it. Following the example of many countries of Western Europe in which this game has achieved considerable success, it would be necessary to implement mini handball in Physical Education, and turn it into a competitive school sport organized by the Croatian School Sports Association. Everything mentioned will contribute to the development of our most successful team sport and raise quality of Physical Education and, equally important, the satisfaction of children for physical activity at school.

Key words: *game, mini handball, Physical Education, school sports*

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Izvorni znanstveni rad

OPTEREĆENJE VJEŽBANJA TIJEKOM PROVEDBE RAZLIČITIH SADRŽAJA U PRIPREMNOM DIJELU SATA TZK

UVOD I PROBLEM

Za vrijeme sata, odnosno nastave tjelesne i zdravstvene kulture učenici se podvrgavaju određenom opterećenju. Opterećenje se može definirati kao ukupan utjecaj na organizam učenika koji se postiže sveukupnim odgojno – obrazovnim radom na satu (Findak, 1999.).

Srce je bez sumnje najvažniji mišić u tijelu. Funkcija čitavog organizma ovisna je o radu srca, a preko jedne značajke srce ukazuje i na druge važne fiziološke funkcije. Radi se o frekvenciji srca, odnosno broju otkucaja u minuti. Frekvencija srca varira od pojedinca do pojedinca, ovisno o činiteljima koji dovode do promjena. Frekvencija srca kroz jedan broj, govori o mnoštvu važnih fizioloških procesa u raznim vrstama aktivnosti i reakcija na vanjske uvjete u kojima se nađemo. Tako se pomoću mjerača frekvencije srca sasvim točno zna kako brzo i koju vrstu energije tijelo troši, kakvim intenzitetom se vježba, treba li ubrzati ili usporiti; reakciju na vrućinu i vlažnost u atmosferi, je li se organizam oporavio od prošlog treninga i sl. Tipični odgovor srca na napor je povećanje njegove frekvencije. Kada rad počne, frekvencija srca raste sve do iscrpljenosti sukladno s intenzitetom i ekstenzitetom rada. Frekvencija srca različito reagira na različita opterećenja. Tako će različiti organizmi na različite napore odgovarati razlikama u frekvenciji (Neljak, 2009.).

Zbog razlika u razvijenosti pojedinih sposobnosti, učenici će imati različite frekvencije srca pri izvršavanju različitih sadržaja u pripremnom dijelu sata. Svaki nastavnik tjelesne i zdravstvene kulture trebao bi brinuti o tome na način da se pravilno usmjerenim doziranjem i opterećenjem tijekom vježbanja utječe na ona područja koja su kod pojedinog djeteta slabije razvijena. Postizanje optimalnog fiziološkog opterećenja ima iznimno važnu ulogu u transformaciji antropoloških obilježja učenika. Za potrebe školske prakse fiziološko opterećenje može se mjeriti pulsnim vrijednostima, to jest utvrđivanjem stanja pulsa. Fiziološko opterećenje se planira ovisno o sposobnostima učenika i ciljevima sata, a provodi se kroz sadržaje

rada i organizacijske oblike rada. Cilj pripremnog dijela sata odnosi se na primjenu odgovarajućih općepripremnih vježbi, koje pripremaju organizam na povećane napore koji ga očekuju u daljnjem radu u ostalim dijelovima sata.

Na temelju uvida u frekvenciju srca učenika i učenica tijekom provedbe različitih sadržaja u pripremnom dijelu sata, na satu tjelesne i zdravstvene kulture, pokušat će se utvrditi postoje li statistički značajne razlike u funkcionalnim reakcijama učenika i učenica radi kvalitetnijeg planiranja i provođenja sata tjelesne i zdravstvene kulture.

HIPOTEZE ISTRAŽIVANJA

H1: Različiti sadržaji pripremnog dijela sata na temelju prosječne frekvencije srca učenika neće se statistički značajno razlikovati;

H2: Različiti sadržaji pripremnog dijela sata na temelju postotka vremena provedenog u pojedinim zonama intenziteta neće se statistički značajno razlikovati.

METODE RADA

Uzorak ispitanika

Uzorak ispitanika čini 13 učenika petog razreda osnovne škole, prosječne visine 149,5 ± 5,8 centimetara, prosječne težine 39 ± 8,4 kilograma i prosječne dobi 11,6 ± 0,6 godina (tablica 1).

Uzorak varijabli

Uzorak varijabli čine 3 pojavnosti frekvencije srca i 5 zona intenziteta koje su izračunate za svakog učenika posebno. Sve varijable su pojedinačno navedene u nastavku:

1. **FS pro** - Prosječna frekvencija srca
2. **FS maks** - Maksimalna frekvencija srca
3. **FS min** - Minimalna frekvencija srca
4. **MAKS I vri** - Maksimalni intenzitet (vrijeme)
5. **I VIS I vri** - Izrazito visoki intenzitet (vrijeme)
6. **VIS I vri** - Visoki intenzitet (vrijeme)
7. **U VIS I vri** - Umjereno visoki intenzitet (vrijeme)
8. **UMJ I vri** - Umjereni intenzitet (vrijeme)
9. **MAKS I %** - Maksimalni intenzitet (postotak)
10. **I VIS I %** - Izrazito visoki intenzitet (postotak)
11. **VIS I %** - Visoki intenzitet (postotak)

12. **U VIS I %** - Umjereno visoki intenzitet (postotak)
13. **UMJ I %** - Umjereni intenzitet (postotak)

PROTOKOL MJERENJA I OBRADA PODATAKA

Istraživanje je provedeno pomoću monitora srčane frekvencije Polar RS400 te Polar Team System (Polar Electro Oy, Finland) koji su bili postavljeni učenicima tijekom provedbe tri nastavna sata tjelesne i zdravstvene kulture. Mjerenje se provodilo svakih sedam dana s istim učenicima i u isto vrijeme. Standardnim statističkim postupcima izračunati su osnovni deskriptivni parametri varijabli: aritmetička sredina (AS), standardna devijacija (SD), minimalna (MIN) i maksimalna vrijednost (MAKS) rezultata te vrijeme i postotak vremena proveden u pojedinoj zoni intenziteta za svaki od sadržaja provedenih u pripremnom dijelu sata. Univarijatnom analizom varijance (ANOVA) utvrđeno je razlikuju li se sadržaji statistički značajno u odnosu na prosječnu frekvenciju srca i postotak vremena provedenog u pojedinim zonama intenziteta. Obrade podataka provedene su upotrebom statističkog paketa Statistica for Windows 7.0 Kineziološkog fakulteta Sveučilišta u Zagrebu.

REZULTATI I RASPRAVA

Deskriptivni pokazatelji frekvencije srce za sva tri provedena sadržaja u pripremnom dijelu sata, vidljivi su u tablici 1. Iz dobivenih rezultata vidljivo je kako su prosječne frekvencije srca učenika približno podjednake, iako prosječne vrijednosti sadržaja pripremne vježbe u kretanju pokazuju nešto veće vrijednosti od prethodna dva sadržaja.

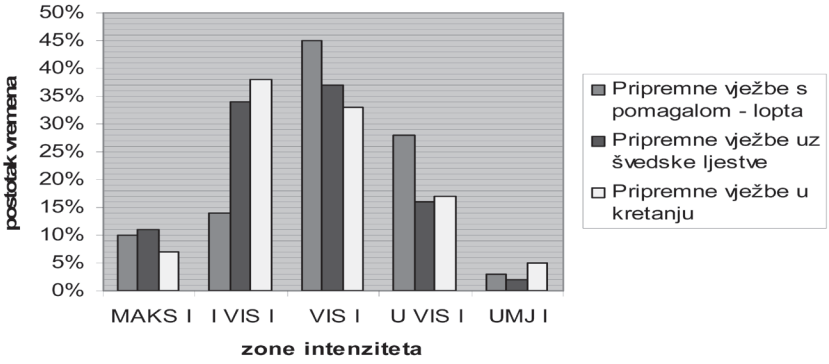
U tablici 1. prikazani su rezultati dobiveni obradom podataka o frekvenciji srca učenika tijekom provedbe sva tri sadržaja uvodnog dijela sata. Za svaki sadržaj pirkazani su deskriptivni pokazatelji: aritmetička sredina, minimalna i maksimalna vrijednost kao i modalna vrijednost.

Tablica 1. *Osnovni deskriptivni pokazatelji frekvencije srca tijekom provedbe različitih sadržaja*

	Sadržaj 1	**Sadržaj 2**	**Sadržaj 3**
	AS ± SD	AS ± SD	AS ± SD
FS pro	141,2 ± 14,8	140,7 ± 12,2	148,1 ± 15,8
FS min	127,5 ± 10,9	124,7 ± 6,9	132,4 ± 11,7
FS maks	160,0 ± 22,7	158,2 ± 15,9	169,3 ± 21,6

Sadržaj 1: Pripremne vježbe s pomagalom – lopta
Sadržaj 2: Pripremne vježbe uz švedske ljestve
Sadržaj 3: Pripremne vježbe u kretanju

Grafički prikaz 1 prikazuje postotak vremena proveden u pojedinim zonama intenziteta tijekom provedbe sva tri sadržaja tijekom pripremnog dijela sata. Kao što je već i rečeno u prethodnim prikazima, tako se i ovdje može vidjeti da su učenici najmanje vremena provodili u zonama umjerenog (aerobna ekstenzivna zona) i maksimalnog intenziteta (anaerobna zona). Najviše vremena proveli su u zoni visokog intenziteta (visoko aerobna ekstenzivna zona).



Grafički prikaz 1. *Postotak vremena proveden u pojedinim zonama intenziteta tijekom provedbe sva tri sadržaja*

Statističkim programom statistica 7.0 univarijatnom analizom varijance (ANOVA), dobivene su razlike između prosječne frekvencije srca učenika, prilikom provedbe Pripremnih vježbi s pomagalom – lopta, Pripremnih vježbi uz švedske ljestve te Pripremnih vježbi u kretanju (tablica 2). Na temelju dobivenih rezultata, vidljivo je da je F-vrijednost manja od granične vrijednosti što znači da se prihvaća hipoteza H1 i može se zaključiti kako nema statistički značajne razlike između prosječne frekvencije srca učenika tijekom provedbe već spomenutih sadržaja provedenih u pripremnom dijelu sata.

Tablica 2. *Razlike između frekvencije srca; vrijeme i postotak vremena u zonama intenziteta razlike u postotku vremena provedenog u pojedinim zonama između sadržaja*

V A R	sadržaj 1	sadržaj 2	sadržaj 3	ANOVA 1 – 2 – 3	
	vrijeme (s) %	*vrijeme (s)* %	*vrijeme (s)* %	F	p
AS±SD	141,2±14,8	140,7±12,2	148,1±15,8	1,64	0,21
UMJ I	0:00:19 3	0:00:10 2	0:00:24 5	1,19	0,32
U VIS I	0:03:27 28	0:01:31 16	0:01:30 17	**8,05**	**0,001**
VIS I	0:05:33 45	0:03:35 37	0:02:52 33	**8,26**	**0,001**
I VIS I	0:01:46 14	0:03:11 34	0:03:21 38	**5,21**	**0,01**
MAKS I	0:01:15 10	0:01:05 11	0:00:38 7	2,06	0,14

Pripremne vježbe s pomagalom – lopta (sadržaj 1), Pripremne vježbe uz švedske ljestve (sadržaj 2), Pripremne vježbe u kretanju (sadržaj 3), aritmetička sredina (as), standardna devijacija (sd), vrijeme u sekundama provedeno u zoni (vrijeme(s)), postotak vremena provedenog u zoni (%), umjereni intenzitet 50%-59% (UMJ I), umjereno visoki intenzitet 60%-69% (U VIS I), visoki intenzitet 70%-79% (VIS I), izrazito visoki intenzitet 80%-89% (I VIS I), maksimalni intenzitet 90%-100% (MAKS I)

Univarijatnom analizom varijance (ANOVA) dobivene su razlike između provedenih sadržaja u pripremnom dijelu sata u odnosu na postotak vremena proveden u pojedinim zonama intenziteta (tablica 2). Na temelju dobivenih rezultata utvrđeno je da u zonama I VIS I, VIS I i U VIS I postoje statistički značajne razlike između sadržaja provedenih u pripremnom dijelu sata, tj. Pripremnih vježbi s pomagalom – lopta, Pripremnih vježbi uz švedske ljestve i Pripremnih vježbi u kretanju, u odnosu na postotak vremena proveden u tim zonama intenziteta. Nadalje, u zonama MAKS I i UMJ I ne postoje statistički značajne razlike između već spomenutih sadržaja provedenih u pripremnom dijelu sata, u odnosu na postotak vremena proveden u navedenim zonama intenziteta.

Na temelju navedenoga ne prihvaća se hipoteza H2 i dolazi se do zaključka da postoji statistički značajna razlika u postotku vremena provedenog u pojedinim

zonama intenziteta u odnosu na sadržaje provedene u pripremnom dijelu sata: Pripremne vježbe s pomagalom – lopta, Pripremne vježbe uz švedske ljestve i Pripremne vježbe u kretanju.

Dobiveni rezultati ukazuju kako je frekvencija srca bila najveća tijekom provedbe Pripremnih vježbi u kretanju. Razlog povećane prosječne frekvencije jest provođenje sadržaja u kretanju, odnosno s povećanjem intenziteta vježbanja učenici dosežu i veće frekvencije srca.

Raspon prosječnih frekvencija srca pojedinih učenika ukazuje na veliku heterogenost među učenicima i sa stajališta funkcionalnih sposobnosti i sa stajališta interesa i motiva prema redovitoj nastavi tjelesne i zdravstvene kulture, odnosno prema pojedinim sadržajima tjelesne i zdravstvene kulture. Temeljem dobivenih prosječnih frekvencija srca svakog učenika, vidljivo je kako su sva tri sadržaja s fiziološkog stajališta podjednaka, da su učenici podjednako reagirali na zadana fiziološka opterećenja te da nema velike razlike između sadržaja koja su provedena tijekom pripremnog dijela sata. To znači da su zadana opterećenja tijekom pripremnog dijela sata, na temelju funkcionalnih sposobnosti učenika, uspješno realizirana i u skladu su s njihovim dobnim i spolnim karakteristikama te nema značajnog odstupanja rezultata frekvencija srca tijekom tri različita sadržaja.

Prosječno vrijeme koje su učenici proveli u pojedinoj zoni intenziteta razlikuje se. U sva tri mjerenja, u prosjeku su najviše vremena proveli u zoni visokog intenziteta (visoko aerobna ekstenzivna zona).

Ovakvim pristupom programu tjelesnog vježbanja približavamo se individualnim obilježjima svakog učenika na osnovi aktualnog stanja njegova antropološkog statusa. Pojedini razredni odjel ne čini zbroj jednakih individua, već među njima postoje razlike koje valja uvažiti.

ZAKLJUČAK

Za donošenje konačne odluke o fiziološkom opterećenju učenika tijekom različitih sadržaja provedenih u pripremnom dijelu sata, treba provoditi daljnja istraživanja na većim i reprezentativnijim uzorcima ispitanika u cilju povećanja efektivnog rada učenika na satu, a u skladu s tim, i postupnom i optimalnom povećanju frekvencije srca. Tijekom provedbe ovoga istraživanja, uočeno je kako većina učenika ne dozira vlastiti intenzitet na adekvatan način, što rezultira naglim porastom frekvencije srca, a samim time i do nastanka umora. Upravo se putem monitora srčanih frekvencija omogućuje učenicima pregršt informacija putem kojih oni sami mogu dozirati intenzitet te u skladu s individualnim trenažnim zonama očekivati realne efekte na satu tjelesne i zdravstvene kulture. Istodobno se pruža mogućnost nastavniku da u svakom trenutku ima uvid u kojoj se trenažnoj zoni nalazi učenik te da u skladu s tim informacijama adekvatno dozira opterećenje.

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THE ANALYSIS OF WORKLOAD EXERCISE DURING THE PERFORMANCE OF DIFFERENT PROGRAMMES DURING THE WARMING-UP PART OF THE LESSON

ABSTRACT

An experiment was conducted in a primary school on the sample of 13 fifth grade pupils (eight males and five females) with the aim to analyse physiological workload during the performance of three different programmes during the warming-up part of the lesson. A heart-rate frequency monitor (Polar RS400) was used to monitor the physiological workload and the results can be reduced as follows: average heart rate during the warming-up part of the lesson is between 140 and 148 beats per minute; the pupils spent most of the time, 33%-45%, during the three different exercising programmes in the zone of the medium intensity (aerobic extensive zone). It was determined, by using the statistical program Statistica 7.0, and univariate analysis of variance (ANOVA), that there is a statistically significant difference in the exercising programmes conducted during the warming–up only in the time spent in the zone of extremely high intensity (70-79% FS max.), high intensity (60-69%FS max.) and in the moderately high intensity level zone (50-59%FS max.).

Key words: *physiological load, heart rate, zone of intensity, Physical Education*

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Izvorni znanstveni rad

RAZLIKE U NEKIM ANTROPOLOŠKIM OBILJEŽJIMA UČENIKA S OBZIROM NA URBANO – RURALNU PRIPADNOST

UVOD I CILJ RADA

Neprocjenjivo je važno za optimalan rast i razvoj te za zdravlje svake osobe pratiti i vrednovati osobine i sposobnosti (Findak, 1999). Sukladno tome, za život čovjeka nije važna samo kvantiteta i kvaliteta znanja, već i odgovarajuća razina antropoloških obilježja, i to posebice onih za koje sa sigurnošću možemo reći da neizostavno sudjeluju u definiranju ljudskog zdravlja. Mnogobrojni su autori do sada istraživali razlike u nekim antropološkim obilježjima između učenika koji žive u različitim podnebljima i klimatskim uvjetima (Reyes, Tan, Mallina, 2000; Tsimeas i sur., 2005; Ozdirenc i sur., 2005; Tognarelli i sur., 2004; Felton i sur., 2002; Petrić i sur., 2007 i dr.). Ustvrdili su da razlike postoje, a posebice u tjelesnoj težini te da je ruralna populacija generalno „boljih" antropoloških obilježja.

Osobe (bez obzira na dob) s prekomjernom težinom izloženije su zdravstvenim problemima i njihov je svakodnevni život otežan. Mogućnost pojave fizičkih i psihičkih poteškoća kod pretilih osoba je povećana. Kod odraslih je osoba, bez obzira na dob i spol, prekomjerna tjelesna težina i pretilost definirana fiksnim vrijednostima ITM-a (ITM>25, odnosno ITM>30), u djece i adolescenata se on mijenja s dobi i tjelesnim razvojem. Stoga se za ovu populaciju ne koriste univerzalne dijagnostičke vrijednosti ITM (kg/m^2), već se one određuju s obzirom na percentilne krivulje ITM po dobi i spolu (Hammer LD i sur. 1991.). Prekomjernu tjelesnu težinu imaju djeca kojoj je ITM između 85. i 95. percentila, a pretila su ona s ITM većim od 95 percentila za dob.

Istraživanja pokazuju da raste broj djece koja obolijevaju od dijabetesa tipa 2 upravo zbog pretilosti (Hunter i sur., 2000; Wang i sur., 2006). Warner (2005) je došao do zaključka da su pretile osobe dvostruko sklonije ozljedama od osoba koje su normalne tjelesne težine. Završnik (2004) pretpostavlja da su pretila djeca sklonija frakturama kostiju jer nisu u mogućnosti vježbati kako bi ojačala koštani i mišićni sustav.

Možemo se složiti da se pretile osobe nalaze u izrazito kritičnoj skupini te da su izloženije velikom broju bolesti, a i samu pretilost možemo definirati kao tešku bolest.

U ovom istraživanju uspoređuju se dva uzorka ispitanika, odnosno učenici koji žive u urbanim sredinama s učenicima istog godišta koji žive u ruralnim naseljima. Cilj je istraživanja utvrditi postoji li rizik za zdravlje učenika (kronološke dobi 12 godina) u odnosu na njihovu uhranjenost (procijenjeno ITM) te statistički značajna razlika u nekim antropometrijskim karakteristikama (tjelesna visina, tjelesna težina, opseg podlaktice) i eksplozivnoj snazi donjih ekstremiteta između njih s obzirom na njihovu urbano – ruralnu pripadnost.

METODE RADA

Uzorak ispitanika

Uzorak ispitanika sastavljen je od ukupno 249 učenika koji imaju 12 godina (104 u urbanoj i 145 u ruralnoj sredini). Uzorci su podijeljeni prema mjestu stanovanja na urbanu i ruralnu sredinu i prema životnoj dobi. Uzorak učenika u urbanom naselju formiran je u osnovnoj školi „Kralja Tomislava" u Zagrebu, dok je uzorak učenika u ruralnoj sredini formiran u osnovnim školama Općine Marčana: „Vladimir Nazor" u Krnici , „Divšići" u Divšićima i „Marčana" u Marčani.

Ispitanici su izmjereni u razdoblju od 01.09.2008. do 15.09.2008. godine. Tijekom mjerenja bili su zdravi i uključeni u redovitu nastavu. Mjerenje je provođeno u isto vrijeme dana (± 2 sata).

Uzorak varijabli

Ispitanici su mjereni pomoću 5 standardnih testova za procjenu antropoloških obilježja u školstvu. Za procjenu antropometrijskih karakteristika izmjerena je tjelesna visina (ATV), tjelesna težina (ATT), opseg podlaktice (AOP) te je za utvrđivanje usporedbe tjelesne težine u odnosu na visinu tijela i procjenu utjecaja uhranjenosti na zdravlje izračunat indeks tjelesne mase (ITM).

Procjena motoričke sposobnosti „eksplozivna snaga donjih ekstremiteta" mjerena je testom skok udalj iz mjesta (MSD).

Metode obrade podataka

Za sve varijable izračunati su osnovni deskriptivni statistički parametri (aritmetička sredina (AS), standardna devijacija (SD), minimalna (MIN) i maksimalna (MAX) vrijednost, a razlika između nekih pokazatelja antropoloških obilježja učenika dviju regija iz jednog urbanog područja i jedne ruralne sredine utvrđena je Studentovim t-testom za nezavisne uzorke.

REZULTATI

U daljnjem tekstu uspoređuju se osnovni deskrptivni parametri mjerenih antropoloških obilježja kod učenika kronološke dobi 12 godina koji žive u Zagrebu i Općini Marčana s prosjekom u Republici Hrvatskoj i međusobno te rezultati razlika među njima dobivene Studentovim t – testom za nezavisne uzorke.

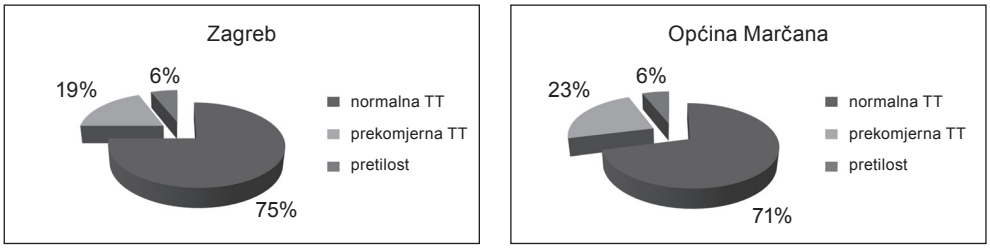
Tablica 1. *Osnovni deskriptivni parametri mjerenih antropoloških obilježja učenika iz Zagreba i Marčane sa 12 godina starosti i prosjeci u Republici Hrvatskoj (RH): aritmetička sredina (AS), standardna devijacija (SD), najveći postignuti rezultat (MAX), najmanji postignuti rezultat (MIN)*

	GRAD ZAGREB				OPĆINA MARČANA				RH	
	AS	**SD**	**MIN**	**MAX**	**AS**	**SD**	**MIN**	**MAX**	**AS**	**SD**
ATV	**155,74**	7,76	141	169	**154,15**	9,31	137	192	**154.2**	8.0
ATT	**46,29**	10,00	32	77	**46,12**	12,54	28	98	**44.1**	7.8
AOP	**21,73**	2,01	19	28	**22,24**	2,19	18,5	30	**21.4**	1.5
ITM	**19,37**	4,05	15,5	31,3	**18,70**	3,45	11,2	32,7		
MSD	**165,60**	22,78	120	200	**174,28**	21,48	125	247	**175**	18.0

Antropometrijske karakteristike: tjelesna visina (ATV), tjelesna težina (ATT), opseg podlaktice (AOP), indeks tjelesne mase (ITM); Motorička sposobnost: skok udalj iz mjesta (MSD)

Analizirajući osnovne deskriptivne parametre (tablica 1) antropometrijskih karakteristika može se uočiti da su obje skupine učenika u varijabli tjelesna visina (155 cm) na prosjeku s RH. U varijablama tjelesna težina i opseg podlaktice nalaze se ispod prosjeka. Obje su skupine učenika u odnosu na prosjek RH, 2 kg teži (46,2 kg) i opseg podlaktice je za 1 cm veći (22 cm). Rezultati u varijabli indeks tjelesne mase (Zagreb ITM=19,4, Marčana ITM=18,7), ukazuju da, obje skupine učenika, prema Coleu i sur. (2000) u prosjeku imaju normalnu tjelesnu težinu. Iako, gledajući pojedinačno, i kod učenika s 12 godina starosti u obje skupine imamo djece s ITM većim od 31, koji spadaju u skupine pretilih osoba.

Gledajući rezultate eksplozivne snage donjih ekstremiteta može se vidjeti da su učenici iz Zagreba ispod prosjeka RH s prosječnim rezultatom na testu MSD 165 cm, dok se učenici iz Marčane nalaze na prosjeku s rezultatom 175 cm.



Grafikon 1. *Grafički prikaz rezultata (u postocima) varijable indeks tjelesne mase (ITM) za ispitanike kronološke dobi 12 godina iz Zagreba i Općine Marčana klasificiranih prema Coleu i suradnicima.*

U grafikonu 1. možemo uočiti kako ispitanika iz Zagreba ima 75% s normalnom tjelesnom težinom, 19% s prekomjernom težinom i 6% je pretilih. Dok kod ispitanika Općine Marčana imamo 71% djece sa normalnom težinom, 23% sa prekomjernom težinom i 6% pretilih.

Tablica 2. *Rezultati razlika između učenika iz Zagreba i Marčane sa 12 godina starosti, dobiveni Studentovim t – testom za nezavisne uzorke: aritmetička sredina (AS), vrijednost t-testa (t), stupnjevi slobode (df), pogreška (p)*

	AS ZAGREB	AS MARČANA	t-vrijednost	df	p
ATV	155,74	154,15	-1,41	246	0,15
ATT	46,29	46,12	-0,11	245	0,90
AOP	21,73	22,24	1,85	231	0,06
ITM	18,70	19,37	1,34	245	0,17
MSD	**165,61**	**174,29**	**2,92**	**221**	**0,00**

Antropometrijske karakteristike: tjelesna visina (ATV), tjelesna težina (ATT), opseg podlaktice (AOP), indeks tjelesne mase (ITM); Motorička sposobnost: skok u dalj iz mjesta (MSD)

Analizirajući rezultate t – testa za nezavisne uzorke u tablici 2, može se uočiti kako se učenici iz Zagreba i Marčane s 12 godina starosti statistički značajno razlikuju (p=0,00) jedino u varijabli skok udalj iz mjesta (MSD). Učenici iz Marčane postižu u prosjeku gotovo 10 cm bolje rezultate od učenika iz Zagreba.

Antropometrijske karakteristike ukazuju nam na generalno veliku sličnost, odnosno ni u jednoj od mjerenih varijabli za procjenu antropometrijskih karakteristika ne razlikuju se statistički značajno.

RASPRAVA

Sagledavši dobivene rezultate može se zaključiti kako su generalno obje skupine učenika u mjerenim varijablama za procjenu antropometrijskih karakteristika u tjelesnoj visini nešto iznad prosjeka, a u tjelesnoj težini i opsegu podlaktice ispod prosjeka Republike Hrvatske (Primijenjena kineziologija u školstvu-Norme, 1996). U motoričkoj sposobnosti, eksplozivnoj snazi donjih ekstremiteta, učenici iz Marčane nalaze se iznad prosjeka RH, dok se učenici iz Zagreba generalno nalaze ispod prosjeka RH.

Rezultati u varijabli indeks tjelesne mase (ITM), ukazuju kako su učenici obje skupinae u prosjeku normalne tjelesne težine. Međutim, analizirajući rezultate pojedinačno, može se uočiti da su kod obje skupine učenika dobiveni visoki postoci djece s prekomjernom tjelesnom težinom (Zagreb: 19%, Marčana ukupno: 23%) i djece koja su pretila (6%).

Negativan učinak pretilosti na zdravlje, odnosno mogućnost oboljenja pretilih osoba od raznih bolesti potvrđeno je od mnogobrojnih znanstvenika (Cheng i sur. 2007; Hunter i sur., 2000; Wang i sur., 2006; Warner, 2005; Westcott, 2006; Pucarin-Cvetković i sur., 2006 i dr.) koji se bave upravo ovim problemom te će se gotovo svi složiti da je bavljenje tjelesnom aktivnošću jedno od mogućih rješenja problema pretilosti.

Tjelesna aktivnost znatno utječe na smanjenje prekomjerne tjelesne težine i pretilosti te se smatra najprirodnijim načinom za trošenje energije i regulator tjelesne mase. Hill i Wyatt (2005) tvrde da tjelesna aktivnost održava energetski balans u organizmu te tako sprječava pojavu suvišnih kilograma. Svojim djelovanjem tjelesna aktivnost utječe na smanjenje potkožnog masnog tkiva te na ubrzanje metabolizma, a značajno utječe i na hormonski sustav koji opet svojim djelovanjem sprječava pojavu suvišnih kilograma (Hackney, 2006).

Sagledavajući prostor motoričkih sposobnosti (eksplozivna snaga donjih ekstremiteta), može se uočiti kako učenici iz Marčane postižu znatno bolje rezultate od učenika iz Zagreba. Ovu su činjenicu u svom istraživanju potvrdili Petrić i Novak, (2007) koji su dokazali da učenici ruralnih naselja, uslijed vremenskih prilika, više slobodnog vremena borave na otvorenom od učenika koji žive u urbanim naseljima te se bave različitim sportskim igrama u kojima dolaze do izražaja i razvijaju se gotovo sve motoričke sposobnosti, a i aerobni kapacitet se povećava što potkrepljuju i rezultati ovog istraživanja.

ZAKLJUČAK

Uočene razlike u pokazateljima antropoloških obilježja mogle bi biti rezultat relacije načina svakodnevnog života i poduke o važnosti tjelesnog vježbanja.

U modernom načinu življenja prisutna je suprotnost između sela i grada. Ta se suprotnost očituje u načinu življenja rezidencijalnog stanovništva te u različitostima klimatskih i atmosferskih prilika (Sijerković, 2006). Djeca, odnosno učenici koji žive u ruralnim naseljima, mnogo više borave na otvorenom i koriste vanjske sportske terene od učenika koji žive u urbanim sredinama (Petrić i Novak, 2007). Ova bi činjenica u današnje vrijeme mogla biti ogromna prednost za generalno bolji razvoj antropoloških obilježja, a time i zdravlje djece (učenika) koja žive u ruralnim naseljima.

Međutim, ovo nam je istraživanje pokazalo kako postoje i iznimke te da kod jednih i drugih ispitanika ima učenika koji su pretili (prema klasifikaciji Colea i sur., 2000), a na taj način i ugroženog zdravlja. Pretila djeca u ovoj dobi (od 11 do 14 godina) mogu imati ozbiljne psihičke poremećaje (Bosnar, 2007), što ukazuje da se moramo uistinu ozbiljno posvetiti ovome problemu.

Može se zaključiti da klimatski uvjeti i atmosferske prilike mogu pridonijeti samo djelomično u korist boljem stanju antropoloških obilježja i zdravlju te da bi se puno više pažnje moralo posvetiti poduci o važnosti tjelesnog vježbanja.

Ovdje veliku ulogu može imati profesor tjelesne i zdravstvene kulture, a posebno ako ima podršku škole koja ga svojim pravilima i ponašanjem ostalih djelatnika u školi podržava i nadopunjava. Međutim, ključnu ulogu u poduci o važnosti tjelesnog vježbanja imaju roditelji samih učenika u njihovom kućnom odgoju i osobnim primjerom.

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DIFFERENCES IN SOME ANTHROPOLOGICAL CHARACTERISTICS OF STUDENTS WITH RESPECT TO THEIR URBAN- RURAL BACKGROUND

ABSTRACT

This study sought to determine whether there is a risk to the health of students (chronological age 12 years) with respect to their nutritional status (as assessed by BMI) and to determine whether there are statistically significant differences in some anthropometric characteristics (body height, body weight, forearm volume) and the explosive power of lower limbs with respect to their urban - rural background. The sample comprised a total of 249 students aged 12 (104 in urban and 145 in rural areas). The results showed that for both groups of students the variable body height (155 cm) matches the average in the Republic of Croatia, while the variables body weight and forearm volume are below average. The results of the t - test for independent samples showed significant difference ($p = 0.00$) only in relation to standing long jump (SLJ). The observed differences in indicators of anthropological characteristics could be the result of relations of everyday life and teaching about the importance of physical exercise. It can be concluded that climatic conditions and atmospheric conditions can contribute only partially to a better status of anthropological characteristics and health, and that much more attention needs to be paid to teaching the importance of physical exercise.

Key words: *urban-rural differences, secondary school students, the Republic of Croatia*

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Abstract

INCREASING THE PRECISISION OF MOTOR ABILITY ESTIMATES

Key words: *Item Response Theory, German Motor Test, Ability Estimates*

INTRODUCTION

Woll (2007) concluded that many studies investigating the motor performance of teenagers and children appear to be questionable from a methodological point of view. By referencing to the analyses of six items of the German Motor Test (DMT6-18) (Bös, 2009) this study compares to what extent unidimensional analyses based on the classical test theory (CTT) and on the item response theory (IRT) allow for a precise calculation of ability estimates. At the same time, a recently proposed IRT model is presented that allows for the calculation of a unidimensional ability estimate even when the considered construct – in this case the motor performance – is assumed to be multidimensional.

METHOD

For 486 pupils unidimensional ability estimates of motor performance are calculated based on the six test items: endurance run, hopping sideways, push ups, sit-ups, squad jump, and 20m sprint. The used calculation methods are the mean method of the CTT and two IRT methods – one Rasch scale based on the partial credit model (Masters, 1982) and one based on the subdimension model (Brandt, 2008). Hereby, the subdimension model considers additional subtest specific factors depending on the underlying multidimensional structure of the test.

RESULTS AND DISCUSSION

The results in Table 1 show that the application of a Rasch model yields a more precise calculation of the ability estimates. By taking the multidimensional or subdimensional structure of the construct into account, the accuracy can be further improved and the calculation is also theoretically consistent with the assumed multidimensional structure of the construct.

Table 1. *Measurement Errors of the CTT and the IRT in Comparison*

Method (Analysis)	Mean Error of the Ability Estimates	Standard Deviation of the Ability Estimates	Mean Error in Percent Standard Deviation
CTT (Mean Method)	0.312	1.141	27.4%
IRT (Partial Credit Model)	0.215	1.461	14.7%
IRT (Subdimension Model)	0.222	1.728	12.9%

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THE LEVEL OF PHYSICAL FITNESS COMPETENCE IN STUDENTS OF THE FACULTY OF TEACHER EDUCATION

INTRODUCTION

Young children observe, learn, practise, and develop fundamental movement patterns. In the first grade, this basis continues to be established and reinforced to facilitate motor skill acquisition which gives children capacity for successful levels of performance as they mature. Children learn how to improve their locomotor (travelling actions), nonlocomotor (movement in place) and manipulative (object handling) skills which they acquired in preschool age. They begin to understand how being physically active contributes to their health, social opportunities and contributes to the quality of life, and how physical activity affects their body (heart rate, muscles strength, cardio respiratory endurance, flexibility, physical fitness) (Castelli, Williams, 2007). All this knowledge is presented to children by their physical education teacher (Manross, Templeton, 1997).

The goal of the Physical Education curriculum is to develop individuals who are proficient at movement and who can use physical activity to (RH MZOŠ, 2006):

- Maintain or develop fitness
- Develop skills for sport and recreation
- Use movement for self-expression, enjoyment, challenge, and social interaction
- Be involved in lifelong physical activity, etc.

To achieve that goal, physical education teachers should have the knowledge and skills necessary to demonstrate competent movement performance and health enhancing fitness (Zeigler, 2003). They need to demonstrate personal competence in motor skill performance for a variety of physical activities and movement patterns, and achieve and maintain health-related physical fitness: cardio respiratory endurance, motor abilities - strength, flexibility, coordination, speed (National Association for Sport and Physical Education, 2004). For those reasons, the students who graduate from the Faculty of Teacher Education should have acquired experience of physical education that is essential for elementary school children, and should be able to demonstrate various skills that are planned in the curriculum (RH MZOŠ, 2006):

(1) fundamental stability and manipulative skills;
(2) locomotor and non-locomotor skills;
(3) rhythm and dance movement skills;
(4) aerobic endurance;
(5) body composition;
(6) flexibility;
(7) muscular strength and endurance, etc.

These numerous facts call for the need to investigate the level of physical fitness competence in elementary school physical education teachers. So, the aim of this research is to determine the level of motor abilities in students of the Faculty of Teacher Education and to compare them with Croatian National Standards established on fourth grade secondary school children.

METHODS

For the purpose of this study, the sample consisted of 167 female students of the Faculty of Teacher Education in Zagreb, aged 20 + 1. The research was conducted in academic year 2009/2010. The sample of variables consisted of six standard tests for establishing the motor abilities - polygon backwards (MPN), sit and reach (MPR), hand tapping (MTR15), flexed arm hang (MIV), standing long jump (MSD), sit-ups (MPT) and Croatian National Standards for fourth grade secondary school children (Findak et al., 1996). The obtained data were processed by descriptive statistics (Valid N, Mean, Minimum, Maximum, Range, Std. Dev) and for establishing the difference between students' motor abilities and standards, the ANOVA was used.

RESULTS

Based on the collected data and the descriptive statistics shown in Table 1, it can be seen that the greatest range of results, and thus the largest standard deviation from the Mean, is for the test standing long jump, followed by sit and reach, hand taping and trunk bend. Comparing the Mean of students and National standards, it is evidently that the students achieve good results on polygon backward, hand tapping and sit-ups tests, but they attain poor results on sit and reach, standing long jump and flexed arm hang tests.

Table 1. *Descriptive statistics for students*

	Valid N	Mean	Minimum	Maximum	Range	Std. Dev.	Standards
MPN	167,00	12,43	7,49	25,50	18,01	2,51	13,45
MPR	167,00	73,38	45,00	103,00	58,00	11,45	78,00
MTR15	167,00	44,72	26,00	77,00	51,00	13,69	37,50
MSD	167,00	167,28	128,00	235,00	107,00	17,87	194,50
MIV	167,00	16,46	0,00	58,21	58,21	13,70	38,50
MPT	167,00	41,40	15,00	75,00	60,00	9,33	41,00

In accordance with the objective of this study, the results of ANOVA analyses are shown in Table 2. Based on the obtained results, it can be concluded that there is a statistically significant difference between the students of the Faculty of Teacher Education and National standards for fourth grade secondary school children on polygon backward, sit and reach, hand standing long jump and flexed arm hang tests.

Table 2. *ANOVA*

	SS	Df	MS	SS	Df	MS		
	Effect	Effect	Effect	Error	Error	Error	F	P
MPN	**87,51**	**1,00**	**87,51**	**1042,63**	**332,00**	**3,14**	**27,86**	**0,00**
MPR	**1779,76**	**1,00**	**1779,76**	**21761,47**	**332,00**	**65,55**	**27,15**	**0,00**
MTR15	**4358,21**	**1,00**	**4358,21**	**31107,33**	**332,00**	**93,70**	**46,51**	**0,00**
MSD	**61888,21**	**1,00**	**61888,21**	**53031,33**	**332,00**	**159,73**	**387,45**	**0,00**
MIV	**40560,21**	**1,00**	**40560,21**	**31140,74**	**332,00**	**93,80**	**432,42**	**0,00**
MPT	13,04	1,00	13,04	14455,92	332,00	43,54	0,30	0,58

DISCUSSION

From the obtained results it can be concluded that the students have, according to National standards, well developed coordination and frequency of movement (Figure 1 and 3). Consequently, they have the competence to perform units and themes from Physical education curriculum that are based on coordination: walking and running with changing direction of movement, rolling, crawling and wriggling in different ways, games, hand and leg manipulation with the ball, dancing with changing directions and tasks; as well as those based on frequency of movement: throwing and catching, quickly run across an obstacle, all types of games etc.

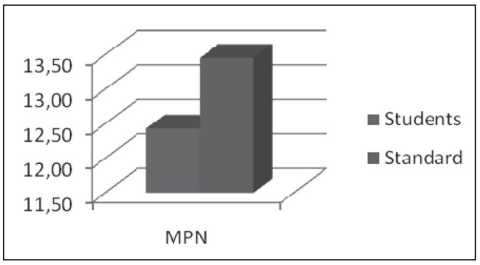


Figure 1. *Polygon backward*

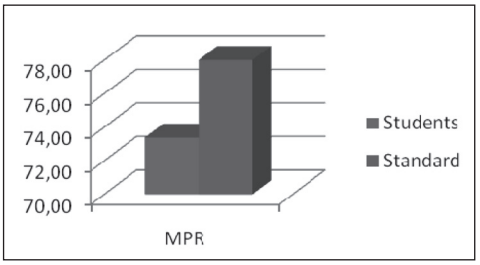


Figure 2. *Sit and reach*

However, the students achieved poor results in flexibility, explosive and static strength (Figure 2, 4 and 5). According to these results, it can be assumed that they are not entirely competent to execute tasks that are based on those motor abilities, such as leaps and rhythmic jumps, balance on the ground, gallop, high jump, one and two leg jumps and hops, throwing medicine ball, hangs and strongholds, pulling and pushing.

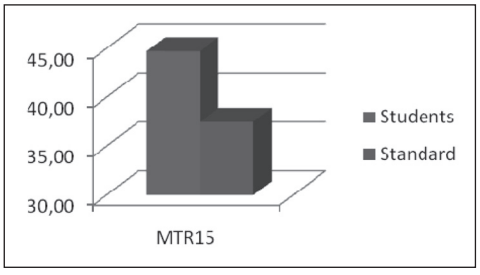


Figure 3. *Hand tapping*

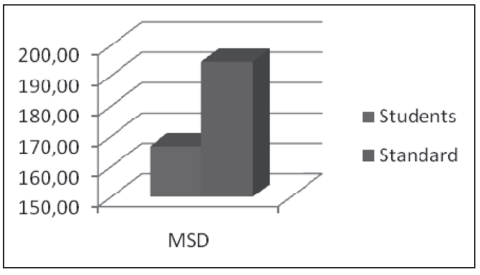


Figure 4. *Standing long jump*

The only variable, which showed no statistically significant difference, between the students and National standards, is sit-ups (Figure 6.). Sit-ups is a standard test for evaluating repetitive strength, so it can be concluded that the students are competent to provide tasks that include this motor ability.

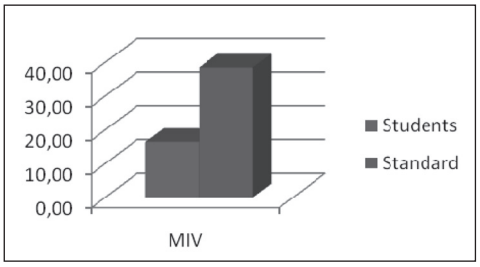


Figure 5. *Flexed arm hang*

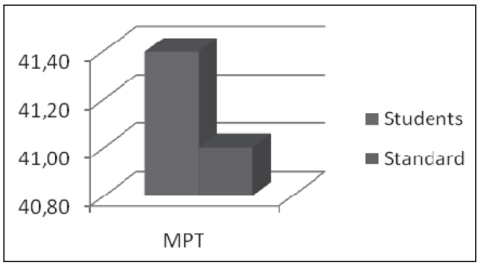


Figure 6. *Sit-ups*

Up to date, female students' motor abilities were studied by many authors. The results of their studies are shown in Table 3.

Table 3. *Results of studies by different authors*

Name of authors	Year	MPN	MPR	MTR15	MSD	MIV	MPT
Tomljenović et al	2007.	11,54 2,17	63,21 15,76	37,42 3,62	186,3 31,49	34,42 33,71	48,50 8,67
Mesarić, Boutlas	2005.	13,37 2,21	69,18 9,36	35,66 3,74	169,3 14,18	20,32 13,13	40,09 3,93
Srhoj et al	2006.	12,14 2,12	65,87 11,82	34,42 4,71	173,8 20,43	29,13 19,64	22,33 4,29
Horvat, Delija	1998.	11,86 2,11	70,29 11,25	/	177,1 46,02	23,18 14,22	45,45 21,87
Jeras, Kondrič	2002.	11,59 26,06	/	48,16 5,04	182,4 17,13	31,32 16,74	45,25 10,49

(upper value in every cell is mean value and lower value is standard deviation)

CONCLUSION

The aim of this study was to determine the level of motor abilities in students of the Faculty of Teacher Education and to compare them with Croatian National Standards established on fourth grade secondary school children. Motor abilities of 167 female students of the Faculty of Teacher Education in Zagreb, aged 20 + 1 were measured on 6 motor tests. According to the obtained results, it can be concluded that the students are competent to perform tasks that include coordination, frequency of movement and repetitive strength, but less competent in performing those tasks that contain flexibility, explosive and static strength. With the aim to have quality teachers at every level of knowledge transfer, students' awareness of the importance of their

competences in future profession should be one of the priorities while studying at the Faculty of Teacher Education.

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ABSTRACT

The aim of this research is to determine the difference between the level of motor abilities in students of the Faculty of Teacher Education and Croatian National Standards established on fourth grade secondary school children. The sample consisted of 167 female students of the Faculty of Teacher Education in Zagreb, aged 20 + 1. The sample of variables consisted of six standard tests for establishing the motor abilities and Croatian National Standards. The obtained data were processed by descriptive statistics and for establishing the difference between students' motor abilities and standards, the ANOVA was used. Based on the obtained results, it can be concluded that the students are competent to perform tasks set by Physical education curriculum that include coordination, frequency of movement and repetitive strength, but less competent in performing the tasks containing flexibility, explosive and static strength.

Key words: *motor abilities, National Standards, students, physical education, curriculum*

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Original scientific paper

MOTION EFFICIENCY AND FUNCTIONAL ABILITY OF UNDERGRADUATES

INTRODUCTION

There is a lot of research considering low motor efficiency of the undergraduates and that level is on the decrease (1-4). Among scientific papers there are few articles considering the group of students of physiotherapy. That is why this group was chosen as subjects in the research.

MATERIALS AND METHODS

87 students of the Institute of Physiotherapy were involved in this research. The group consisted of 32 men and 55 women. We have evaluated the whole group of students and then separately according to gender, and trained and untrained students. The average age of the students was 21. The measurements were done between 18th November and 16th December 2009 at the IFBLR Piešťany. This published part of the research is aimed at the evaluation of the markers of motor efficiency and functional efficiency as well as measurement of the trunk and hand muscles power, explosive power of the legs, trunk flexibility, blood pressure levels and blood circulation ability. These markers were evaluated with standardised motor tests, hand grip with manual dynamometer of soviet origin (DRP90) and blood pressure with Omron M10 IT apparatus. The results show average values of the group and some of the relevant outcomes were analysed using the test.

RESULTS

a) Sit-up test

The sit-up test refers to the measurement of the abdominal muscle power; however, it is well known that during the exercise, other muscle groups are involved as well. The test has various modifications in terms of time shift of the movement sequences, structure of the movement, and initial and terminal posture of the subject.

In our research, the subject was lying on the back with the hands in occiput, legs stretched with ankles fixed by the other person to the floor. The sitting position was reached with 90 degrees flexion of the trunk to the legs. With every return to the lying position, the subject was supposed to touch the floor with his occiput. Total number of the sit-ups was counted for 30 seconds.

In our research, no significant differences were found between men and women in this test. The results of several research studies favour men in the results of muscle power tests rather than women, thus the sit up test should favour men in our outcomes as well. The results of the test at IFBLR: men 19.30 cycles, women 18.90 cycles. The whole group had average value of 19.1 cycles (Figure 1). Less surprising was little difference in the results between trained men and women. It can be said that trained women have strengthened more their abdominal and lumbar muscles. The difference between trained and untrained men was statistically significant, just as the difference between trained and untrained women (favouring trained in both cases).

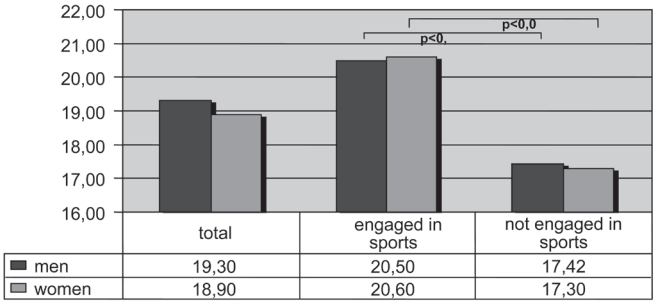


Figure 1.

b) Hand grip power

As expected, men's hand grip power was much higher (see table 1). In men it was 895 N and in women 459 N. This difference was statistically significant at level $p < 0.01$. We have confirmed the well known fact about the lower level of the muscle power in women in comparison with men. This comes from several researches of the muscle power of women regardless of their profession (that means it is considering not only female students). Trained men had better results compared to trained women. In this group the difference was even more notable (men 902N, women 442N) and was again statistically significant. For further analysis of these results it would be necessary to know what kind of sports the subjects are engaged in (separately men and women) and according to these findings, evaluate the influence of the sport on their muscle power level. Higher values of the hand muscle power in men rather than

in women were found in the untrained group of the students as well. In this group the difference was smaller than in trained group, but this data were also statistically significant. The difference between trained and untrained group was surprisingly small.

Table 1. *Informative table of the hand-grip values of both hands in Newtons*

Age	Men			Women		
	Insufficient	Good	Excellent	Insufficient	Good	Excellent
15 – 20y	Below 39	39 – 44	Over 44	Below 31	31 – 34	Over 34
21 – 30y	Below 45	45 – 55	Over 55	Below 27	27 – 36	Over 36
31 – 40y	Below 38	38 – 44	Over 44	Below 25	25 – 32	Over 32
41 – 50y	Below 34	34 - 43	Over 43	Below 24	24 – 29	Over 29

Table 2. *Normative of jumps value in cm*

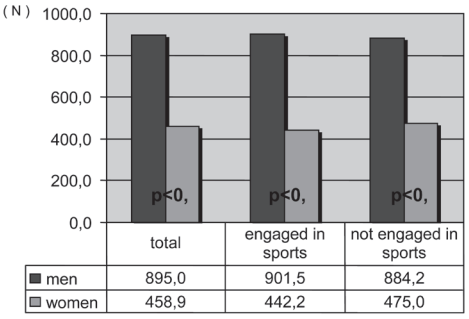
	The power level			
	Poor	Fair	Good	Excellent
Men	580	750	800	930
Women	480	650	700	800

c) Vertical jump

It was found that leg load is the most effective in terms of growth hormone production and that is why the measurement of the explosive power of the legs was included in the battery of the tests. This is usually measured with the distance jump from the spot or with the high jump. The high jump measurement is easier. The difference between the touch of the wall with the arm stretched while standing and jumping is measured with these tests.

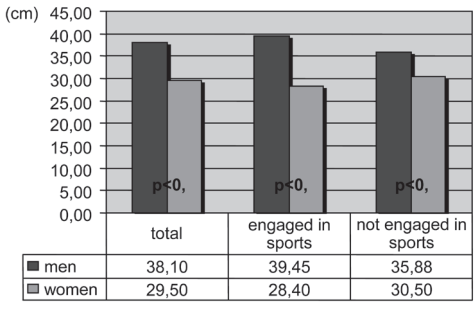
In the whole group of subjects, men had relatively better results than women, but in overall evaluation according to the scale, the average result of men (38 cm) was insufficient while in women it was good (30 cm). It can be deduced that in female students this motor ability improved on a higher level compared to men, even if their output was not excellent. The difference between men and women was statistically significant at $p < 0.01$. Similar results were found in trained students for both genders. Men had relatively better results (39cm) than women (28cm), although according to the evaluation scale, their output was insufficient. Similar situation was

in women whose average output was good but close to insufficient result. Untrained male students reached better results (36cm) than untrained female students (30cm), although their output in evaluation scale was insufficient while in women it was good. Women were better in overall results (Figure 3).



	total	engaged in sports	not engaged in sports
men	895,0	901,5	884,2
women	458,9	442,2	475,0

Figure 2.



	total	engaged in sports	not engaged in sports
men	38,10	39,45	35,88
women	29,50	28,40	30,50

Figure 3.

d) Trunk-bending sideways (difference)

The trunk flexibility measured with bend aside: the evaluation of the trunk-bending sideways to the left in the whole group of the IFBLR students showed no difference between men and women. Similarly, there were no major differences between the values of the bend aside of the trunk to the left in trained men and trained women, and the same holds for untrained men and women (Figure 4). There were no major differences in the results of the bend aside of the trunk–bending sideways to the right in the whole group and among men and women as well as in trained men and women, and untrained men and women (Table 3a, 3b). The results were not statistically significant. In theory, based on the equality of the achieved results, it can be presumed that the results of the bend aside of the trunk to the left would be similar in men and women. In comparison of the results of the bend aside to the left and to the right in the whole group and separately in trained and untrained men, no major differences were observed. The same results were achieved in the whole group of women and trained and untrained women.

Table 3a. *Normative values for men*

Evaluation	20 – 30 – 39 years	40 – 49 years	50 – 59 years
Above average	27,2 cm	25,9 cm	23,5 cm
Better than average	23,3 – 27,1 cm	22,0 – 25,8 cm	19,6 – 23,4 cm
Average	19,5 – 23,2 cm	18,1 – 21,9 cm	15,7 – 19,5 cm
Lower than average	15,6 – 19,4 cm	14,3 – 18 cm	12,0 – 15,6 cm
Insufficient	15,5 cm	14,2 cm	11,8 cm

Table 3b. *Normative values for women*

Evaluation	20 – 30 – 39 years	40 – 49 years	50 – 59 years
Above average	26,2 cm	24,7 cm	23,0 cm
Better than average	22,6 – 26,1 cm	21,0 – 24,6 cm	19,3 – 22,9 cm
Average	18,9 – 22,5 cm	17,4 – 20,9 cm	15,7 – 19,2 cm
Lower than average	15,2 – 18,8 cm	13,7 – 17,3 cm	12,0 – 15,6 cm
Insufficient	15,1 cm	13,6 cm	11,9 cm

The disadvantage of the table is that the same category of the bend aside of the trunk is applied for 20, 30 and 39-year-olds. There can be huge differences in this range and that is why the evaluation is only informative. According to the above table, the outputs of our students are evaluated as better than average.

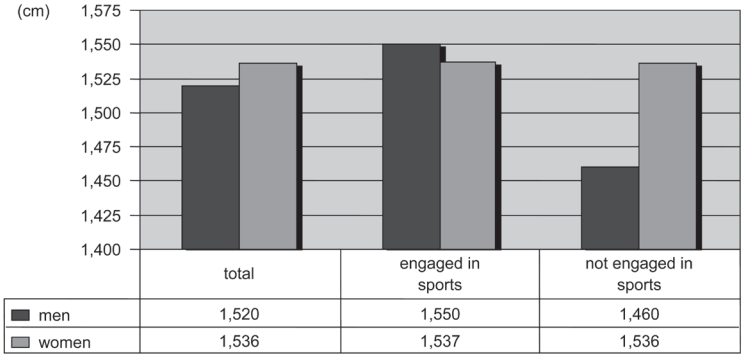


Figure 4. *(difference in cm)*

e) Blood pressure

Surprisingly high levels of the systolic blood pressure were found in the male group (137 mmHg) compared with women, whose values were almost ideal (119 mmHg) ($p < 0.01$). Similar results were obtained for trained male subjects: men – 138 mmHg, women 117 mmHg and untrained too: men 135 mmHg, women 121 mmHg. In both groups the differences were statistically significant (evaluated with t-test) with $p < 0.01$. In the evaluation of the diastolic blood pressure, the ideal values were found in men in the whole group (82 mmHg) in comparison with women (77 mmHg). Both values can be marked as very good (with statistical significance of $p < 0.05$).

The values of the diastolic blood pressure in the group of the trained men (82 mmHg) in comparison to the trained women (76 mmHg) reached the highest difference between genders and were statistically significant. The differences in the values of the diastolic blood pressure in the group of untrained men and women were not significant and they reached ideal level (Figure 5 and 6).

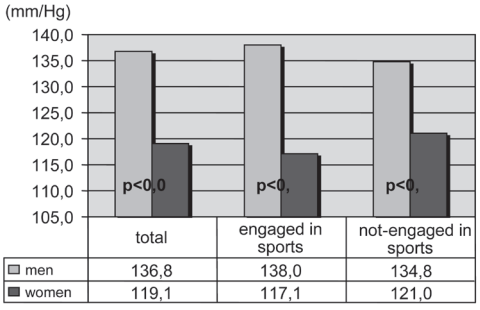


Figure 5. *Systolic BP*

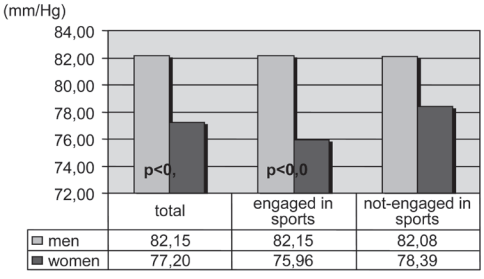


Figure 6. *Diastolic BP*

f) Orthostatic test

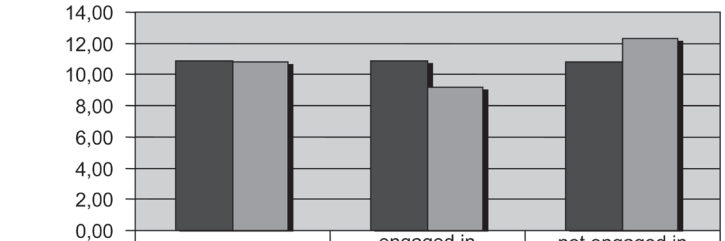
In the evaluation of the orthostatic test the following limits were used:

6-12 beats/min – good heart reaction for the load

13-19 beats/min – satisfactory reaction

20 and more – unsatisfactory reaction – lowered heart efficiency

In the whole group the heart reaction for the changed posture was good. It was closely over 10 strokes /min, the difference between trained and untrained men was minimal (trained 10.9 strokes/min, untrained 10.8 strokes/min). The heart reaction of the untrained women can be evaluated only as satisfactory. Although these results were not statistically significant, they were remarkable (Figure 7).



	total	engaged in sports	not engaged in sports
men	10,88	10,90	10,83
women	10,78	9,19	12,32

Figure 7.

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ABSTRACT

Objective: In this paper the authors collected information about the level of motor efficiency and functional ability indicators in students of the Institute of Physiotherapy, Balneology and Medical Rehabilitation (IFBLR) IFBLR UCM in Trnava. The level of the indicators was measured in 87 students, 32 male and 55 female, and 47 of them were doing some sport and 40 were not. Their average age was 21 years. In the paper the authors are evaluating the results of the whole group, the results of the group involved in training (trained) and the one not involved in training

(untrained), and men and women individually as well. **Methods:** The standardised tests for power measurement and joint mobility were used. For the measurement of the functional values, the orthostatic exam and blood pressure levels were collected. **Results:** In the **sit-up test** surprisingly no difference between men and women was found, neither in the trained nor untrained group. There were significant differences between men (895 N) and women (459 N) in **hand grip test** using dynamometer. The higher values were found both in trained and untrained men compared to women. The values of **vertical jump** in men are marked as „insufficient" and in women as „good". It can be deduced that women have more lower hand power than men. There were no significant differences in the **trunk-bending sideways** to the left and to the right between men and women, similarly between trained and untrained men and women. The **systolic blood levels** in men were much higher (137 mmHg) while in women the levels were normal (119 mmHg). The values of the diastolic pressure were almost ideal in men and women. The results of **orthostatic exam** were found to be as good in men and women without any significant differences between trained and untrained men. There was more significant difference between trained and untrained women. The heart reaction of the untrained women was unsatisfactory.

Key words: *motor efficiency, functional efficiency, sit-up, hand grip power, vertical jump, trunk bending sideways, blood pressure, orthostatic test, undergraduates, students of physiotherapy*

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ODNOS DIMENZIJA LIČNOSTI ADOLESCENATA I OCJENA U TJELESNOM ODGOJU

UVOD

Relacije dimenzija ličnosti i školskog uspjeha predmet su istraživanja velikog broja autora. Prema istraživanju Funke (2006) Alfred Binet je prije jednog stoljeća sa svojim suradnikom Teodorom Simonom konstruirao test za mjerenje inteligencije djece kako bi se mogla dijagnosticirati intelektualno neuspješna djeca koja nisu bila sposobna svladati propisane školske programe. Charles Spearman je u prvoj polovici XX. stoljeća na osnovu analize školskih ocjena konstruirao prvu teoriju o strukturi ljudskog intelekta – generalni faktor inteligencije (Cianciolo i Sternberg, 2004). Potkraj 1970-ih Herrnstein i Murray (Herrnstein & Murray, 1994) pretpostavljaju da su samo najinteligentniji sposobni da svladaju najzahtjevnije obrazovne programe, da su oni nosioci razvoja društva, dok su svi ostali vođeni. Reakcije američke javnosti na ovakve stavove o razvoju inteligencije i postizanju društvenih položaja bile su krajnje negativne.

Novi poticaji ispitivanja utjecaja i nekih drugih varijabli koje bi, osim inteligencije, mogle doprinositi školskom uspjehu, dolaze krajem XX. stoljeća kada petofaktorski model postaje dominantnim istraživačkim pristupom u području ličnosti. Najzaslužniji za teoriju o petofaktorskom modelu ličnosti bili su autori Costa i McCrae koji su razvili odgovarajuće psihološke instrumente namijenjene dijagnosticiranju definiranih dimenzija i to: 1) NEO FFI instrument koji se sastoji od 60 čestica kojima se pokriva pet osnovnih dimenzija iz petofaktorskog modela i 2) instrument NEO PI–R sastavljen od 240 čestica namijenjen istom predmetu mjerenja Costa i McCraae.

Međutim, pored petofaktorskog modela ličnosti pojavila su se i druga rješenja. Talijanski autori Caprara, Barbaranelli i Borgogni kreirali su upitnik *Big Five Questionnaire* (BFQ), koji se sastoji od 132 tvrdnje na koje se odgovara u Likertovu formatu od pet jedinica, raspoređenih u pet ljestvica, odnosno 10 podljestvica.

Autor ovog istraživanja u nekoliko je radova ispitivao dimenzije ličnosti sportaša i trenera. Ivanović (2009) je identificirao relacije petofaktorskog modela dimenzija

ličnosti i indikatora zadovoljstva životom na uzorku 137 karatista – mlađi seniori. Ivanović (2010a) je na uzroku od 126 trenera u stalnom radnom odnosu s područja grada Beograda iz 14 sportskih klubova definirao prediktivnu vrijednost dimenzija ličnosti, spol i radni staž trenera i zadovoljstva trenerskog posla (kao kriterij). Ivanović (2010b) je na uzorku od 136 karatista oba spola – seniora iz Kolubarskog okruga utvrdio korelacije između latentnih dimenzija ličnosti i pojedinih faktora organizacijske kulture.

U proteklom prvom desetljeću XXI. stoljeća objavljeni su rezultati većeg broja studija, kojima se pokušalo odgovoriti na pitanje u kojoj mjeri pojedinačne dimenzije ličnosti doprinose školskom uspjehu. Na primer, Laidra, Pulman Pullmann i Allik (2007.), Zanga (2003.) te Matešić, ml. i Zarevski (2008) primijenili su Upitnik NEO-FFI Coste i McCraea.

Pregledom dosadašnjih istraživanja dostupnih autorima ovog rada vidljivo je odsustvo radova o korelaciji dimenzija ličnosti i uspjeha u telesnom odgoju. Stoga je osnovni cilj ovog istraživanja ispitivanje relacija prediktorskih varijabli pet velikih dimenzija ličnosti adolescenata (kao uzroka) i kriterijske varijable školskih ocjena u tjelesnom odgoju(kao posljedice).

METODE

Sudionici i postupak

U istraživanju je sudjelovalo ukupno 338 sudionika učenika IV. razreda tehničke, ekonomske, poljoprivredne i medicinske škole u Valjevu. Aritmetička sredina ispitanika u istraživanju je 18.1 godina, a standardna devijacija 0.31 godina.

Anonimno testiranje ispitanika obavljeno je tokom prosinca 2010. godine. Na upitniku se nalazilo uputstvo za samostalno popunjavanje. Ispitivanje je vršeno grupno za vrijeme redovite nastave telesnog odgoja u trajanju od jednoga školskog sata. Ispitivanje je bilo anonimno i dobrovoljno i sudionici su mogli odbiti sudjelovanje ili u bilo kojem trenutku ispitivanja odustati.

Instrumenti

Big Five upitnik

Za ispitivanje 5 velikih dimenzija ličnosti starijih od 16 godina primijenjen je talijanski oblik *s* (Big Five Questionnaire – BFQ; Caprara, Barbaranelli i Borgogni, 2005).

Upitnik korištenog petofaktorskog modela kojom se operacionaliziraju osobine ličnosti čini sljedećih 5 ljestvica: energija (E), ugodnost (U), savjesnost (S), emocionalna stabilnost (ES) i mentalna otvorenost (MO). Za svaki od pet faktora

utvrđene su dvije PODDIMENZIJE od kojih svaka podrazumjeva različite aspekte dimenzije: **energija** (*dinamičnost* – Di i *dominacija* – Do), **ugodnost** (*kooperativnost*/*empatija* – Kp i *srdačnost*/*prijateljstvo* – Sr), **savjesnost** (*temeljitost* – Tm i *ustrajnost* – Us), **emocionalna stabilnost** (*emocionalna kontrola* – Ek i *kontrola impulsa* – Ki), **mentalna otvorenost** (*otvorenost prema kulturi* – Ok i *otvorenost prema iskustvu* – Oi) i **ljestvica laganja** (L).

Upitnik modela „Pet velikih" dimenzija ličnosti, sastoji se od 132 ajtema u obliku kratkih verbalnih fraza. Svaka rečenica sadrži marker osobina ličnosti uz kratku razradu, objašnjenje ili kontekstualnu informaciju, što olakšava razumijevanje i smanjuje višeznačnost. Svaka latentna dimenzija ličnosti, odnosno prediktorska varijabla, obuhvaća 24 tvrdnje, a poddimenzije ličnosti sadrže po 12 čestica, od kojih je 1/2 formulirana u pozitivnom, a druga polovina u negativnom smjeru u odnosu na naziv ljestvice. Zadatak ispitanika je da u ovom mjernom instrumentu procijeni stupanj slaganja sa svakim od,stupnjeva na ljestvici Likertovog tipa od 5 stupnjeva ne/slaganja (od 1 – u potpunosti netočno do 5 – u potpunosti točno). Rezultat sudionika određuje se zbrajanjem procjena za odgovarajuće čestice svake pojedine pod-dimenzije upitnika, što omogućava dobivanje ukupnog rezultata za dimenzije BFQ-a.

Ocjene iz telesnog vaspitanja

Kao mjera uspjeha korištena je ocjena učenika iz tjelesnog odgoja jer se ova kriterijska varijabla smatra objektivnijim pokazateljem njegovog znanja. Učenici su u upitnicima trebali napisati ocjenu u rasponu od 1 do 5 na kraju prvog polugodišta iz ovog nastavnog predmeta.

U tablici 1. prikazane su vrijednosti pouzdanosti unutarnje konzistencije Cronbah Alfa koeficijenata Cronbah (Cronbach, 2004) pod-dimenzija pet faktora ličnosti.

Tablica 1. *Vrednosti koeficijenata pouzdanosti skale Big Five upitnika*

PODDIMENZIJE LIČNOSTI	Cronbach α
Energija	.83
Ugodnost	.90
Savjesnost	.87
Emocionalna stabilnost	.93
Mentalna otvorenost	.84
Ljestvica laži	.95
Dinamičnost	.82
Dominacija	.91

PODDIMENZIJE LIČNOSTI	Cronbach α
Kooperativnost	.85
Srdačnost	.92
Temeljitost	.86
Ustrajnost	.94
Emocionalna kontrola	.88
Kontrola impulsa	.95
Otvorenost prema kultu	.89
Otvorenost prema iskustvu	.94

Uvidom u matricu podataka petofaktorskog modela ličnosti uočavaju se vrijednosti koeficijenata unutarnje konzistencije (Cronbach-alpha), koje se kreću se u intervalu od α = .81 do α = .95. Imajući u vidu da se koeficijenti pouzdanosti ne manji od 0.7 obično smatraju zadovoljavajućim, korišteni *Big Five* upitnik imao je prihvatljivu pouzdanost interne konzistentencije Frenkel i Volen, Nanali, Rivil i Zinbarg (Fraenkel & Wallen, 1990; Nunnally, 1978; Revelle & Zinbarg, 2009).

REZULTATI I RASPRAVA

Prvo su izračunate aritmetičke sredine, standardne devijacije i Pearrsonovi koeficijenti korelacija varijabli (Tablica 2).

Tablica 2. *Korelacije dimenzija i poddimenzija ličnosti i ocjena u tjelesnom odgoju*

		AS	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	**Prosjek ocena**	4.5	6.03	1																
2	**BFQ E**	80.3	9.27	.05	1															
3	**BFQ U**	76.4	9.06	-.09	.01	1														
4	**BFQ S**	76.5	10.92	.31**	.35**	.12	1													
5	**BFQ ES**	70.1	14.22	.08	-.05	.20	.06	1												
6	**BFQ MO**	79.13	10.51	.04	.39**	.06	.32**	.03	1											
7	**BFQ L**	30.1	6.12	-.06	.05	.11*	.23**	.33**	-.02	1										
8	**BFQ Di**	38.3	5.95	-.05	.84**	.16**	.28**	-.06	.43**	.05	1									
9	**BFQ Do**	40.2	6.06	.08	.85**	-.08	.28	-.06	.36**	-.02	.54**	1								
10	**BFQ Kp**	38.19	4.64	-.03	.06	.79**	.21**	.16**	.19**	.03	.06	-.03	1							
11	**BFQ Sr**	36.7	5.47	-.11*	-.05	.86**	.07	.16**	-.06	.09	.10	-.18**	.42**	1						
12	**BFQ Tm**	36.1	6.96	.20**	.13*	.12*	.86**	-.05	.17**	.22**	.05	.12*	.13*	.08	1					
13	**BFQ Us**	40.9	6.41	.27**	.49**	-.06	.85**	.16**	.37**	.12*	.40**	.48**	.19**	-.03	.51**	1				
14	**BFQ Ek**	37.1	7.25	.09	.04	.13*	.05	.88**	.13*	.19**	.05	.08	.19**	.05	-.08	.18**	1			

**p <. 01; *p <. 05

Legenda: BFQ E, Energija; BFQ U, Ugodnost; BFQ S, Savjesnost; BFQ ES, Emocionalna stabilnost; BFQ MO, Mentalna otvorenost; BFQ L, Ljestvica laži; BFQ Di, Dinamičnost; BFQ Do, Dominacija; BFQ Kp, Kooperativnost; BFQ Sr, Srdačnost; BFQ Tm, Temeljitost; BFQ Us, Ustrajnost; BFQ Ek, Emocionalna kontrola; BFQ Ki, Kontrola impulsa; BFQ Ok, Otvorenost prema kulturi; BFQ Oi, Otvorenost prema iskustvu.

Dobivena matrica korelacija pokazuje da je dimenzija ličnosti *savjesnost*, sa svojim pod-dimenzijama *temeljitost* i *ustrajnost*, statistički značajno i pozitivno povezana s ocjenama tjelesnog odgoja, što signalizira na to da adolescenti koji su

ustrajniji i temeljitiji imaju i bolji uspjeh u ovoj nastavnoj oblasti. Također dobivene su i statistički značajne korelacije (negativnog smera) pod-dimenzije ličnosti *ugodnost* i ocjena tjelesnog odgoja. Bez obzira na relativno nizak linearan odnos ovih varijabli, pretpostavlja se da maturanti s iskazanom dimenzijom ličnosti ugodnosti imaju slabiji uspjeh u školskom premetu tjelesni odgoj. Hipotetički to ukazuje na održavanje socijalne mreže i druženje, jer adolescenti koji imaju visoke vrijednosti na ljestvici petofaktorskog modela ličnosti *ugodnosti* imaju više prijatelja od onih koji na ovoj ljestvici imaju niske vrijednosti. Prema tome, može se pretpostaviti da druženje i mnogobrojni prijatelji kod tih srednjoškolaca predstavljaju karakterističnu prednost, te im zbog ove osobine ličnosti ne ostaje dovoljno vremena za svakodnevno tjelesno vježbanje. Međutim, prema istraživanju Koste i Makre (Costa & McCrae, 2005) generalno postoji drugo objašnjenje: neugodne ličnosti načelno ostvaruju bolji školski uspjeh zato što su nepopopustljive. One se često kruto pridržavaju pravila što ih u komunikaciji s okruženjem s jedne strane čini neugodnima, a s druge strane ta njihova rigidnost im olakšava rješavanje problema u sportskim aktivnostima koje su osnova školskog telesnog odgoja, gdje se nikad ne smije odstupati od pravila.

Izračunati koeficijent multiple korelacije (R = .76) naglašava značajnu povezanost kriterijske varijable ocjena iz tjelesnog odgoja i sistema prediktora bazičnih dimenzija ličnosti, pri čemu vrednost koeficijenta determinacije je R = .58. To znači da je objašnjeno 20% ukupne varijance na nivou (p < . 01), dok se 4/5 % varijabiliteta ne može objasniti dimenzijama modela Pet velikih.

U cilju provjere koliki se dio varijance ocjena iz nastavnog predmeta telesni odgoj (kriterij) može objasniti pomoću dimenzija ličnosti mjerenih *Big Five* upitnikom, kao i kauzalnosti odnosa među istraživanim varijablama provedena je hijerarhijska regresijska analiza (Tablica 3).

Tablica 3. *Koeficijent multiple korelacije, koeficijent determinacije i parcijalni doprinosi prediktora za kriterijsku varijablu*

DIMENZIJE LIČNOSTI	**β**
Energija (E)	-.08
Ugodnost (U)	**-.14***
Savjesnost (S)	**.31****
Emocionalna stabilnost (ES)	.10
Mentalna otvorenost (MO)	.03
Ljestvica laži (L)	-.09

*p < .05; **p < .01 R = .76; R^2 = .20 p < .01

Dobiveni koeficijent multiple korelacije (R = .76) naglašava značajnu linearnu povezanost kriterijske varijable ocjena iz telesnog odgoja i sistema prediktora bazičnih dimenzija ličnosti, pri čemu vrijednost koeficijenta determinacije je R = .58. To znači da je objašnjeno 20% ukupne varijance na nivou (p < . 01), dok se 4/5 % varijabiliteta ne može objasniti dimenzijama modela Pet velikih.

Uvidom u ćelije matrice podataka uočava se da su u modelu „Pet velikih" dimenzija ličnosti samo dva standardizirana beta koeficijenta statistički značajna i to: *ugodnost* sa pozitivnim predznakom (β = .11) i *savjesnost* s negativnim predznakom (β = -.31). Srednjoškolci završnih razreda koji ostvaruju značajan rezultat na dimenziji ličnosti ugodnosti, opisuju se kao suradnici, ljubazni, nesebični, prijateljski raspoloženi, plemeniti i suosjećajni. Dimenzija ličnosti savjesnost odnosi se na sposobnost samoregulacije ili samokontrole, a adolescenti koji ostvaruju značajne rezultate na toj dimenziji, opisu¬ju se kao refleksivne, savjesne, uredne, točne i uporne ličnosti.

Dakle, dobiveni standardizirani beta koeficijenti pozitivnog prediktora ugodnost i negativnog prediktora savjesnost ukazuju da ove dimenzije ličnosti relevantno doprinose predikciji kriterija OCJENA IZ TJELESNOG ODGOJA maturanata.

Hijerarhijska regresijska analiza provedena i na 10 poddimenzija petofaktorskog modela dimenzija ličnosti. Veličine beta koeficijenata poddimenzija ličnosti i njihov pojedinačan utjecaj na kriterijsku varijablu ocjene iz tjelesnog odgoja adolescenata predočene su u tablici 4.

Tablica 4. *Predikcija pojedinih poddimenzija ličnosti za kriterijsku varijablu*

POD-DIMENZIJE LIČNOSTI	**β**
Dinamičnost (Di)	**-.13***
Dominacija (Do)	.06
Kooperativnost (Kp)	-.03
Srdačnost (Sr)	-.05
Temeljitost (Tm)	**.14***
Ustrajnost (Us)	**.19****
Emocionalna kontrola (Ek)	**27****
Kontrola impulsa (Ki)	-.02
Otvorenost prema kulturi (Ok)	.06
Otvorenost prema iskustvu (Oi)	.01

*p < .05; **p < .01

Pregledom tablice vidljivo je da su 4 poddimenzije ličnosti statistički značajni prediktori kriterija i to: temeljitost, ustrajnost, dinamičnost i emocionalna kontrola.

Pod-dimenzija ličnosti *temeljitost* – Tm (β = .14), mjeri aspekte koji se odnose na pouzdanost, brigu o detaljima i ljubav prema redu, dok poddimenzija ličnosti *ustrajnost* – Us (β = .14), mjeri aspekte koji se odnose na upornost i ispunjavanje preuzetih obaveza.

Statistički značajnim negativnim prediktorom školskog uspjeha tjelesnog odgoja manifestirana se varijabla *dinamičnost* – Di (β = -.13), kao pod-dimenzija dimenzije energije, koja mjeri aspekte energičnih i dinamičnih ponašanja. *Emocionalna kontrola* – Ek (β = .27) je poddimenzija emocionalne stabilnosti ličnosti koja se odnosi na kontrolu stanja napetosti uz proživljavanje osećanja, manifestovala se kao statistički značajan pozitivan prediktor.

Dobiveni negativni smer standardiziranih beta koeficijenata signaliziraju na to da su maturanti koji ostvaruju veće vrijednosti na poddimenziji dinamičnost skloniji energičnom reagiranju, dok adolescenti koji ostvaruju niže vrednosti na pod-dimenziji emocionalna kontrola, imaju manju kontrolu nad svojim emocionalnim reakcijama, što nije optimalno za realizaciju tjelesnog odgoja te ne doprinosi uspjehu u ovom nastavnom predmetu.

ZAKLJUČAK

Nalazi u ovom istraživanju potvrđuju postavku o složenosti petofaktorskog modela ličnosti i njegovog linearnog odnosa s ocjenom tjelesnog odgoja adolescenata (kao kriterija). Rezultati naglašavaju to da određene osobine ličnosti maturanata iz modela Velikih pet mogu u određenoj mjeri doprinijeti objašnjenju varijance usp¬jeha u nastavnom premetu telesna kultura.

Najbolja prediktorska varijabla ocjene tjelesnog odgoja pokazala se latentna dimenzija savjesnost kao jedna od „pet velikih" dimenzija ličnosti primijenjenog *Big Five* upitnika, što upućuje na zaključak da maturanti s izraženom navedenom osobinom ličnosti ostvaruju bolji uspjeh u nastavi tjelesnog odgoja. Također, statistički značajan predskazivač ocjene telesne kulture pokazala se i latentna dimenzija ličnosti ugodnost. To znači da adolescenti koji imaju veće vrijednosti standardiziranih beta koeficijenata na latentnoj dimenziji ugodnosti, ostvaruju lošiji školski uspjeh u nastavi tjelesnog odgoja. Uzrok je vjerojatno održavanje široke mreže prijatelja, koja uvjetuje manjak vremena za redovno vježbanje i motoričko učenje.

Od poddimenzija ličnosti najboljim prediktorom školskog uspjeha u nastavi tjelesnog odgoja pokazale su se pod-dimenzije savjesnost, dinamičnost, emocionalna kontrola i kontrola impulsa.

Dobiveni rezultati u teorijskom smislu otvaraju nove mogućnosti za istraživanja relacija prediktorskih varijabli pet velikih dimenzija ličnosti adolescenata (kao uzrok) i kriterijske varijable školskih ocjena u tjelesnom odgoju (kao posljedice).

Glavno ograničenje ovog transverzalnog istraživanja koje otežava generalizaciju rezultata je to što je korišten relativno homogen uzorak.

Navedene najvažnije činjenice u ovom radu sugeriraju osnovanost budućih empirijskih istraživanja čiji bi predmet bio identificiranje korelata između dimenzija ličnosti adolescenata i njihovih ocjena iz telesnog odgoja. Bilo bi interesantno da se struktura nedovoljno definiranih odnosa u ovoj domeni u budućim istraživanjima longitudinalnog dizajna egzaktnije ispita na većem broju maturanata uzrasta od 18 godina i u nekim drugim školskim populacijama. To bi stvorilo uvjete za potpunije definiranje pojedinih latentnih dimenzija i poddimenzija ličnosti učenika završnih razreda srednjih škola kao najboljih prediktora uspeha u nastavi tjelesnog odgoja, ali i uvjeta za utvrđivanje kvantitativnih i kvalitativnih razlika dosadašnjih rezultata u komparaciji s rezultatima dobivenim u ovom istraživanju.

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RELATION OF ADOLESCENT PERSONALITY DIMENSIONS AND PHYSICAL EDUCATION MARKS

ABSTRACT

The aim of this research was to examine relations of the five-factor adolescent personality model dimension and Big Five Questionnaire school marks in physical education (BFQ; Caprara, Barbaranelli and Borgogni, 2005). The sample consisted of 338 male, 4th grade students from five secondary schools in Valjevo. „Big Five" dimensions model and a sub dimension personality model of the Big Five Questionnaire were applied: energy (dynamics and domination), pleasantness (cooperation/empathy and cordiality/friendship), conscientiousness (meticulousness/persistence), emotional stability (emotional control and impulse control), mental open-mindedness (openness towards culture and openness towards experience) and lying scale. The average mark in physical education was taken as the measure for graduates' success. The data were processed using the Pearson's correlation coefficient and hierarchy regression

analysis. Correlation analysis has shown that personality conscientiousness dimension, with its sub-dimensions (meticulousness/persistence) is statistically significantly and positively related to the adolescents' success in physical education. Between cordiality, as a personality pleasantness sub-dimension, and physical education mark, the obtained correlation was negative and low, but statistically significant. Hierarchy regression analysis has shown that the main personality dimension set explains 20% of the total variance. The results point to the conclusion that two personality characteristics (pleasantness and conscientiousness) from the „Big Five" model, as well as 4 personality sub-dimensions (meticulousness, persistence, dynamics and emotional control) can, up to a certain point, contribute to the variability explanation of physical education mark.

Key words: *Big Five Questionnaire, personality dimensions, sub-dimensions, physical education mark*

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Izvorni znanstveni rad

KOMPARACIJA ALGORITAMA ODABIRA VARIJABLI REGRESIJSKOG MODELA U KINEZIOLOŠKIM ISTRAŽIVANJIMA

UVOD

Istraživanja u području selekcije varijabli u primijenjene statističke i matematičke modele počinju s Lewis (1962) i Sebestyen (1962). Na tim početnim istraživanjima su se nadogradili mnogi radovi u medicini i biologiji (Ganster i sur., 2001; Inza i sur., 2001a, 2001b). Važno je naglasiti da je konstrukcija najboljeg podskupa skupa varijabli koji bi trebali biti uključeni u model izuzetno kompleksno pitanje obzirom na činjenicu da broj mogućih odabira varijabli raste eksponencijalno u ovisnosti o broju varijabli. Preciznije, ako imamo n prediktorskih varijabli, tada imamo:

$$\sum_{k=1}^{n}\binom{n}{k} = 2^n - 1$$

mogućnosti za odabir prediktorskih varijabli u model. Pritom smo isključili mogućnost da model nema niti jednu varijablu. Navedeni problem je interesantan i sa samog aspekta teorijskog i praktičnog računarstva obzirom da spada u klasu NP-teških (*Nondeterministic Polynomial - Hard*) problema (Cotta i sur., 2004). Praktično to znači da je za velike skupove varijabli problem pronalaženja optimalnog rješenja nerješiv. Stoga su se vremenom razvila dva smjera istraživanja selekcije varijabli u regresijske modele: tehnike koje garantiraju optimalno rješenja, ali samo primijenjene na malim skupovima varijabli te heurističke tehnike koje pronalaze „dovoljno dobro" rješenje, ali u razumnom vremenu. Pritom, istraživanja u smjeru pronalaženja optimalnog rješenja problema selekcije varijabli u regresijski model su još uvijek znanstveni problemi na kojima se intenzivno radi. Tako primjerice, Yusta, Bonrostro i Letamendia (2007) predlažu novu metodu za selekciju varijabli, posebno u diskriminativnoj i logističkoj analizi. Pritom je metoda utemeljena na metaheurističkoj strategiji te u većini promatranih slučajeva generira bolje rezultate od klasičnih metoda *stepwise backward* i *stepwise forward*.

Naglasimo da svako povećanje broj prediktora u modelu višestruke regresije doprinosi povećanju koeficijenta determinacije, odnosno doprinosi objašnjenu kriterijske (regresand) varijable. To može biti objašnjeno formulom

$$\lim_{k \to \infty} R_k^2 = 1$$

pri čemu je R_k^2 koeficijent multiple determinacije uz k varijabli uključenih u model (Draper i Smith, 1991). Formalno matematički analizirano, svaki model višestruke regresije bit će 100% protumačen ako beskonačno mnogo varijabli uključimo u model. Suprotno tome, ukoliko raspolažemo s većim brojem prediktorskih varijabli, ponekad, nije potrebno sve varijable unijeti u model, pogotovo ako svaka značajno ne doprinosi objašnjavanju kriterijske varijable. Stoga se u praktičnim upotrebama regresijske analize, korištenjem principa parsimonije, raznim metodama ograničava broj regresorskih varijabli te se zadržavaju samo one koje djeluju značajno. Potrebno je naglasiti da je jedan od zahtjeva za ispravnu upotrebu regresijske analize nepostojanje multikolinearnosti, odnosno prediktorske varijable ne smiju biti međusobno zavisne. U skladu s tim, prisutnost većeg broja varijabli može uzrokovati probleme multikolinearnosti što može implicirati greške u interpretaciji i značajnosti parametara. Naglasimo da je selekcija varijabli pri generiranju modela važan korak kod više metodoloških postupaka: klasične diskriminativne analize, logističke regresije, neuronskih mreža, stabala odlučivanja, strojnog učenja te drugih njima srodnih metoda.

U znanstvenoj praksi u društvenim i humanističkim znanostima standardni algoritmi odabira varijabli u model su *backward stepwise*, *forward stepwise* i *all effects*.

Kod *forward* metode na početku nema niti jedne varijable u regresiji. Prva varijabla koja ulazi u model je ona koja ima najveći koeficijent korelacije sa kriterijskom varijablom. Zatim se ispituje njena značajnost F-testom. Pritom možemo fiksirati F-omjer kojeg treba premašiti i nivo signifikantnosti koji F-omjer treba zadovoljiti. Potrebno je naglasiti da fiksiranje F-omjera ne daje uvijek isti nivo signifikantnosti jer se zbog mijenjanja broja varijabli mijenja broj stupnjeva slobode. Ukoliko je prva varijabla uvrštena u model zadovoljila F-test, iz preostalog skupa prediktora bira se ona koja ima najveći koeficijent parcijalne korelacije sa kriterijskom varijablom. Ponovo se testira F-testom jeli ta varijabla značajno doprinijela povećanju protumačenosti modela. Postupak se ponavlja dok sve varijable koje zadovoljavaju navedene kriterije ne budu uvrštene u regresijski model.

Backward metoda ide u suprotnom smjeru u odnosu na metodu *forward*. Na početku selektiranja varijabli u model se uključe sve prediktorske varijable, a pritom se umjesto kriterija za ulazak varijabli u model postavljaju uvjeti za izlazak varijable

iz modela. Prvi kriterij je minimalna vrijednost F-omjera koji neka varijabla mora zadovoljiti da bi ostala u modelu a drugi kriterij je da je maksimalna signifikantnost za isključenje koja obično iznosi 0,1. U daljnjem tijeku algoritma promatra se varijabla koja ima najmanji koeficijent parcijalne korelacije sa kriterijskom varijablom. Ako ta varijabla pri tom i zadovoljava kriterijima za isključenje tada se isključuje iz modela. Postupak se nastavlja sve dok ima varijabli koje zadovoljavaju sve uvjete za isključenje. U praksi je ipak najzastupljenija *all effects* metoda - uzima sve prediktorske varijable u regresijski model. Unutar programskog paketa Statistica 8.0 unutar modula *Advanced Linear/Nonlinear Models – General Regression Models – Multiple Regression*, integrirani su *all effects*, *backward stepwise*, *forward stepwise*, *forward entry*, *backward removal* i *best subsets* algoritmi selekcije varijabli u regresijski model.

CILJ ISTRAŽIVANJA

Cilj je ovog istraživanja napraviti usporednu analizu efikasnosti različitih algoritama odabira varijabli u model višestruke regresijske analize u izabranom kineziološkom istraživanju. Pritom će se koristiti različiti algoritmi: *all effects*, *backward stepwise*, *forward stepwise*, *forward entry*, *backward removal* i *best subsets* odabira varijabli u regresijski model. U skladu s tim, također je cilj dati opće metodološke smjernice znanstvenicima i praktičarima u kineziologiji za korištenje algoritama selekcije prediktorskih varijabli u regresijski model.

METODE ISTRAŽIVANJA

Uzorak entiteta sastojao se od 97 učenika koji su mjereni u varijablama: visina tijela (AVIS), dužina noge (ADN), dužina ruke (ADR), širina ramena (AŠR), širina zdjelice (AŠZ), dijametar ručnog zgloba (ADRZ), dijametar koljena (ADK), težina tijela (ATT), opseg podlaktice (AOPL), opseg potkoljenice (AOPK), opseg grudnog koša (AOGK), kožni nabor nadlaktice (AKNN), kožni nabor leđa (AKNL), kožni nabor trbuha (AKNT) i podizanje trupa iz ležanja s pogrčenim nogama (MDTR), a svaka varijabla mjerena je 3 puta, a u razmatranje je uzeta srednja vrijednost. Sukladno s ciljem istraživanja, korištena je višestruka regresijska analiza te su se pritom koristili različiti algoritmi odabira varijabli u model: *all effects*, *backward stepwise*, *forward stepwise*, *forward entry*, *backward removal* i *best subsets*. Pritom je varijabla podizanje trupa iz ležanja s pogrčenim nogama uzeta kao kriterij dok je prediktorske varijable odabran skup navedenih morfoloških varijabli. Za svaku varijablu i za svaki odabir algoritma pronađeni su koeficijenti beta i njihova signifikantnost, koeficijent multiple korelacije, koeficijent multiple determinacije, korigirani koeficijent multiple determinacije te signifikantnost čitavog modela.

REZULTATI I RASPRAVA

Unutar tablice 1 nalaze se rezultati regresijske analize s pripadnom signifikantnošću za različite algoritme odabira varijabli u regresijski model: *all effects*, *backward stepwise*, *forward stepwise*, *forward entry*, *backward removal* i *best subsets*. Pritom je korištena opcija uključenja *intercept* koeficijenta u sve modele. Možemo uočiti da su na ovom uzorku varijabli *forward stepwise* i *forward entry* algoritmi generirali isti odabir varijabli, kao i *backward stepwise* i *backward removal*. To je vjerojatno posljedica sličnosti navedenih algoritama kao i relativne homogenosti uzorka. Važno je uočiti da različiti algoritmi generiraju modele s različitim brojem varijabli. Standardno korištena metoda uključivanja svih varijabli u regresijski model – *all effects* – ima najveći koeficijent determinacije ali sve varijable osim ADRZ, ADK i AOGK ne pridonose značajno modelu (Tablica 1). Uočimo da *forward* i *backward* algoritmi generiraju modele u kojima su algoritmom uključene varijable u model i sam model značajni (osim *intercepta*), ali je koeficijent determinacije manji nego u odnosu na *best subsets* i *all effects*.

Tablica 1. *Beta koeficijenti regresijske jednadžbe sa pripadnom značajnošću za različite algoritme odabira varijabli u regresijski model: all effects, backward stepwise, forward stepwise, forward entry, backward removal i best subsets*

	All effects		Forward stepwise		Backward stepwise		Forward entry		Backward removal		Best subsets	
	Beta	p	Beta	p	Beta	p	Beta	p	Beta	p	Beta	p
Intercept	-0.43	0.99	-0.03	1.00	4.62	0.75	-0.03	1.00	4.62	0.75	-1.74	0.92
AVIS	-0.12	0.72										
AND	0.46	0.21									0.32	0.23
ADR	-0.37	0.42									-0.36	0.31
AŠR	0.27	0.75										
AŠZ	-0.19	0.82										
ADRZ	**8.26**	**0.02**	**7.61**	**0.00**	**9.03**	**0.00**	**7.61**	**0.00**	**9.03**	**0.00**	**8.70**	**0.01**
ADK	**-6.68**	**0.03**			**-6.22**	**0.01**			**-6.22**	**0.01**	**-6.88**	**0.01**
ATT	0.02	0.98										
AOPL	0.58	0.61										
AOPK	-0.28	0.73										
AOGK	**0.78**	**0.05**			**0.63**	**0.01**			**0.63**	**0.01**	**0.81**	**0.00**
AKNN	-0.60	0.17	**-0.83**	**0.00**	**-0.90**	**0.00**	**-0.83**	**0.00**	**-0.90**	**0.00**	-0.60	0.13
AKNL	-0.71	0.26									-0.59	0.23
AKNT	0.07	0.88										

Iz tablice 2 vidljivo je, algoritam *all effects* kao posljedicu uključenja svih varijabli u model ima veći nivo signifikantnosti nego ostali algoritmi kojima je nivo signifikantnosti 0,00 odnosno koji su statistički 100% pouzdani. Potrebno je naglasiti da je algoritam *best subset* realiziran uz opciju „stop=7", što je opravdano u kontekstu rezultata ostalih algoritama.

Tablica 2. *Koeficijent multiple korelacije (R), koeficijent multiple determinacije (R2), korigirani koeficijent multiple determinacije (Korigirani R2), broj stupnjeva slobode (df) i nivo signifikantnosti regresijskog modela (p) za različite algoritme odabira varijabli u regresijski model: all effects, backward stepwise, forward stepwise, forward entry, backward removal i best subsets*

	R	R^2	Korigirani R^2	df	p
All effects	0,51	0,26	0,13	14	0,02
Forward stepwise	0,39	0,15	0,13	2	0,00
Backward stepwise	0,48	0,23	0,20	4	0,00
Forward entry	0,39	0,15	0,13	2	0,00
Backward removal	0,48	0,23	0,20	4	0,00
Best subsets	0,50	0,25	0,20	7	0,00

ZAKLJUČAK

U kineziološkim istraživanjima standardno koristi *all effects* postupak selekcije varijabli u regresijski model – sve se varijable uključuju u model. Taj postupak generira najveći koeficijent determinacije, ali nivo signifikantnosti je veći u odnosu na druge algoritme. Iako često nedostatno tretirana, algoritamska selekcija varijabli unutar pojedinog regresijskog modela bi trebala biti prvi korak pri primjeni višestruke regresijske analize, u znanstvenim istraživanjima. To naročito stoga jer:

1. Preciznost predikcije i značajnost samog modela može biti poboljšana ako iz istraživanja izuzmemo nebitne i redundantne varijable.
2. Prediktor je postaje jednostavniji za interpretaciju te kasniju primjenu.
3. Znanje o tome koje varijable su relevantne pri tumačenju varijance kriterija daje „čisti" uvid u prirodu veze kriterija sa prediktorima te pruža mogućnost boljeg interpretiranja samog problema.
4. Jeftinije je vršiti mjerenja na manjem skupu varijabli.

Nužno je naglasiti da se dobiveni zaključci u ovom radu mogu primjenjivati ne samo u kineziološkim već i u svim drugim znanstvenim istraživanjima. Zaključno, u daljnjim metodološkim istraživanjima ovog tipa, a posebice u primijenjenoj kineziologiji, trebalo bi koristiti homogenije uzorke ispitanika, ispitivati algoritme za više kriterijskih varijabli te usporediti kakve bi efekte na pojedini algoritam imali drugačiji odabiri uključenja/isključenja *intercept* koeficijenta kao i modifikacije *p* odnosno *F* levela u *stepwise* algoritmima za uključenje i isključenje varijabli u model.

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THE COMPARISON OF ALGORITHMS FOR VARIABLE SELECTION IN THE REGRESSION MODEL IN KINESIOLOGICAL RESEARCH

ABSTRACT

In the regression analysis, while dealing with multiple choices of variables selection in the scientific research, appropriate algorithms for the selection of variables into the model exist with the aim to generate optimal regression model. In this paper, comparative efficiency study of different algorithms for the selection of variables into the multiple regression model in the chosen kinesiological research has been made. On the sample consisted of 97 pupils aged 6-7, a dependence of repetitive strength through morphological status has been analyzed by using different algorithms for the selection of variables into the regression models: all effects, backward stepwise, forward stepwise, forward entry, backward removal and best subsets. Variables of longitudinal and transversal skeleton dimensionality, voluminosity and subcutaneous fat tissue measures have been used as a set of predictor variables. The results imply that in the applied kinesiological research, from purely methodological point of view, before the model is finally generated, the problem of which variables should be included into the model has to be analyzed. The obtained conclusions can be applied, not only in kinesiological research, but also in research in other applied sciences.

Key words: *methodology, multiple regression analysis, variable selection, algorithm*

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Abstract

VALUES, BELIEFS AND CHANGING PHILOSOPHIES –UNDERGRADUATE STUDENTS' PERCEPTIONS OF PHYSICAL EDUCATION

Philosophy, values and beliefs of students (pre-service teachers) and Newly Qualified Teachers (NQT) have been shown to have been strongly influenced by their experiences within physical education (Curtner-Smith, 2001). The interactions with physical education teachers, schools and sports coaches has been described by Lortie (1975) as an ' apprenticeship of observation' and has influence on an individual's future decisions, practices and ideologies as a teacher. As a consequence, little has changed in the way PE has been taught in schools over the years, despite significant innovations in the curriculum (Green, 2006; Keay, 2009). This study examines the values and beliefs students hold in their first year of an undergraduate Physical Education degree programme, and the attributes they associate with being a 'good PE teacher'. It also seeks to determine the perceptions and changes in philosophy of second and third year undergraduate PE students. It explores issues relating to adolescent experiences of PE, professional socialisation (Higher Education) and organisational socialisation (schools). It is the first cycle of a longitudinal study and builds on the work of Keay (2009); Capel and Blair (2007); Penney and Chandler (2000) and Green (2003 & 2007), Cassidy and Tinning (2004).

Sagor's (2005) Action Research Cycle forms the framework for this longitudinal study. The qualitative data generated in Cycle 1 was through 'Knowledge Café' and semi-structured focus group interviews and forms the baseline data for Cycle 2 of the study.

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Original scientific paper

THE COMPARISON OF PHYSICAL FITNESS OF 13-YEAR-OLD STUDENTS FROM LJUBLJANA AND BELGRADE

INTRODUCTION

Depending on geographical, cultural and socio-economic origins, various distinctive lifestyles are being created. Nevertheless, today the lives of young people in developed countries are mostly characterized by the modern information era. Media and information technology which offer easy and immediate fulfilment of human needs for entertainment and communication are important factors of their lifestyles. Many young people live in half-virtual world of web social networks and they also decide to participate in physical activities less often than they used to (Silva et al., 2010; Strel, Kovač, & Jurak, 2007). In connection with some other trends (sheltering praxis of parents, individualisation) sedentary lifestyle is common among young people (Armstrong, 2007; Ferreira et al., 2006; Jurak, 2006; Strel, et al., 2007). According to the findings of secular studies, it can be concluded that changes in the lifestyles of young people in developed countries are manifesting themselves in an increased skin fat (Olds, Ridley, & Tomkinson, 2007; Strel, et al., 2007), a higher proportion of the overweight population (Currie, et al., 2004; Lobstein & Frelut, 2003; Malina, 2007; Strauss & Pollack, 2001; Strel, et al., 2007; Wedderkopp, et al., 2004) and in the deterioration of their physical fitness, particularly endurance and strength (Beunen et al., 1992; Froberg & Andersen, 2010; Rychtecky, 2007; Strel et al., 2007; Tomkinson & Olds, 2007; Westerståhl, Barnekow-Bergkvist, & Jansson, 2005). Therefore, the findings also demonstrate a decline of results in activities which require young people's body movement, especially running capacity (Strel et al., 2007; Tomkinson & Olds, 2007; Wedderkopp, et al., 2004). Old et al. (2007) found out that increases in fatness alone explain less than half the observed decline in aerobic fitness performance. Since maximum oxygen uptake has remained stable since 1930s (Armstrong, Williams, Balding, Gentle, & Kirby, 1991; Armstrong & Welsman, 2007; Eisenmann & Malina, 2002), it can be concluded that bigger body mass of young

people with some other less secular studied characteristics (i.e. mechanical efficiency, motivation, pacing skills, changes in anaerobic threshold, oxygen uptake kinetics) effect on reduction of young people's functional movement.

Geographic variability of paediatric fatness and fitness indicates north-south gradient in the obesity levels (Livingstone, 2001; Lobstein & Frelut, 2003) and aerobic performance of European children (Tomkinson, Olds, & Borms, 2007). The superior fitness of northern and central European children has been found in few studies (Knuttgen, 1960; Tomkinson et al., 2007; Shephard, 1966). Most interpretations of fitness differentials are focusing on climate, genetic and embedded socio-cultural differences.

There have been no recent studies to compare the physical fitness test performance of young people from different countries of the former Yugoslavia. Little is therefore known about the geographic variability of young people's physical fitness performances since the disintegration of the country. The former Yugoslavian countries have similar climate conditions, somewhat different socio-cultural background, yet they derive from common genetic roots. The purpose of this study is therefore the first attempt after the year 1990 to identify differences in morphological characteristics and physical fitness between the two groups of students from Slovenia and Serbia according to their gender.

METHODS

Sample

The cluster sample of subjects (students from the same class) consists of two gender groups of 13-year-old primary school students from capitals of Serbia (Belgrade) and Slovenia (Ljubljana). All students were measured in the 2006/2007 academic year during physical education classes. Only healthy students who were not exempt from physical education for health reasons and whose parents gave their written consent to participate in the measurements were tested. Seven students with more than five missing test values were excluded from the analysis, while in 38 other students, missing values were computed using EM algorithm. In remaining 267 students data were complete.

Table 1. *Sizes of the subsamples*

Country	Male	Female	Total
Slovenia	51	51	102
Serbia	113	87	200
Total	164	138	302

Variables

Data from the Eurofit system (Council of Europe, 1993) were used in the analysis. The data included two morphological and five motor tests (Table 2; additional to Eurofit obstacle course, backwards test was added to motor tests and BMI were calculated from body height and weight). All the tests have suitable measuring characteristics.

Table 2. *Sample of variables*

Test	Measured capacity	Measuring unit
Body height	Longitudinal dimension of the body	cm
Body weight	Volume of the body	kg
BMI	Body mass	kg/m
Standing broad jump	Explosive leg power	cm
Obstacle course backwards	Co-ordination of the whole body movement	seconds
Sit-ups in 30-second	Trunk strength	no. of repetitions
Sit and reach	Flexibility	cm
20 m endurance shuttle-run	Cardio respiratory endurance	km/h

Data analysis

The data were analysed using the statistical package SPSS 18.0.3. Basic parameters of the distribution of variables were calculated (mean, standard deviation). Multivariate analysis of variance (MANOVA) was used to test the differences according to the country and gender. The power of the concurrent influence of the country and gender on the entire set of dependent variables (morphological measures and fitness tests) was measured by Wilks' lambda; its statistical significance was tested by Bartlett's V transformation. The amount of explained variance of the entire system of dependent variables was estimated with an adjusted R^2 for the entire system of predictors (main effect - country, gender - and their two-way interaction) and with a partial η^2 for individual predictors. Univariate tests were also carried out for each dependent variable separately: F-tests for the entire model, for main effects and its interaction were applied.

RESULTS

The basic parameters of the distribution of results of boys and girls (Table 3) display differences between the countries.

Table 3. *Test means and standard deviations*

	Country			
	Slovenia		Serbia	
	male	female	male	female
Age	12.76	12.85	12.97	12.98
	±0.29	±0.34	±0.16	±0.22
Body height	158.7	161.0	165.8	163.7
	±8.12	±5.94	±9.49	±6.29
Body weight	50.5	52.7	56.4	54.9
	±12.52	±12.52	±12.96	±10.58
BMI	19.9	20.3	20.3	20.4
	±3.81	±4.42	±3.40	±3.43
Standing broad jump	173.2	170.4	175.5	142.4
	±18.45	±19.73	±30.33	±21.77
Sit and reach	15.7	25.1	15.2	22.0
	±6.93	±8.15	±6.41	±5.93
Sit-ups in 30-second	20.6	21.5	25.8	20.9
	±4.19	±4.78	±4.26	±3.68
Obstacle course backwards	12.2	11.8	11.1	13.8
	±2.42	±2.81	±3.12	±3.68
20 m endurance shuttle-run	14.7	13.9	14.9	13.2
	±1.61	±1.47	±2.47	±1.79

Boys and girls from Serbia are taller and heavier than their counterparts from Slovenia but there are small differences in BMI. Boys are taller and heavier than girls in Serbia but not in Slovenia. In Serbia boys scored better than girls in all motor tests except in sit and reach, yet in Slovenia the picture is more colourful. Girls are better in sit and reach, sit-ups and obstacle course backwards.

Differences between the countries are not large (the exception are results of standing broad jump for females and results of sit-ups for males), but they are different with regard to gender. Serbian boys performed better than their counterparts from Slovenia on all motor tests except sit and reach. In turn, Slovenian girls performed better than Serbian girls on all motor tests.

All the differences between the countries are statistically significant for the entire set of motor and morphological variables (Table 4). The biggest proportion of variance (44.4%) between the groups is explained by gender. The influence of a

country is quite large (31.0% of explained variance). Also considerable (15.4% of the explained variance) is the two-way interaction of country with gender.

Table 4. *Multivariate test (Wilks' λ) and explained variance for the model effects*

Effect	λ	F	df	p	Partial η^2
Country	.690	16.351	8	<0.001	31.0%
Gender	.556	29.019	8	<0.001	44.4%
Country*Gender	.846	6.636	8	<0.001	15.4%

The univariate test for the main factor and interactions together (Table 5) show the considerable effect on the dependent variables, particularly sit and reach, standing broad jump and sit-ups. These tests also show the most significant impact of gender. The only negligible interaction is in BMI.

Table 5. *Univariate ANOVA F-test for the full model and the proportion of explained variance*

	Sum of Squares	df	Mean Square	F	p	adj. R^2
Body height	2,043.674	3	681.225	10.9	<.001	.099
Body weight	1,422.001	3	474.000	3.2	.024	.031
BMI	11.225	3	3.742	.3	.841	.003
Standing broad jump	61,697.516	3	20,565.839	34.0	<.001	.255
Sit and reach	4,875.918	3	1,625.306	36.302	<.001	.268
Sit-ups in 30-second	1,674.797	3	558.266	31.910	<.001	.243
Obstacle course backwards	378.498	3	126.166	12.791	<.001	.114
20 m endurance shuttle-run	150.178	3	50.059	12.453	<.001	.111

Table 6. *Univariate F-test significance and the proportion of explained variance for the model effects*

	Effect					
	Country		Gender		Country * Gender	
	p	η^2	p	η^3	p	η^4
Body height	<.001	7.9%	.930	0.0%	.025	1.7%
Body weight	.006	2.5%	.811	0.0%	.202	0.5%
BMI	.486	0.2%	.580	0.1%	.695	0.1%
Standing broad jump	<.001	5.8%	<.001	10.7%	<.001	7.8%
Sit and reach	.031	1.6%	<.001	24.9%	.104	0.9%
Sit-ups in 30-second	<.001	6.5%	<.001	5.1%	<.001	9.6%
Obstacle course backwards	.233	0.5%	.003	2.9%	<.001	5.5%
20 m endurance shuttle-run	.226	0.5%	<.001	7.5%	.069	1.1%

Differences between the countries are negligible for BMI, obstacle course backwards and 20 m endurance shuttle-run (Table 6, Figure 1). The largest noticed differences are for body height, sit-ups and standing broad jump. Gender has bigger influence as it reached almost 25% of the explained variance on the test sit and reach and more than 5% on tests standing broad jump, 20 m endurance shuttle-run and sit-ups.

The univariate interaction is relatively high between the main effects (see the rightmost columns of Table 6 and Figure 1) as it exceeds 5% of the explained variance on tests sit-ups, standing broad jump and obstacle course backwards.

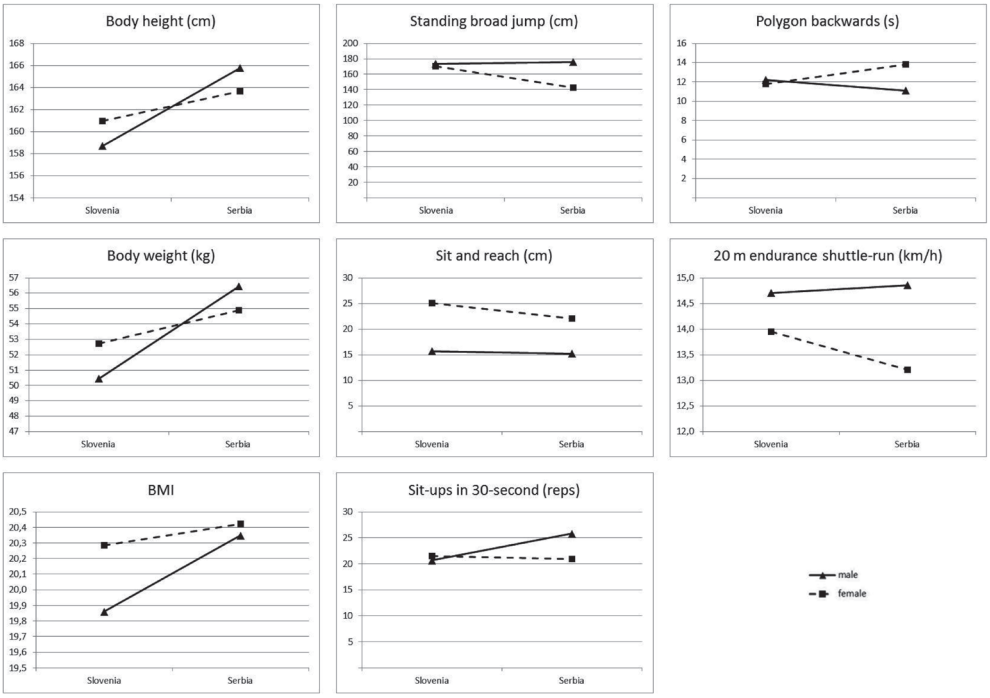


Figure 1. *Interaction plots*

DISCUSSION

Differences in morphological characteristics and physical fitness performance between 13-year-old children from Ljubljana (Slovenia) and Belgrade (Serbia) are not so large, yet they are surprising according to gender differences. Boys from Ljubljana are less physically fit compared to boys from Belgrade. Girls from Ljubljana are more physically fit compared to girls from Belgrade and in many cases more than boys from Ljubljana. Comparison with population data of morphological characteristics of Slovenian 13-year-old children (Starc, Strel, & Kovač, 2010) shows deviation of studied sample in Slovenia. Boys from Ljubljana are smaller (Slovenian Mean=163.9±8.8 cm) and lighter (Slovenian Mean=56.4±1.3 kg) than other Slovenian boys of the same age. Average height and weight of Slovenian boys' population is similar to Belgrade boys. Morphological characteristics affect motor efficiency (Strel et al., 2007; Tomkinson & Olds, 2007; Wedderkopp, et al., 2004) therefore poorer physical fitness has been expected. Further studies could find out more about possible deviation of studied sample from national representative sample in both countries. In our study, gender differences can be therefore explained by later maturation of boys from Ljubljana and its effect on motor performance. As it can be seen in Table 3 they are smaller

and lighter than girls from Ljubljana and Belgrade. The interpretation of our results must be taken into consideration with this limitation.

We found out negligible differences between the measured subjects from Ljubljana and Belgrade in BMI, obstacle course backwards and 20 m endurance shuttle-run. This is predictable since BMI is a proxy for human body fat and it is negatively connected with body movement, especially running capacity (Strel et al., 2007; Tomkinson & Olds, 2007; Wedderkopp, et al., 2004).

The differences in body height, sit-ups and standing broad jump can be explained due to differences derived from gender (see Figure 1). Belgrade boys are taller but the girls are smaller than their counterparts from Ljubljana. Similar results can be obtained in sit-ups (Belgrade boys are better than Ljubljana boys) and standing broad jump (Ljubljana girls are better than Belgrade girls).

Comparison of test results with recent HELENA study (Ortega et al., 2011) indicates that Slovenian and Serbian 13-year-old children have physical fitness around 60th centile of tests performance values (P60) of their counterparts from Europe.

PROPOSAL FOR FURTHER RESEARCH ACTIVITIES

The lack of relationship between physical fitness performance and gross indicators of economic status (Tomkinson et al., 2007), the apparent irrelevance of scheduled minutes of school PE (Mallam, Metcalf, Kirkby, Voss, & Wikin, 2003; Tomkinson et al., 2007), and similar climate and genetic roots suggest that variability of physical fitness performance of young people on the territory of former Yugoslavia could be determined mostly by socio-cultural factors. To confirm this hypothesis studies on different age groups on national representative samples should be performed. Such studies could point out similarities and differences of physical development of Slovenian and Serbian young people regarding the final physical fitness of mature young people. Further investigations should also focus on comparison of secular trends of physical fitness and fatness in different countries of the former Yugoslavia since it can be assumed that with disintegration, the socio-cultural differences between different countries of former Yugoslavia territory have become bigger.

To understand differences in socio-cultural environment, certain factors, such as political decisions about PE and children's sport participation, competences in physical education teaching and extracurricular sports activity of young people, should also be studied. On such basis proper measures could be suggested to authorities and professionals to improve physical fitness of young people.

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ABSTRACT

There have been no recent studies to compare physical fitness of young people in former Yugoslavian countries. The purpose of this study is therefore the first attempt after the year 1990 to identify such differences between two groups of students from Slovenia and Serbia.

The cluster sample of 302 subjects consists of two gender groups of 13-year-old primary school students from capitals of Serbia (Belgrade) and Slovenia (Ljubljana). Data from the Eurofit system were used in the analysis. Multivariate analysis of variance was used to test the differences according to the country and gender.

Slovenian and Serbian 13-year-old children have greater physical fitness than their counterparts from Europe. Differences between the students from Ljubljana and Belgrade are not large, but they exist regarding the gender. Boys from Belgrade performed better than their counterparts from Ljubljana on all motor tests except sit and reach. Also, girls from Ljubljana performed better than girls from Belgrade on all motor tests. All the differences between the countries are statistically significant ($p<0.001$) for the entire set of motor and morphological variables. The biggest proportion of variance (44.4%) between the groups is explained by gender. Such findings were explained with later maturation of boys from Ljubljana and its effect on motor performance. Possible deviation of studied sample from national representative sample in both countries could be found out in further studies.

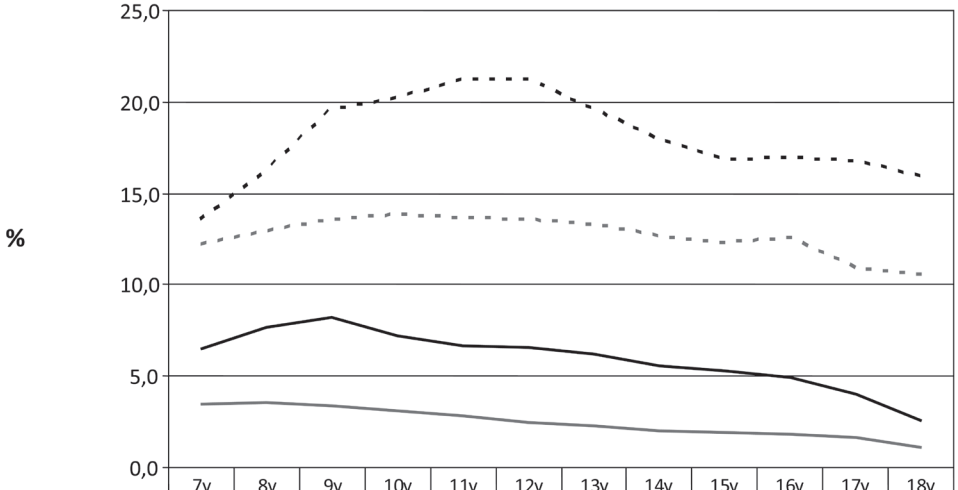
Key words: *morphological characteristics, motor abilities, Eurofit, BMI*

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NO GYM OR E-GYM?

INTRODUCTION

Media and information technology which offer easy and immediate fulfilment of human needs for entertainment and communication are important factors of contemporary lifestyles of young people in developed countries (Jurak, Kovač, & Strel, 2002). Many young people live in half-virtual world of web social networks, far away from climbing the trees and ripping trousers. Also, they decide to participate in physical activities less often than they used to (Brettschneider et al., 2004; Strel, Kovač, & Jurak, 2007). In connection with some other trends (sheltering praxis of parents, individualisation), a sedentary lifestyle is common among young people (Ferreira et al., 2006; Jurak, 2006; Strel, et al., 2007; Armstrong, 2007). According to the findings of secular studies, it can be concluded that changes in the lifestyles of young people in developed countries are manifesting themselves in increased fat skin (Strel, et al., 2007), a higher proportion of the overweight population (Strauss & Pollack, 2001; Wedderkopp, et al., 2004; Currie, et al., 2004; Strel, et al., 2007) and in the deterioration of their physical fitness, mainly endurance and strength (Beunen et al., 1992; Strel, et al., 2007). Therefore, the findings also demonstrate a decline of results in activities which require young people's body movement (Wedderkopp, et al., 2004; Strel et al., 2007). It seems like battle is lost since also political decisions which influence their physical activity (Kovač & Jurak, 2010) are not in young people's favour.



	7y	8y	9y	10y	11y	12y	13y	14y	15y	16y	17y	18y
overweight 1991	12,3	13,0	13,6	13,9	13,7	13,6	13,3	12,7	12,3	12,6	11,0	10,6
overweight 2009	13,6	16,3	19,6	20,3	21,3	21,3	19,6	18,0	16,9	17,0	16,8	16,0
obese 1991	3,5	3,6	3,4	3,1	2,8	2,5	2,3	2,1	1,9	1,9	1,6	1,1
obese 2009	6,5	7,7	8,2	7,3	6,7	6,6	6,3	5,6	5,3	4,9	4,0	2,6

Source: Kovač & Jurak, 2010

Figure 1. *Increasing proportion of overweight and obese Slovenian young people in past decade*

Significant changes in the environment, where young people grow up, and their consequences on motor competence of young people require different approaches to teaching. This paper therefore addresses the challenge of how to take advantage of modern lifestyles of youth and their parents in PE teaching.

NO GYM

Poorer physical fitness, lower physical self-image and worse health status in combination with lack of motivation for PE, inappropriate pedagogical measures and other factors can result in avoidance of PE.

Students can be excused partially or completely from participation in PE lessons. In Slovenia in 1973, staggering 10% of secondary school population were excused from PE lessons (Vučetić-Zavrnik, 1974), whereas at the beginning of 1990s approximately 3% of secondary school students were entirely excused from these lessons (Kovač, 1995). According to the data by Jurak et al. (2007), 3% of primary and secondary school students provided complete or partial doctors' letter of excuse from

PE lessons in 2004. Kolar (2010) analysed the archive of excuse letters at the Health centre for school children and youth in Maribor and found that in 2004/2005 2.6% of secondary school population from Maribor region received complete or partial letters of excuse and in 2008/2009 the proportion was 1.5%. As the study did not include letters of excuse from personal doctors or specialists, the author assumed that the overall proportion of excused students was even larger. In both monitored periods, the majority of letters of excuse were issued to girls (62.1% and 67.7%).

Students can be excused from individual lessons due to other commitments, e.g. to visit a doctor, to participate in a competition, etc. Often students excuse themselves when they are not ready for tests or when they did not finish their homework and then despite the excuse still participate in a lesson (Lovšin et al., 1988). Although the legislature in Slovenia states that a student can be excused only with doctor's letter, which has to include a recommendation about the degree of participation, it has been noticed that also in PE lessons students excuse themselves and consequently do not participate in practical lessons or they do so only in various activities. Jurak et al. (2004) examined the frequency of excuses, the justification of reasons for being excused when students nevertheless participate in other lessons, and the activities of students during the time when they are excused from physical education lessons. The authors have noticed that girls are more often excused from lessons, although the type of secondary school programme did not reveal statistically significant differences in the frequency of excuses. The most often actual reasons for excuses were illness, in girls also pains when menstruating, as well as lack of sports clothing. A comparison to the study by Vučetić-Zavrnik (1974) revealed that after more than 30 years, the materialistic and hygienic conditions do not present important reasons for excuses anymore. Students most often tell the teacher the real reason when they cannot present anything justifiable. Staggering 44.3% of students provide doctor's letter of excuse at least once a year despite not having a justifiable reason and 52.5% of students at least once a year provide false letter of excuse from parents, stating invented health difficulties. Whilst excused from PE, students most often remain passive or study for other subjects. A fifth of girls (18.9%) excuse themselves at every menstruation whereas more than a quarter (26.3%) of girls practice through it. A half of girls (49.8%) practice during the menstruation with the same intensity as other girls. Academically less successful students excuse themselves statistically most often. All the justified or unjustified reasons apart from one („teacher is unfair to me") are in negative correlation with the mark in PE.

Avoidance from PE classes can be decreased with suitable measures (see: Jurak et al., 2007). One set of measures must focus on the system of how and when PE teacher can excuse a student from PE lessons. But more important preventive measure for decrease of reasons for excusing from PE is attractiveness of PE classes and goal

orientation in providing of individual needs of the youth. Research data indicate that physical education teachers cannot compensate the long hours of sedentary life in children and youth with common teaching practices. With quick technological advance and its effects, it is a challenge for children and youth to create basic motor patterns, control their movement and acquire lifelong motor knowledge that will encourage a free time physical activity, similar to that in the past. Namely, only then a necessary consumption of energy will be achieved. The answer to the challenge might lie in the creation of different learning environment and all its elements.

E-GYM

Nowadays, physical education represents a counter-balance to ever increasing sedentary lifestyle, which is prompted particularly by the development of new technologies; therefore, many physical education teachers fight the inclusion of ICT in physical education. Computer and video-technology have been present in physical education for a period of time; however, Slovenian physical education teachers use them during lessons mostly in an indirect way (writing teaching plans, analyses, communication, promotional activities) and do not include them directly into the teaching process (Štihec & Leskošek, 2004; Markun Puhan, et al., 2007; Sitar, 2010). From the point of view of maintaining the sufficient volume and intensity of motor encouragement in physical education lessons this is understandable, on the other hand, modern technologies provide important visual and mental feedback information in learning of new movements and improved control of movement in various circumstances. This is particularly true when the feedback information is provided via a suitable e-material with the use of video-clips, video analysis, computer simulated movement etc.

Research studies on motivation have shown that enhancement of human values in sport and education, also physical education, is closely related to, and dependent on using intrinsic causes for achieving goals (Duda & Nicholls, 1992; Papaioannou, 2000). In physical education lessons this is particularly noticeable in motivation of older students to overcome effort or to conceptualise the contents. Namely, with age the positive attitude toward sport activity decreases, especially for physically more demanding contents as well as the satisfaction and degree of effort of young people (intrinsic motivation) in physical education lessons; in addition, older students feel less competent at physical education (Škof, Tomažin, & Dolenec, 2000). Consequently, cooperation in physical education lessons decreases with age (Jurak, Kovač, Strel, & Starc, 2005) and participation in sport out of school hours is smaller (Strel, et al., 2007).

Students who know more about physical activity are more likely to take an active approach to it (Birtwistle & Brodie, 1992; Bocket, 1994; Hunt, 1995). As these findings indicate, the primary role of the school and PE teachers should be to make physical activities meaningful and focus on promoting knowledge about physical activity and healthy lifestyle in order to increase a student's motivation, normally reflected in a wish to seek out and overcome challenges. In order for the learning process to be effective, we need to create such conditions for physical activities that would motivate the performers to want to progress, learn more about their interests, or perform better. This approach promotes active involvement of students in the process of acquiring knowledge and skills (Kolb, 1984). In such an approach augmented feedback given to students is important for successful learning. Students become actively engaged in the process of acquiring motor skills and improving movement control. Also, such practice develops their intrinsic motivation for personal progress and consequently, adds meaning to several stamina exercises which students otherwise tend to avoid as they see no benefit in them for their own development.

ICT is most often used in gymnasium in order to provide feedback information about the movement of a practicing person; it can also be used to present theoretical information, related to the importance of physical activity and healthy lifestyle. When using the ICT, physical education teacher faces several obstacles.

- Presentation of information with the use of ICT about safe and suitable exercise should not be static. Theoretical contents can be presented together with practical exercises, in this way they will result in better understanding. Similarly, learning of certain practical contents, which are uninteresting for some groups of children (e.g. endurance activities, exercises for correct posture, flexibility etc.), can be brought closer to students.
- The use of ICT should not reduce intensity of physical activities. A poor example of ICT use is organisation of PE lesson as a frontal type of video analysis, where all the students watch an analysis of everyone else, as this is very time consuming in relation to the limited number of PE lessons.
- Exaggerated or unnecessary use of various ICT media. The point of using the ICT is for students to learn curriculum faster and better. Therefore, teacher has to know, which goals are being fulfilled with the use of ICT, as its use for a sole purpose of entertainment of children, is inappropriate.
- Preparation of media. Less experienced user can easily have a bad day, thus it is sensible to check the functioning of media prior to their use in lessons. Furthermore, it is wise to use the same technology in different classes.

Physical education teacher should plan lessons, so that the use of ICT facilitates better utilisation of time and technology. One of the group organised teaching methods (e.g. work on stations, work with complementary and supplementary tasks) is appropriate for analyses, where teacher can concentrate on an individual student (as the coordinator of work; students work on all stations and teacher uses one of them for individual analysis). For simple and regular use of ICT in PE lessons it is important to adequately position technology in the gymnasium.

EXPERIMENTAL ENVIRONMENT ELAN FIT-ME

In the past, the primary role of school gymnasium was to provide covered practicing area in bad weather conditions. In Slovenia, the materialistic provision of schools is satisfactory from the quantitative point of view (Jurak, 2010); however, the quality aspect of learning environment sometimes becomes questionable. This includes solutions, related to the demands of learning environment in physical education. Nowadays, the described lifestyle of children and youth with its consequences as well as changes in teaching methods, require more than just a mere gymnasium. It is important what possibilities a gymnasium offers in connection with the knowledge of teachers.

Environment changes fast under the influence of modern technologies. In order to utilise the technology and conceptualise physical education in social context of future times, a concept of e- gymnasium for the future has been developed together with a business partner (Elan Inventa d.o.o.). Its working title is Elan fit-me. The aim of this experimental project is to develop and implement a new, professionally unique concept of acquiring diagnostic data through efficient use of ICT in a school gymnasium.

Augmented feedback given to performers of physical activities is important for evaluation of movement in PE and sport. Such feedback can be effectively transferred via ICT. Combining various diagnostic-based technology services in a school gymnasium with e-learning materials will establish a system that will make it easier for PE teachers to prepare for lesson and also enable the students, and all persons with whom the students will wish to share the information to see the diagnostic results. Thus, the system will ensure the information required for further use in effective PE and sports practice, as indicated in the acronym of the project.

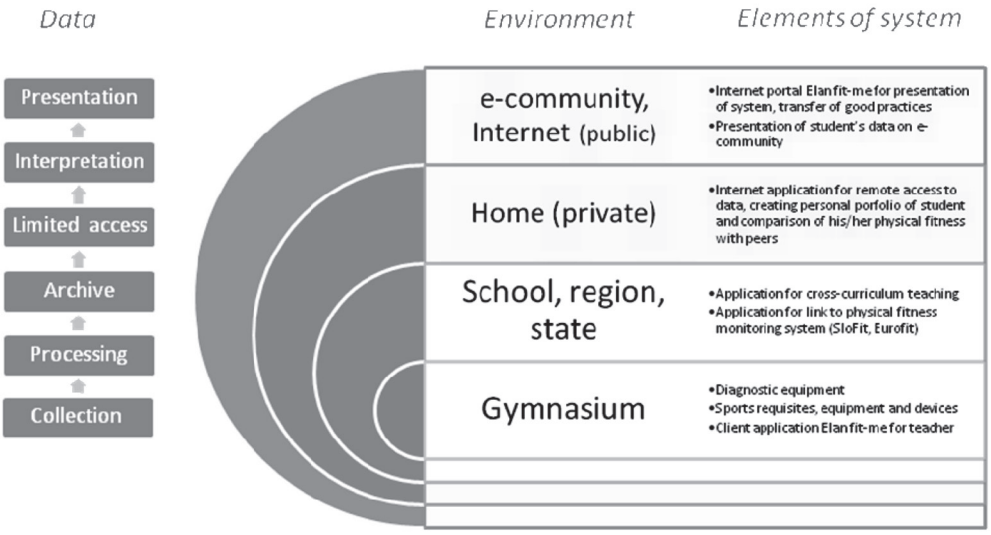


Figure 2. *Diagram of the Elan fit-me processes*

The Elan fit-me concept is made up of a software environment for teachers (client application) which allows central management of the diagnostic equipment system in the gymnasium (combination of the existing equipment from other manufacturers and newly developed equipment, an RFID system, an interface to store diagnostic data by individual codes, integration of all ICT equipment into the school gym facilities) and a web portal that enables exchange of diagnostic and other data between users of the system (teachers, students, parents, coaches, doctors, etc.). From the content view, the concept is divided into 3 stages:

- Gymnasium environment (client application in school gym for PE teacher and students)
- School environment (application for cross-curriculum teaching)
- Web environment (web portal for the presentation of the system, transfer of good practices, remote access to student's data)

In the client application, teachers will be able to make advance plans for using ICT in a gymnasium; the plans will include the use of various types of diagnostic-based and education technology (e.g. demonstration of a student's movement with a delay or in slow motion, video recording, heart beat and energy use monitoring, results of specific motor tests, presentation of data on worksheets). Using the software tool that will be developed in the course of the project, the teachers will be able to access and run all the software and hardware needed for the lesson plan via a

central medium, instantly arranging the gymnasium to the planned physical activities. Also, this concept will enable simple collection of data on the physical and motor development of children (e.g. SloFit, Eurofit).

Through the use of RFID technology, students will be identified at each station and diagnostic data will be stored to a data field in the gym. The data, such as a digital video of the movement or the heart beat frequency, will be immediately available for viewing inside the gym. At home or in the course of another subject (e.g. cross-curricular approaches – PE data used in a physics class) students will be able to access the data archive which will have been transferred to a web-based environment, and create their own portfolios. In the course of the project, appropriate software environment will be created to prepare, process, analyse and store data. It will enable the students to compare their physical (body height, weight, BMI, skin-folds) and motor development (endurance, strength, flexibility, speed, coordination) against their peers from the same school and other schools (SloFit) or to analyse their movement with optimal performance during the PE lesson with their teacher, or at home with their parents, coach, or physician. The web portal will also bring the users presentations of the ELAN fit-me system, transfer of good practice (system applications) and links to other useful web portals (e.g. theoretical background on movement enhancement). Finally, students will be able to publish their data on e-social networks.

The project will bring a new level to the quality of e-learning/teaching in PE and sports where teachers and coaches are otherwise limited as the primary focus of the lesson are physical activities. Gymnasiums with an integrated IT system will provide for easier combination of different types of modern ICT equipment to acquire diagnostic data, create diagnostic databases (in particular, physical fitness data), which will facilitate comparing the results for a specific student with those of his/her peers, cross-curricular cooperation, establish regular communication via current media between the PE teachers and parents regarding the execution of PE classes and activities; potential cooperation between PE teachers and the school doctor on planning the physical activities for students with health issues; a web portal for exchange of diagnostic data; one-stop-shop (web) for pictorial and word information on the performance of movements by a participant, learning these movements and the role of these in other school subjects (fields) and life. In such a learning environment PE teacher is not only transmitter of knowledge but also teaches students to gain knowledge with the usage of e-learning materials and ICT by themselves. With such an approach, a comeback to origins of PE can be achieved: more physical movement, sweating, acquiring motor skills, playing, socializing with peers etc.

Case scenario: Basketball

The aim of the lesson is to check the knowledge and motor skills in basketball: the tactical elements of the top of the ball defence, jumping ability and referee rules. The teacher organizes the lesson in stations.

Using the Elan fit-me software, the teacher determines the ICT equipment to be used:

- *A camera is used to make RF ID based skill performance recordings in a part of the gymnasium; the teacher defines the data acquisition method (automatic – time delay between identification and action; or manual by prior confirmation – in case there are several performances of the skill and the teacher only wishes to record one)*
- *RF ID based video recording played in slow motion on the LCD screen*
- *RF ID based quiz testing (e-learning material) the knowledge of situations in basketball game is performed on the LCD screen (the teacher chooses from a selection of questions or creates new questions and answers)*

At the start of the lesson, the teacher explains the purpose and organization of the lesson to the students. The students put on their RF ID bracelets and perform identification by software. The work is carried out at the following stations:

1. *Zone defence: Top of Ball Side. The teacher sets up a work station for zone defence drill in the part of the gymnasium that is covered by cameras. When a student in the group gets close enough to the LCD screen, the RF identification starts. The LCD screen displays the name and surname of the student along with the instructions for recording the actual performance. The group performs the task and the video of the student's performance is stored under his/her ID. Then, another student triggers the RF identification, and the group repeats the drill with the student taking different roles/zones. The task is repeated so many times that each of the students takes on all the roles.*
2. *Defence Performance Analysis. Together with their teacher, the students analyse their defence performance at the LCD-equipped work station. On the basis of the RF identification, the Elan fit-me software finds a certain student's defence performance video(s).*
3. *Three-on-three Half Court Defence. Three points are awarded for a shot that ends in a defence.*
4. *Jump Ability Test. When the student approaches the work station, the LCD screen displays his or her name and the protocol for performing the jump. The Optojump measuring device measures the jump and enters the result under the student's ID.*

5. *Situations in basketball game. The student approaches the work station and performs identification. The screen displays a quiz testing the student's knowledge of proper player reaction in basketball game. The student completes the quiz, and the screen displays the score and correct answers.*

Students pass from station to station in the teacher-designated order. The teacher also defines the time interval needed for each station and coordinates all the other activities in the gymnasium.

CONCLUSION

Learning environment is an important factor of teaching and learning. Poorer conditions require adaptation of the teacher in his/her work; nevertheless, even excellent conditions cannot replace a teacher. It is crucial that the competences of teachers change in line with the changes in learning environment, which is presented in the paper. On the basis of the findings of studies involving Slovenian PE teachers (Štihec & Leskošek, 2004; Kovač, Sloan, & Starc, 2008; Sitar, 2010) it can be concluded that the competence of PE teacher for work with ICT is one of the important elements in improvement of their teaching. Teachers state to have lower than desired competence for ICT work in PE (Kovač, et al., 2010). At the same time, teachers obviously consider the use of ICT in PE more in indirect connection and not for direct inclusion into lessons. The answers of teachers, revealing that they do not require ICT for presentation of curriculum and additional motivation could indicate that teachers feel threatened in their two traditional roles in PE lessons: demonstration of skills and the motivation of students for PE and sport. Obviously a combination of improvement of materialistic conditions and the necessity of use of ICT (e.g. compulsory sending of data about physical fitness) will be required for a transition to higher level of accepting of ICT in PE; the thesis is confirmed with the fact that teachers, who have already been forced into such kind of work (external examination in PE at the end of primary school), are more familiar with e-learning material (Sitar, 2010).

Learning environment should not be considered too narrowly, merely as an ICT. Social changes influence the perception of school as a whole; therefore, entirely conceptual questions about the further education of young people are being considered. In some countries, in line with the „d.school" concept (http://dschool.stanford.edu) and the experience of ambient, a different picture of school environment has been designed with the aim of bringing school as a learning environment closer to modern lifestyle of children and youth. This context also includes a gymnasium as a learning environment of physical education. As such, physical education teachers will have to architecturally position a gymnasium through interdisciplinary cooperation into such school and also produce a conceptual image of its concepts.

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ABSTRACT

Media and information technology which offer easy and immediate fulfilment of human needs for entertainment and communication are important factors of contemporary lifestyles of young people in developed countries. In connection with some other risk factors, a sedentary lifestyle is common among young people (Ferreira et al., 2006; Strel, Kovač & Jurak, 2007; Armstrong, 2007). Some young people avoid participation in PE and sport (Jurak et al., 2007). These changes are manifesting themselves in decreased physical fitness of young people (Ferreira et al., 2006; Wedderkopp et al., 2004). It seems like battle is lost since also political decisions on state and local levels which influence their physical activity (Kovač & Jurak, 2010) are not in young people's favour.

This paper addresses the challenge of how to take advantage from modern lifestyles of youth and their parents in PE teaching. It presents concept of acquiring sufficient data for student's feedback through efficient use of ICT in a future school (e-) gymnasium as appropriate learning environment. Augmented feedback given to student is one of the basis to successful PE teaching and student's understanding of contents of PE classes.

Key words: *PE, ICT, e-learning, e-teaching, gymnasium, physical fitness*

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Izvorni znanstveni rad

FIZIOLOŠKI PROCESI PRI MODIFICIRANOM NAČINU HRVANJA

UVOD

Mnogi treneri tzv. kontaktnih sportskih igara (rukomet, nogomet i sl.) preporučuju hrvanje kao dopunsku aktivnost-sport koja ima višestruki utjecaj na razvoj različitih psihofizičkih obilježja sportaša. Međutim, integracija hrvanja u trenažni proces nekog sporta nije jednostavna jer: a) postoji razmjerno visok rizik od ozljeda, b) potreban je dug period učenja velikog broja tehnika, c) pri vježbanju je nužna hrvačka strunjača i sl. Modificirani način hrvanja (Marić, 1993., 2007.) podrazumijeva vježbanje hrvanja tj. hrvačku borbu bez bacanja, padova i hrvanja u parteru. Na taj se način rizik od ozljede smanjuje na minimum, a pri vježbanju nije nužna strunjača. Pravilima je dozvoljeno primijeniti osam jednostavnih tehnika koje sportaši u pravilu brzo usvoje. Bodovi se dobivaju za dolazak iza leđa protivniku, podizanje protivnika i/ili izguravanje protivnika iz omeđenog prostora. Zbog jednostavnog sistema bodovanja trener ili učitelj vrlo lako može suditi, a publika bez problema pratiti borbu. Taj način hrvanja može se prakticirati u otvorenim i zatvorenim prostorima bez rekvizita i bez specijalne opreme i kao takav je obavezan dio programa kolegija Hrvanje (Borilački sportovi 2) na Kineziološkim fakultetima u Splitu i Zagrebu. Dosadašnja istraživanja analiziraju fiziološke procese u hrvačkoj borbi, a ukazaju da borbe koje u prosjeku traju 6 do 8 minuta podižu razinu laktata u krvi do 15 mml/L, a nekad čak i do 20 mml/L (Kreamer, 1982. i Marić, 1985.). Sposobnost tijela da podnese takav acido-bazni poremećaj međustaničnih bikarbonata i fosfata te funkcioniranje buferskog sustava svojevrstan je trenažni fenomen (Kreamer 2001.). Budući da su laktati indikator trenažnog opterećenja (Bourdon, 2000.) te se često uzimaju kao indikator anaerobne snage i anaerobnog kapaciteta kod vrhunskih hrvača (Yoon i sur. 2002.) pokušat će se istražiti utjecaj modificiranog načina hrvanja na fiziološke promjene u ljudskom organizmu te odgovoriti na pitanje je li fiziološko opterećenje pri modificiranom hrvanju slično onom kod priznatih olimpijskih načina hrvanja.

Stoga je cilj ovog istraživanja utvrditi laktatnu krivulju u hrvanju modificiranim načinom kod sportaša iz različitih kontaktnih sportova.

METODE

Uzorak ispitanika sačinjava skupina od 20 ispitanika prosječne dobi 23,6 ± 0,9 godina koji se aktivno bave nogometom (n=10) i rukometom (n=10). Svi ispitanici su studenti Kineziološkog fakulteta Sveučilišta u Splitu, koji su položili kolegije Borilački sportovi 1 i 2.

Uzorak varijabli sačinjavaju masa, visina te vrijednosti laktata iz krvi vađene u četiri točke: L1 prije početka prve runde (nakon zagrijavanja), L2 nakon prve, L3 nakon druge runde i L4 nakon treće runde (na kraju borbe).

Statistička obrada podataka vršila se u statističkom paketu Statistica v. 7.0. Sve su varijable obrađene deskriptivnom statistikom i testirane Kologorov Smirnovljevim testom. Da bi se utvrdile razlike između 4 točke mjerenja fiziološkog opterećenja (laktata) u hrvanju modificiranim načinom korišten je t-test. Razina značajnosti određena je na $p<0.05$.

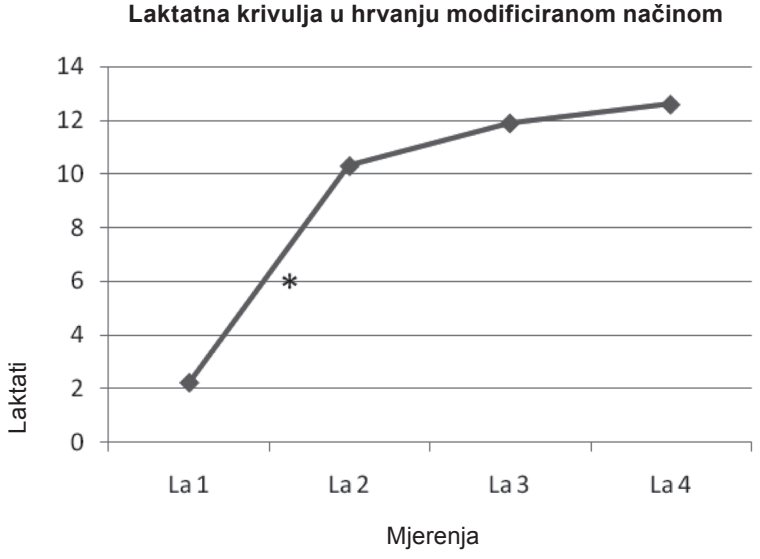
OPIS EKSPERIMANTALNOG POSTUPKA

Studenti su nakon odslušanog kolegija Borilački sportovi 2, dobrovoljno sudjelovali u hrvačkim borbama modificiranim načinom. Svi su, unutar svoje težinske kategorije, odradili po jednu borbu koja je trajala 3 puta po dvije minute. Ispitanici su se zagrijavali 15 minuta po protokolu: 5 min. trčanje, 5 min. opće-pripremne vježbe i 5 minuta specifične hrvačke vježbe. Za potrebe ovog istraživanja angažiran je sportsko medicinski laboratorij „Diomed" iz Splita. Krvne uzorke su uzimali medicinski laboranti kapilarno neposredno nakon zagrijavanja te nakon svake runde, i to svaki put iz drugog prsta. Za određivanje količine laktata u krvi koristio se Accutrend Lactate uređaj koji ima zadovoljavajuće metrijske karakteristike (Baldari i sur. 2009). Masa se tijela mjerila medicinskom vagom (točnost čitanja rezultata do 100 grama). Antropometar po Martinu korišten je za mjerenje visine tijela (točnost čitanja rezultata do 1 mm).

REZULTATI I RASPRAVA

Tablica 1. *Deskriptivni statistički parametri: aritmetička sredina (AS) i standardna devijacija (SD), Minimalni (min) i maksimalni (max) rezultat te rezultati Kolmogorov Smirnovljevog testa za sljedeće karakteristike ispitanika: dob, visina, masa i razina izmjerenih laktata u krvi u sva četiri mjerenja*

Varijabla	AS/SD	min	max	max D
Dob	23,6 ± 0,9	22	25	0,22
Visina	184,7 ± 5,5	173	196	0,20
Masa	85,7 ± 8,8	71	105	0,15
La 1	2,2 ± 0,8	1,1	4,5	0,15
La 2	10,3 ± 2,3	6,2	14,3	0,10
La 3	11,9 ± 3,0	5,3	16,6	0,11
La 4	12,6 ± 2,9	8,2	18,7	0,14



* Statistički značajna razlika na razini p<0.01(t-test) između dva mjerenja laktata u modificiranom načinu hrvanja kod sportaša u kontaktnim sportskim igrama.

Graf 1. *Razlike u visini izmjerenih laktatnih vrijednosti u hrvanju modificiranim načinom kod sportaša kontaktnih sportskih igara sa statistički značajnim razlikama među mjerenjima (t-test).*

Vrijednosti laktata u mirovanju kreću se između 1 i 2 mml/L, dok kod vježbanja niskog intenziteta rastu na 3 do 4 mml/L (Mazzeo i sur. 1982). Vrijednosti laktata nakon zagrijavanja u ovom istraživanju iznose 2,2 mml/L. Ta je vrijednost blago povišena u odnosu na uobičajene vrijednosti u mirovanju, a niža je od vrijednosti izmjerenih pri vježbanju niskim intenzitetom. Dobiveni rezultati približni su onima dobivenim u sličnim istraživanjima gdje su analizirani hrvači, ali i borci srodnih borilačkih sportova (Eaton prema Sterkowitz 1997.; Kreamer i sur. 2001.; Aziz i sur. 2002.; Karninčić i sur. 2009.). Razina izmjerenih laktata u krvi nakon prve runde u ovom istraživanju iznosi 10,3 mml/L što je statistički značajno više u odnosu na prethodno mjerenje ($p<0.01$). Razina laktata u krvi nakon druge runde iznosi 11,9 mml/L i nije statistički značajno porasla u odnosu na mjerenje nakon prve runde. Nakon treće runde odnosno na kraju borbe izmjerena je vrijednost laktata 12,6 mml/L. Statističkom analizom također nije utvrđen značajan rast laktata u odnosu na prethodnu rundu. Dobivene vrijednosti laktata nakon prve dvije runde te na kraju borbe u modificiranom hrvanju vrlo su slične vrijednostima dobivenima analizom vrhunskih hrvača i boraca srodnih borilačkih sportova (Yoon i sur. 1994.; Eaton prema Sterkowitz i sur. 1997.; Da Lima i sur. 2004.; Karninčić i sur 2009.). Nešto više vrijednosti na kraju borbe 14,8 do 20 mml/L su izmjerene u vrijeme kada je prema pravilima runda trajala minutu duže ili su pak laktati uzorkovani na natjecanju gdje su hrvači bolje motivirani da daju svoj maksimum (Marić i sur 1985.; Sharrat i sur. 1986.; Nilsson i sur. 2002.).

U ovom istraživanju, uočava se da laktati statistički značajno rastu samo u prvoj rundi, što je uobičajena pojava i kod hrvača nižeg razreda kvalitete (Karninčić i sur. 2009.). S druge strane hrvači višeg razreda kvalitete u pravilu imaju statistički značajan rast laktata i nakon druge runde, što se objašnjava boljom raspodjelom energetskih potencijala.

Može se zaključiti da se laktatna krivulja u hrvanju modificiranim načinom kod sportaša iz kontaktnih sportskih igara ne razlikuje bitno od krivulje izmjerene tijekom borbi u hrvačkim sportovima, osobito kod hrvača nižeg razreda kvalitete. Fiziološko opterećenje je slično opterećenju kakvo vlada u olimpijskom hrvanju ili primjerice u judu, bez obzira na pojednostavljena pravila modificiranog hrvanja i uzorak ispitanika. Može se stoga pretpostaviti da se modificiranim načinom hrvanja osim višestrukog utjecaja na razvoj različitih motoričkih sposobnosti može utjecati na razvoj anaerobnih kapaciteta, funkcioniranje buferskog sustava te na taj način pomicati granicu tolerancije organizma na visoke laktate kao što je to slučaj u olimpijskom hrvanju (Kreamer i sur. 2001).

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PHYSIOLOGICAL PROCESSES INVOLVED IN THE MODIFIED TYPE OF WRESTLING

ABSTRACT

The purpose of this study is to determine the lactate curve in a 'modified' manner of wrestling for athletes in contact sports. This research gives us an evaluation of possible physiological responses to this specific type of wrestling. The study was conducted on 10 football players and 10 handball players. Lactate samples were collected in four intervals in the 'modified' manner of a wrestling fight. Lactate level before the fight was 2.2 mmol/L, after the first round lactate level was significantly higher (t-test $p<0.01$) 10.3 mmol/L, while after the second (11.9 mmol/L) and the third round (12.6 mmol/L) there was no statistically significant increase. We come to the conclusion that the physiological strain in the 'modified' type of wrestling is similar to the strain in the Olympic wrestling or other similar combat sports in the fighters of the elementary quality level. We can suppose, based on this study, that the 'modified' manner of wrestling can affect different physical abilities, but also the anaerobic capacity development.

Key words: *combat sports, lactates, sport games*

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MODEL FOR PHYSICAL EDUCATION CONTENT STANDARDS AT EARLY STAGES OF PRIMARY EDUCATION IN THE REPUBLIC OF MACEDONIA

INTRODUCTION

One of the goals of physical education (PE) is to activate locomotor system, to improve physical abilities and to stimulate healthy way of life with general intention to activate regular psychomotor, cognitive and socio-emotional development through different contents, exercises and movement games (Bureau for the development of education, 2007). Using different contents and activities of locomotor, non-locomotor and manipulative character, positive transformational processes are provided. The knowledge of age and developmental characteristics of students is essential for suitable content selection and realization of proposed goals. In this sense, the knowledge of structure of motor space, morphological characteristics, as well as students' intellectual potentials are important in the process of developing and designing PE curricula as leading documents for successful teaching process and realization (Blazevic et al., 2007; Bilic, 2007).

Morphological and motor structures of children at preschool and early school ages are treated in numerous researches (Bala, 1981, 2002, 2003; Strel & Šturm, 1981; Rajtmajer & Proje, 1990; Peric, 1991; Rausavljevic, 1992; Rajtmajer, 1993, 1997; Zurc et al., 2005, Pisot & Planinsec, 2005). The obtained findings of children's anthropological status are important in the sense of designing educational curricula and programmes conception according to children's possibilities and potentials at specific age. The findings give correct content selection, organization and realization with main goal and positive anthropological changes (Popeska, 2009a).

Educational programmes, based on findings about morphological and motor structure as objective indicators for student potentials and possibilities, are in relation with students' achievements, precisely with content standards which refer to what students should know and what students should be able to do after certain period of active realization of programme contents and participation in PE activities. National curriculum or programme frame enriched with precise standards of students'

achievements is an accepted way of functioning in many countries through Europe and worldwide (Klincarov, 2007).

Analyzing PE process in the Republic of Macedonia and in the region, there are different approaches in the concept of PE national curricula designing and developing as well as in the establishment of models for assessment of achievements, educational effects and overarching standards. There are approaches with clearly defined contents and activities, precisely determined goals and tasks, but not clearly enough defined expected results, models of students' achievements, overarching standards and norms for evaluation.

Exactly defined achievements, output for what children should be able to do after a certain period of realization of some PE contents, give a possibility for clear definition of goals, correct choice of contents, as well as clear directions for assessment of students' progress. In this sense, every country should have a national curriculum based on objective indicators for children's motor potentials and capacities at every age period, clearly defined goals, and number of contents that offer possibilities for achieving the goals, as well as overarching standards in each segment of anthropological status.

The aim of this article is to propose a model of PE standards for students achievements, based on the findings about motor structure of Macedonian children, in relation with Macedonian PE curriculum, and overarching PE standards for children in California, USA (California Department of Education, 2009), chosen as a representative model of PE, which is in the same line with our opinion of how a PE model content standard should be created in the Republic of Macedonia (Klincarov, 2007, 2010).

ANALYSIS OF DETERMINED MOTOR STRUCTURE IN 7-YEAR-OLD MALE STUDENTS IN THE REPUBLIC OF MACEDONIA

In research conducted by Popeska (2009b), a factor structure of motor structure of 7-year-old male children was determined. The research was realized on a sample of 100 second grade students in five primary schools in Skopje, the Republic of Macedonia. Using 33 motor tests, the following factors were isolated: flexibility, running speed, coordinate speed of legs and arms, explosive strength, accuracy while leading, accuracy while throwing, coordinated speed strength, one undefined factor, strength of arms and shoulders, balance and factor for trunk and arms strength.

According to the results obtained in this research, coordination as complex motor ability is not clearly isolated among children at this age, but it appears together with speed and power. This is a result of the complex structure of coordination, its connection with other abilities and the connection with still unfinished developmental

processes and unfinished development of CNS. Similar motor structure is obtained in other researches in early childhood (Strel & Sturm, 1981; Rajtmajer, 1993; Peric, 1991; Bala, 2002; Pisot & Planinsec, 2005).

ANALYSIS OF NATIONAL PHYSICAL EDUCATION CURICULUM FOR FIRST TO THIRD GRADE IN NINE YEAR PRIMARY EDUCATION IN THE REPUBLIC OF MACEDONIA

In the Republic of Macedonia, PE is realized as a teaching subject named physical and health education. In the first three years in primary schools it is realized with 3 classes weekly, or 108 classes per year. The teaching process is based on the national PE curriculum for first to third grade in nine year primary education (Bureau for the development of education, 2007). PE curriculum for this stage is structured in 5 themes named as (1) lining and space organization exercises (2) body shape exercises (3) fundamental athletic activities, (4) fundamental gymnastic activities, (5) games as well as additional contents realized in dependence of schools' possibilities and students' interests.

Beside general goals given in PE curriculum, for every theme there are specifically defined goals, contents, terms, activities and methods. Analyzing PE curriculum, general characteristic is orientation toward educational content, represented by fundamental moving abilities. Projected contents are elaborated within every theme in the section of activities, methods and terms. On the other hand, PE goals are elaborated in general, indistinctly and inaccurately (unclearly and imprecisely defined). They are mostly directed toward contents, specifically, the goal indicates the content and activities that should be realized.

Only small numbers of goals are oriented toward students' achievements and abilities, but these goals are defined in general, for example: to develop balance, to improve coordination etc. This segment from the curriculum is not complementary with the results obtained in the previously mentioned research. Although the motor structure obtained in this research is not clearly defined, researches point out that beside coordination, balance and accuracy as it is directed in Macedonian PE curriculum, for seven-year-old children, there are also abilities such as accuracy with leading, running speed, flexibility, as well as certain strength qualities, such as explosive strength, trunk, arms and shoulders strength etc. which are in line with developmental changes in this period (Malina et al., 2004). Therefore, according to our opinion, PE curriculum for early stages of primary education should be enriched with contents and activities used to initiate, provoke and develop mentioned abilities. Also, a standard that will ensure ways to asses and measure these abilities, as well as how to assess changes in motor abilities caused by practical realization of PE contents and activities should be designed.

Other notification directed to the current PE curriculum refers to lack of goals directed to psychological, social and emotional aspect and gains from physical activity. We consider that PE contents gives an ideal opportunity, using games and team activities for children to learn certain manners of behaviour, solving conflicts, positive feedback, personal development, manners of communication, interaction, cooperation, collaboration and many other so called life skills.

Intention of goals determined in the current PE curriculum in the Republic of Macedonia is motivating individual achievements according to students' possibilities, without clear distinction what is the basic minimum of achievement for every child in the sense of what should be learned, what should be developed and what should be the gain of that activity as a psychological, social and emotional effect. Because of this, we consider it necessary to redefine goals in the sense to design clear content standards as output results for students' achievements.

ANALYSIS OF CALIFORNIA PE MODEL CONTENT STANDARDS

A California PE model content standard is selected as representative role model for designing Macedonian PE content standards. California's PE standards (California Department of Education, 2009), focus on PE content and provide a comprehensive vision of what students need to know and be able to do at each grade from kindergarten through grade twelve. For elementary and middle school students, five overarching model content standards are accepted. It contains following standards:

Standard 1: Students demonstrate motor skills and movement patterns needed to perform a variety of physical activities. This standard refers to movement concepts, body management, locomotor movements, manipulative skills, rhythmic skills.

Standard 2: Students demonstrate knowledge of movement concepts, principles and strategies that apply to the learning and performance of physical activities. This standard refers to movement concepts, body management, locomotor movements, and manipulative skills.

Standard 3: Students assess and maintain a level of physical fitness to improve health and performance. It refers to fitness concept, aerobic capacity, muscular strength/endurance, flexibility, assessment.

Standard 4: Students demonstrate knowledge of physical fitness concepts, principles and strategies that are applied to improve health and performance. Elements of standard 4 are fitness concept, aerobic capacity, muscular strength/endurance, flexibility, body composition.

Standard 5: Students demonstrate and utilize knowledge of psychological and social concepts, principles and strategies that apply to the learning and performance of physical activity.

Standard 5 refers to self – responsibility, social interaction and group dynamics.

This model of five overarching standards is accepted for students from kindergarten up to grade eight, while in the secondary school, from ninth grade there is standards integration, standard 1 incorporates standard 1 and 2 from K-8, Standard 2 incorporates standard 3 and standard 4, while standard 3 incorporates standard 5. Standards designed in California's model clearly define what students should be able to do or should know after overarching certain PE content, making a clear distinction between knowledge, abilities, possibilities and effects. Therefore, according to our opinion this model could be used as a role model for designing Macedonian PE content standards. Similarities also could be found with obtained motor structure, as well as our intentions in organization and structuring of PE process in primary schools, where precise determination of PE contents areas is essential.

The integration of all three analyzed elements: current PE curriculum for early stages in the Republic of Macedonia; estimated motor structure for seven-year-old students as an objective base for children's potential; and California PE model content standards, points out the following three strands for the development of Macedonian PE model content standards:

Strand 1: Movement skills. This strand refers to the acquisition and the development of locomotor, non-locomotor and manipulative movement skills as well as theoretical knowledge of movement concept and principles.

Strand 2: Motor abilities - health related and performance related. This strand refers to practical manifestation of motor abilities, assessment, development and theoretical knowledge and recognition of motor abilities.

Strand 3: Psychosocial characteristics. This strand refers to the changes that occur and are developed during PE process in a sense of children's personality and interaction, a part that deprives in defined aims and teaching contents in current Macedonian national PE curriculum.

CONCLUSION

Scientific analyses and results obtained from researches applied in order to assess the structure of anthropological area as well as students' needs and possibilities, should be considered when strategic educational documents, such as national curriculum and content standards are being designed. Research results applied for estimation of developmental characteristics are objective indicators for students' potentials and possibilities, and are closely related with students' achievements. In this sense, clearly defined standards in relation with curriculum goals and contents are an objective way to assess students' achievements. Macedonian national PE curriculum does not provide standards for students' achievement. Therefore, an observation of experiences

from abroad was made and as a result of this analysis in relation to obtained results of an investigation of motor structure conducted on seven- year-old Macedonian students, the model for the development of national PE content standards has been proposed. It contains following three strands: movement skills, motor abilities - health related and performance related and psycho-social characteristics.

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ABSTRACT

The aim of this article is to propose a model for designing national physical education content standards in early stages of primary education in the Republic of Macedonia. Proposed model is based on the findings about motor structure of children at the early stage of primary education obtained in researches realized in 5 primary schools in Skopje, the Republic of Macedonia, in relation with Macedonian PE curriculum, and overarching standards for children at this age in California, USA, chosen as a representative PE model. As a result of detailed analysis of mentioned documents and results, a model with three defined strands under which the PE standards should be established is proposed. It contains following stands for the development of Macedonian national PE standards: movement skills, motor abilities and psychosocial characteristics.

Key words: *physical education, content standard, curriculum, students, achievements*

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PRILOG ANALIZI PROVOĐENJA PROGRAMA TJELESNE I ZDRAVSTVENE KULTURE KOD DJECE MLAĐE ŠKOLSKE DOBI

UVOD

Mnogo se istraživanja u cijelom svijetu bavi problematikom tjelesne i zdravstvene kulture (TZK) te se najčešće u prvi plan ističe uloga nastavnika TZK kao ključne karike u razlikama i specifičnostima provedbe tog programa (Mei, F. i sur. 2011, Garm, A.C. i sur. 2011, Barker D.M. i sur. 2011). Nastavni plan i program iz područja Tjelesne i zdravstvene kulture u Republici Hrvatskoj uključuje dva različita segmenta odnosno izvršitelja programa. Od prvog do četvrtog razreda nastavu provode učiteljice i učitelji razredne nastave dok od petog do osmog razreda nastavu provode profesori tjelesne i zdravstvene kulture odnosno kineziologije. U programu razredne nastave učitelji predaju sve uključene predmete te zbog toga nisu i ne mogu biti specijalisti u određenim područjima. Zbog svoje specifičnosti nastava tjelesne i zdravstvene kulture, prema analizi mnogih stručnjaka te objavljenih radova (Knjaz, i sur. 2010, Herold, F.A. i sur, 2011) zahtjevnija je kod mlađih uzrasta. Tu se posebno naglašava potreba kvalitetnog uključivanja djece u proces organiziranog tjelesnog vježbanja, upoznavanja sa svim njegovim segmentima (predviđenim nastavnim planom), svakako imajući u vidu specifičnosti rasta i razvoja uključenog uzrasta. Jasno su brojna istraživanja pokazala da npr. koordinacija kao temeljna motorička sposobnost najkvalitetnije se razvija u razdoblju od 6. do 10. godine života. Kasnije je naravno moguć razvoj ove motoričke sposobnosti, ali u svom limitiranom dosegu.

METODE ISTRAŽIVANJA

Uzorak ispitanika

Uzorak ispitanika čine učiteljice i učitelji razredne nastave te nastavnici tjelesne i zdravstvene kulture na području Republike Hrvatske. Ukupan broj testiranih ispitanika je 160 od toga učitelji razredne nastave (95) te nastavnici TZK (65). Obje skupine imale su isto, prosječno nešto više od 19 godina radnog staža te su u obje podskupine značajno prevladavale osobe ženskog spola.

Uzorak varijabli

Uzorak varijabli čine odgovori na pitanja postavljenih putem anonimne ankete. Anketa je sadržavala 27 pitanja te nekoliko zasebnih segmenata dok je za potrebe ovog rada izvučeno nekoliko skupina odgovora. Istraživanje je provedeno u nastavnoj godini 2010/11.

Metode obrade podataka

Dobiveni podaci obrađeni su putem programskog paketa STATISTICA 9.0. for Windows. Izračunati su osnovni centralni i disperzivni parametri kao i frekvencije u pojedinim varijablama. U daljnjoj statističkoj analizi upotrijebljen je t-test za nezavisne uzorke koji testira razlike između uzoraka ispitanika u određenoj varijabli. Razina statistike značajnosti iznosi .05.

Kao kriterijska varijabla postavljene su podskupine uzorka ispitanika.

REZULTATI I DISKUSIJA

Dobiveni rezultati velikim se dijelom uklapaju u neka već provedena istraživanja, ali i u logična razmišljanja imajući u vidu da su nastavnici TZK izabrali svoju specijalnost dok su učitelji razredne nastave morali pokazati mnogo veću svestranost u provedbi nastavnog programa te time i njihov osobni afinitet može značajnije varirati. U segmentu osobne tjelesne aktivnosti učitelji razredne nastave manje su aktivni (65% se bavi nekim sportom ili oblikom sportske rekreacije) dok je kod nastavnika TZK taj postotak očekivano iznimno visok (92%). Time je vjerojatno i djelomična povezana konstatacija o odnosu prema osobnoj tjelesnoj težini koji je statistički značajno različit (p-.047). Nastavnici TZK su prosječno zadovoljni sa svojom težinom dok bi učitelji razredne nastave željeli biti mršaviji. U tom očekivanom segmenti učitelji razredne nastave ulaze u opću populaciju dok nastavnici TZK u selektiranu pa je i njihova usporedba nezahvalna. Iako je utjecaja i poveznica mnogo, moguće je, jednim dijelom, povezati gore navedeno s analizom odgovora na pitanje „Je li Vam nastava tjelesne

i zdravstvene kulture naporna". Ponovno je dobivena statistički značajna razlika (p-.02). Učitelji razredne nastave su svoje odgovore prosječno pozicionirali između kategorija odgovora „ponekad" i „rijetko" dok su nastavnici TZK svoje odgovore prosječno pozicionirali između kategorija odgovora „rijetko" i „nikada". To može jednim dijelom ukazati i na logičnu te apsolutnu naklonost nastavnika prema nastavi TZK koji je svakako na strani „specijalista". Takvi su odgovori očekivani imajući u vidu da su tijekom odabira studija profesori TZK specijalizirani za ovaj prostor dok su učitelji razredne nastave morali savladati različite programe svim obuhvaćenih predmeta od prvog do četvrtog razreda osnovne škole

Putem ankete postavljeno je i pitanje učiteljima razredne nastave „Biste li prepustili provođenje nastave TZK profesoru TZK?" Zanimljivo da je uočena podijeljenost u odgovorima te je 40% odgovorilo potvrdno dok je 53.3% odgovorilo negativno. Ostalih 6.7% se nije izjasnilo na ovo pitanje ili su dali oba odgovora uz dodatno objašnjenje. Očekivano nastavnici TZK u velikom postotku (88.8%) smatraju da bi trebali provoditi nastavu TZK i u prva četiri razreda osnovne škole. Tema svakako nije jednostavna te definitivno postoje razlozi za jedno i drugo opredjeljenje. Možda se trebalo ponuditi odgovor u smislu moguće suradnje oba nastavnika tijekom provođenja programa.

Definitivno je da prema fondu sati tijekom edukacije, ali i prema načinu života, nastavnici TZK polažu „veća prava" podučavati ovaj predmet u osnovnoj školi, ali jasno je i da učitelji razredne nastave moraju usvojiti mnogo širi nastavni program koji je usmjeren na rad s djecom isključivo mlađe školske dobi. U tom segmentu to njih čini „specijalistima" u radu s tom populacijom. Specifičnost ovog predmeta u odnosu na sve ostale je nepotrebno naglašavati kao i samim time kompleksnost koja se zahtjeva. S time da se kompleksnost povećava što je dijete mlađe, a ne kao kod (većine ili pak svih) drugih predmeta obrnuto. Mogućnost ozljeđivanja ili nezgode, kao potencijalnu opasnost, također ne treba zanemariti. Time se nestručnost ili nekompetentnost ne odražava samo na smanjenje usvojenih informacija, već i na direktan rast i razvoj djeteta. Pogreške koje je moguće učiniti u takvom procesu mogu biti trenutne, tragične, ali i dugoročne s vidljivim posljedicama tek nakon dužeg vremena. Kao neki logičan zaključak nameće se suradnja oba kadra na provedbi programa.

ZAKLJUČAK

Definitivno bi današnje hrvatsko društvo trebalo još značajnije unaprijediti programe koji doprinose rastu i razvoju svoje djece. To se ne odnosi samo na školski sustav, već i na sve ostale segmente vanškolskih aktivnosti, obitelji, društva u cijelosti. Poboljšanja su moguća u mnogim smjerovima te bi jedan od njih mogao biti

i unapređenje postojećeg sustava provedbe nastavnog plana i programa s naglaskom na Tjelesnu i zdravstvenu kulturu. Opremljenost dvorana, fond sati, nastavna sredstva i pomagala su jedan dio problema. Drugi dio su kadrovi koji provode program. Nastavnici TZK bez sumnje su najosposobljeniji kadrovi tog područja odnosno suradnja između nastavnika TZK i učitelja razredne nastave bi vjerojatno polučilo najbolje rezultate. Kako je proces rada s djecom u području TZK kompleksan i specifičan bilo bi korisno, barem pokušati, pronaći model u kojem će oni najbolji raditi s djecom, ili barem sudjelovati jednim dijelom, od njihovog početka organiziranog bavljenja tjelesnom aktivnošću u sklopu osnovnog obrazovanja. Pogreške koje je moguće učiniti u takvom procesu mogu biti trenutne, tragične, ali i dugoročne s vidljivim posljedicama tek nakon dužeg vremena. Djeca ipak zaslužuju najbolje, a na društvu je da im to i osigura.

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ABSTRACT

A research was conducted on a sample of 160 primary school teachers and physical education teachers with the aim to analyze and compare them int he field related to PE and healthy „sports" lifestyle. Since both subgroups implemented the curriculum in this subject, their differences may partly affect the implementation and the approach to the subject. Some differences have been observed and they are analyzed through the prism of PE in elementary school. Since the process of working with children in PE is complex and specific, it is important to indicate all segments that can have an impact on this process.

Key words: class teachers, physical education teachers, PE curriculum

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RAZLIKE U KOMPETENCIJAMA U NASTAVI TJELESNE I ZDRAVSTVENE KULTURE U NEKIM ZEMLJAMA EUROPE

UVOD

Tjelesna i zdravstvena kultura kao faza u obrazovanju ima za cilj kroz uravnotežen i koherentan raspon fizičkih aktivnosti, doprinijeti optimalnom razvoju pojedinca uključujući potencijale rasta i razvoja te fizičke i psiho-socijalne kompetencije (Hardman, 2007). U kognitivnoj pedagogiji kompetencija se definira kao „vrsta znanja koja se koristi u prirodnom okruženju, kroz empirijsko iskustvo i zato je primjenjena s prirodnom lakoćom i učinkovitosti. To je vrlo slično načinu kako pojedinac koristi materinji jezik i onda ga upotrebljava za izražavanje neograničenog raspona misli." U ovom smislu kompetencija je kategorija vrijednog, valjanog i korisnog znanja (Physical education and sports, 2006.). Grubo rečeno kompetencija predstavlja „sve ono što si naučio što ti je za život korisno". Cilj je opća konstatacija koja pruža smjer i namjeru da se izvede obrazovna akcija, u našem slučaju cilj nam govori o onome što bi učenici trebali postići nastavom tjelesne i zdravstvene kulture. Ciljevi odgoja i obrazovanja u osnovnoj školi su: osigurati sustavan način učenja o svijetu, prirodi, društvu, ljudskim dostignućima, o drugima i sebi; poticati i kontinuirano unaprjeđivati intelektualni, tjelesni, estetski, društveni, moralni, duhovni razvoj učenika, u skladu s njegovim sposobnostima i sklonostima, stvoriti mogućnosti da svako dijete uči i bude uspješno; osposobiti učenike za učenje, naučiti ih kako učiti i pomoći im u učenju; pripremiti učenike za mogućnosti i iskušenja koja ih čekaju u životu; poučiti učenike vrijednostima dostojnih čovjeka (HNOS, 2006). Iz svega navedenog možemo zaključiti da kompetencije isto tako proizlaze iz ciljeva te ih na neki način možemo definirati kao ostvarene ciljeve, odnosno sposobnosti koje se stječu kroz nastavu tjelesne i zdravstvene kulture.

PROBLEM I CILJ

Osnovna svrha istraživanja je procijeniti kakva je situacija u Europi s nastavom tjelesne i zdravstvene kulture u širem smislu, odnosno kompetencijama u nastavi u užem smislu, na svim razinama školovanja. Korišten je multimetodološki, pluralistički pristup koji se sastojao od analize čitave lepeze izvora sakupljenih

globalno i regionalno, uglavnom putem elektroničkih medija, ali i pregleda vrlo iscrpne literature (znanstvenih i stručnih članaka i knjiga), kako bi se stekao što opsežniji uvid u europsku situaciju.

Tablica 1. *Prikaz kompetencija u nastavi tjelesne i zdravstvene kulture u nekim zemljama Europe*

AUSTRIJA	Usvojene i razvijene motoričke osnove, razvijena i usavršena individualna izvedba, osigurana široka i uravnotežena raznolikost fizičkih sposobnosti, osposobljenost za uvid na utjecaj tjelesnih aktivnosti na svoje zdravlje, razvijena sposobnost bavljenja fizičkim aktivnostima u svakodnevnom životu, razvijen pozitivan stav prema svom tijelu, razvijena kreativnost, razvijena sposobnost kooperacije u grupi, biti u mogućnosti nositi se s osjećajima osobito na natjecanjima, razvijen osjećaj odgovornosti za sebe i druge, razvijeno unutarkulturalno razumijevanje.
BELGIJA	Usvojene kretne kompetencije, usvojene higijensko-zdravstvene navike i razvijeno samopoštovanje.
ČEŠKA	Osposobljenost za raspolaganje motoričkim sposobnostima i vještinama. Razvijena svijest o važnosti cjeloživotnog bavljenja sportskim aktivnostima.
DANSKA	Razvijene motoričke sposobnosti, usvojene sportske aktivnosti i znanja te sposobnosti podučavanja. Usvojene navike cjeloživotne brige o zdravlju. Znati preuzeti odgovornost i sudjelovati u obvezujućem prijateljstvu. Usvojene socijalne kompetencije, etičko ponašanje i „fair play".
FRANCUSKA	Razvijene okretnost, snalažljivost te spretnost. Usvojena kultura tjelesne, sportske i umjetničke aktivnosti pomoću učenja i vježbanja tih aktivnosti. Usvojene navike upravljanja fizičkim životom.
MAĐARSKA	Osposobljenost za vođenje brige o osobnoj higijeni i razvijena potreba za očuvanjem zdravlja, usvojena potreba za vježbanjem i održavanjem lijepog tijela, atraktivnog i biomehanički ispravnog držanja, znati se nositi sa životnim poteškoćama i poteškoćama na poslu, razvijena sposobnost komunikacije te solidarnost, tolerancija i „fair play", usvojen model socijalno primjerenog ponašanja, usvojena znanja o sportskim igrama i sportskoj kulturi, razvijene motoričke sposobnosti te mogućnost izražavanja kroz pokret, razvijene specijalne kognitivne, emocionalne i motoričke sposobnosti.
SLOVAČKA	Razvijene fizičke, motoričke i funkcionalne sposobnosti te usvojen viši stupanj tjelesne vježbe i motoričke izvedbe. Stečene i razvijene kompetencije koje su povezane s njihovim znanjem – s procesima učenja i usvajanja vještina kretanja kao i teoretskim znanjem. Usvojene navike dobrog vladanja i odgoja, osobito prema tjelesnoj aktivnosti, ali i u društvu općenito.
ŠVEDSKA	Razvijene fizičke, mentalne i socijalne sposobnosti te razvijeno samopouzdanje. Usvojena spoznaja o vrijednostima zdravog života. Razvijena svijest o tijelu sa zdravstvene perspektive, osposobljenost da vide, odaberu i usavrše različite programe vježbanja u svrhu očuvanja zdravlja. Razvijen neprekidan interes za svakodnevnim tjelesnim vježbanjem. Razvijen smisao za zajedništvo te za izražavanje mašte, osjećaja. Usvojene sposobnosti igre i sudjelovanja u sportskim aktivnostima. Razvijene sposobnosti organiziranja i vođenja sportskih aktivnosti. Stečena osnovna znanja iz povijesti sporta i rekreacijskih aktivnosti, kao i igara, plesa i sportova drugih kultura. Razvijena sposobnost rješavanja hitnih situacija.
ŠVICARSKA	Razvijeno zadovoljstvo vježbanjem i motivacija za kretanjem. Stečene motoričke, socijalne, kognitivne i psihološke vještine. Osposobljenost za uspješno rješavanje sukoba. Usvojen veliki repertoar motoričkih gibanja.

VELIKA BRITANIJA	Razvijene osnovne vještine koje se odnose na grube pokrete koji omogućuju da se tijelo kreće i bude agilno te fine pokrete koji omogućuju rukovanje rekvizitima, gestikuliranje ili pisanje, znati izabrati taktike, strategije ili koreografije, ovisno o vrsti aktivnosti, znati reagirati tijelom i duhom na zahtjeve aktivnosti; ovo se odnosi na otpornost, snagu i gipkost tijela te na duhovne vrijednosti kao što su smjelost, odlučnost za uspjeh, mentalnu pozornost i znati kako se nositi s osjećajima, znati se prilagoditi na široki raspon poznatih i nepoznatih sklopova, usvojene vrijednosti zdravog i aktivnog životnog stila, osposobljenost za rad u grupi ili ekipi (timski rad) te razvijeni pojmovi pravednosti i osobne i socijalne odgovornosti, osposobljenost za preuzimanje vodstva, za trenerske i sudačke poslove, znati kako biti učinkoviti u natjecateljskim, kreativnim i izazovnim situacijama.
BIH	Osposobljenost za primjenu osnovnih kinezioloških znanja i iskustava – koja omogućuju samostalno tjelesno vježbanje i usavršavanje psihomotoričkih i funkcionalnih sposobnosti te stimuliranja normalnog rasta i razvoja. Razvijena svijest o pozitivnom utjecaju tjelesne aktivnosti na zdravlje i opću dobrobit. Stečene trajne navike svakodnevnog vježbanja.
CRNA GORA	Usvojene adaptivne i stvaralačke sposobnosti u suvremenim uvjetima života i rada. Stečeni brojni i raznovrsni sportsko – tehnički sadržaji. Razvijena svijest o zdravstvenoj kulturi i zdravom načinu života. Razvijeni osjećaji povjerenja u sebe. Znati poštovati i razumjeti različitosti. Razvijena svijest o korisnosti utjecaja sporta na antropološki status čovjeka i stvorene trajne navike svakodnevnog tjelesnog vježbanja.
SRBIJA	Razvijene motoričke sposobnosti, usvojena motorička i teorijska znanja.
NJEMAČKA	**Predmetne (stručne) kompetencije** koje se odnose na motorička znanja i sposobnosti: povećana tjelesna i motorička iskustva, usvojena osnovna motorička znanja, osposobljenost za raspolaganje motoričkim sposobnostima, razvijene sposobnosti kreativnog i produktivnog ophođenja s formama pokreta i igre, oblikovanje pokreta kroz ples, ritmiku, gimnastiku i igre, osposobljenost za raspolaganje osnovnim znanjima sportskih igara, razvijena svijest o pozitivnom utjecaju kretanja i sporta na vlastito zdravlje, mogućnost reflektiranja iskustava i doživljaja iz nastave TZK na druge životne aspekte. **Metodske kompetencije** koje se odnose na veliki repertoar sportskih metoda, strategija i tehnika: znati promatrati pokrete, osposobljenost za sastavljanje dokumentacije (dnevnik trčanja, koreografija...), osposobljenost za razumijevanje informacija (opisi pokreta, plan treninga...), mogućnost organiziranja sportskih akcija, osposobljenost za obavljanje sudačkih poslova, mogućnost prezentiranja naučenog **Osobne kompetencije** koje se odnose na osjećaj osobne vrijednosti i samopouzdanja: razvijen pozitivni stav prema sebi i vlastitom tijelu, osposobljenost za postavljanje vlastitih ciljeva i ne odstupati od njih, razvijen osjećaj ustrajnosti i upornosti, znati se nositi i s pobjedom i s porazom, znati preuzeti odgovornost za svoje postupke i djela, znati kada treba riskirati, biti otvoren prema ljudima, njihovim zahtjevima i situacijama, osposobljenost za rad u grupi (timski rad). **Socijalne kompetencije** koje se odnose na sposobnost i spremnost rada sa drugim ljudima te na ostvarivanje zajedničkih ciljeva: razvijena sposobnost empatije, odnosno suosjećanja s drugima, razvijen osjećaj poštovanja prema drugima, znati uvažiti mišljenja i želje drugih, pokazuje spremnost na pomoć drugima, znati preuzeti socijalnu odgovornost, razvijena sposobnost komunikacije, osposobljenost za kooperaciju, znati se držati dogovora i pravila.
IRSKA	**Socijalne i osobne kompetencije:** osposobljenost za interakciju i kooperaciju sa drugima, razvijeno samopouzdanje, osjećaj vrijednosti, samosvijest, povjerenje, znati preuzeti inicijativu i vodstvo, kroz sudjelovanje u natjecanju razvijen osjećaj za „fair play" (poštenu igru) i kolektivni duh, razvijen pozitivan stav prema sudjelovanju u sportskim aktivnostima. **Tjelesne i motoričke kompetencije:** razvijene motoričke sposobnosti (snaga, brzina, izdržljivost i fleksibilnost) kroz veliki raspon aktivnosti, razvijene sposobnosti (agilnost, pozornost, kontrola, ravnoteža i koordinacija) kroz pokret, razvijene osobne kompetencije u atletskim znanjima trčanja, skakanja i bacanja, usvojene plesne kompetencije, uključujući narodne i Irske plesove, razvijene gimnastičke kompetencije, razvijene kompetencije znanja u igrama, osposobljenost za upotrebu vještina koje su potrebne za život i kretanje s povjerenjem u okolini, razvijeno povjerenje blizu, u i ispod vode, razvijene kompetencije raznih stilova plivanja i okretnosti u vodi.

IRSKA	**Kompetencije znanja i razumijevanja:** razvijeno razumijevanja i sveobuhvatno znanje motoričkih aktivnosti te znati kako izvući korist kao sudionik i kao gledatelj, razvijeno razumijevanje za uporabu prostora, brzine, sile i smjera u izvedbi aktivnosti, usvojeno razumijevanje osnovnih pravila, taktike i strategije u motoričkim aktivnostima, razvijena mogućnost promatranja, diskutiranja, analiziranja, interpretiranja i uživanja u motoričkoj izvedbi, razvijena sposobnost sakupljanja, snimanja i interpretiranja informacija o motoričkoj izvedbi, razvijena domišljatost, osposobljenost za donošenje odluka, rješavanje proble,ma i samostalnost, usvojeno znanje, razvijeno razumijevanje za kulturne aktivnosti, znati cijeniti prirodu i okolinu a sve to kroz sudjelovanje u aktivnostima na otvorenom. **Kreativne i estetske kompetencije:** osposobljenost za korištenje tijela kao sredstva izražavanja i komunikacije, osposobljenost za smišljanje i izvedbu jednostavnih plesova, osposobljenost za smišljanje i igranje jednostavnih igara, razvijen osjećaj za lijepo. **Zdravstvene kompetencije:** znati zadržati i poboljšati tjelesnu formu potrebnu za dobro zdravlje, osposobljenost za vođenje brige o osobnoj higijeni i držanju tijela, znati cijeniti dobrobit relaksacije i znati se nositi s izazovom. **Sigurnosne kompetencije.**
HRVATSKA	**Kompetencije u predškolskom odgoju:** usvojena osnovna biotička motorička znanja, usvojene higijensko-zdravstvene navike, znati se pravilno obući za tjelesno vježbanje, osposobljenost za vođenje brige o obući i odjeći za tjelesno vježbanje te o higijeni svoje neposredne okoline, osposobljenost za poštivanje u grupi i poštivanje dogovorenog, razvijena potreba za suradnjom među djecom, usvojene osnovne norme ponašanja i reda. **Kompetencije u osnovnoj školi:** usvojena temeljna kineziološka teorijska i motorička znanja, osposobljenost za djelotvorno korištenje slobodnog vremena i snalaženje u urgentnim situacijama, usvojene navike samostalnog vježbanja, razvijen interes za osobni napredak u različitim sportskim aktivnostima, usvojena znanja o očuvanju i promicanju zdravlja, formiran pozitivan odnos prema TZK, usvojena znanja o potrebi nošenja odgovarajuće odjeće i obuće, o tjelovježbenom prostoru te higijenskim aktivnostima nakon tjelesnog vježbanja te pri izletima i ekskurzijama, usvojena znanja o značenju bavljenja tjelesnim aktivnostima, korisnosti i štetnosti utjecaja sunčevih zraka, djelovanju čistoga zraka na čovjeka te važnosti pravilne i raznovrsne prehrane na rast i razvoj, usvojena teorijska znanja o ispravnosti osnovnih položaja i kretnih struktura kako bi se spriječila ozljeđivanja, usvojena znanja o pravilnom držanju tijela, o održavanju i ispravljanju svoda stopala te značenju praćenja tjelesne visine i težine, usvojena temeljna znanja o ubrzanim biološkim promjenama u organizmu te o povezanosti tjelesnog vježbanja i voluminoznosti tijela, usvojena znanja o utjecaju pravilne prehrane na zdravlje te uzimanju tekućine prije, za vrijeme i nakon vježbanja, kao i uzroke mogućih nerazmjera u odnosu visine i težine te o izračunavanju indeksa tjelesne mase kao kontrolne mjere sprječavanja pretilosti, usvojena znanja o razlozima pojave umora u školi i načinima njegova otklanjanja, znati organizirati sportska natjecanja te osnove suđenja usvojena znanja o štetnosti nikotina, alkohola, dopinga i drugih sredstava ovisnosti na zdravlje, usvojena znanja o korisnim i štetnim tjelovježbenim sadržajima za vrijeme mjesečnog ciklusa, usvojena znanja o izmjeni etapa rada, odmora i razonode tijekom dana, o važnosti sna i odmora te igre i boravka u prirodi, razvijene odlučnost, samopouzdanje, ustrajnost i svladavanje straha, razvijen osjećaj za poštivanje protivnika, pridržavanja pravila igre, svladavanje bijesa i nezadovoljstva, priznavanje pobjede protivniku, razvijeno suradničko ponašanje radi osposobljavanja za timski rad, razvijene sposobnosti uvažavanja razlika u tjelesnim sposobnostima različitih spolova te prihvaćanja vlastite osobnosti, razvijene sposobnosti emocionalne samoregulacije u odnosu prema učitelju i organizaciji vježbanja, razvijeno poštovanje prema sucima i prihvaćanje pravila, usvojene navike lijepog ponašanja te uljuđene navijačke navike, poštivanje rasnih i nacionalnih razlika, osposobljenost za izražavanje samopoštovanja i poštovanja prema drugima. **Kompetencije u srednjoj školi:** usvojena specifična kineziološka motorička znanja, osposobljenost snalaženja u urgentnim situacijama, usvojena znanja o utjecaju i važnosti tjelesnog vježbanja za poboljšanje i očuvanje zdravlja ljudskog organizma, razvijene navike bavljenja tjelesnim aktivnostima u slobodnom vremenu te prihvaćanje zdravog načina života i cjeloživotnog tjelesnog vježbanja, usvojene zdrave prehrambene i higijenske navike, usvojene navike redovitih liječničkih kontrola, razvijeni pravilni motivi vezani uz kompetenciju i natjecanje.

SLOVENIJA	**Kompetencije u predškolskom odgoju:** Usvojene osnovne kretne strukture, usvojeni osnovni počeci sportskih vrsta, razvijena spoznaja o svojim kretnim sposobnostima, razvijeno povjerenje u svoje tijelo i kretne sposobnosti, znati značenje sudjelovanja te poštivanja i uvažavanja razlika. **Kompetencije u osnovnoj i srednjoj školi:** usvojene navike pravilnog držanja tijela, usvojene higijensko – zdravstvene navike kao što su njega tijela, zdrava prehrana, sportski rad, ravnoteža u učenju, odmor i spavanje, sposobnost podnošenja napora, razvijen zdrav osjećaj samosvijesti i vjera u sebe te razvijeno samopouzdanje, oblikovani pozitivni primjeri ponašanja (dobri maniri, suradnja sa drugima, poštena igra, tolerancija prema drugima), razvijen pozitivan odnos prema prirodi i okolišu kao posebnoj vrijednosti te poštivanje prirodnog i kulturnog nasljeđa.
NIZOZEMSKA	**Kompetencije u osnovnoj školi:** usvojene navike kretanja te usvojena osnovna načela najvažnijih oblika kretanja i igara, stečene navike zajedničkog sudjelovanja u tjelesnim aktivnostima na pošten način te poštivanja pravila igre, osposobljenost za procjenu vlastitih kretnih sposobnosti (mogućnosti) te ih znati uzeti u obzir kod izvođenja aktivnosti. **Kompetencije u srednjoj školi (prvih par godina):** usvojena znanja iz raznih sportskih grana te osposobljenost za procjenu svojih mogućnosti u njima, usvojen širi repertoar pokreta, osposobljenost za primjenu osnovnih načela sportskih aktivnosti na vlastitoj razini, usvojena sportska načela ponašanja, kako biti obzirni prema mogućnostima i prioritetima drugih te se znati brinuti jedni za druge za vrijeme sportskih aktivnosti, razvijena svijest o važnosti tjelesnog vježbanja za zdravlje. **Zadnjih par godina:** stečena kultura sporta i pokreta, usvojene razne kretne vještine te sposobnost grupnog rada u kretnim situacijama, osposobljenost za držanje kontrole, usvojene zdravstvene navike i etički principi.
FINSKA	**Kompetencije u predškolskom odgoju:** usvojene navike učenja novih razmišljanja, usvojene neke fiziološke zakonitosti poput brzog hodanja, ubrzanog kucanja srca, ostajanja bez daha te usvojene osnove za prihvaćanje tjelesne aktivnosti kao životnog stila. **Osnovna škola:** razvijene fizičke, psihičke i socijalne mogućnosti i dobrobiti te razvijen osjećaj važnosti tjelesnog vježbanja za zdravlje, usvojene vještine, znanja i iskustva koja će biti temelj za moguće usvajanje tjelesne aktivnosti kao životne navike. **Srednja škola:** usvojene navike promicanja zdravlja i aktivnog životnog stila te razumijevanje značenja tjelesnog vježbanja za fizičku, mentalnu i socijalnu dobrobit, razvijen društveni duh, znati preuzet odgovornost prema sebi, svojim postupcima, ali i prema drugima, osjećaj za „fair play" i sigurnost.

KOMPARATIVNA ANALIZA KOMPETENCIJA U NASTAVI TJELESNE I ZDRAVSTVENE KULTURE U NEKIM EUROPSKIM ZEMLJAMA

Iako se teži tome da se sustav školovanja maksimalno uskladi u zemljama Europske unije, javni obrazovni sustavi i njihove strukture u mnogim europskim zemljama još uvijek se razlikuju i pokazuju kako postoje različite obrazovne politike (Leibinger, E. i sur. 2007). Vrijeme trajanja osnovnoškolskog i srednjoškolskog obrazovanja znatno varira. Prosječan broj godina s kojim se djeca uključuju u osnovnoškolsko obrazovanje je 6 godina (raspon od 3 do 7 godina), a prosječan broj godina s kojim djeca završavaju osnovnoškolsko obrazovanje je 13 godina (raspon od 10 do 16 godina). Što se tiče srednjoškolskog obrazovanja, ono prosječno počinje s 13 godina (raspon od 10 do 16) i prosječno završava s 18 godina (raspon od 15 do 20 godina) (Hardman, K. 2008). Može se zaključiti da i hrvatski školski sustav po tom segmentu pripada prosjeku. U većini zemalja Europske unije sat tjelesne i

zdravstvene kulture obavezan je i u osnovnoj i u srednjoj školi, dok vrijeme trajanja sata varira. Prosječno trajanje tjelovježbe u osnovnim školama za zemlje EU u 2007. godini iznosi 109 minuta na tjedan (s rasponom od 30 do 240 minuta). Izuzetno nisko trajanje tjelovježbe kroz tjedan zabilježeno je u Irskoj, Litvi, Nizozemskoj, Sloveniji i Velikoj Britaniji, prosječni raspon minuta se kreće od 35 do 90 minuta tjedno, što ako se preračuna u broj sati tjedno u trajanju od 45 minuta iznosi 0,7 do 2 sata na tjedan. U Estoniji, Mađarskoj, Francuskoj, Malti i Poljskoj zabilježen je najveći raspon minuta tjelesnog vježbanja kroz tjedan koji iznosi 130 do 186 minuta, što ako se preračuna u broj sati tjedno u trajanju od 45 minuta iznosi 3 do 4 sata tjedno, što je zapravo ono čemu se teži. U srednjim školama širom Europe stanje je slično. Prosječno trajanje tjelovježbe za sve navedene zemlje EU u 2007. godini iznosi 101 minutu na tjedan (s rasponom od 45 do 240 minuta). Izuzetno nisko trajanje tjelovježbe kroz tjedan zabilježeno je u Nizozemskoj, Litvi, Finskoj, Cipru i Slovačkoj. Prosječni minimalni raspon minuta je 45 do 100 minuta, što ako se preračuna u broj sati tjedno u trajanju od 45 minuta iznosi svega 1 do 2 sata. U Portugalu, Bugarskoj i Poljskoj zabilježen je najveći raspon minuta tjelesnog vježbanja kroz tjedan. Prosječni raspon minuta u navedenim zemljama iznosi 150 do 165 minuta, što ako se preračuna u broj sati tjedno u trajanju od 45 minuta iznosi 3 do 4 sata tjedno, što je izvanredno. U Hrvatskoj se u srednjim (četverogodišnjim) školama uglavnom provode dva sata tjelesne i zdravstvene kulture tjedno (90 min), dok se u trogodišnjim školama provodi svega jedan sat na tjedan (45 min), što je zabrinjavajuće. Isto tako i kompetencije koje se stječu na nastavi tjelesne i zdravstvene kulture blago variraju od države do države. Potrebno je naglasiti da prikupljeni podaci o kompetencijama u nastavi nisu potpuni. Za mnoge države nismo uspjeli pronaći kompetencije za pojedina odgojno-obrazovna razdoblja: predškola, osnovna i srednja škola te samo na osnovi toga teško je napraviti neku iscrpniju komparativnu analizu. Negdje su kompetencije podijeljene u nekoliko područja (socijalne, osobne,...) te su opisane vrlo detaljno dok kod drugih država nalazimo samo šture podatke u dvije rečenice. Ipak, analizom prikupljenih podataka vidimo da učenici u svim državama iz škola izlaze sa sličnim znanjima korisnim u daljnjem životu. Najviše se spomiju: usvojena motorička znanja, razvijena svijest o pozitivnom utjecaju tjelesnog vježbanja na zdravlje, razvijene higijenske navike, razvijene navike cjeloživotnog vježbanja. Nadalje, tu su osposobljenost kooperacije u grupi (timski rad), razvijen osjećaj za „fair play" i kolektivni duh, razvijeni osjećaji samopovjerenja, samopoštovanja i poštovanja prema drugima, odgovornost prema sebi i svojim postupcima. Može se primijetiti da su upravo za Hrvatsku navedeni najdetaljniji podaci tako na neke od kompetencija nismo naišli kod drugih država kao što su usvojena znanja o korisnim i štetnim tjelovježbenim sadržajima za vrijeme mjesečnog ciklusa, usvojena znanja o štetnosti nikotina, alkohola, dopinga i drugih sredstava ovisnosti na zdravlje, usvojena znanja o razlozima pojave umora u školi i

načinima njegova otklanjanja. Možda je i razlog tome što su ipak podaci za Hrvatsku najdostupniji ili neke od kompetencija u drugim državama spadaju jednostavno u jedan „koš" npr. u ovom slučaju usvojene zdravstveno – higijenske navike.

ZAKLJUČAK

Ovim istraživanjem pokušali smo procijeniti kakva je situacija u Europi s nastavom tjelesne i zdravstvene kulture u širem smislu, odnosno kompetencijama u nastavi u užem smislu, na svim razinama školovanja. Utvrđeno je da se javni obrazovni sustavi i njihove strukture u mnogim europskim zemljama još uvijek razlikuju i pokazuju kako postoje različite obrazovne politike. Vrijeme trajanja osnovnoškolskog i srednješkolskog obrazovanja znatno varira, isto tako varira duljina trajanja sata tjelesne i zdravstvene kulture i njegova učestalost. Premda su neke zemlje uspjele urediti svoje obrazovne sustave blizu onome čemu bi se trebalo težiti, u većini zemalja nema nekih većih pomaka te i dalje zabrinjavaju problemi kao što su: nedovoljan broj sati tjelesne i zdravstvene kulture u nastavnom planu i programu, uočen inferioran status predmeta, nepostojanje ili nepristupačnost objekata, nedostatnost ili slaba kvaliteta sprava i ostalog nastavnog materijala vrlo često povezana s nedostatnim financiranjem potreba nastave tjelovježbe, preveliki razredi ili grupe s kojima se radi. Primjećuje se, također, lagano variranje u iznesenim kompetencijama za pojedine države. Uzrok tome možemo naći u nedovoljnim podacima koje smo uspjeli prikupiti i teškom pristupu istim, ili jezičnoj barijeri koja je evidentna te iz koje proizlaze različiti prevodi, isto tako uzrok vjerojatno leži i u djelomično različitim nastavnim ciljevima za pojedine države. Treba težiti tome da se sustav školovanja maksimalno uskladi u zemljama Europske unije što bi još više dovelo do ujednačavanja ciljeva u nastavi tjelesne i zdravstvene kulture koji su i danas uglavnom orijentirani u prvom redu na razvoj motoričkih sposobnosti i vještina (ponajprije u osnovnoškolskom odgojno obrazovnom području), na unapređenje zdravlja kroz tjelesnu aktivnost te svakodnevno tjelesno vježbanje uz promicanje aktivnog stila života (u osnovnoškolskom i srednjoškolskom odgojno obrazovnom području), vjerujemo da bi to pomoglo što potpunijem ostvarivanju tih ciljeva odnosno potpunijem stjecanju kompetencija na svim razinama školovanja.

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THE DIFFERENCES IN THE COMPETENCES IN PHYSICAL EDUCATION IN SOME EUROPEAN COUNTRIES

ABSTRACT

The main purpose of the study was to assess the contemporary state of physical education systems at all levels of schooling in Europe in a broader sense, and pupils' competences in the narrow sense. It was established that public education systems in many European countries still differ. The duration of primary and secondary education varies considerably, as well as the length of hours of physical education and its frequency. Likewise, the competences acquired during physical education lessons vary slightly from country to country. The most frequent differences are: acquired and developed motor skills, awareness of the positive impact of physical exercise on health, developed hygiene habits, developed habits of lifelong exercise. Furthermore, there are qualifications of cooperation in groups (teamwork), developed sense of fair play and team spirit, developed sense of self-confidence, self esteem and respect for others, responsibility to themselves and their actions.

Key words: *physical education, European countries, competence*

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Izvorni znanstveni rad

ANTROPOLOŠKA OBILJEŽJA SREDNJOŠKOLACA KAO SPOLNI DIMORFIZAM

UVOD

Antropološka su obilježja organizirani sustavi svih osobina, sposobnosti i motoričkih informacija te njihove međusobne relacije (Findak i Prskalo, 2004.).

Kada se govori o djeci (adolescentima), ne možemo, a da ne naglasimo kako je to razdoblje kada su prisutne snažne promjene izazvane rastom i razvojem svih antropoloških obilježja, pogotovo u dobi od 10. do 15. godine kada se dječaci i djevojčice znatno razlikuju. Razlike postoje u antropometrijskim karakteristikama, funkcionalno-motoričkim sposobnostima jednako kao i u psihološkom i socijalnom pogledu (Despot, Viskić-Štalec, 1983.; Paish, 2000.). Spolni dimorfizam u većini parametara rasta i razvoja počinje se značajnije očitovati tijekom spolnog sazrijevanja, a do puberteta se djevojčice i dječaci razvijaju usporedno (Prskalo, I. i sur., 2009.).

Kurelić i suradnici (1975.) proveli su istraživanje koje pokazuje da je porast visine tijela najveći u razdoblju od 11. do 13. godine, kao i tjelesna masa djevojčica.

Pubertet prati stalni napredak u grubim motoričkim aktivnostima. Napredak je sporiji i postupniji kod djevojčica i on svoj vrhunac dostiže oko 14. godine. Za razliku od toga dječaci pokazuju značajan zamah u snazi, brzini i izdržljivosti koji se nastavlja tijekom cijele tinejdžerske dobi (Berk, 2005.). Djevojčice dostižu najbolje rezultate u području koordinacije između 7. i 9. godine života, a maksimum oko 11. godine. Kod dječaka se to događa dvije do tri godine kasnije (Fach, 1998.). Stoga je i cilj ovog rada utvrditi razlike u motoričkim sposobnostima i antropometrijskim karakteristikama kod učenika srednje škole prema spolu.

METODE RADA

Istraživanje je provedeno na uzorku od 59 ispitanika podijeljenih prema spolu na dva subuzorka: (1) 26 učenica (16 godina ± 6 mjeseci) i (2) 33 učenika (16 godina ± 6 mjeseci) drugoga razreda Srednje turističko-ugostiteljske škole iz Mostara. Za procjenu motoričkih sposobnosti učenika odabran je skup standardnih testova za

procjenu bazičnih motoričkih sposobnosti (Gredelj, Metikoš, Hošek i Momirović, (1975); Metikoš i sur. (1989)).

Za procjenu eksplozivne snage: skok udalj s mjesta (MFESDM); skok uvis s mjesta (MFESVM); bacanje medicinke iz ležećeg položaja (MFEBML). Za procjenu koordinacije: koverta test (MAGTUP); trčanje 10 x 5 m; prema Mechelen, W. van et. Al (2001.); koraci u stranu (MAGKUS). Za procjenu antropometrijskih karakteristika mjerenje je provedeno prema uputama Međunarodnog biološkog programa (IBP-a), a mjerene su: visina (ATV), težina (ATT), kožni nabor nadlaktice (AKNN), kožni nabor leđa (AKNL), kožni nabor trbuha (AKNT). Za procjenu odnosa nemasne i masne tjelesne mase koristio se indeks tjelesne mase (engl. Body mass indeks) gdje se identifikacija pretilosti kod djece vrši pomoću krivulja, tzv. BMI percentila (Vranesić i Alebić, 2005.).

REZULTATI I RASPRAVA

Tablica 1. *Deskriptivni statistički pokazatelji morfoloških varijabli za subuzorak učenica (AS - aritmetička sredina, MIN - minimum, MAX - maksimum, SD - Standardna devijacija, KS - Kolmogorov Smirnov Test*

Varijable	N	AS	MIN	MAX	SD	Asimetričnost distribucije	Spljoštenost distribucije	KS
VISINA	26	169,31	158,00	186,00	6,33	0,50	0,81	0,09
TEŽINA	26	61,62	47,00	76,00	9,16	0,12	-1,22	0,13
BMI	26	21,54	17,00	30,00	3,04	0,90	1,53	0,16
AKNN	26	14,81	9,00	24,00	3,88	0,77	0,20	0,15
AKNL	26	10,85	7,00	20,00	4,08	0,71	-0,84	0,22
AKNT	26	12,81	6,00	24,00	4,55	0,44	-0,06	0,13

Granična vrijednost KS testa je značajna na razini od 0.05 za d>0.27 kada je (N=26)

Legenda: visina, težina, BMI - Body mass index, AKNN - kožni nabor nadlaktice, AKNL - kožni nabor leđa, AKNT - kožni nabor trbuha

Kada se pogledaju mjere asimetričnosti i mjere spljoštenosti - zakrivljenosti, možemo uočiti da se rezultati nalaze u prihvatljivim granicama iako vrijednosti asimetričnosti tendiraju k slabijim rezultatima. Vrijednosti mjere zakrivljenosti pokazuju tendenciju da se raspršе jer dobivene vrijednosti formiraju platikurtičnu krivulju. Testiranje distribucije podataka KS testom ukazuje na normalnu distribuciju samih podataka.

Tablica 2. *Deskriptivni statistički pokazatelji morfoloških varijabli za subuzorak učenika (AS –aritmetička sredina, MIN - minimum, MAX - maksimum, SD - Standardna devijacija, KS - Kolmogorov Smirnov Test*

Varijable	N	AS	MIN	MAX	SD	Asimetričnost distribucije	Spljoštenost distribucije	KS
VISINA	33	183,30	172,00	195,00	5,99	0,03	-0,36	0,07
TEŽINA	33	71,53	54,00	115,00	13,32	1,47	2,70	0,22
BMI	33	21,15	17,00	30,00	3,33	1,03	0,58	0,17
AKNN	33	7,39	2,00	20,00	3,54	1,69	3,97	0,24
AKNL	33	6,94	4,00	15,00	3,03	1,44	1,26	0,22
AKNT	33	7,64	4,00	24,00	4,81	2,53	6,18	0,32

Granična vrijednost KS testa je značajna na razini od 0.05 za d>0.24 kada je (N=30)

Legenda: visina, težina, BMI - Body mass index, AKNN - kožni nabor nadlaktice, AKNL - kožni nabor leđa, AKNT - kožni nabor trbuha

Kada analiziramo rezultate mjera asimetričnosti i spljoštenosti - zakrivljenosti kod subuzorka učenici, možemo zaključiti da učenici u svim varijablama, izuzev visine, imaju slabije rezultate u odnosu na aritmetičku sredinu. To je naročito izraženo kod varijable AKNT. Važno je napomenuti da su rezultat mjera asimetričnosti i mjera spljoštenosti varijabli za procjenu potkožnog masnog tkiva, koji izlaze izvan okvira granične prihvatljivosti dobili drugi autori (Bavčević, T. i sur., 2006.). Vrijednosti mjera spljoštenosti ukazuju na povećanje vrijednosti kod testova AKNN i AKNT. Pokazalo se da ima puno više učenika koji imaju malu razinu potkožnog masnog tkiva, pogotovo kod kožnog nabora leđa i nadlaktice. Vrijednosti KS testa ukazuju na normalnu distribuciju podataka, izuzev varijable AKNT.

Tablica 3. *Deskriptivni statistički pokazatelji motoričkih varijabli za subuzorak učenica (AS - aritmetička sredina, MIN - minimum, MAX - maksimum, SD - Standardna devijacija, KS - Kolmogorov Smirnov Test*

Varijable	N	AS	MIN	MAX	SD	Asimetričnost distribucije	Spljoštenost distribucije	KS
MFESDM	26	147,90	89,50	196,50	28,42	-0,10	-0,94	0,12
MFESVM	26	28,80	19,50	40,00	5,70	0,24	-0,39	0,15
MFEBML	26	6,39	3,85	8,28	1,25	-0,50	-0,43	0,09
MAGTUP	26	31,77	26,55	39,25	3,07	0,71	0,55	0,11
10X5m	26	24,34	19,20	33,08	3,44	1,13	0,83	0,22
MAGKUS	26	12,21	9,20	15,84	1,40	0,32	1,17	0,14

Granična vrijednost KS testa je značajna na razini od 0.05 za d>0.27 kada je (N=26)

Legenda: MFESDM - Skok u dalj s mjesta; MFESVM - Skok u vis s mjesta; MFEBML - Bacanje medicinke iz ležećeg položaja; MAGTUP - Koverta test; 10x5m test - test trčanje 10x5m; MAGKUS - Koraci u stranu

Analizirajući mjeru asimetričnosti kod subuzorka učenice za motorički prostor vidimo da je normalna distribucija podataka. Učenice tendiraju u trima varijablama k pojavi lošijih rezultata, ali se oni kreću u granicama prihvatljivosti, što potvrđuje i KS test. Rezultati mjera spljoštenosti formiraju platikurtičnu krivulju jer podatci pokazuju težnju da se raspršе.

Tablica 4. *Deskriptivni statistički pokazatelji motoričkih varijabli za subuzorak učenici*

varijable	N	AS	MIN	MAX	SD	Asimetričnost distribucije	Spljoštenost distribucije	KS
MFESDM	33	190,71	140,50	234,50	24,74	-0,06	-0,64	0,10
MFESVM	33	42,64	31,00	60,00	7,68	0,32	-0,71	0,13
MFEBML	33	10,73	7,20	13,47	1,60	-0,31	-0,88	0,12
MAGTUP	33	28,37	21,05	33,21	2,18	-0,87	3,30	0,17
10X5m	33	20,58	15,86	25,81	2,10	0,33	0,77	0,14
MAGKUS	33	10,73	8,75	14,39	1,33	0,75	0,86	0,09

Granična vrijednost KS testa je značajna na razini od 0.05 za d>0.24 kada je (N=30)

Legenda: MFESDM - Skok u dalj s mjesta; MFESVM - Skok u vis s mjesta; MFEBML - Bacanje medicinke iz ležećeg položaja; MAGTUP - Koverta test; 10x5m test - test trčanje 10x5m; MAGKUS - Koraci u stranu

Kod učenika se mjere asimetričnosti nalaze u granicama prihvatljivosti, dok mjere spljoštenosti - zakrivljenosti tendiraju da se raspršе, dok je kod testa za procjenu koordinacije – MAGTUP povećana mjera zakrivljenosti, što ukazuje da se rezultati polariziraju oko aritmetičke sredine. Rezultati KS testa pokazuju normalnu distribuciju podataka.

Za utvrđivanje kvantitativnih razlika sustava varijabli između dvaju subuzorka definiranih na temelju spola primijenjena je diskriminacijska analiza.

Tablica 1. *Diskriminacijska funkcija varijabli morfološkog prostora između subuzoraka definiranih na temelju spola*

	Svojstvena vrijednost	Kanonička diskriminacija	Wilksova Lambda	x^2	Stupnjevi slobode	P=
0	4,10	0,90	0,20	87,95	6,00	**0,00**

Pri obradi podataka na multivarijantnoj razini korištena je diskriminacijska analiza metodom linearne diskriminacijske analize, pri čemu se izolirala jedna diskriminacijska funkcija s iznimno visokim kanoničkim koeficijentom korelacije Kd = 0,90. S druge strane, vrijednost Wilkis Lambde, koja potvrđuje jačinu diskriminacijske funkcije, ukazuje na postojanje razlika između dvaju subuzoraka (Wl = 0,20), pri čemu su centroidi skupina na diskriminacijskim funkcijama kod učenika s pozitivnim predznakom, a kod učenica s negativnim predznakom.

Tablica 2. *Struktura diskriminacijske funkcije*

Varijable	FAKTOR 1
VISINA	0,569
TEŽINA	0,212
BMI	-0,030
AKNN	-0,501
AKNL	-0,276
AKNT	-0,275
Centroidi	
M	1,766
Ž	-2,241

Legenda: visina, težina, BMI - Body mass index, AKNN - kožni nabor nadlaktice, AKNL - kožni nabor leđa, AKNT - kožni nabor trbuha; M - muškarci, Ž - žene

Analizirajući strukturu diskriminacijske funkcije može se uočiti da diskriminaciji između dvaju subuzoraka najviše doprinosi varijabla visina, a njezina korelacija s diskriminacijskom funkcijom je 0,569 i AKNN, a korelacija s diskriminacijskom funkcijom je -0,501, dok se manja razina utjecaja na ukupnu diskriminaciju može uočiti kod varijabli AKNL i AKNT. Projekcija centroida pokazuje dominaciju visine kod dječaka, a kožnog nabora kod djevojčica. U dječaka se najintenzivniji rast odigrava od 13 do 15,5 godina, tako da kroz to vrijeme dječaci narastu za približno 20 cm. Kod djevojčica intenzivniji rast počinje dvije godine ranije, tj. od 11. godine. U godini najintenzivnijeg rasta djevojčice postižu najviše oko 8 cm. (Medved i sur., 1987.). Rezultati ispitivanja (Prebeg, 1977.) pokazuju da prosječni rast u djevojaka definitivno završava sa 17, a u mladića s 19 godina, iako je povećanje visine nakon 15. godine u djevojaka i nakon 17. godine u mladića samo minimalno. Najintenzivniji porast tjelesne mase u djevojčica javlja se u prosjeku između 11. i 13. godine. Prosječna tjelesna masa dječaka stalno se povećava do 19. godine, s tim da se najveći prosječni porast tjelesne mase opaža između 12. i 14. godine (Medved i sur., 1987.). Što se

tiče mišića, u muškaraca 40% tjelesne težine otpada na mišiće, a u žena samo 33% (prema nekim autorima 23%), (Medved i sur., 1987.). Oko 8. godine djevojčice počinju dobivati masnoću na rukama, nogama i trupu, a taj se trend ubrzava u dobi između 11. i 16. godine. Masnoća u rukama i nogama adolescentnih dječaka se smanjuje. Dječaci puno više dobivaju na mišićnoj snazi nego djevojčice.

Tablica 3. *Diskriminacijska funkcija varijabli motoričkog prostora između subuzoraka definiranih na temelju spola*

	Svojstvena vrijednost	Kanonička diskriminacija	Wilksova Lambda	X^2	Stupnjevi slobode	P=
0	2,43	0,84	0,29	66,51	6,00	0,00

Pri obradi podataka diskriminacijske analize metodom linearne diskriminacijske analize motoričkog prostora, utvrđena je visoka korelacija izolirane diskriminacijske funkcije koja je statistički značajna s visokim koeficijentom (Kd = 0,84), kao i visokim koeficijentom za utvrđivanje jačine diskriminacijske funkcije (Wiks Lambda = 0,29).

Tablica 4. *Struktura diskriminacijske funkcije*

Varijable	FAKTOR
MFESDM	0,525
MFESVM	0,652
MFEBML	0,963
MAGTUP	-0,423
10 X 5m	-0,440
MAGKUS	-0,352
centroidi	
M	1,36
Z	-1,73

Legenda: MFESDM - Skok udalj s mjesta; MFESVM - Skok uvis s mjesta; MFEBML - Bacanje medicinke iz ležećeg položaja; MAGTUP - Koverta test; 10x5m test - test trčanje 10x5m; MAGKUS - Koraci u stranu

Analizom strukture diskriminacijske funkcije utvrđena je najveća korelacija s diskriminacijskom funkcijom, što pokazuju rezultati testova za procjenu eksplozivne snage ramenog pojasa i nogu MFESDM, MFESVM i MFEBML, a projekcija centroida pokazuje dominaciju ovih varijabli kod učenika. Doba puberteta karakterizirano je ne

samo rastom (morfološkim promjenama), nego i čitavim nizom promjena fiziološke prirode. Istraživanja snage latentnog prostora pokazala su da su mnogobrojne motoričke manifestacije eksplozivnog karaktera određene mehanizmima za regulaciju intenziteta eksitacije. Morfološke karakteristike, biopologija, kao i biomehanički uvjeti doprinose većoj ili manjoj eksplozivnosti vršenja pokreta (Mikić, B. 2000.).

Relacije između motoričkih sposobnosti i morfoloških karakteristika na razini ne samo manifestnih mjera, nego i latentnih dimenzija antropološkog statusa čovjeka izučavane su na intenzivan način posljednjih godina. Rezultati su pokazali da su manifestni i latentni indikatori energetskog izlaza kod osoba muškaraca pod snažnim pozitivnim utjecajem dimenzije volumena i mase tijela, dok je kod žena ovaj utjecaj znatno manji. Kod oba spola potkožno masno tkivo ima jako izražen negativni utjecaj na indikatore energetskog izlaza, posebice na dijelovima tijela na kojima postoji jače izraženo gomilanje masnog tkiva (Malacko i sur., 2004.).

Kada se analiziraju razlike između dječaka i djevojčica u odabranim subuzorcima i kada se pogledaju rezultati morfološkog mjerenja, vidljivo je da dječaci imaju puno manje potkožno masno tkivo od djevojčica, što vjerojatno i doprinosi uočenim razlikama.

Ako se vodimo činjenicom da muškarci imaju veću mišićnu masu nego djevojke, automatski će ta mišićna masa imati i veći postotak i različitih mišićnih vlakana, a u ovom slučaju brzog trzaja (FT-vlakna) koja su zadužena za izvođenje pokreta velikom brzinom.

U postizanju razlika između učenika zasigurno doprinosi i genetska komponenta. Tako prevladava mišljenje da se eksplozivna snaga i koordinacija nasljeđuju (.80 - .85), (Malacko, 2004.). Tako veliki postotak daje nam za pravo da zaključimo kako je i genetska pojava doprinijela pojavi razlike.

ZAKLJUČAK

U potpunosti se može reći da su utvrđene razlike u motoričkim sposobnostima i antropometrijskim karakteristikama kod učenika srednje škole prema spolu u korist muškog spola, tj. učenika. Učenici su pokazali bolje rezultate od učenica u prostoru motorike, pogotovu u testovima eksplozivne snage nogu i ramenog pojasa. Također, učenici imaju puno manje potkožnog masnog tkiva od učenica. Razlike koje su dobivene potvrđuju nam činjenicu da se dječaci i djevojčice kada ulaze u fazu spolnog sazrijevanja, tj. ulaze u razdoblje kada su prisutne snažne promjene izazvane rastom i razvojem svih antropoloških obilježja, pogotovu u dobi od 10. do 15. godine, znatno razlikuju. Razlike postoje u antropometrijskim karakteristikama, funkcionalno-motoričkim sposobnostima, jednako kao i u psihološkom i socijalnom pogledu.

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ANTHROPOLOGICAL CHARACTERISTICS OF SECONDARY SCHOOL CHILDREN AS GENDER DIMORPHISM

ABSTRACT

The aim of this study is to establish differences regarding motor abilities and anthropometric characteristics among school children, according to gender. The research was conducted on the sample of 59 examinees at the age of 16 (± 6 months) who were divided, according to gender into two sub-samples: (1) 26 female students (16 years old ± 6 months) and (2) 33 male students (16 years old ± 6 months) attending second grade of „Turističko – ugostiteljska škola" in Mostar.

Statistically significant difference was established and confirmed between boys and girls regarding the area of motor abilities and morphology. A discriminant analysis confirmed the differences between sub-samples in favour of male students. As a final result, these differences confirm the fact that these children are on the verge of the phase of sexual maturation/the period of significant changes induced by the development of all anthropological characteristics. However, development and growth are determined by sequence of endogenous and exogenous factors.

Key words: *motor abilities, anthropometrical characteristics, gender dimorphism*

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STUDY OF MOTION ACTIVITIES OF UNDERGRADUATES AND THE POSITION OF THESE ACTIVITIES IN THE STRUCTURE OF FREE TIME ACTIVITIES

INTRODUCTION

Knowing what free time activities of the undergraduates are can have a special meaning for the society. University graduates become the managers of the whole society. Alma Mater influences not only their professional interests but also their free time activities. If the students gain the knowledge that the appropriate activity can influence their physical and mental health, they will probably use it, not only during their study, but in their future life as well. What is more important, they will influence in this sphere their children, employees, workers of social community and cultural life, politicians, directors of institutions, etc. (Charzewski, 1997, Prachár et al., 1997). The Universities and their faculties can do a lot in their educational programmes and that is why they analyse free time activities of their students, their attitude to motion activities, and their views about the need for movement activities. In connection with this, they offer students good conditions for realisation of sport-recreational activities. This is the reason why the research was conducted in the Institute of Physiotherapy, Balneology and Medical Rehabilitation (IFBLR) UCM in Trnava.

MATERIALS AND METHODS

In total, 87 students of the IFBLR UCM Trnava participated in the research, among them 32 were men and 55 women at average age of 21. The whole group of respondents was divided into trained and untrained, and men and women. Research methods that were used were questionnaire, evaluation of the selected somatic, motor and functional indexes, and correlation relationships. The distribution and collection of the questionnaires was done during winter term in 2009. The questionnaire was aimed at finding out free-time activities of the students, learning the motives for the practical training, finding out the reasons for free-time activities, monitoring physical activities which the students prefer and learning which sport – relaxation activities the students like. Statistical analyses were done using t-test and chi-square.

RESULTS AND DISCUSSION

Question 1: What do you prefer to do in your free-time? (The subjects could mark maximum 5 activities).

Evaluation: in the whole group of IFBLR students, the most frequent answer was meeting with friends (72.4%) (Figure 1). This response is interesting in contrast to the present social philosophy theory of disaffection, i.e. weakening social interactions and stepwise disaffection of the human being from the present community. The question here is what type of meeting friends the students referred to. It can be meeting followed by listening to the music (which is strongly supported by the second free-time activity – 64.4%), or it can be meeting with drug abuse (alcohol, marihuana etc.), i.e. „drug party" more or less. Further analyses of free-time activities could clarify a lot of things. Among other, it can be deduced that subjects prefer passive – receptive activities. High percentage involves listening to the music (65%), surfing the Internet (60%), watching TV (59%) and, to a much less extent, reading books and magazines (44%). Occurrence of physical activities and tourism represent much lower percentage (46%).

The character of the study at IFBLR forces the students to regular physical activities, and thus the higher percentage of exercising is expected. The results would be more acceptable if the students practising sports had been engaged. When comparing male and female free-time activities, it can be seen that in the first place there is meeting friends (M – 84.4 %, W- 65.5%). The 20% difference favouring men is remarkable. Even watching TV is more popular among men. The biggest difference between men and women is in reading books and magazines, 50% in favour of women. In contrast, sports training is the men's domain- 43.8% versus 12.7% in women. Household chores are traditionally found in higher percentage among women. Notable is almost the same interest in physical activities in men (44%) and women (47%). Surfing the Internet is in the second place among free-time activities both in men and women.

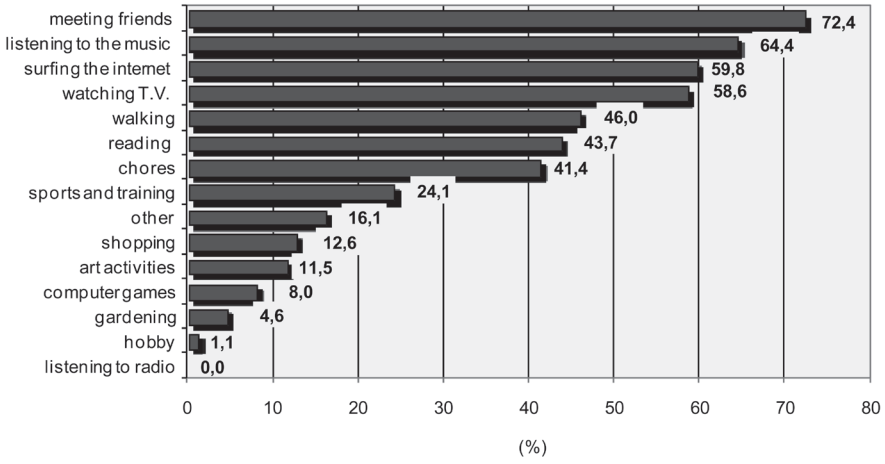


Figure 1.

Question 2: If you do exercise or sport regularly, tell us why. (The subjects could write a maximum of three motives.)

Evaluation: in the whole group, all subjects refer to increase in physical condition as the reason for regular training or doing sports (38%) (Figure 2). The expected result of improving health was at the third place (33%). In many surveys with similar focus, the health reasons are usually at the first place. Majority of population finds the health level as the most important, that is, it occupies the first places on their ranking scale. It can be postulated with satisfaction that recreational sports is considered by the subjects to be effective means for fun and distraction (36%), relieving stress (32%) and psychological relaxation (23%). The data concerning the influence of physical activity on mental state of man appears seldom in literature and even among ordinary population it is not favoured. The influence of physical activities is generally understood as the effective intervention on somatic and functional aspect of man. It is interesting that in comparison with other analyses, much lower percentage of answers is in terms of reducing weight (13%) and posture modulation (32%). In these cases, it can be assumed that our students aged 21 do not feel the acute necessity for these interventions. The opportunity for superiority was not concerned by anyone. In monitoring the reasons for exercising in professional sportsmen, these opinions appear quite often. Comparing the answers of men and women among the subjects, it can be postulated that stress relieving is more frequent (47%) in men than in women (23.6%). Surprising is the major difference in trying to enhance own performance in men (28%) and women (4%). Sports in terms of health improvement is postulated by women more often (36%) in comparison to men (28%). Male part of the population

in our group should be healthier. Naturally, women are more concerned with body forming (38%) than men (22%).

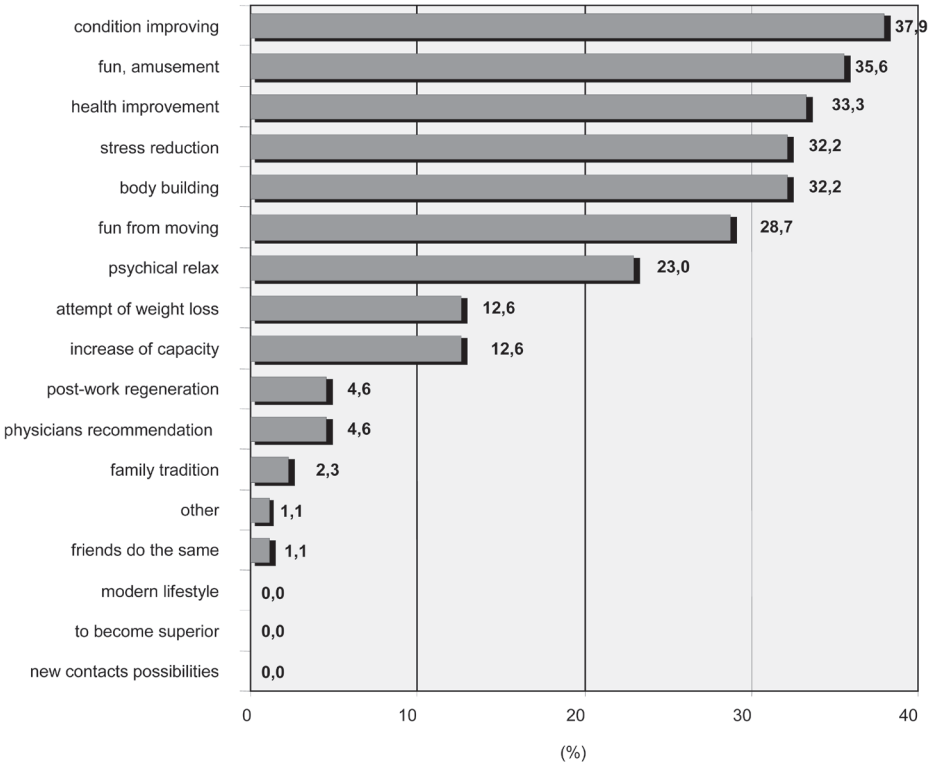


Figure 2.

Question 3: Give a reason if you do not exercise or train regularly at present (the subjects could mark maximum three reasons).

Evaluation: The lack of free-time or missing free time is generally marked as the main reason for not exercising or doing sports. The reasons are mainly an internal barrier (psychological). Why the lack of free time indeed? Why do the students mark this as the main reason? It is a fictive reason. People lack the right information about recreational sports and do not have proper knowledge. Even in our analysis, the lack of time (27.6%) and indolence (27.6%) is the major reason (Figure 3). It is surprising that subjects confirm indolence to such a high percentage. This is very rare in respondents. Both reasons are not cardinal indeed. A quarter of the subjects in the whole group states the lack of exercise opportunities (25.3%) as the reason

for movement inactivity. Even this reason cannot be accepted. There are a lot of simple but effective motion activities independent of special places, instruments, actions, services, group exercises etc., thus hypothetically, this reason is named out of ignorance. Further study or career prospects is of newer origin, and 2 decades ago they were not mentioned at all. These can reduce the necessary time set for exercise. Inexplicable is the reason that they do not know how to start (4.6%).

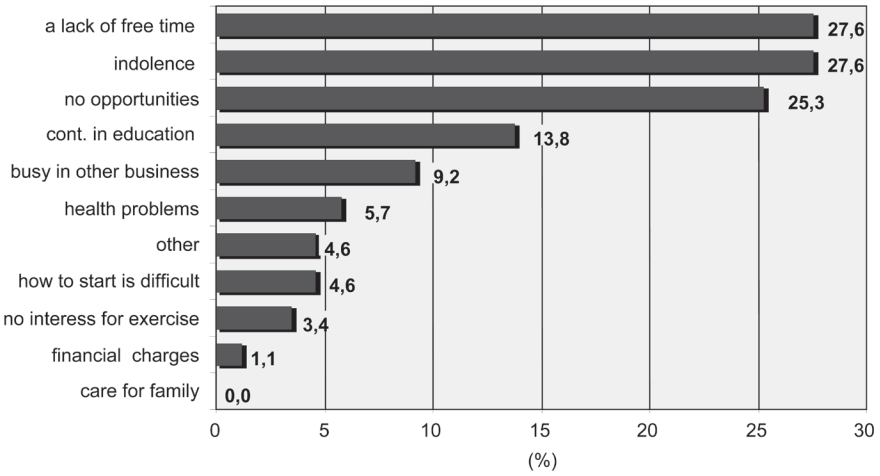


Figure 3.

Question 4: If you do exercise or sport, mark 3 activities you do the most during the year.

Evaluation: In-line skating was in the first place in the whole group (36%), Figure 4. This sport-recreational activity was at the bottom of the scale several years ago. The increasing interest in recent years is a pleasant improvement. The interest in swimming (31%) represents the good choice of physical activity of our respondents. This discipline was marked as physiologically most effective and suitable for average population. Home exercising of students is positive as well (22%) which can demonstrate understanding of the meaning of exercise, time sparing and getting used to training even in poor conditions. Fast walking is not exploited that much (18%). Low percentage in taking use of games in the whole group can be hypothetically explained by the domination of women in this group, who for example, never played football. The data about walking and hiking (26.4%) and cycling (23%) are positive. However, there is surprisingly low interest in aerobics (9%).

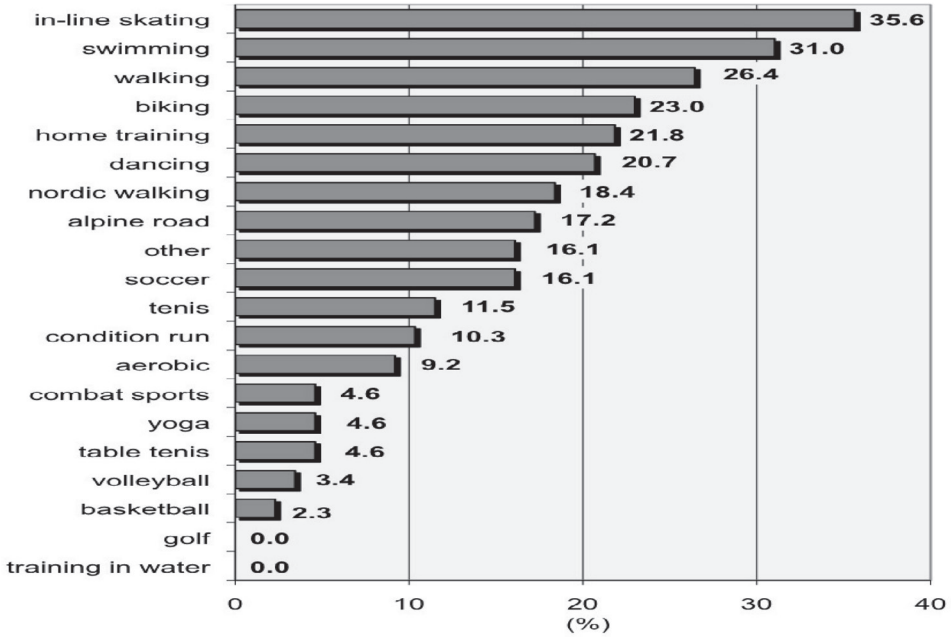


Figure 4.

Question 5: When you do not do sports or exercise regularly, mark the activity which you would prefer.

Evaluation: In the whole group, 45% of subjects wish to swim. This activity is at the top of the activities among adults throughout the country, but not only in Slovakia. In our study, the second place was occupied by dance, which is surprising. Hypothetically, the reason can be female prevalence in the group. The high percentage of people interested in dance is influenced by the better offer of this activity by services. It can also be proposed that TV dance shows helped the promotion. Differences were found in the intention to swim (M-15.6%, W-36.4%) and to dance (M-3%. W-34%) comparing the interests in sports activities in men and women who are studying at IFBLR. Both these differences are statistically significant. There are interesting wishes of women taking part in martial arts, which were positioned higher than in men. Similar situation was found for in-line skating (M-3%, W-13%). Women tend to play volleyball more often and of course, do aerobics as well.

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ABSTRACT

The authors observed free-time activities of 21-year-old students of physiotherapy at the University of St. Cyril and Methodius in Trnava. The responses of 87 students in three grades of bachelor ´s study were evaluated in this research. The questionnaire mainly focused on the subjects engaged in sports and those who do not do sports. Men and women were evaluated separately. In the set of free time activities, the receptive (movement unresponsive) nature of common activities was acknowledged. Chummy gatherings (72%) were preferred to listening to music (64%), to surfing the net (60%) and to watching TV (59%). The activities connected with physical activity (movement of the body) follow, but some were at the bottom of the scale. The results corresponded at this point with the results of some other undergraduate workplaces, in fact, they were similar. It was noteworthy that the first 3 movement unresponsive activities occurred in higher percentage in men in comparison with women, the first 2 were even perceptually more frequent in those respondents engaged in sports. The most important reason for exercising was the effort to improve physical condition, the next was entertainment, and surprisingly, the improvement of health condition was the third. Lack of free time was the reason for passivity in movement as well as laziness. Among those respondents who were not engaged in sports activities up till now, the highest percentage incline to swimming. Considerable interest was in dancing and in-line skating.

Key words: *free time activities, free time of the undergraduates, students of physiotherapy, recreational engagement in sports, sport and recreational activities, movement and inactivity, hypokinesis*

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Original scientific paper

BODY PROPORTIONS OF TURKISH PHYSICAL EDUCATION AND SPORTS STUDENTS

INTRODUCTION

The close relationship between health condition and body shape has been known for a long time (Muñoz-Cachón et al. 2007). Since body type can be affected by genetic factors, nutritional intake, socio-economic conditions, age, gender etc., it has the possibility to give valuable information about the societies for researchers (Muñoz-Cachón et al. 2007).

One of the most important health issues of modern societies is obesity and worst of all; it seems to affect children as well. As much as 13-14% of children in USA are determined as obese, while in England it is 10-17%. In 2001, in an obesity research where 6 countries were involved (Brazil, Great Britain, Hong Kong, Holland, Singapore and USA) it was found that children aged 4-11 have obesity rate of 2-3%. Between the years of 1984 and 1994, the percent of overweight children increased 50% (Jebb et al., 2003).

The best method for preventing and stopping this fast increase in obesity is the combination of regular physical exercise and a balanced diet (Nakeeb et al., 2007). From this perspective, the importance of physical exercise in primary/secondary and high school education and the importance of teachers who will organize these exercises is tremendous.

With that in mind, the purpose of this study is to assess the body proportion of Turkish physical education and sports students who are going to be future teachers of children and young people.

MATERIALS AND METHOD

Subjects

258 male students from The School of Physical Education and Sports in Ege University who exercises recreationally participated in this study (age: 22.40 ±2.75 years, height: 178.67±9.43 cm., body weight: 73.44±13.64 kg.).

Participants written consent was obtained and the purpose of the study was explained. All of the measurements were made by the same group of people during the same day in Ege University School of Physical Education and Sports Performance Lab.

Weight and height measurement: Electronic scales (Angel, 150 MA, Istanbul/ Turkey) used in determining weight categories and height of the athletes before official competitions were used.

Body fat percentage measurement: Holtain 0.2 mm sensitive skin fold calliper was used to measure body fat percentage (Holtain Ltd, Crosswell, Crymych, UK). Skin fold thickness was measured on the following sites: triceps brachii, biceps brachii, subscapular, suprailiac, chest, thigh, calves, and abdomen. Yuhazs formula was used to assess body fat percentage

Width measurements: were made with a sliding calliper (Holtain HLT-100, UK)

Girth measurements: Made with a non-flexible tape measure.

Statistical analysis: SPSS for Windows (ver. 17.0) was used to calculate means and standard deviation of the obtained data.

RESULTS

In Table 1 Weight, Height, Weight to Hip Ratio (WHR), Ponderal Index (RPI) and Body Fat percentage is shown. In Table 2 BMI (body mass index), Cornique index, Monourier Index, Acromioiliak index, Martine index, Biacromial index and hip Index values are shown. Results are as follows: BMI 22.86±3.05 (kg/m^2), Body fat percentage 14.43±4.41 (%), Cormique index 51.51 ± 1.58 (%), Monourier index 94.31 ± 6.10 (%), Acromio-iliac index 63.88± 6.61 (%), Martine Index 6.11 ± 0.48 (%), Biacromial index 22.32 ± 1.86 (%) and Hip index 13.89 ± 0.97 (%).

Table 1. *Average Values For Athletes' Body Proportions*

Variables	Mean±SD (n=258)	Evaluation
Height (cm.)	178.67±9.43	
Body Weight (kg.)	73.44±13.64	
WHR (%)	0.79±0.05	Low risk
RPI (cm/kg $^{0.333}$)	42.89±1.77	Optimal
% Fat	14.43±4.41	Optimal

Table 2. *Body Proportion Indexes*

Index	Calculation Method	Mean±SD (n=258)	Evaluation
Body Mass Index (kg/m^2)	(weight/height^2)	22.86±3.05	Normal
Cormique Index (%)	(Sitting height/ height).100	51.51±1.58	Mid-Trunk
Monourier Index (%)	(Height-sitting height/sitting height).100	94.31±6.10	Sub macroskelia
Acromio-iliac Index (%)	(Biiliac width/Biacromial width).100	63.88±27.13	Wide shoulders
Martine Index (%)	(height/chest width)	6.11±0.48	Narrow upper body
Biacromial Index (%)	(Biacromial width/height).100	22.32±1.86	Normal
Hip Index (%)	(Biiliac width/height).100	13.89±0.97	Narrow hips

DISCUSSION

Increased BMI, RPI and WHR are the indicators of diseases, such as coronary heart disease or diabetes mellitus. Although it has become a custom to see high values of the above-mentioned criteria in modern societies, it is surprising to see the increasing values for athletes as well. For instance, a study by Joyce et al. (Joyce and Hecth 2005) found that ¼ of American Football players have 2nd degree obesity.

In a wide research conducted by International Health Behavior in 2006, including 22 countries, covering 18,152 university students (male: 8,115, female: 10,037) BMI values according to countries were: Belgium 22.1 kg/m^2, England 22.7 kg/m^2, France

21.9 kg/m^2, Germany 22.8 kg/m^2, USA 24.3 kg/m^2, Bulgaria 23.1 kg/m^2, Greece 23.1 kg/m^2, Italy 22.1 kg/m^2 (Wardle et al., 2006). In another study on 203 male soccer players in Spain, aged 19, the BMI value was 22.96 ± 1.2 kg/m2 (Gil et al., 2010). In a study conducted in Turkey, on 153 males having different levels of physical activity, BMI values were as follows: American football players 27.76±5.18 kg/m^2, volleyball players 24.49±2.90 kg/m^2, basketball players 24.70±2.65 kg/m^2, football players 23.37± 2.78 kg/m^2, and for students who do not exercise regularly 23.42± 3.62 kg/m^2 (Pelin et al., 2009).

Another criterion for physical fitness is the amount of subcutaneous fat tissue. Subcutaneous fat tissue value (%) changes according to gender and sport. Sınırkavak et al. (2004) found the subcutaneous fat tissue value of male physical education and sports students to be 11.80± 0.55 (Sınırkavak et al., 2004). In a study conducted by Akın et al. with 5 different sports including 100 male athletes, subcutaneous fat tissue values for different sports were as follows: wrestling 13.06%, soccer 15.1%, weight lifting 18.2%, handball 20.8% and taekwondo 16.8% (Akın et al., 2004).

It is notable that although there are numerous studies assessing physical fitness according to anthropometric attributes, there are not many studies concerning body proportions for physical fitness. In body proportion studies handball players were found to have wide shoulders, narrow hips and mid-sized trunk, whereas soccer players had long body and narrow hips (Çakıroğlu et al., 2002; Çıkmaz et al., 2005).

In conclusion, participants in our study were found to have normal BMI, RPI, WHR and percentage of fat values. According to the body indexes, they had sub-macroskelia, mid-sized trunks, wide shoulders and narrow upper body and hips.

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ABSTRACT

The aim of this study was to assess body proportions of Turkish physical education and sports students, who will instruct children and young people in the field of physical education in the near future. In this study, 258 male physical education and sports students who exercise on a recreational level (age: 22.40±2.75 years, height: 178.67±9.43 cm, body weight: 73.44±13.64 kg) were assessed in terms of BMI (Body Mass Index), RPI (Ponderal Index), WHR (Waist to Hip Ratio), percentage of body fat, Cormique index, Monourier index, Acromio-iliac index, Martine index, Biacromial index and hip index. The results were as follows: BMI: 22.86 ± 2.66 (kg/m^2), RPI:42.89 ± 1.77 ($cm/kg^{0.333}$), WHR: 0.79 ± 0.05(%), body fat percentage 14.43±4.41 (%), Cormique index 51.51 ± 1.58 (%), Monourier index 94.31 ± 6.10 (%), Acromio-iliac index 63.88± 6.61 (%), Martine index 6.11 ± 0.48 (%), Biacromial index 22.32 ± 1.86 (%) and hip index 13.89 ± 0.97 (%). Although the subjects were found to be normal- healthy individuals in terms of BMI, WHR and percentage of body fat, they were also assessed as having mid-trunk, sub-macroskelia, narrow upper body and narrow hips.

Key words: *Physical education and sports students, anthropometric attributes, obesity, body proportions*

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Original scientific paper

GROWTH PATTERNS IN YOUNG ITALIAN STUDENTS: A LONGITUDINAL STUDY

INTRODUCTION

Our body is exposed to the physical growth effects during the first two decades of life. Changes in body and gender evolution are the macroscopic outcomes that affect all adolescents.

Also, the hormonal levels cause an increasing and important peak of muscular strength and power, variations in endurance and in speed performance. Even in the school environment, physical activity is modified and sometimes compromised. In particular, during school course all Physical Education (PE) teachers observe the growing path of their students.

The aim of this study is to show the growth patterns of Italian students observed during three different stages.

METHODS

Height and weight were measured (1) on three wide samples of adolescents (n=748; 14, 15 and 16-year-olds). The measurements were repeated on the same sample in the following two years. As such, a brief longitudinal study on anthropometric characteristics was assessed on 403 males (150, 114, 139 of 14, 15 and 16-year-olds respectively) and 345 females (131, 123, 91 of the three age groups).

PE teachers conducted all phases of the protocol during PE lessons. In particular, body weight was measured to the nearest 0.5 kg on a beam-balance scale, and stature was measured to the nearest 1 cm with a stadiometer (1).

RESULTS

In 2006, the 14-year-old male students were 167.5 cm in height and reached 175 cm in the following two years. In the same year, the 15-year-old males started from 171 cm (same value reached by 14-year-old group after one year) and reached 176 cm. The last group (16-year-olds) were 175 cm in height and the average 2-year increase was 1 cm.

Therefore, it was possible to define two important peaks of growth (mean=4 cm), while in the last steps (16 to 17 years) the phenomenon had a minimum variation (1 cm).

In all groups there was an increase in stature. The range was between 160 cm (14-year-old group in 2006) and 167 cm (third step for 16-year-old group in 2006). In particular, 16-year-old girls (Fig. 1) measured 165 cm while the last peak of growth is presumably between 17 and 18 years (167 cm).

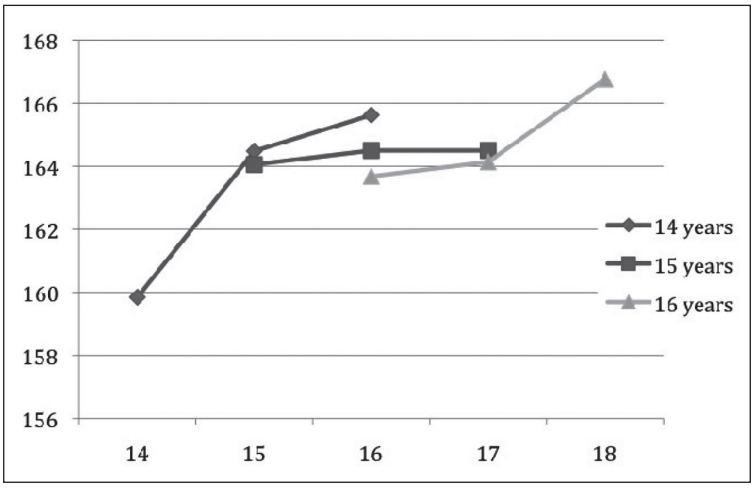


Fig.1 *Height trend among young female students*

Weight in males showed a non-linear trend. Indeed, in the first group (14-year -olds) there was an increase from 3 and 9 kg in 2007 and 2008, reaching 72 kg. In the second group the initial weight was 67 kg in 2006, increasing about 1 and 1.5 kg during the following two years. The last group (16-year-olds in 2006) showed an initial 3 kg decrease and a second phase of increase (3 kg).

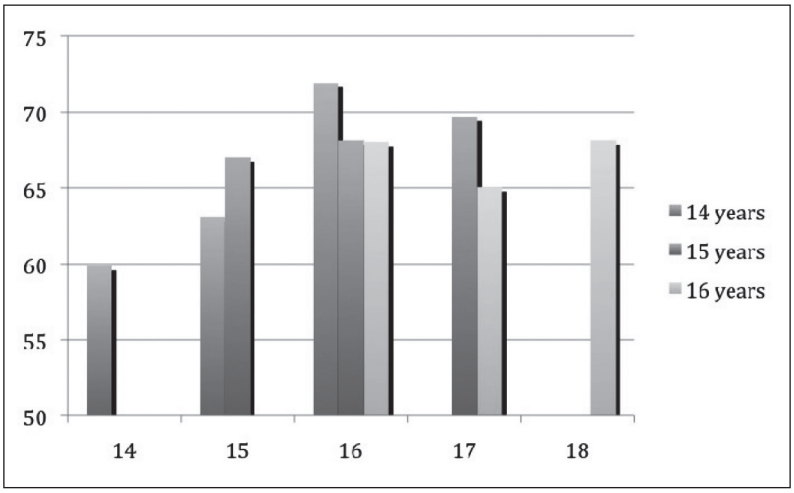


Fig. 2 *Weight trend among young male student*

Females also showed a non-linear trend in ponderal status. Namely, all three groups after the first measurement had obtained inferior weights compared to the second one. The greatest gap between the first and the third step was 8 kg (14-year-old group).

DISCUSSION

The real definition of growth allows an insight into critical aspects. Especially considering height, there were similar measures among different age groups (2) while according to gender, there was a weight increase among both males and females, but with a non-linear trend.

Future investigations could compare the growth trend between urban and rural populations, the effects of socioeconomic hierarchies (3) and the variability due to motor habits.

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Stručni rad

SAT TJELESNE I ZDRAVSTVENE KULTURE U FUNKCIJI RAZVOJA SNAGE

UVOD

Snaga je sposobnost organizma, a naročito mišića da znatno i efikasno djeluju protiv otpora (podloge, suparnika, nekog predmeta i sl.). Različite su vrste akcijskog očitovanja ove motoričke sposobnosti, npr. eksplozivna snaga, apsolutna maksimalna snaga, elastična ili pliometrijska snaga, repetitivna snaga i statička snaga. Bitno je naglasiti kako postoji velika razlika u cilju pri razvoju snage u nastavi tjelesne i zdravstvene kulture (TZK) i snage u sportu. U nastavi TZK primarni je cilj postizanje optimalnog rasta i razvoja te zdravlja svakog djeteta, dok je u sportu prvenstvena svrha postizanje što boljih sportskih rezultata. Podizanjem razine snage u nastavi TZK djeluje se na optimalan razvoj unutarnjih organa, hormonalnog i lokomotornog sustava (Hollmann i Hettinger 2000, Rusch i Weineck 1998). Stoga bi bilo od velike koristi da svaki nastavnik tjelesne i zdravstvene kulture u svom godišnjem programu pronađe mjesta za unapređenjem ove motoričke sposobnosti. Unatoč svim prednostima razvoja snage koji pozitivno utječu na organizam učenika, ona je samo dio spektra svih motoričkih sposobnosti potrebnih da se poboljša sveukupni antropološki status učenika. Osnovni cilj ovoga rada je prikazati kako sat tjelesne i zdravstvene kulture, kao osnovni organizacijski oblik rada, može biti u funkciji razvoja snažnih svojstava.

VAŽNOST RAZVOJA SNAGE

Učenici se u sklopu sata TZK susreću s raznovrsnim sportovima gdje izvode gotovo sva kretanja prilikom kojih savladavaju različite vrste otpora (podloge, suparnika, nekog predmeta i sl.), a gdje su snažna svojstva od neizmjerne koristi. Što iz razloga unapređenja i očuvanja zdravlja (npr. sprečavanje ozljeda), a što iz veće natjecateljske efikasnosti. Istraživanja pokazuju da gotovo 60% školske djece ima slabo razvijenu muskulaturu trupa (Weineck, 1998.) što dovodi do pogrešnog držanja tijela te samim time i do raznih koštanih deformacija. Putem nastave tjelesne i zdravstvene kulture svakako bi, uz problem kroničnog nedostatka kretanja, trebalo utjecati na razvoj snažnih svojstva. Dobro osmišljena progresija treninga snage

rezultirat će jačanjem ligamenata i tetiva što omogućuje učenicima da se bolje suoče s naporima koji ih očekuju u nastavnom procesu te u velikoj mjeri spriječe moguće ozljede (Kramer i Fleck, 1993.). Razvoj snage ima i veliki zdravstveni učinak na koštani sustav. Dostignuta gustoća kostiju u mladosti određuje i gustoću kostiju u odrasloj dobi (Mišigoj Duraković, 1999.). Mineralni sastojci kostiju povećavaju svoju funkcionalnost što kasnije u životu djeluje kao preventivna mjera od osteoporoze. Poticati razvoj snage s učenicima već u osnovnoj školi ima mnogobrojne prednosti, a dvije najvažnije su da pospješuje optimalan rast i razvoj te osigurava zdravlje cjelokupnog organizma.

MODALITETI VJEŽBI KOJE SE MOGU KORISTITI S OBZIROM NA DOB UČENIKA

Analizom dosadašnjih istraživanja može se zaključiti kako se od prvog do trećeg razreda osnovne škole treba koristiti vježbama dinamičnog karaktera s izmjeničnim i malim opterećenjima, dok se od četvrtog razreda mogu primjenjivati i neke statičke vježbe. Najčešći modaliteti vježbi koji se koriste za razvoj snage u osnovnoj školi su:

- vježbe u kojima se savladava težina svoga tijela ili dijelova tijela,
- vježbe s vanjskim opterećenjem (medicinke, bučice malih težina do 2 kg i sl.),
- vježbe u paru (potiskivanje, povlačenje, nošenje),
- vježbe poput skokova, poskoka na povišenja, doskoci, penjanja i sl.

Kada je u pitanju izbor vježbi, bilo bi dobro uz sve navedeno opredijeliti se za vježbe dinamičnog karaktera i svakako u toku vježbanja izbjegavati dugotrajan rad statičnog tipa.

PRIPREMANJE ZA SAT TZK U FUNKCIJI RAZVOJA SNAGE

U pripremi za sat TZK u funkciji razvoja snage, prije svega valja provjeriti aktualno stanje učenika kako bi analizom dobivenih rezultata utvrdili njihove stvarne potrebe. Sljedeći korak u pripremi je izbor vježbi i pomagala koja će se koristiti za razvoj ove motoričke sposobnosti. Određivanjem vremena potrebno za izvedbu, uključujući i vrijeme odmora, vrijeme za moguće promjene opterećenja i vrijeme za modifikaciju pomagala zadnji je korak u pripremi. Ponekad se u praksi događa da se zbog nedostatka vremena preskače neka od vježbi, a tada je uputno izostaviti upravo onu vježbu koja ima u datom trenutku *najmanji* utjecaj na antropološki status učenika (grupe ili individue) s obzirom na prethodnu analizu stanja. Skraćivanje vremena odmora, odnosno pauze između vježbi preporučuje se jedino u slučaju kada se želi povećati lokalnu mišićnu izdržljivost, uz uvjet da se i vanjsko opterećenje znatno smanji. Prilikom korištenja vježbi s vanjskim opterećenjem valja osigurati da se

vježbanje odvija pod stručnim nadzorom, a opterećenje mora biti takvo da ga učenik može kontrolirati kroz cijeli opseg pokreta.

MOGUĆI SADRŽAJI ZA RAZVOJ SNAŽNIH SVOJSTAVA PRIKAZANI PO DIJELOVIMA SATA

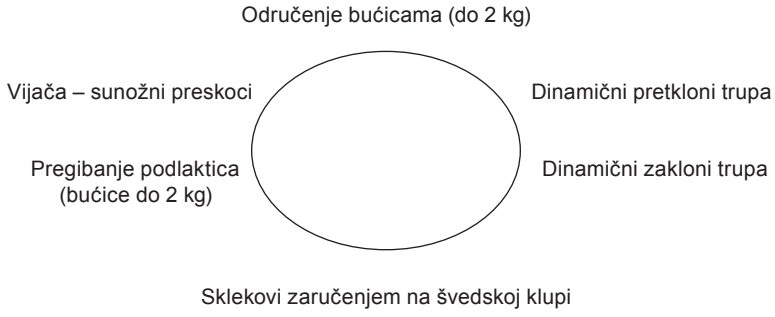
U daljnjem tekstu dan je konkretan primjer sadržaja za razvoj snage po dijelovima sata (uvodni, pripremni, glavni „A", glavni „B" i završni) tjelesne i zdravstvene kulture u odnosu na njihov cilj i zadaće.

Tablica 1. *Primjeri sadržaja po dijelovima sata TZK*

STRUKTURA SATA TJELESNE I ZDRAVSTVENE KULTURE
1. Uvodni dio sata Elementarna igra „Hvatanje na različite načine". Sastoji se od specifičnih kretnji, kao što su: kratki sprintevi (do 10 m), sunožni poskoci, jednonožni poskoci, upor predrukama, upor zarukama i sl. Svi se učenici kreću na jedan od prethodno navedenih načina (nastavnik odlučuje kojim će načinom kretanja igra započeti i kada će promijeniti način kretanja). Jedan od učenika hvata ostale sve dok nekoga ne dodirne i tada zamjene uloge.
2. Pripremni dio sata Kompleks **vježbi s bućicama od 1 kg**. Svaka se vježba izvodi jedanput uz 8 – 12 ponavljanja. • Stav raskoračni, bućice se nalaze u šakama, ruke u priručenju. Nogama se izvodi čučanj, dok se naizmjenično jedna ruka dovodi u predručenje, a druga u zaručenje. • Stav raskoračni, bućice se nalaze u šakama, ruke u priručenju. Izvode se čeoni krugovi u lijevu, a zatim u desnu stranu. • Stav raskoračni, bućice se nalaze u šakama, ruke u predručenju. Izvode se zasuci trupom u lijevu i desnu stranu naizmjenično. • Stav raskoračni, bućice se nalaze u šakama, ruke u priručenju naslonjene na prednju stranu natkoljenice. Podiže se lijeva natkoljenica (do stava paralelnog s tlom) valjajući bućicu do zgloba koljena, a zatim se vraća u početni položaj, zatim se isto ponovlja s desnom natkoljenicom. • Stav raskoračni, bućice se nalaze u šakama, ruke u priručenju. Pokretom iz skočnog zgloba odvajaju se pete od tla (podizanje na prste), zatim se vraća u početni položaj. • Stav ležeći na leđima, bućice se nalaze u šakama koje su prislonjene na prsa, noge u koljenima savijene pod kutom od 90 stupnjeva, potkoljenice paralelne s tlom. Izvodi se podizanje i spuštanje trupa. • Stav ležeći potrbuške, bućice se nalaze u šakama koje su prislonjene iza vrata. Izvodi se podizanje i spuštanje trupa. • Stav raskoračni, širi od širine ramena, bućice se nalaze u šakama koje su prislonjene na prednju stranu natkoljenice. Spušta se u čučanj do razine kada bućice valjajući se po natkoljenici, prijeđu razinu koljena te se tada na isti način vraća u početni položaj.

3. Glavni „A" dio sata

Kružni metodički organizacijski oblik rada:



4. Glavni „B" dio sata

Borbe hrvanja u parteru. Izvode se na borilištu označenom strunjačama i bore se grčko – rimskim stilom. Djeca borbu započinju na koljenima (na znak suca) i tokom cijelog trajanja borbe jedno koljeno mora biti na strunjači. Pobjednik je onaj učenik koji okrene protivnika na leđa ili skupi više bodova u vremenu od jedne minute, nakon čega se mijenjaju parovi. Svaki učenik sebi broji pobjede.

5. Završni dio sata

Elementarna igra **„predaja medicinke do 2 kg različitim načinima"**. Učenici su podijeljeni u dvije kolone. Prvi u koloni drži medicinku rukama u predručenju i na znak nastavnika je predaje učeniku iza sebe vršeći zasuk trupa u desnu stranu i tako do posljednjeg u koloni. Zatim se mijenja način predaje, npr. zasuk u lijevu stranu, provlačenjem između nogu, preko glave i sl. U svakom od načina pobjeđuje kolona koja prva preda medicinku do posljednjeg u koloni.

ZAKLJUČAK

Nekada je razdoblje djetinjstva predstavljalo najaktivniji dio ljudskog života, ali je današnje sedentarno društvo to promijenilo. Današnja su djeca zaokupljena računalima, televizijom, stvarima koje ne izazivaju dovoljne podražaje za kvalitetan razvoj mišićno-skeletnog sustava. Škola putem predmeta tjelesne i zdravstvene kulture, kao i rada školskog sportskog kluba, može uvelike pridonijeti rješavanju prethodno navedenog problema. Specifičnost sata tjelesne i zdravstvene kulture, kao osnovnog organizacijskog oblika rada, ogleda se upravo u njegovoj suštinskoj i nezamjenjivoj ulozi utjecaja na pravilan rast i razvoj te cjelokupni zdravstveni status učenika. Upravo je zato u ovom radu prikazano kako sat tjelesne i zdravstvene kulture može biti u funkciji razvoja snažnih svojstava, odnosno u funkciji razvoja cjelokupnog antropološkog statusa djece i mladeži. Takav pristup razvoju snage kod učenika sasvim će sigurno pripomoći pri svladavanju njihovih svakodnevnih životnih zadaća i unapređenju specifične sportske izvedbe. Za kvalitetu i pravilno provođenje jednog

takvog programa ponajviše je odgovoran nastavnik tjelesne i zdravstvene kulture. Važno je da upravo on, kao stručnjak koji rukovodi programom tjelesnog vježbanja, prihvati pristup radu koji će se razlikovati od standardne i uobičajene školske prakse.

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THE FUNCTION OF PHYSICAL EDUCATION LESSONS IN THE DEVELOPMENT OF STUDENTS' STRENGTH

ABSTRACT

In the past, the period of childhood represented the most active part of human life, but today's sedentary society has changed that. The primary goal of physical education lessons is to achieve the optimal growth and development, and health of each child. By raising the level of strength during physical education lessons, the optimal development of internal organs, endocrine and musculoskeletal system is affected. Research shows that almost 60% of school children have poor muscle tone of the upper body (Weineck, 1998), which leads to incorrect posture and thus to various bone deformities. Physical education lessons should, besides dealing with the problem of chronic lack of movement, also affect the development of strength. In the preparation for physical education lesson whose aim is to develop strength, the current status of students must be established first, so that by analysing the obtained results, children's real needs could be determined. The next step in the preparation is

the selection of exercises and equipment that will be used for the development of this motor skill. Determining the time required for performance, including time for rest, time for possible load changes and time needed for the modification of the equipment is the last step in the preparation. Such approach to students' strength development will quite certainly help in overcoming their daily life tasks and improve specific sport performance.

Key words: *Physical education classes, strength, preparation for class*

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Izvorni znanstveni rad

KOMPETENCIJE U TJELESNOM I ZDRAVSTVENOM ODGOJNO OBRAZOVNOM PODRUČJU: PROCJENA UČENIČKE TRENUTAČNE OSPOSOBLJENOSTI

„Kada bismo svakom pojedincu dali pravilnu dozu hrane i kretanja mogao bi to biti put prema zdravlju."

- Hipokrat

UVOD

Brze promjene u društvu dovode do potrebe za promjenama u odgojno-obrazovnom sustavu. Donesen je Nacionalni okvirni kurikulum čije je temeljno obilježje prelazak na kompetencijski sustav i učenička postignuća (ishode učenja), za razliku od sadašnjeg koji je usmjeren na sadržaj. U tjelesnom i zdravstvenom odgojno-obrazovnom području također se žele uvesti promjene kojima bi usvajanje znanja te stjecanje vještina i navika bilo usmjereno k razvijanju ključnih kompetencija učenika.

Kompetencije se mogu definirati kao korisna znanja i postignuća koja se učinkovito mogu upotrijebiti u praktičnim okolnostima.

Stjecanje i razvoj temeljnih kompetencija proizlazi iz potrebe primjerenog i stalnog prilagođavanja novim radnim i životnim situacijama (Findak, 2009).

Promjene u tjelesnom i zdravstvenom odgojno-obrazovnom području i prednosti kompetencijskog sustava svakako treba sagledati i u kontekstu globalne zabrinutosti zbog fizičke neaktivnosti i sjedilačkog načina života. Tu škola ima ključnu ulogu u naporima da se poveća fizička aktivnost. Svjetska zdravstvena organizacija navodi kako je škola najjeftinija investicija kojom država može istovremeno unaprijediti i obrazovanje i zdravlje svog stanovništva. (WHO, 2004). Donošenje Nacionalnog okvirnog kurikuluma koji treba poslužiti kao osnova za rekonstruiranje nastavnih planova i predmetnih kurikuluma predstavlja šansu koju bi trebalo iskoristiti kako bi se promijenio slogan Američkog fakulteta za sportsku medicinu (ACSM) koji

trenutačno u potpunosti opisuje Hrvatsku: „Ako je vježbanje lijek onda je nastava tjelesne i zdravstvene kulture pilula koja se ne uzima" (McKenzie i Lounsbery, 2009).

Cilj je **rada** ispitati u kojoj su mjeri učenici usvojili pojedine kompetencije, odnosno postignuća tjelesnog i zdravstvenog područja koje su kao osnovne smjernice definirane u Nacionalnom okvirnom kurikulumu Republike Hrvatske, a koje bi trebali steći u četvrtom obrazovnom ciklusu. Dodatno se želi ispitati postoje li razlike u stvarnoj osposobljenosti s obzirom na razred, na bavljenje sportom, na opći uspjeh i na ocjenu iz tjelesne i zdravstvene kulture.

METODE

Uzorak sudionika sačinjava 237 učenika sva četiri razreda Tehničke škole Čakovec. Istraživanje je provedeno u 2010./2011. školskoj godini. Svi sudionici su muškog spola i polaznici su četverogodišnjeg strukovnog srednjoškolskog obrazovanja u obrazovnom sektoru elektrotehnike i strojarstva.

Sudionici istraživanja ispunili su anketni upitnik u kojem je navedeno 41 učeničko postignuće (kompetencija) za četvrti obrazovni ciklus (strukovne škole) u tjelesnom i zdravstvenom odgojno-obrazovnom području, iz Nacionalnog okvirnog kurikuluma Republike Hrvatske (NOK, 2010). Očekivana učenička postignuća su podijeljena u pet područja, a peto područje (Sprječavanje bolesti i promicanje zdravlja) podijeljeno je na pet potpodručja (Tabela 1).

Sudionici su procijenili svoju trenutačnu stvarnu osposobljenost odnosno znanje, vezano uz pojedina učenička postignuća, na skali od četiri stupnja, gdje 1 znači da uopće nisu osposobljeni, 2 da nisu dovoljno osposobljeni, 3 da jesu osposobljeni i 4 da su vrlo osposobljeni.

Za sve varijable izračunati su pokazatelji opisne statistike, a normalnost njihove razdiobe testirana je Kolmogorov-Smirnovljevim testom. Obzirom da su sve analizirane varijable ordinalne, a njihove razdiobe značajno odstupaju od normalne, analiza razlika izvršena je korištenjem Mann-Whitney U testa i Kruskal-Wallis H testa. Statistička analiza izvršena je na razini značajnosti od 95% ($p<0,05$).

REZULTATI I DISKUSIJA

Aritmetičke sredine i standardne devijacije procjene učenika o njihovoj trenutačnoj stvarnoj osposobljenosti vezano uz očekivana učenička postignuća, a izračunate na ukupnom uzorku sudionika, prikazane su u tabeli 1. Generalno se može ustvrditi kako sudionici smatraju da su dobro osposobljeni i kompetentni, odnosno da su usvojili znanja, vještine i navike koje definira kurikulum tjelesnog i zdravstvenog odgojno-obrazovnog područja. Ukupna prosječna ocjena kojom su sudionici procijenili svoju osposobljenost iznosi 2,99.

Područje za koje učenici smatraju da posjeduju najviše znanja i kompetentnosti su „*Motorička dostignuća*" s prosječnom ocjenom 3,19. Kako se trenutačno u nastavi tjelesne i zdravstvene kulture značajna pažnja posvećuje motoričkim postignućima, čini se da je ovakav rezultat logičan i očekivan. Očekivana učenička postignuća koja su ocjenjena najvišom ocjenom te sudionici smatraju kako za njih posjeduju najviše kompetentnosti su: „*Biti osposobljen za provođenje samostalnoga vježbanja*" (3,30), „*Razviti svijest o vlastitim sposobnostima, a time i jačanje samopouzdanja i samopoštovanja*" (3,28), „*Biti osposobljen za djelotvorno služenje naučenim u svakodnevnomu životu i radu*" (3,23) i „*Biti osposobljen za vođenje brige o vlastitomu zdravlju i zdravlju okoline*" (3,17).

Tabela 1. *Aritmetičke sredine (AS) i standardne devijacije (SD) procjene učenika o njihovoj trenutačnoj stvarnoj osposobljenosti vezanoj uz očekivana učenička postignuća, izračunate na ukupnom uzorku sudionika*

	OČEKIVANA UČENIČKA POSTIGNUĆA – KOMPETENCIJE	AS	SD
I.	**TJELESNO VJEŽBANJE I ZDRAVLJE**	3,11	,479
1.	Biti osposobljen za vođenje brige o vlastitomu zdravlju i zdravlju okoline	3,17	,629
2.	Prepoznati i razumjeti zakonitosti o utjecaju tjelesnoga vježbanja na pojedine dimenzije antropološkoga statusa	3,05	,705
3.	Prepoznati i biti svjestan važnosti redovitog i pravilnog održavanja higijene sportskih objekata i prostora	3,12	,755
4.	Steći zdrave prehrambene navike o uzimanju hrane i tekućine u vrijeme povećanih tjelesnih napora	3,13	,798
5.	Promicati preventivnu ulogu tjelesnoga vježbanja u sprječavanju bolesti te čuvanju, unaprjeđivanju i zaštiti zdravlja kao općeljudske vrijednosti	3,05	,729
6.	Usvojiti osnovna znanja o sprječavanja povreda pri tjelesnom vježbanju	3,13	,810
7.	Steći naviku pravilnoga odijevanja radi zaštite od nepovoljnih izvanjskih utjecaja u različitim uvjetima vježbanja	3,11	,802
II.	**ANTROPOLOŠKA OBILJEŽJA**	2,94	,640
8.	Samostalno izračunati svoj indeks tjelesne mase (ITM)	2,76	1,03
9.	Biti osposobljen za samopraćenje antropoloških obilježja	2,87	,836
10.	Prepoznati i biti svjestan potrebe o održavanju antropoloških obilježja na optimalnoj razini	2,84	,827
11.	Razviti svijest o vlastitim sposobnostima, a time i jačanje samopouzdanja i samopoštovanja	3,28	,775
III.	**KINEZIOLOŠKA TEORIJSKA I MOTORIČKA ZNANJA**	2,79	,616
12.	Steći opće i temeljne kineziološke kompetencije o pravilnoj uporabi kineziloških operatora	3,04	,772
13.	Steći specifične kineziološke kompetencije o korištenju kineziloških operatora koji su primjereni budućemu zanimanju	2,76	,842

14.	Usporediti vrijednosti između dobivenih rezultata inicijalnim, tranzitivnim i finalnim provjeravanjem	2,75	,845
15.	Biti osposobljen za samoocjenjivanje antropoloških obilježja	2,87	,904
16.	Biti osposobljeni za primjenu mjera sigurnosti na skijalištu i klizalištu	2,54	1,05
17.	Prepoznati i osvijestiti temeljne zakonitosti glede opterećenja pri tjelesnomu vježbanju	2,94	,790
18.	Prepoznati i primijeniti opremu i sredstva na skijalištu i klizalištu	2,61	1,09
IV.	**MOTORIČKA DOSTIGNUĆA**	3,19	,571
19.	Biti osposobljen za djelotvorno služenje naučenim u svakodnevnomu životu i radu	3,23	,736
20.	Prepoznati i osvijestiti prednosti aktivnoga odmora	3,19	,819
21.	Biti osposobljen za provođenje samostalnoga vježbanja	3,30	,759
22.	Biti osposobljen za rješavanje problema u urgentnim situacijama	3,05	,845
V.	**SPRJEČAVANJE BOLESTI I PROMICANJE ZDRAVLJA**	2,96	,463
	A) Mentalno, socijalno i emocionalno zdravlje	2,93	,625
23.	Prepoznati poruke verbalne i neverbalne komunikacije	2,92	,819
24.	Kritički vrjednovati vlastite postupke i planove u odnosu na željene životne i profesionalne ciljeve	2,90	,796
25.	Steći socijalne vještine za djelotvorno rješavanje sukoba, suočavanja s konkurencijom i promjenama u odnosima	2,97	,789
	B) Rizična ponašanja	2,96	,648
26.	Argumentirati utjecaj alkohola i psihoaktivnih tvari na ponašanje i odluke glede međuljudskih i spolnih odnosa	2,97	,934
27.	Pravilno postupiti u slučaju nezgode i hitnih stanja zbog zlouporabe alkohola ili psihoaktivnih tvari	2,93	,828
28.	Usvojiti vještine vršnjačke pomoći i podrške pri rizičnomu ponašanju u skupini ili razredu	2,97	,838
	C) Međuljudski odnosi, spolno zdravlje i roditeljstvo	3,01	,543
29.	Analizirati i prepoznati moć u međuljudskim odnosima koja može biti dobro ili loše upotrijebljena	2,93	,784
30.	Argumentirati važnost i potrebu privrženosti, povjerenja i poštovanja u emocionalnim i spolnim odnosima	3,00	,844
31.	Razlikovati posebnosti pojedinih međuljudskih i partnerskih odnosa, uključujući i brak	2,93	,856
32.	Objasniti i usvojiti pojmove odgovorna spolnoga ponašanja i odnosa	3,21	,739
33.	Analizirati važnost, trajnost i odgovornost roditeljstva te njegov utjecaj na životne mogućnosti i odabire	2,99	,851
	D) Prehrana i zdravlje	2,83	,636
34.	Razmotriti utjecaj društva i medija na prehrambene navike	2,94	,813
35.	Opisati temeljna prava potrošača na obaviještenost i poštovanje zakonskih propisa o namirnicama i prehrani	2,79	,832
36.	Pružiti vršnjačku pomoć i potporu kod problema poremećaja prehrane u skupini ili razredu	2,76	,896

	E) Sprječavanje bolesti i unapređenje zdravlja	3,01	,543
37.	Nepristrano procijeniti osobne zdravstvene potrebe	3,00	,789
38.	Analizirati načine očuvanja i unaprjeđenja zdravlja tijekom života	3,00	,773
39.	Usvojiti odgovarajuću tjelesnu aktivnost kao načelo ponašanja u svim životnim uvjetima	3,13	,776
40.	Aktivno sudjelovati u programima promicanja zdravlja i sprječavanja bolesti	2,91	,852
41.	Analizirati i procijeniti utjecaj okoliša i radnoga mjesta na zdravlje i na mogući razvoj bolesti	3,03	,870

Učenici smatraju kako su najmanje osposobljeni za sljedeće kompetencije: „*Biti osposobljeni za primjenu mjera sigurnosti na skijalištu i klizalištu*" (2,54) i „*Prepoznati i primijeniti opremu i sredstva na skijalištu i klizalištu*" (2,61).

A) Razlike u procjeni trenutačne stvarne osposobljenosti s obzirom na razred

Uzorak je podijeljen u četiri skupine s obzirom na razred koji polaze: prvi razred 62, drugi razred 78, treći razred 54 i četvrti razred 43 sudionika. Mann-Whitney U testom testirana je razlika između skupina u odnosu na procjenu njihove trenutačne osposobljenosti, a s obzirom na analizirane kompetencije. Rezultati su pokazali kako skupine pripadaju istoj populaciji te kako između njih nema statistički značajnih razlika. Jedina razlika pojavila se kod kompetencije broj 8 (p=0,02) gdje se mlađi sudionici smatraju više osposobljeni za samostalno izračunavanje svog indeksa tjelesne mase.

B) Razlike u procjeni trenutačne stvarne osposobljenosti s obzirom na aktivno bavljenje sportom

Mann-Whitney U test je korišten kako bi se utvrdilo postoji li razlika u procjeni trenutačne stvarne osposobljenosti između dvije skupine sudionika: one sudionike koji su članovi sportskog kluba u kojem treniraju i natječu se (131 sudionik) i one koji se ne bave organiziranim sportom u nekom od sportskih klubova (106 sudionika). Statistički značajne razlike pojavljuju se u području „Tjelesno vježbanje i zdravlje", a unutar tog područja kod kompetencija broj 1, 2, 4, 5, 6 i 7; u području „Antropološka obilježja" i kod kompetencija broj 9, 10 i 11; u području „Motorička dostignuća" i kod kompetencija broj 19, 20 i 21; te u potpodručju „Sprječavanje bolesti i unaprjeđenje zdravlja" kod kompetencija broj 37, 38, 39, 40 i 41. Pokazalo se da postoji značajna razlika i u kompetencijama broj 12, 14, 24 i 36, ali se kod područja i potpodručja kojima te kompetencije pripadaju razlika nije ostvarila.

U svim područjima i svim pojedinačnim kompetencijama u kojima je dobivena statistički značajna razlika, oni sudionici koji su članovi sportskog kluba i aktivno se bave nekim sportom svoju osposobljenost smatraju većom u odnosu na sudionike koji se ne bave sportom.

C) Razlike u procjeni trenutačne stvarne osposobljenosti s obzirom na ocjenu iz predmeta tjelesne i zdravstvene kulture

Uzorak je podijeljen u dvije skupine: one učenike koji su iz predmeta tjelesna i zdravstvena kultura u prethodnom razredu imali ocjenu „odličan" (171 sudionik) i one koji su imali neku drugu ocjenu (66 sudionika). Mann-Whitney U test je pokazao kako učenici s odličnom ocjenom iz predmeta tjelesna i zdravstvena kultura procjenjuju svoju stvarnu osposobljenost većom u odnosu na učenike s nižim ocjenama i kako je ta razlika statistički značajna.

Značajne razlike pojavljuju se u području „Tjelesno vježbanje i zdravlje" ($p=0,00$), a unutar područja kod kompetencija broj 1, 2, 5 i 6; u području „Antropološka obilježja" ($p=0,00$) i kompetencija broj 9, 10 i 11 te u području „Motorička dostignuća" ($p=0,01$) i kod kompetencija broj 19, 20 i 21.

S nešto manjom razinom značajnosti, ali još uvijek u granicama od 95%, razlika se pojavila i u područjima „Kineziološka teorijska i motorička znanja" ($p=0,03$), a unutar područja kod kompetencije broj 15 te u području „Sprječavanje bolesti i promicanje zdravlja" ($p=0,03$) i kompetencijama broj 28, 36 i 37.

D) Razlike u procjeni trenutačne stvarne osposobljenosti s obzirom na školski opći uspjeh

Sudionici su podijeljeni u tri skupine s obzirom na školski opći uspjeh: na sudionike koji su prethodni razred završili odličnim uspjehom (35 sudionika), na one s vrlo dobrim uspjehom (130 sudionika) i one s dobrim, dovoljnim ili nedovoljnim uspjehom (72 sudionika). Kruskal-Wallis H test pokazao je da ne postoje razlike između analiziranih skupina, što ukazuje kako opći uspjeh ne utječe na osposobljenost u tjelesnom i zdravstvenom odgojno-obrazovnom području.

ZAKLJUČAK

Procjenjujući svoju osposobljenost s obzirom na kompetencije definirane u Nacionalnom okvirnom kurikulumu, sudionici istraživanja su svojim relativno visokim ocjenama naznačili kako su nastavom tjelesne i zdravstvene kulture stekli zadovoljavajuću razinu osposobljenosti vezanu uz očekivane odgojno-obrazovne

ishode. Područje „Motorička dostignuća" ocjenjeno je najvišom ocjenom te sudionici smatraju kako za učenička postignuća unutar tog područja posjeduju najviše kompetentnosti. S obzirom na razred, u procjeni razine osposobljenosti nema statistički značajnih razlika. Značajnih razlika nema ni s obzirom na opći uspjeh.

Kod procjene sudionika o njihovoj trenutačnoj stvarnoj osposobljenosti s obzirom na aktivno bavljenje sportom i s obzirom na ocjenu iz predmeta tjelesne i zdravstvene kulture, dobivene su značajne razlike. Učenici koji se aktivno bave nekim sportom svoju osposobljenost smatraju većom u odnosu na učenike koji se ne bave sportom, a svoju veću stvarnu osposobljenost procjenjuju i učenici s odličnom ocjenom iz predmeta tjelesna i zdravstvena kultura u odnosu na učenike s nižim ocjenama.

Ovakvi rezultati upućuju na zaključak kako je potrebno na nastavi tjelesne i zdravstvene kulture još više pažnje posvetiti slabijim učenicima i onima koji se ne bave sportom, kako bi i oni usvojili znanja, razvili sposobnosti, stekli vještine i navike te razvili pozitivne stavove definirane unutar tjelesnog i zdravstvenog odgojno-obrazovnog područja.

Iako su sudionici svoju osposobljenost procijenili relativno dobrom ocjenom, njena stvarna razina ipak nije zadovoljavajuća. Potrebno je uložiti dodatne napore kako bi se kod svih učenika povećala razina znanja, sposobnosti, postignuća i vrijednosti, a koje se stječu u ovom području. Ključnu ulogu u ovim naporima i željama ima raspoloživo vrijeme. Ono je danas nedostatno, a trebalo bi iznositi minimalno 180 minuta tjedno (u SAD-u preporuka je 210 minuta tjedno) ako se želi omogućiti izvršenje zadataka koje Nacionalni okvirni kurikulum postavlja pred tjelesno i zdravstveno odgojno-obrazovno područje.

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COMPETENCIES IN THE FIELD OF PHYSICAL EDUCATION: CURRENT COMPETENCY ASSESSMENT OF STUDENTS

ABSTRACT

The aim of this study was to inquire into the level of adopted competences among pupil population, that is, achievements in the field of physical education. The above-mentioned competences are defined as the basic guidelines pursuant to the National Curriculum Framework in the Republic of Croatia, and in line with it, are to be gained in the fourth educational cycle. An additional goal was to determine if there are differences in actual competence regarding the class, doing sports, general school success and the mark in physical education. The research was conducted on the total of 237 pupils who attend four-year vocational secondary education.

The participants in this study emphasized to have gained relatively good competence related to the competences in the field of physical education. Moreover, the competences that define the field of „Motor Achievements" received the best mark. The pupils who practice sports actively find themselves to have better competence than the pupils who do not do sports. In addition, the pupils who achieved mark „A" in physical education find themselves to have better actual competence than the pupils who got lower grades.

Key words: *curriculum, pupils' competences, vocational schools*

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Izvorni znanstveni rad

SKALA STAVOVA PREMA ALKOHOLU U SPORTU

UVOD

Alkohol je u svim porama našeg društva pa tako i u sportu te se nameće kao velik problem. Ako bismo vjerovali svemu što vidimo, alkohol (pogotovo pivo) bi se korelativno mogao povezivati sa sportom. Situacija koja je vezana uz konzumaciju piva, gdje se sve veći broj proizvođača javlja kao sponzor sporta, sve je očitija. Zakonom u Republici Hrvatskoj zabranjeno je konzumirati alkohol na i oko sportskih objekata, no svjedoci smo čestog povezivanja alkohola i sporta u našem društvu. Danas je gotovo nepisano pravilo da se na svakoj većoj sportskoj manifestaciji javlja kao glavni sponzor jedan od proizvođača piva u Hrvatskoj. Ako se samo sjetimo tko je generalni sponzor Hrvatske nogometne reprezentacije i njegov moto 'uvijek vjerni', odmah možemo razabrati o čemu se radi ne uzimajući u obzir ni dob ni spol naših građana. U novije su vrijeme također rađena istraživanja o dobrobiti alkohola odnosno piva kao njezina konzumacija nakon teške sportske aktivnosti gdje se kao hipoteza navodi – pivo je bolja zamjena za izgubljenu tekućinu od vode (Garzon, 2008.).

Voditelj istraživanja bio je profesor Manuel Garzon koji kaže da je pivo postiglo bolji hidratacijski efekt od vode. Kardiolog koji je prije radio s nogometašima Real Madrida, Juan Antonio Corbalan, kazao je da pivo ima savršen profil za rehidraciju nakon sporta.

Corbalan (2008) navodi: „Dugo sam preporučivao pijenje piva profesionalnim sportašima nakon vježbe". Dok poznati nutricionist dr. James Betts kaže da određena količina piva može biti jednako dobra kao voda, no on ipak sumnja da može biti puno bolja. Promatrajući osvrt na takav tip radova (Garzon, 2008.) gdje se daje značaj pivu kao dobrom načinu rehidracije, dolazimo do zaključka kao i svi ostali koji su se bavili tom temom - da su takva istraživanja zapravo sponzorirana od različitih proizvođača piva!

PROBLEM I CILJ ISTRAŽIVANJA

Kao što je konstatirano u uvodu, alkohol je velik problem našeg društva. Također, i sport je sve više ugrožen agresivnom propagandom proizvođača alkoholnih pića koji nastoje duboko povezati konzumaciju piva i sport.

U kolikoj je mjeri populacija prihvatila ovu propagandu nije poznato. Da bi se to moglo utvrditi potreban je provjereni instrument za istraživanje. Stoga je cilj ovog rada ispitati metrijske karakteristike novokonstruirane skale za ispitivanje stava prema alkoholu u sportu te utvrditi razlike u rezultatima za sport.

METODE RADA

Uzorak ispitanika

Uzorak ovog istraživanja čini 791 ispitanik u dobi od 40 do 65 godina iz različitih mjesta na području Republike Hrvatske. U skladu s ciljem istraživanja ispitan je približno isti broj ispitanika – sudjelovala su 423 muškaraca (53,5%) i 368 (46,5%) žena.

Mjerni instrument

Novokonstruirana skala za ispitivanje stava prema alkoholu u sportu sastoji se od 42 čestice (u prilogu) na koje ispitanici odgovaraju na skali Likertovog tipa od 5 stupnjeva. Ispitanik treba izraziti stupanj slaganja s pojedinom česticom (tvrdnjom) izborom jedne od sljedećih mogućnosti: 1 – potpuno netočno, 2 – uglavnom netočno, 3 – nisam siguran, 4 – uglavnom točno i 5 – potpuno točno.

Priprema i obrada podataka

Kako bi se izbjegla tendencija davanja sličnih odgovora tijekom ispitivanja, približno polovica čestica skale formirana je u obliku podrške uživanju i uporabi alkohola (primjerice: „*Odlično se osjećam kad pijem pivo i gledam utakmicu!*"), dok je druga polovica formirana tako da osuđuje uživanje alkohola (primjerice: „*Alkohol smanjuje motoričke sposobnosti i uništava sportaša!*"). Budući da se za potrebe obrade sve čestice skale moraju bodovati u istom smjeru (tako da su vrijednosno formirane na jednak način), prije obrade podataka bodovanje nekih čestica je transformirano pa na svim česticama veći rezultat uvijek ukazuje na podržavajući stav prema uživanju alkohola i njegovoj povezanosti sa sportom. Ukupni rezultat na skali izračunat je kao zbroj odgovora na svim česticama, odnosno kao linearna kombinacija svih čestica (metodom jednostavnog zbrajanja bodova). Teorijske vrijednosti sumarnog rezultata za cijelu skalu kreću se u rasponu od 42 do 210.

REZULTATI ISTRAŽIVANJA I RASPRAVA

Budući da se Skala stavova prema alkoholu u sportu po prvi puta koristi u istraživačke svrhe bilo je potrebno provesti detaljniju deskriptivnu analizu čestica.

Deskriptivna analiza

Raspon vrijednosti na svim česticama je maksimalan (odnosno 4), što znači da čestice dobro pokrivaju spektar mogućih odgovora – od krajnje negativnog do krajnje pozitivnog stava prema alkoholu u sportu. Uvidom u distribuciju bodova na svakoj čestici utvrđeno je da ne postoje multimodalne čestice, odnosno čestice s više modova, a što može maskirati prave razlike između odgovora ispitanika.

Tablica 1. *Osnovni statistički pokazatelji čestica skale prije rekodiranja (M – aritm. sredina, D – mod, Min. – najmanja i Max. – najveća vrijednost, s – stand. devijacija)*

Var.	M	D	Min.	Max.	s
Ispijanje alkohola razbija monotoniju i potiče domoljublje.	2,7	1	1	5	1,4
Vino i pivo su dio naše kulture i vjekovna su tradicija.	3,5	4	1	5	1,2
Reklamirajući alkohol, sport gubi ugled.	3,4	3	1	5	1,2
Pivo je kvalitetna hrana.	2,9	3	1	5	1,3
Alkohol zbližava ljude.	3,1	4	1	5	1,3
Reklamiranje piva putem sporta trebalo bi potpuno zabraniti.	3,3	4	1	5	1,3
Kada popijem, osjećam se slobodnije.	3,3	5	1	5	1,3
Čaša vina ili piva uz ručak je dobra za zdravlje.	4,0	4	1	5	1,0
Bez alkohola nema smisla slaviti pobjedu.	2,5	1	1	5	1,3
Odlično se osjećam kad pijem pivo i gledam utakmicu.	2,8	4	1	5	1,4
Treba pustiti ljude da sami odluče hoće li piti ili neće.	4,1	5	1	5	1,1
Alkohol je čovjekov najveći neprijatelj.	3,5	5	1	5	1,2
Poslije tekme volim popiti s društvom.	3,1	4	1	5	1,4
Alkohol uništava stanice mozga i čini ljude glupljima	3,8	5	1	5	1,1
Alkohol smanjuje motoričke sposobnosti i uništava sportaša.	4,2	5	1	5	1,0
Crno vino suzbija anemiju.	3,7	3	1	5	1,0
Alkohol umanjuje percepciju i brzinu reakcije.	4,2	5	1	5	1,0
Alkohol potiče agresivnost navijača i sportaša.	4,2	5	1	5	1,0
Alkohol smanjuje koordinaciju, pa je pravi 'antidoping' za sportaše	4,1	5	1	5	0,9
Umjerena količina žeste može popraviti probavu.	3,3	3	1	5	1,2
Alkohol upropaštava ten.	3,7	3	1	5	1,1

Alkohol dovodi do brže dehidracije za vrijeme treninga i ugrožava sportaša.	4,2	5	1	5	0,9
Alkohol općenito uništava život.	4,0	5	1	5	1,1
Alkohol remeti ravnotežu. Probajte zamisliti pijanog gimnastičara!	4,4	5	1	5	0,9
Alkohol potiče na nerazumne i rizične spolne odnose.	4,1	5	1	5	1,0
Alkohol daje snagu za suočavanje s teškoćama u životu.	2,5	1	1	5	1,3
Prije svake tekme kupim gajbu piva.	1,9	1	1	5	1,2
Nakon treninga, dobro je popiti pivu jer regenerira i opušta.	2,5	1	1	5	1,2
Crno vino je dobro za niski tlak.	3,6	3	1	5	1,1
Alkohol zacjeljuje „srčane rane" popraćene gorčinom zbog gubitka na utakmici.	2,5	1	1	5	1,2
Dođe mi da se napijem kad repka izgubi.	2,2	1	1	5	1,3
Alkohol te čini neuništivim na terenu.	2,1	1	1	5	1,2
Reklamiranje alkohola u sportu se protivi mojim moralnim načelima.	3,4	3	1	5	1,3
Ako znate svoje granice, alkohol nije opasan.	3,7	4	1	5	1,2
Sport i reklamiranje alkohola nikako se ne bi smjeli povezivati.	3,6	5	1	5	1,2
Kad vidim reklamu, s guštom popijem pivu.	2,3	1	1	5	1,3
Kad mi je teško, nešto popijem i bolje se osjećam.	2,5	1	1	5	1,3
Nije važno što se reklamira uz sport, glavno da to donosi novac.	2,7	3	1	5	1,3
Pivo je dobro za bubrege.	3,3	3	1	5	1,1
Reklamiranje alkohola putem sporta je siguran način širenja alkoholizma.	3,4	4	1	5	1,2
Alkohol u umjerenim količinama utječe na podizanje dobrog raspoloženja.	3,7	4	1	5	1,0
Reklamiranjem alkohola putem sporta potiče se mlade ljude da piju i uništavaju svoj život.	3,5	4	1	5	1,3

Analizom vrijednosti u tablici 1. vidljivo je sedam čestica s aritmetičkom sredinom većom od 4. To su čestice 15, 17, 18, 19, 22, 24 i 25, sve iz skupa tvrdnji koje se gotovo sve odnose na stav prema alkoholu u sportu, redom: „Alkohol smanjuje motoričke sposobnosti i uništava sportaša.", „Alkohol umanjuje percepciju i brzinu reakcije.", „Alkohol potiče agresivnost navijača i sportaša.", „Alkohol smanjuje koordinaciju, pa je pravi anti-doping za sportaše.", „Alkohol dovodi do brže dehidracije za vrijeme treninga i ugrožava sportaša.", „Alkohol remeti ravnotežu. Probajte zamisliti pijanog gimnastičara!" i „Alkohol potiče na nerazumne i rizične spolne odnose.". Budući da se tvrdnje odnose na situacije koje su teško zamislive i spojive s uporabom alkohola, suženi raspon odgovora i asimetričnost njihovih distribucija je i očekivana.

Pouzdanost skale

Analizom pouzdanosti svih ispitanika dobivene su: aritmetička sredina od 111.485, standardna devijacija od 22.220 i Crombachova alpha (pouzdanost) od 0.904. Za procjenu pouzdanosti Skala stavova prema alkoholu u sportu, koja je po predmetu mjerenja homogeni mjerni instrument, korištena je metoda unutarnje dosljednosti (interne konzistencije) i Cronbachov koeficijent pouzdanosti α. Prema opće prihvaćenom standardu (Bukvić, 1982), instrumenti koji imaju Cronbachov koeficijent α veći od 0.9 smatraju se vrlo visoko pouzdanim. Prema tom načelu, Skala stavova prema alkoholu u sportu može se smatrati vrlo pouzdanim mjernim instrumentom. Međutim, pitanje koje se postavlja je u istraživanju: može li se pouzdanost skale još više poboljšati? Posebice jer je prosječna interkorelacija čestica relativno niska, što ukazuje na slabu homogenost čestica (doduše, neki autori upozoravaju da prosječna interkorelacija nije dovoljno dobar pokazatelj homogenosti - Mejovšek, 2003.).

Faktorska valjanost skale

Unutarnja konzistencija pokazuje stupanj u kojem su čestice instru¬menta međusobno povezane, odnosno stupanj povezanosti pojedinih čestica i ukupnog rezultata u instrumentu. Mjerni instrument visokog stupnja unutarnje konzistencije naziva se homogenim instrumentom. U ovom je radu faktorska valjanost Skale stavova prema alkoholu u sportu ispitana primjenom komponentnog modela faktorske analize i varimax transformacije inicijalnog koordinatnog sustava latentnih dimenzija. Budući da analiza latentne strukture Skale sama po sebi nije u fokusu ovog istraživanja smatra se da je važno napomenuti da je dobivena faktorska struktura Skale s osam pripadajućih faktora.

Valjanost čestica skale

Valjanost čestica skale mjeri se pomoću korelacije čestice i ukupnog rezultata instrumenta bez te čestice i naziva se diskriminacija valjanost čestice. Prema Mejovšeku (2003), bolja mjera valjanosti čestice je korelacija čestice i prve glavne komponente. Prva glavna komponenta ekstrahirana u postupku faktorske analize po teoriji objašnjava najveći dio zajedničke varijabilnosti (kovarijance) predmeta mjerenja koji se ispituje mjernim instrumentom, tj. njegovim česticama. U tablici 2. prikazane su projekcije čestica na prvu glavnu komponentu i to za cijeli uzorak. Čestice s visokim projekcijama, neovisno o predznaku, označene su podebljano.

Tablica 2. *Projekcije čestica na prvu glavnu komponentu, za cijeli uzorak. Boldano su označene visoke projekcije (u apsolutnom smislu).*

Var.	Svi Factor 1
Ispijanje alkohola razbija monotoniju i potiče domoljublje.	-0,372
Vino i pivo su dio naše kulture i vjekovna su tradicija.	-0,188
Reklamirajući alkohol, sport gubi ugled.	-0,359
Pivo je kvalitetna hrana.	-0,394
Alkohol zbližava ljude.	-0,498
Reklamiranje piva putem sporta trebalo bi potpuno zabraniti.	**-0,503**
Kada popijem, osjećam se slobodnije.	**-0,527**
Čaša vina ili piva uz ručak je dobra za zdravlje.	-0,150
Bez alkohola nema smisla slaviti pobjedu.	**-0,593**
Odlično se osjećam kad pijem pivo i gledam utakmicu.	**-0,664**
Treba pustiti ljude da sami odluče hoće li piti ili neće.	-0,109
Alkohol je čovjekov najveći neprijatelj.	-0,406
Poslije tekme volim popiti s društvom.	**-0,629**
Alkohol uništava stanice mozga i čini ljude glupljima	**-0,505**
Alkohol smanjuje motoričke sposobnosti i uništava sportaša.	**-0,518**
Crno vino suzbija anemiju.	-0,065
Alkohol umanjuje percepciju i brzinu reakcije.	-0,451
Alkohol potiče agresivnost navijača i sportaša.	-0,458
Alkohol smanjuje koordinaciju, pa je pravi ¨antidoping¨	-0,395
Umjerena količina žeste može popraviti probavu.	-0,220
Alkohol upropaštava ten.	-0,340
Alkohol dovodi do brže dehidracije za vrijeme treninga i ugrožava sportaša.	-0,440
Alkohol općenito uništava život.	**-0,563**
Alkohol remeti ravnotežu. Probajte zamisliti pijanog gimnastičara!	-0,485
Alkohol potiče na nerazumne i rizične spolne odnose.	-0,397
Alkohol daje snagu za suočavanje s teškoćama u životu.	-0,473
Prije svake tekme kupim gajbu piva.	**-0,658**
Nakon treninga, dobro je popiti pivu jer regenerira i opušta.	**-0,623**
Crno vino je dobro za niski tlak.	-0,164
Alkohol zacjeljuje „srčane rane" popraćene gorčinom zbog gubitka na utakmici.	**-0,675**
Dođe mi da se napijem kad repka izgubi.	**-0,678**
Alkohol te čini neuništivim na terenu.	**-0,505**
Reklamiranje alkohola u sportu se protivi mojim moralnim načelima.	-0,428

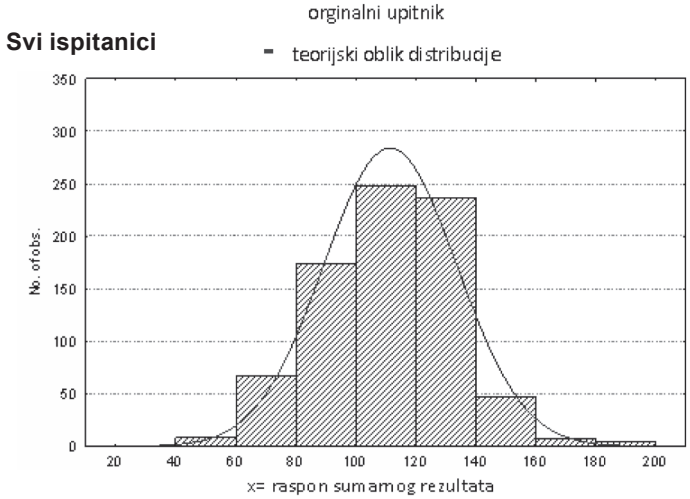
Ako znate svoje granice, alkohol nije opasan.	**-0,344**
Sport i reklamiranje alkohola nikako se ne bi smjeli povezivati.	-0,463
Kad vidim reklamu, s guštom popijem pivu.	**-0,633**
Kad mi je teško, nešto popijem i bolje se osjećam.	**-0,618**
Nije važno što se reklamira uz sport, glavno da to donosi novac.	-0,496
Pivo je dobro za bubrege.	-0,329
Reklamiranje alkohola putem sporta je siguran način širenja alkoholizma.	-0,332
Alkohol u umjerenim količinama utječe na podizanje dobrog raspoloženja.	-0,344
Reklamiranjem alkohola putem sporta potiče se mlade ljude da piju i uništavaju svoj život.	-0,409

Distribucija ukupnog rezultata Skale

Osnovni deskriptivni pokazatelji ukupnog rezultata Skale (AZBROJ) prikazani su u tablici 3., a raspršenost i oblik distribucije prikazan su na slici 1.

Tablica 3. *Deskriptivni pokazatelji varijable AZBROJ.*

AZBROJ	Mean	Median	Min.	Max.	Std.Dev.	Skewness	Kurtosis
svi	111,486	114	49	197	22,220	0,019	0,197



Slika 1. *Distribucija ukupnog (zbrojnog) rezultata skale, za cijeli uzorak. Linijom je iscrtana teoretska normalna distribucija*

Iz tablice 3. i slike 1. može se zaključiti da zbirna varijabla AZBROJ kao ukupni rezultat Skale dobro pokriva sve vrijednosti (tj. kategorije) odgovora na Skali te da se Skala može smatrati primjereno osjetljivim instrumentom.

ZAKLJUČAK

Cilj ovoga rada bio je utvrditi mjerna svojstva Skale stavova prema alkoholu u sportu. Nakon opsežne statističke analize mjernog instrumenta uspjelo se utvrditi da je Skala pokazala dobra mjerna svojstva u smislu pouzdanosti. Također ukupni rezultat Skale dobro pokriva sve vrijednosti, tj. kategorije odgovora na Skali te da se Skala može smatrati primjereno osjetljivim instrumentom. Takvo istraživanje pokazalo je da stavovi prema alkoholu koje možemo povezati sa sportom su dosta predvidljivi. U konačnici već sama tradicija predstavlja imperativ konzumacije alkohola, a budući da je naša država sportski orijentirana, dolazi do neizbježnog povezivanja alkohola i sporta. Uz današnju moć propagande takva svijest i stavovi mogu biti u budućnosti samo još više naklonjeni u korist alkohola, ali i to će pokazati vrijeme. Zadnji korak u cjelokupnoj obradi bi trebao biti skraćena verzija Skale stavova prema alkoholu u sportu čime bi dobili mjerni instrument koji je u konačnici i ekonomičan i lagan za aplikaciju u svakodnevnom istraživanju!

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PRILOZI

Prilog 1. *Novokonstruirana skala za ispitivanje stava prema alkoholu u sportu*

Poštovani ispitanici ,molimo vas da pažljivo pročitate svaku tvrdnju i da zaokružite

- ocjenu **1** ako je tvrdnja **potpuno netočna** za vas,
- ocjenu **2** ako je tvrdnja **uglavnom netočna** za vas,
- ocjenu **3** ako **niste sigurni** što biste odgovorili,
- ocjenu **4** ako je tvrdnja **uglavnom točna** za vas, i
- ocjenu **5** ako je tvrdnja **potpuno točna** za vas.

Tvrdnja		Potpuno netočno	Uglavnom netočno	Nisam siguran	Uglavnom točno	Potpuno točno
1.	Ispijanje alkohola razbija monotoniju i potiče domoljublje.	1	2	3	4	5
2.	Vino i pivo su dio naše kulture i vjekovna su tradicija.	1	2	3	4	5
3.	Reklamirajući alkohol, sport gubi ugled.	1	2	3	4	5
4.	Pivo je kvalitetna hrana.	1	2	3	4	5
5.	Alkohol zbližava ljude.	1	2	3	4	5
6.	Reklamiranje piva putem sporta trebalo bi potpuno zabraniti.	1	2	3	4	5
7.	Kada popijem, osjećam se slobodnije.	1	2	3	4	5
8.	Čaša vina ili piva uz ručak je dobra za zdravlje.	1	2	3	4	5
9.	Bez alkohola nema smisla slaviti pobjedu.	1	2	3	4	5
10.	Odlično se osjećam kad pijem pivo i gledam utakmicu.	1	2	3	4	5
11.	Treba pustiti ljude da sami odluče hoće li piti ili neće.	1	2	3	4	5
12.	Alkohol je čovjekov najveći neprijatelj.	1	2	3	4	5
13.	Poslije tekme volim popiti s društvom.	1	2	3	4	5
14.	Alkohol uništava stanice mozga i čini ljude glupljima.	1	2	3	4	5
15.	Alkohol smanjuje motoričke sposobnosti i uništava sportaša.	1	2	3	4	5

Tvrdnja		Potpuno netočno	Uglavnom netočno	Nisam siguran	Uglavnom točno	Potpuno točno
16.	Crno vino suzbija anemiju.	1	2	3	4	5
17.	Alkohol umanjuje percepciju i brzinu reakcije.	1	2	3	4	5
18.	Alkohol potiče agresivnost navijača i sportaša.	1	2	3	4	5
19.	Alkohol smanjuje koordinaciju, pa je pravi „anti-doping" za sportaše.	1	2	3	4	5
20.	Umjerena količina žeste može popraviti probavu.	1	2	3	4	5
21.	Alkohol upropaštava ten.	1	2	3	4	5
22.	Alkohol dovodi do brže dehidracije za vrijeme treninga i ugrožava sportaša.	1	2	3	4	5
23.	Alkohol općenito uništava život.	1	2	3	4	5
24.	Alkohol remeti ravnotežu. Probajte zamisliti pijanog gimnastičara!	1	2	3	4	5
25.	Alkohol potiče na nerazumne i rizične spolne odnose.	1	2	3	4	5
26.	Alkohol daje snagu za suočavanje s teškoćama u životu.	1	2	3	4	5
27.	Prije svake tekme kupim gajbu piva.	1	2	3	4	5
28.	Nakon treninga, dobro je popiti pivu jer regenerira i opušta.	1	2	3	4	5
29.	Crno vino je dobro za niski tlak.	1	2	3	4	5
30.	Alkohol zacjeljuje „srčane rane" popraćene gorčinom zbog gubitka na utakmici.	1	2	3	4	5
31.	Dođe mi da se napijem kad repka izgubi.	1	2	3	4	5
32.	Alkohol te čini neuništivim na terenu.	1	2	3	4	5
33.	Reklamiranje alkohola u sportu se protivi mojim moralnim načelima.	1	2	3	4	5
34.	Ako znate svoje granice, alkohol nije opasan.	1	2	3	4	5
35.	Sport i reklamiranje alkohola nikako se ne bi smjeli povezivati.	1	2	3	4	5

Tvrdnja		Potpuno netočno	Uglavnom netočno	Nisam siguran	Uglavnom točno	Potpuno točno
36.	Kad vidim reklamu, s gušto popijem pivu.	1	2	3	4	5
37.	Kad mi je teško, nešto popijem i bolje se osjećam.	1	2	3	4	5
38.	Nije važno što se reklamira uz sport, glavno da to donosi novac.	1	2	3	4	5
39.	Pivo je dobro za bubrege.	1	2	3	4	5
40.	Reklamiranje alkohola putem sporta je siguran način širenja alkoholizma.	1	2	3	4	5
41.	Alkohol u umjerenim količinama utječe na podizanje dobrog raspoloženja.	1	2	3	4	5
42.	Reklamiranjem alkohola putem sporta potiče se mlade ljude da piju i uništavaju svoj život.	1	2	3	4	5

ATTITUDE SCALE TOWARDS ALCOHOL IN SPORT

ABSTRACT

The goal of the present study is to examine the metric characteristics of newly constructed scale for examining the attitude towards alcohol. The research sample consists of 791 examinees aged 40 to 65, coming from different places in the Republic of Croatia. In accordance with the goal of research, 423 men (53,5%) and 368 (46,5%) women have been examined. Newly constructed scale for examining the attitudes towards alcohol in sport contains 42 items (in attachment), which the examinees were answering according to the 5-item Likert scale. The participants were expressing the degree of their agreement with each item (claim) by selecting one of the options: 1 - completely incorrect, 2 - mostly incorrect, 3-not sure, 4-mostly correct, 5 - completely correct.

Key words: *alcohol, sport, attitudes*

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Original scientific paper

VOCATIONAL QUALIFICATION AND TRAINING OF PHYSICAL EDUCATION TEACHERS AT THE NATIONAL SPORTS ACADEMY IN BULGARIA

INTRODUCTION

The National Sports Academy has been and now is the only specialized higher school in Bulgaria for training of specialists in three main professional areas – Sport, Pedagogy of Physical Education and Social Health (National Sports Academy). From the founding of the Sports Higher School in Bulgaria until now, different curricula for vocational qualification of teachers in Physical Education (PE) and coaches were created (Higher Institute for Physical Culture). Different social, economic and political factors on national and international level, as well as the development of the society influenced the structure and the content of the curricula - names and number of academic hours of each separate course.

From the contemporary point of view, the processes of globalization and internationalization of the society has led to the transformation of the educational process. In this respect, the curricula for vocational training of PE teachers were changed (Mileva and Tosheva 2009) New modules and courses were introduced. At the same time, other academic subjects were excluded because of the changed social and political conditions and their connection with ideological theories and practices.

The process of the European integration and development of the Bologna process have led to the creation of the European space in higher education. This process was accompanied with many important initiatives such as accepting the Educational Qualification Network (EQN), European Credit Transfer System (ECTS), European Academic Programme ERASMUS, etc. They have had an important influence on the vocational training and the learning programmes for sports pedagogues at The National Sports Academy in Sofia.

The above mentioned processes in the area of higher education determined the necessity for aligning the curricula for vocational qualification of PE teachers. In this relation, different activities and initiatives on the European level were organized. One of these activities was the successful realization of the European Thematic Network Project AEHESIS („Aligning a European Higher Education Structure in Sport Science") which was conducted between 2003 and 2008 (AEHESIS 2005). The

main result of the project for the area Physical Education was working out the model for PE curriculum as the Bachelor's degree.

AIM, MATERIALS AND METHODS

The aim of the study was to compare the curricula for vocational qualification of Physical Education teachers at The National Sports Academy in Bulgaria across different historical periods. For the realization of the study, the main criteria according to the European educational model curriculum for PE teachers were outlined. The following educational areas were defined: Practical Activities (Theory and Practice), Educational and Teaching Sciences, Social Sciences/Humanities, Natural and Biological Sciences, Scientific Work and School-based Teaching Practice (Hardman 2007; Hardman 2008). Interesting for the research was the significance of each educational area in the total training of the specialists of physical education during separate historical periods.

For the realization of the study, the necessary educational documentation was investigated (Higher Institute for Physical Culture; Physical Education Major 2006; Hardman 2008). The following research methods were applied: content analysis and comparative analysis. For the processing of the data, alternative analysis was used.

ANALYSIS OF THE RESULTS AND DISCUSSION

Curricula from four different historical periods that were very important for the development of The National Sports Academy were chosen. The years were 1950, 1968, 1991 and 2005. The choice of each of the curricula had a logical argumentation. In 1950 after the new law for higher education was passed, the name of the higher school was changed from Higher School for Corporal Education to Higher School for Physical Culture (Higher Institute for Physical Culture). The creation of two faculties: Pedagogical and Sports pedagogical faculty were planned. The number of departments increased from 4 to 12. In addition, the term lecturer was replaced with the term pedagogue and the system of five grades was introduced for the evaluation of students' results. The first foreign students were admitted. A further positive novelty from this period was the possibility for electing a second major during the Internship.

Academic year 1967/1968 was also essential for the development of higher sports education in Bulgaria. Two new faculties (1) The Sports Pedagogical Faculty, which replaced The Coaching School, and (2) The Faculty of Mass-rehabilitation and remedial physical culture were created (Higher Institute for Physical Culture; National Sports Academy). From this moment on, two vocational qualifications sprang into existence: (1) physical education teacher and (2) sports trainer/coach.

1989 was the year of transmission from the totalitarian system of government to the democratic system in the country. The new social and political conditions affected significantly the structure and the content of the curricula. The compulsory ideological disciplines were excluded from the learning plan (National Sports Academy). The number of lectures of other subjects increased. At the same time, new modules and courses were created and were included in the curriculum for the vocational training of the sports pedagogues.

The curriculum for vocational training of physical education teachers adopted in 2005 is the last official document that accredited successfully the professional field of „Pedagogy of Physical Education" by The National Agency for Evaluation and Accreditation (Hardman 2007).

By the comparative analysis of the contemporary curriculum for the Physical Education Major with the learning plans of 1968 and 1991, the change of the name for the major should be underlined. The professional area is currently defined as „Pedagogy of Physical Education", with „Physical Education" (Physical Education Major 2006) as the major and „Teacher of Physical Education" as the vocational qualification. In 1968 the major was defined as „Physical Education" (Higher Institute for Physical Culture). For the year 1991 it was named „Physical Education", too while the vocational qualifications were defined subsequently as the „Lecturer of Physical Education" for 1968 and the „Teacher of Physical Education" for 1991.

It should be pointed out that the comparative analysis of the curricula according to different criteria based on the European model curriculum covered all subjects during the training course, both mandatory and elective. In this respect, it should be mentioned that the presence of the elective courses and modules was strengthened considerably in the curriculum after the introduction of the European credit transfer system (ECTS) at The National Sports Academy in 2005. The elective modules represented 15% of the overall curriculum during the last years (Mileva and Tosheva 2009, Physical Education Major 2006). There was a tendency to increase the theoretical and practical elective courses in the following years.

By analyzing the results according to separate European criteria and their presence in the unique curricula for training PE teachers at The National Sports Academy from four different historical periods, the following conclusions were made.

In all of the studied curricula there was a high relative share for the area *Practical activities* (*theory and practice*) which included the study of various sports pedagogical practical disciplines as handball, basketball, volleyball, football, gymnastic, track-and-field, wrestling, etc. It varied between 41% and 43% in the curricula from 1991 and 2005 to 53% and 54.5% for the former curricula (Table 1). Probably the main reason for the relative decrease in the number of lessons of sports disciplines was the

development of new areas of sports sciences and their inclusion in the new educational programmes. Overall, however, the presence of the practical sport disciplines was marked and far exceeded the number of lessons recommended in the proposed European model for the vocational field „Physical Education" (Table 1).

The percentage of *Educational and Teaching Sciences* was relatively low for all of the curricula. These educational areas included Pedagogy, and Theory and Methods of Physical Education. The percentage ranged from 4.5% for the former curricula to 7.5% for the present curriculum from 2005. It should be emphasized that the presence of these recommended courses in the European model curriculum for PE teachers was between 10% and 20 % of the total credits.

Table 1. *Comparison of educational areas in the curricula for PE teachers*

Educational areas in European model curriculum for PE teachers	ECTS/ % of educational areas in European model curriculum	ECTS/ % of educational areas Curriculum 2005	% of educational areas Curriculum 1950	% of educational areas Curriculum 1968	% of educational areas Curriculum 1991
Practical Activities (theory and practice)	36-48 ECTS 15-20%	104 ECTS 43%	54,5%	53%	41%
Educational and Teaching Sciences	24-48 ECTS 10-20%	17-18 ECTS 7-7.5%	4,5%	4.25%	8.6%
Natural and Biological Sciences	36-48 ECTS 15-20%	32 ECTS 13.3%	15%	18.8%	17%
Social Sciences/ Humanities	36-48ECTS 15-20%	29-39 ECTS 15,4%-16,2%	20%	19.5%	17%
Scientific Work	12-24 ECTS 5-10%	19 ECTS 8%	--------	---------	3.7%
School-based Teaching Practice	24-48 ECTS 10-20%	29 ECTS 12%	---------	2.7%	12.7%
Others			6%	1.8%	

The place of the learning subjects in *Natural and Biological field* in all of the curricula for teacher training at The National Sports Academy was traditional and permanent and between 13.3% and 18.8%. This referred to the rich tradition that these learning areas have in the overall training and vocational preparation of the future sports professionals. The fact that one of the first deans of the Higher School of Physical Culture in Sofia was the renowned physiologist, Professor Dragomir Mateev, Ph.D., who for many years managed the academic institution successfully, probably played a considerable role in this respect.

The high relative share of the learning subjects from *Social Sciences/Humanities* in the curricula from 1950 and 1968 (respectively 20% and 19.5%) was explained by the fact that the ideological or political sciences as Foundation of Marxism and Leninism, Political Economy, Dialectical and Historical Materialism, History of the Bulgarian Communist Party and others held a significant place in higher sports education. Their failure after the changes in 1989 led to the significant reduction of the relative share of the social sciences in the general structure and content of the curriculum - between 15.4% and 16.2% for the current academic curriculum (influenced by the choice and the number of credits for elective modules of this area) and 17% for the curriculum since 1991.

As shown in Table 1, the recommended number of credits for the Social Sciences/ Humanities, according to the European requirements for PE teachers, varies between 15% and 20% of the total load for all learning subjects. This means that the actual curriculum for physical education specialists was aligned with the European criteria for this educational area.

With regard to *School-based Teaching Practice*, it was clear that the teaching practice was not present in the curriculum of 1950, which was understandable as a fact. Its presence in the curriculum of 1968 was low - only 2.7 percent. However, it currently represents 12% of the whole study content and a similar presence of the teaching practice is in the curriculum of 1991 - 12.7 percent. The teaching practice at schools was enlisted in the European requirements for physical education teachers' training.

In the curricula of 1950 and 1968 courses and modules aimed at *Scientific Work* in sport were missing. From the analysis of the history of specialized higher school for physical education and sport in Bulgaria it was clear that such courses appeared only in the 1980s due to the needs of the sports practice and the expansion of the scale and importance of sports sciences (Higher Institute for Physical Culture; National Sports Academy). This fact was expressed in the curriculum of 1991, where the scientific work constituted 3.7 percent of the learning content. At this stage, the place of the scientific research in the entire number of credits was significantly higher - 8%. It was associated with the need to build knowledge and basic skills for future

sports professionals to conduct scientific and practical research in the area of physical education and sport. Thus the connection between the theory of physical education and sport and the sports pedagogical practice must be realized.

It is worth studying the „other" subjects in the former curricula for vocational training of PE teachers. Such were Music and Field production practices/Field farming (curriculum 1950) or Music and Civil Defence (curriculum 1968) (Higher Institute for Physical Culture).

CONCLUSIONS

As a result of the study and of the provided comparative analysis, the following conclusions can be outlined:

- The learning disciplines from the educational area „Practical Activities" have a strong presence in the studied curricula. Methods of teaching separate sports disciplines are included here.
- The relative share of the learning disciplines in the area of Educational and Teaching Sciences for all studied curricula for vocational qualification of PE teachers is low in comparison with the European model curriculum.
- Overall, there is a correlation between the current curriculum for vocational training of physical education teachers at The National Sports Academy and the proposed European model curriculum for training of these professionals.

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ABSTRACT

The aim of the study was to compare the curricula for vocational qualification of physical education teachers (PE) at The National Sports Academy in Bulgaria across different historical periods. For the realization of the study, the main criteria according to the European educational model curriculum for PE teachers were outlined. Content analysis and comparative analysis as research methods were applied. As a result of the study, the following aspects can be outlined: there is strong presence and expression in the studied curricula of the learning disciplines from the educational area „Practical activities"; the relative share of the learning disciplines in the area of Educational and Teaching sciences has been low; there is a correlation between the current curriculum for the education of physical education teachers at The National Sports Academy and the proposed European model curriculum.

Key words: *vocational qualification, training, physical education, teachers, curricula*

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Abstract

DOCTORAL STUDY OF KINESIOLOGY – THE IMPLEMENTATION OF BIOMEDICAL SUBJECTS IN THE STUDY CURRICULUM

Kinesiology, as a science of human movement and of managing the processes of teaching and exercise, significantly contributes to the increase of the level of perceptions in this field as well as in the application of those perceptions in the education system, sport, recreation, kinesitherapy and sport for people with disabilities. The study curriculum has been continuously modernized in accordance with the expansion of perceptions within the field of kinesiology and interdisciplinary areas. The structure of the postgraduate doctoral study of kinesiology at the University of Zagreb is presented with special attention to the implementation of interdisciplinary subjects. The study curriculum is composed of four credit groups. Three credit groups embrace study subjects for which lectures, seminars and contact hours are organised, whereas the fourth credit group presumes independent research activity of a student. The study is based on the holistic approach to research in the field of kinesiology taking into account the fact that the knowledge of all characteristics, abilities and skills of a man as a bio-psycho-social being is necessary for understanding human movement and the process of teaching and exercise. It is also necessary to know a whole series of environmental factors and factors of interaction between the man and the environment that significantly influence the transformation of abilities, characteristics and skills relevant for the preservation and improvement of health as well as for success in sport and physical exercise. This is the reason why the study subjects from the field of biomedical, social and humanistic sciences are significantly represented in the postgraduate study curriculum together with the basic and applied kinesiological disciplines. Biomedical subjects are implemented in the 1st group of methodologically oriented compulsory subjects as well as into the 2nd and 3rd credit group composed of both the elective subjects and elective selected topics, covering a variety of areas of the fundamental and applied kinesiology and of numerous adjacent and cognate

interdisciplinary areas. The presentation gives the list and structure of the 2nd credit group of elective modul of Kinesiological Recreation and 2nd credit group of elective subject where biomedical aspects are markedly represented. During their study, the students pursue knowledge of the scientific methodology of kinesiological research which qualify them for the design and realisation of fundamental, developmental and applicative research projects. Besides, the students acquire a vast amount of scientific information, perceptions, findings and concepts from the fields of scientific interest of the chosen elective module and elective subjects from kinesiology, as well as from the adjacent and cognate interdisciplinary scientific fields.

Key words: *doctoral study, biomedical subject, study curriculum*

Andro Mršić ***Stručni rad***
Osnovna škola „Ivana Brlić Mažuranić"

PLIVAČI I NEPLIVAČI U OSNOVNOJ ŠKOLI „IVANA BRLIĆ MAŽURANIĆ" U STRIZIVOJNI (OSVRT NA UČENIKE OD 5. DO 8. RAZREDA)

Autor je ovim istraživanjem, tj. radom, nastojao putem ankete saznati koliko je djece (učenika/učenica) od 5. do 8. razreda Osnovne škole „Ivana Brlić Mažuranić" plivača, a koliko je neplivača. Što je utjecalo i utječe na dobivene rezultate nastojeći utvrditi broj djece (učenika/učenica) koji nisu do osnovnoškolske dobi imali dodir s plivanjem. Autor u zaključnom razmatranju daje i rješenje kroz izgradnju bazena te uključivanje plivanja u nastavu zdravstvene i tjelesne kulture navedene škole.

UVODNE NAPOMENE

Plivanje je održavanje vlastita tijela na površini vode i kretanje u vodi s pomoću ruku i nogu. Ono je kao vještina poznato od davnina.[1] Još u Starom vijeku plivanje su poznavali Asirci i Egipćani, a antički Grci su plivanje smatrali kao dio općeg obrazovanja. Iz toga vremena je poznata izreka „sramota, ne znaš ni pisati ni plivati"). Drevni Rimljani su plivanje uvrstili u vojničku vještinu. Jedna od 7 vještina u srednjem vijeku koju je obvezno morao znati budući vitez bilo je i plivanje.

Prvi pisani trag o plivanju kao sportu potječe iz 1538. To je knjiga pisana na latinskom jeziku. Od tada pa do kraja 18. stoljeća slijede mnoga djela napisana o plivanju i njegovom značaju u tjelesnom odgoju. Prvo javno kupalište otvoreno je 1760. u Parizu, a prva plivačka organizacija započela je 1796. djelovati u švedskom gradu Upsali.

[1] Zanimljivo je da većina sisavaca ne mora učiti plivati. Menutim, čovjek je jedan od rijetkih sisavaca koje mora „učiti" plivanje. Razlog je u tome što većina životinja u vodi jednostavno ponavlja pokret kretanja s kopna (hod), te na taj način pliva, kao što to radi na primjer pas. Čovjek s druge strane ne može ponoviti svoj uspravni hod u vodi, već mora naučiti koristiti se i rukama, te pravilno disati. Ipak, poznato je da vrlo mala djeca gotovo instinktivno znaju plivati.

Potkraj 18. i početkom 19. stoljeća diljem Njemačkog, Austrijskog i Francuskog Carstva otvarane su škole plivanja, a polovicom 19. stoljeća u Engleskoj je plivanje postalo sportska grana. Tada su organizirana i prva plivačka natjecanja u kojima se razvijaju i plivački stilovi, tj. načini plivanja. Plivanje je na programu od prvih suvremenih Olimpijskih igara 1896, a od 1912. nastupaju i žene.

Četiri su načina plivanja, i to slobodni ili kraul, lenni, prsni i delfin ili leptir. U disciplini mješovitog plivanja natjecatelji pojedine dionice plivaju svakim od četiriju načina plivanja.

Danas u Hrvatskoj plivanje pripada popularnom sportu; zahtjevno je iz svih stanovišta gledanja i još uvijek društveno zapostavljeno i u gradskim (većim) te u manjim (seoskim) sredinama.

Menutim, nije dvojbeno da je plivanje kao bitna sportska aktivnost u djece i mladeži danas iznimno potrebna/poželjna, a poznato je i zašto. Naime, navike stečene u djetinjstvu i pubertetu ostaju trajno. Sama faza puberteta pogodna je za prihvat korisnih podražaja s kojima tjelesna aktivnost utječe na razvoj funkcionalnih sposobnosti, a zasigurno i morfoloških osobina. Poznato je da je športskim aktivnostima moguće spriječiti neke štetne pojave koje se češće javljaju u fazi puberteta, kao što su pretilost, poremećaji cirkulacije, loše držanje tijela i druge loše navike (pušenje, možebitno kušanje droge i sl.).

Istraživanje koje je provedeno 10. prosinca 2010. u Osnovnoj školi „Ivane Brlić Mažuranić" u Strizivojni, rađeno je na uzorku od 182 učenika/učenica od 5. do 8. razreda, i to ne metodom slučajnog uzorka nego su testirani svi učenici navedenih razreda.

METODOLOGIJA ISTRAŽIVANJA

Istraživanje je provedeno ciljano za ovaj rad i odvijalo se na satu tjelesno zdravstvene kulture. Struktura, sadržaj testiranja učenika/učenica prikazani su u tablici 1., dok su pitanja postavljena učenicima priložena u anketi. Testiranje je provedeno neposrednim uvidom. Rezultati su obrađeni metodama deskriptivne statistike.

Struktura i sadržaj pitanja za u čenike osnovne škole.
U prilogu anketa s pitanjima.

ANKETNI LIST UČENIKA

OSNOVNA ŠKOLA
„Ivana Brlić Mažuranić" Strizivojna

Ime i prezime učenika
Zanimanje oca/majke

Pitanja		Odgovori	
1.	Da li znaš plivati?	1. da	2. ne
2.	Dali tvoji roditelje znaju plivati?	1. da	2. ne
3.	Ako ne znaš plivati koji su razlozi?	1. U mom mjestu nema uvjeta	
		2. Roditelji nisu u mogućnosti slati me na more, jezero	
4.	Da li želiš naučiti plivati?	1. da	2. ne
5.	Dali si sudjelovao na ljetnom Logorovanju	1. Išao sam sa školom	
		2. Išao sam s društvom	
		3. Išao sam s organizacijom izviđača, planinara	
		4. Nisam išao	
6.	Kakve vrijednosti vidiš u znanju plivanja?	*Odgovori tekstualno*	
7.	Ako znaš plivati, s kime si naučio?	1. S roditeljima	
		2. S nastavnikom-učiteljom	
		3. S društvom	
		4. Sam	
8.	Da li si se aktivno bavio plivanjem u nekom klubu?	1. da	2. ne
9.	Da li želiš aktivno baviti se plivanjem u nekom plivačkom klubu?	1. da	2. ne

Osnovni statistički parametri - istraživanje

Tablica 1.

OSNOVNA ŠKOLA
„Ivana Brlić Mažuranić"
Strizivojna

ZBIRNA LISTA PROVEDENOG ISTRAŽIVANJA
PLIVAČI - NEPLIVAČI

RAZRED	Br. ODJELA	UKUPNO uč.	MUŠKI	ŽENSKI	PITANJE 1				PITANJE 2				PITANJE 3				PITANJE 4				PITANJE 5					PITANJE 6				PITANJE 7								PITANJE 8				PITANJE 9			
					odgovori				odgovori				odgovori				odgovori				odgovori					Koje vršnjačke skupine uživate pažnju?				odgovori								odgovori				odgovori			
					m		ž		otac		majka		m		ž		m		ž		m/ž	m/ž	m/ž	m/ž		RAZREDU	ŽENAMA	KOLIT	PODRAVLJE	m				ž				m		ž		m		ž	
					1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	3	4						1	2	3	4	1	2	3	4	1	2	1	2	1	2	1	2
V	2	40	15	25	7	8	2	23	34	6	30	9	8	7	12	13	13	2	25	-	-	-	-	40	5	15	3	17	-	-	2	5	-	-	-	2	-	15	-	25	14	1	15	10
VI	2	46	29	17	18	11	8	9	41	5	34	12	20	9	9	8	28	1	16	1	-	-	-	46	11	12	5	18	-	1	9	8	1	-	5	2	-	29	-	17	20	9	12	5
VII	2	47	24	23	17	7	6	17	37	10	34	13	14	10	17	6	23	1	23	-	-	-	-	47	14	16	7	10	-	3	4	10	1	-	2	3	-	24	-	23	18	6	16	7
VIII	2	49	27	22	21	6	4	18	40	9	33	17	6	21	18	4	27	-	20	2	26	-	-	23	10	15	5	19	-	1	12	8	2	-	2	-	-	27	-	22	11	16	15	7
UK	**8**	**182**	**95**	**87**	**63**	**32**	**20**	**67**	**152**	**30**	**131**	**51**	**48**	**47**	**56**	**31**	**91**	**4**	**84**	**3**	**26**	**-**	**-**	**156**	**40**	**58**	**20**	**64**	**-**	**5**	**27**	**31**	**4**	**-**	**9**	**7**	**-**	**95**	**-**	**87**	**63**	**32**	**58**	**29**
%	100	100	52,2	47,8	66,3	33,7	23	77	83	17	72	28	50,5	49,5	64	36	96	4	97	3	14,3	-	-	85,7	22	32	11	35	-	10,5	28,4	33	5	-	10	8	-	100	-	100	66	34	66	34

Obradio:
Andro Mršić

REZULTATI ISTRAŽIVANJA

Na temelju dobivenih rezultata uočeno je da je plivača menu učenicima/učenicama bilo vrlo malo što je vidljivo iz priložene tablice. Osnovni razlozi su u tome što uvjeti sredine (npr. Nema bazena ni obližnje rijeke, a zatvoreni bazeni nalaze se u udaljenom Osijeku) kao i standard roditelja nisu na razini potreba. Dobiveni rezultati provedenim istraživanjem su dobar pokazatelj kako se taj problem može umanjiti. Ukazuje na neophodnost provedbe odrenenog vremena u vježbanju plivanja kako bi se tjelesnim vježbanjem u vodi otklonili nepovoljni subjektivni (navike) i objektivni (savladavanje tehnika plivanja i kondicija) čimbenici. Rješenja za otklanjanje objektivnih čimbenika nalaze se u stvaranju što povoljnijih materijalnih uvjeta za rad, tj. izgradnja bazena.

Otklanjanjem tih, ali i nepostojanje bazena kao nepovoljnog čimbenika, uvjet je za povećanje mogućnosti djece za vježbanje plivanja kako bi se proveo sveukupni utjecaj tjelesnog vježbanja na organizam djece, a na taj način i na antropološki status djece u srednjoj dobnoj skupini.

ZAKLJUČNO RAZMATRANJE

Na temelju provedenog istraživanja u Osnovnoj školi „Ivana Brlić Mažuranić" u Strizivojni u skupini djece (učenika/učenica) osnovnoškolskog uzrasta od 5. do 8. razreda uočeno je da stvarno vježbanje plivanja nije moguće jer postojeći uvjeti ne odgovaraju potrebama djece. Ono će biti moguće samo, ako se sat tjelesne i zdravstvene kulture upotpuni nastavom plivanja i organizira na prihvatljiv način sa stanovišta troškova.

Nastavu plivanja može se provesti pravilnim planiranjem na godišnjoj razini, i otklanjanjem subjektivnih ometajućih čimbenika primjenom i izborom prihvatljive organizacije rada, primjerenim izborom sadržaja i slično.

Takoner i pravilnim izborom, sredstava i korištenjem pomagala te odgovarajućim korištenjem raspoloživog prostora za vježbanje moguće je da učenici proplivaju za tri dana. Ta tvrdnja proizlazi iz iskustva djelovanja škole u prirodi kada djeca 3. razreda u sklopu tog nastavnog odgojno-obrazovnog oblika rada imaju i plivanje.

Rješenja za otklanjanje objektivnih čimbenika nalaze se u stvaranju što povoljnijih materijalnih uvjeta za rad. Stručno postupanje nužno će pridonijeti kvantiteti, ali i kvaliteti rada u ovom odgojno-obrazovnom području.

Naime, biološka potreba za kretanjem djece osnovnoškolske dobi podrazumijeva plivanje i vježbanje na satu tjelesne i zdravstvene kulture. Osnovni organizacijski oblik rada u tjelesnom i zdravstvenom odgojno-obrazovnom području, utječe na antropološki status djeteta sam po sebi, ali i stvara pretpostavke za uključivanje djece u ostale organizacijske oblike rada te uključivanje sadržaja tjelesne i zdravstvene kulture u slobodnom vremenu djeteta.

Današnji čovjek mora imati širok dijapazon aktivnosti kojima se može baviti na odrenenom prostoru i u odreneno vrijeme. U nekim gradovima to dolazi spontano u nekima treba dobro zasukati rukave pa da se opet ništa ne napravi, na planu poboljšanja uvjeta za bavljenje športom općenito. Po mom mišljenju vrlo je bitno imati jasan cilj što jedna sredina želi. Kada ovo govorim mislim prije svega na financiranje kao često problematičnu pojavu u domeni sporta. U današnje vrijeme problemi su povećani time što se provode stabilizacijske mjere tako da se mora paziti u što se ulaže i kako se ulaže.

Istodobno dobre rezultate u sportu, da li u plivanju ili nekoj drugoj sportskoj grani, učenici/učenice, mogu postizati uz primjerene i dobre uvjete rada zato se tome mora poklanjati velika pozornost bez obzira iz koje su oblasti. Imajući na umu, što je vidljivo iz ankete, da je želja djece (učenika/učenica) za plivanjem velika, treba im u navedenoj sredini omogućiti izgradnju barem jednog bazena jer bi time problem neplivača u Strizivojni bio gotovo riješen.

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SWIMMERS AND NON-SWIMMERS AT THE PRIMARY SCHOOL „IVANA BRLIĆ MAŽURANIĆ" IN STRIZIVOJNA (STUDENTS IN GRADES 5-8)

ABSTRACT

After a short lead-in reference about swimming as a skill of body movement in water, and a brief historical reflection on swimming as an educational and sports branch, the author described a research conducted at the end of 2010 at the primary school „Ivana Brlić Mažuranić" in Strizivojna on a sample of 182 students in grades 5 to 8, whose aim was to gather information about swimmers and non-swimmers. The author also analysed the causes of the obtained results and proposed, as a final suggestion, a solution to the problem- building a swimming pool and performing swimming activities as part of physical education lessons at the school in question.

Key words: *swimming, research, students grades 5 to 8, Primary school "Ivana Brlić Mažuranić", Strizivojna, swimmers, non-swimmers, physical education*

Andro Mršić
Osnovna škola „Ivana Brlić Mažuranić"

Stručni rad

LOŠE DRŽANJE TIJELA I DEFORMACIJE U OSNOVNOJ ŠKOLI „IVANA BRLIĆ MAŽURANIĆ" U STRIZIVOJNI (OSVRT NA UČENIKE OD 5. DO 8. RAZREDA)

UVODNE NAPOMENE

U suvremenom svijetu sve je manje profesija u kojima je potreban fizički napor. Kod onih profesija, gdje je on potreban, zbog jednoličnog rada, čovjekovo tijelo je kroz izvjesno vrijeme podložno deformacijama. S druge strane, kod većine današnjih poslova, suočeni smo s potpunom tjelesnom neaktivnosti. Boraveći u školi i kod kuće, mlade generacije uglavnom sjede, a dva sata tjelesnog odgoja tjedno, premalo je za promjene statusnog ili preventivnog djelovanja na tijelo.

Svi svakodnevno uočavamo postojeći problem, ali malo tko nudi prihvatljivo rješenje. Ne žaleći truda, autor ovog rada konstatirao je problem, detaljno je opisao brojne deformacije i predložio moguća rješenja. Autor u sugerira, da se za pravilno držanje tijela potrebno angažirati pravilno na satu. Problem lošeg držanja tijela, kod naše mladeži sve je izraženiji i posljedice bi, mogle biti velike, ukoliko se mladi ne angažiraju u tjelovježbenim i športskim aktivnostima. Tjelesni odgoj neodvojiv je od općeg odgoja, jer od fizičkog razvitka djeteta zavisi njegova budućnost. U skladu sa svojim fizičkim statusom, svakoj osobi moguć je izbor specijalnosti, profesionalno umijeće i proizvodna sposobnost. Zdrav čovjek je najveće bogatstvo za sebe, ali i za zajednicu. Mladi organizmi moraju se izlagati raznovrsnim tjelesnim vježbama. Šport i tjelesno vježbanje donose djeci životnu radost i energiju, čeliči njihov organizam, disciplinira i učvršćuje njihovu kulturu držanja tijela. Bilo bi potrebno kvalitativno poboljšanje i povećanje satnice nastave tjelesnog odgoja jer je njegova vrijednost biološka, zdravstvena, ekonomska, socijalna, pedagoška i estetska.

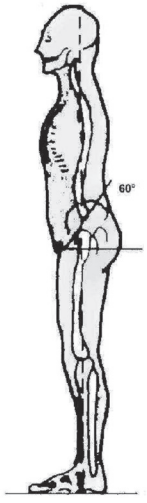
Prema stručnim razmišljanjima, nastavnik tjelesnog odgoja suodgovorna je osoba u preventivi različitih tjelesnih deformacija učenika. On ne može davati dijagnozu, niti je terapeut, ali budući da je svestrano informiran o tjelesnim vježbama i športu, kroz duže vrijeme može uspješno djelovati na njihovom otklanjanju.

METODOLOGIJA ISTRAŽIVANJA

Istraživanje je provedeno ciljano za ovaj rad i odvijalo se na satu tjelesno zdravstvene kulture. Struktura, sadržaj promatranja učenika/učenica prikazani su u tablici 1. Mjerenje je provedeno neposredno. Rezultati su obrađeni metodama deskriptivne statistike. Kako bi došli do predodžbe što je to uopće deformacija na tijelu učenika, analizirali smo pravilan stav i pravilno držanje tijela (pravilan stav-nagib zdjelice 60° slika 1). U pravilu je to neusiljeno držanje tijela malo prema naprijed (slika 2). Deformacije vezane za ravno stopalo ustanovili smo pomoću plantograma - Mayerova linija (slika 3). Objašnjenje; od sredine pete povučemo liniju na dobivenom otisku prema drugom prstu stopala s desna, odstupanja svoda stopala od linije govore o veličini deformacije.



Slika 1. Pravilan stav



Slika 2.



Slika 3. Mayerova linija

Tablica 1. *Struktura i sadržaj pitanja za u čenike osnovne škole*

MJERENJE UČENIKA – LOŠE DRŽANJE TIJELA I DEFORMACIJE ZBIRNI PREGLED REZULTATA MJERENJA UČENIKA

UZRAST UČEN. M/ž O.Š.		LOŠE DRŽANJE TIJELA I NAJČEŠĆE DEFORMACIJE UČENIKA OSNOVNE ŠKOLE – NAZIV POJAVNOSTI									
		KIFOZA		LORDOZA		SKOLIOZA	RAVNA STOPALA	DEFORMACIJA GRUDI	„O" NOGE	„X" NOGE	NAPOMENE
RAZR.	BR. ISP.	L.D.	DEF.	L.D.	DEF.						
V.	46	11	-	-	-	-	8	-	-	-	
VI.	37	2	-	-	-	-	9	-	-	-	
VII.	48	9	3	-	-	1	10	-	-	-	
VIII.	43	12	1	-	-		4	-	-	-	
ukupno	174	34	4	-	-	1	31	-	-	-	
€-%		**19,5**	**2**	-	-	**0,6**	**18**	-	-	-	

Loše držanje tijela (34) evidentno postoji ali poma lo i učenici s deformacijama (4). Svi učenici koji imaju ravna stopala (31) prijeti opasnost deformacije i opasnosti za zdravlje ako se sustav vježbanja ne prilagodi ovim u čenicima.

REZULTATI ISTRAŽIVANJA

Na temelju dobivenih rezultata uočeno je da je broj učenika koji ima loše držanje tijela menu učenicima/učenicama bio velik što je vidljivo iz priložene tablice. Na sreću broj djece koja imaju deformacije u ovome uzrastu još nije toliko izražen. Osnovni razlozi su u tome što je fizička aktivnost današnjih mladih svedena samo na nužno obavljanje fizičke aktivnosti. Takoner, treba reći da je sustav navika loše strukturiran zbog današnjeg načina življenja i životnog tempa. Može se reći da loše navike kod držanja tijela prilikom praćenja nastave, a da toga djeca nisu niti svjesna mogu lako prijeći u deformaciju tijela. Dio razloga leži i u obimnom nastavnom planu i programu djece u osnovnim školama a nije drugačije niti u srednjim školama.

Dobiveni rezultati provedenim istraživanjem su dobar pokazatelj kako se taj problem može umanjiti. Ukazuje na neophodnost provedbe odrenenog vremena u vježbanju kako bi se pravilnim tjelesnim vježbanjem otklonili nepovoljni subjektivni (navike) i objektivni (način življenja i kondicija) čimbenici. Rješenja za otklanjanje objektivnih čimbenika nalaze se u stvaranju što povoljnijih materijalnih uvjeta za rad, tj. stavljanje pod odrenena opterećenja svih mišićnih grupa.

Otklanjanjem tih, ali i nepravilnog sustava navika kao nepovoljnog čimbenika, uvjet je za povećanje mogućnosti djece za vježbanje kako bi se proveo sveukupni utjecaj tjelesnog vježbanja na organizam djece, a na taj način i na antropološki status djece u srednjoj dobnoj skupini.

ZAKLJUČNO RAZMATRANJE

Teorija strukture športa vrlo je široka i zato govoriti o kineziologiji, gdje se njezini fenomeni ne mogu u potpunosti objasniti saznanjima bilo koje druge znanosti, bilo bi spekuliranje bez nekog konkretnog cilja i velike potrebe. Oslikavanje kretanja kroz prošlost kao potrebe i u današnjoj civilizaciji ograničeno je u domeni športskog vježbanja, i to kroz školski uzrast što podrazumijeva i odrenenu razinu početnih sposobnosti vježbača.

Smatra se da je visoka razina početnih motoričkih sposobnosti osnovni preduvjet za efikasno učenje novih motoričkih struktura, njihovo usavršavanje i uspješno korištenje.

Procesom vježbanja nastavnik uvijek nešto želi transformirati, ali tomu uvijek prethodi proces učenja. Zbog toga ne postoji jedinstven i univerzalan sustav vježbanja kojim je moguće osigurati takvu razinu motoričkih sposobnosti koji odgovara svim mogućim vidovima kretanja.

Specifičnost svakog pojedinačnog procesa vježbanja zavisi od relacija izmenu antropoloških dimenzija i ukupnog broja različitih motoričkih informacija, njihove složenosti i učestalosti, te ukupnog trajanja u nekoj konkretnoj motoričkoj aktivnosti.

U korektivnoj gimnastici, kao i u drugim športovima, uvijek se pokušavalo otkriti sve ono što utječe i doprinosi boljem postizanju rezultata. Kada je u pitanju natjecateljski dio fizičkog odgoja pronicljivost nastavnika u sadašnjim uvjetima učinila je odlučujući i ključni korak u očuvanju zdravlja i olakšala put k postizanju zadovoljavajućih rezultata.

Korektivna gimnastika ili stvaranje navika za pravilno držanje tijela ne može se raditi na eksperimentalan način. To je djelatnost kontinuiteta uz uvjet da za nju ima potrebe. Bavljenje športom poznata je činjenica. Smanjuje potrebu za korektivnom gimnastikom, pod uvjetom da deformacija nije uronena, i to zato jer svi športovi imaju razranen sustav vježbi oblikovanja koji izravno ili kompenzacijski utječe na pravilno držanje tijela. Bavljenje športom podrazumijeva znanje, vještinu, zdravlje i pozitivan stav prema športu i natjecanju na način uspostavljanja odnosa izmenu znanja i odrenenih sposobnosti.

Važno i ključno pitanje ovoga priručnika je utvrditi i dati odgovor da li i koliko važeći nastavni plan i program utječe na kvantitativne i kvalitativne promjene motoričkih i funkcionalnih sposobnosti, te koliko utječe na uspješnost pri razvijanju navika za pravilno držanje tijela osobito kod djece od prvog do četvrtog razreda osnovne škole.

Takoner važno saznanje koje donosi ova knjiga je utvrnivanje stupnja zavisnosti rezultata u preventivnom dijelu nastojanja stvaranja navika za pravilnim držanjem tijela u odnosu na korektivnu gimnastiku.

Kada done do toga da se u sustav vježbanja učenika uvodi korektivna gimnastika postavlja se pitanje s kolikim opsegom opterećenja treba početno pristupiti da bi se za neko vrijeme osigurala transformacija psihosomatskog statusa. S obzirom na postavljeni cilj pojedini programi vježbanja mogu biti po svom utjecaju efikasni, neutralni ili bez utjecaja u željenom pravcu, ili, ipak efikasni ali efikasni u negativnom smislu. Zato je potrebno ispravnim odmjeravanjem cjeline motoričke aktivnosti u programu vježbanja postići sudjelovanje volje vježbača, te uspostaviti ispravan odnos energetske i informacijske usmjerenosti sadržaja programa.

Faktor adaptivnosti vježbača na vježbu mora biti efIkasno i brzo prevladan zbog motivacije koja je nužna kao ohrabrenje i potreba za daljnju motivaciju i ustrajan rad.

Svrha ovoga rada je doprinos u spoznavanju potrebe kontinuiranog vježbanja djece dok su opterećena školskim obvezama. Takoner jedna od osnovnih zadaća ovog rada je da kod školskog uzrasta na planu deformacija tijela potakne svijest na planski rad i svrhovitu kontrolu kretnih transformacijskih procesa.

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POOR BODY POSTURE AND DEFORMATIONS OF PUPILS AT THE PRIMARY SCHOOL „IVANA BRLIĆ MAŽURANIĆ" IN STRIZIVOJNA (STUDENTS IN GRADES 5-8)

ABSTRACT

After a short introduction about natural types of movement and a historical summary of sport and its educational value, the author describes a research carried out in 2010 in Ivana Brlić Mažuranić primary school in Strizivojna on a sample of 174 pupils from the fifth to the eighth grade. The author has collected data on poor body posture and deformations in children. He has also looked into the causes of the results and eventually suggests a solution to the problem through age appropriate characteristic exercises, according to the number of repetitions and series as a component of physical education in that school.

Key words: *correct body posture, research, pupils from the fifth to the eighth grade, Ivana Brlić Mažuranić primary school in Strizivojna, deformations, locomotor system, kinesitherapy, physical education*

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Stručni rad

SPORTSKI ODGOJ U PREDŠKOLSKIM USTANOVAMA

CILJ

Razvijanje suradničkih sposobnosti za timski rad, razvijanje sposobnosti donošenja odluka, razvijanje kritičkoga odnosa prema vlastitome i tuđem radu, uviđanje nužnosti svrhovitosti podjele rada, razvijanje samostalnosti i odgovornosti u radu, razvijanje sposobnosti planiranja, kvalitativan i kvantitativan utjecaj na antropološki status djeteta te integriranje zajednički dobivenih rezultata.

OPIS RADA

Projekt je osmišljen na razini predškolskog sportskog natjecanja i popratnih radionica što potiče motiviranost i stvaralačku kreativnost svih sudionika.

Sve planirano odvija se na djetetu svrhovit, a ipak zanimljivim način s primjerenim postupcima, metodama i oblicima poučavanja. Aktivnosti su međusobno povezane u određeni redoslijed kako bi se ostvarili unaprijed određeni ciljevi. Formiraju se radionice s obzirom na unaprijed određene zadatke te se djeca usmjeravaju u predviđene aktivnosti. Djeca dobivaju informaciju što bi trebalo učiniti te uz usmjeravanje stručnjaka (voditelja radionice) biraju način kako doći do unaprijed određenog cilja. Zatim se na „Projektni dan" prikaže učinjeni rad u radionicama kao popratni sadržaj sportskom natjecanju.

Tablica 1. *Tijek projektnog dana*

VRIJEME	**AKTIVNOST**
30 minuta	Okupljanje
5 minuta	Izvođenje navijačke pjesme
1 sat	Natjecanje: **ATLETIKA** **NOGOMET** **RUKOMET**
15 minuta	Proglašenje pobjednika i podjela medalja
30 minuta	Izložba učinjenih radova po radionicama

Radionice

Radionice su osmišljene na način da djeca kroz svoj stvaralački rad usvoje osnovno znanje o sportu jer će kroz suradničko ozračje i konkretnu primjenu vještina upravo oni omogućiti održavanja sportskih natjecanja u izvornom obliku. Obuhvaćaju svu djecu koja žele sudjelovati i podijeljene su po danima. Djeca će se za pojedinu radionicu opredijeliti na temelju vlastitih interesa i sposobnosti, što znači da će moći birati između kreativne, glazbene i sportske radionice (tablica 2).

Tablica 2. *Radionice i njihov programski sadržaj*

Kreativna U kreativnoj će se radionici izrađivati likovni radovi, medalje od glina za sve sudionike, kostimi od plahti i zastava s prepoznatljivim grbom za pojedinu grupu.
Glazbena Radionica u kojoj će djeca osmisliti i uvježbati glazbene (pjevačke) i plesne sadržaje, slogan za navijanje te plesne koreografije navijanja. Predviđeno je i snimanje CD-a sa svim usvojenim i uvježbanim tekstovima.
Sportska Radi se o dodatnom satu Tjelesne i zdravstvene kulture koji će biti u funkciji pripreme djeteta za sportsko natjecanje.

Natjecanje

U natjecateljskom djelu djeca će se okušati u različitim sportovima. Sportovi su prilagođeni djeci predškolske dobi i poduzete su sve mjere sigurnosti kako bi se svaki rizik od ozljede što je moguće više smanjio. U tablici 3. nalaze se tehnički elementi sportova koji će se provoditi tokom trajanja projekta.

Tablica 3. *Sportovi i njihovi tehnički elementi*

Atletika – trčanje na 30 m
Nogomet – šutiranje jedanaesteraca
Rukomet – šutiranje sedmeraca

ZAKLJUČAK

Potrebno je potaknuti djecu da u potpunosti primjene stečeno znanje i usvojene vještine u svakodnevnom životu. Projekt je sačinjen od mnogih kreativnih sadržaja gdje se svako dijete može u nečemu pronaći, prepoznati te na taj način razvijati svoje sposobnosti i obogatiti svoju osobnost.

Timski rad, ugodno ozračje, sigurnost i vjera u osobne mogućnosti, utječu na snažno formiranje djetetove slike o sebi, upravljanju emocijama, osjećaju ponosa na rezultate zajedničkoga i individualnog rada, a iznad svega pridonose procesu tolerancije, personalizacije i socijalizacije.

Ovaj bismo projekt mogli nazvati individualnim i autentičnim receptom na kojem bi svaka odgojna ustanova mogla graditi svoju osobnost jer na taj način utječe i na osobnost djece koji će vrlo brzo biti uključiti u tokove suvremenog društva i sudjelovati u njegovu razvoju.

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EDUCATING CHILDREN THROUGH OLIMPIC GAMES

ABSTRACT

The project Educating children Through Olympic games is imagined as a process of teaching Olympic games with a purpose of stimulating and developing creativity as well as knowledge and skills, which are the purpose of this project.

Using different education contents in creative workshops (art, music, acting) and sport competition we tried to enrich each child personaliry.

Children working in teams are making new friends, developing tolerance, communication skills and team learning, which means they are deeply involved in the process of socialization as a main step in everyday life.

The project includes lot of different contents where everyone can choose different activity to develop his/hers possibilities and knowledge.

Educating children through Olympic games is modern and atractive way of working which provides many-sided and contemporary nursery school with a main purpose to develop children's personality and skills.

Key words: *education, child, creativity, tem work, sport*

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Izvorni znanstveni rad

KOMPETENCIJE U TJELESNOM I ZDRAVSTVENOM ODGOJNO--OBRAZOVNOM PODRUČJU: UČENIČKA PROCJENA VAŽNOSTI

„Ne dolazite na nastavu matematike ako prije toga niste vježbali."

- Hipokrat

UVOD

Ministarstvo znanosti, obrazovanja i športa Republike Hrvatske 2010. godine donijelo je dokument pod nazivom „Nacionalni okvirni kurikulum za predškolski odgoj i obrazovanje te opće obvezno i srednjoškolsko obrazovanje Republike Hrvatske". Nacionalni okvirni kurikulum donosi okvir za stjecanje temeljnih i stručnih kompetencija u obveznom obrazovanju i pravi pomak s transfera znanja na razvoj kompetencija kao cilja obrazovanja. Temeljno je obilježje usmjerenost na učenička postignuća, odnosno kompetencije koje se trebaju steći nakon određenog obrazovnog ciklusa (Tot, 2010).

Nacionalni okvirni kurikulum uključuje sedam odgojno-obrazovnih područja od kojih svoje značajno mjesto zauzima i tjelesno i zdravstveno odgojno-obrazovno područje. „Svrha tjelesnoga i zdravstvenoga područja jest usvajanje znanja, stjecanje vještina i navika te razvijanje pozitivnog stava prema tjelesnoj aktivnosti i zdravomu načinu življenja kako bi se omogućilo dosizanje najboljih tjelesnih i duševnih potencijala pojedinca" (NOK, 2010). Koncepcija tjelesnog i zdravstvenog odgojno-obrazovnog područja temelji se na kineziološkom idealu čovjeka, a kroz zajedničko djelovanje sadržaja i aktivnosti u predmetu Tjelesna i zdravstvena kultura i modulu Zdravstveni odgoj utječe se na antropološki status svakog pojedinca (Findak, 2009).

Kompetencije, odnosno očekivana učenička postignuća, predmet su ovog istraživanja. Kompetentnost se može jednostavno naznačiti kao učinkovita upotreba znanja u praktičnim okolnostima. Temeljne kompetencije osiguravaju svakom

učeniku bolje snalaženje u životu i pripremaju ga za promjenjiv i nepredvidiv svijet u kojemu treba biti spreman za cjeloživotno učenje.

Cilj je rada ispitati koliku važnost učenici pripisuju pojedinim kompetencijama tjelesnog i zdravstvenog odgojno-obrazovnog područja koje su kao osnovne smjernice definirane u Nacionalnom okvirnom kurikulumu Republike Hrvatske. Dodatno se želi ispitati pridaju li učenici različitu važnost pojedinim kompetencijama s obzirom na razred, na bavljenje sportom, na opći uspjeh i na ocjenu iz tjelesne i zdravstvene kulture. Dosad nije bilo istraživanja koje bi se bavilo percepcijom kompetencija tjelesnog i zdravstvenog odgojno-obrazovnog područja od strane učenika te će rezultati ovog istraživanja omogućiti korisne početne informacije za buduća istraživanja u ovom području.

METODE

Istraživanje je provedeno na uzorku od 237 učenika Tehničke škole Čakovec u 2010./2011. školskoj godini. Svi su sudionici muškog spola i polaznici su četverogodišnjeg strukovnog srednjoškolskog obrazovanja u obrazovnom sektoru elektrotehnike i strojarstva. Uzorak sačinjavaju učenici sva četiri razreda: prvi razred 62 sudionika, drugi razred 78 sudionika, treći razred 54 sudionika i četvrti razred 43 sudionika.

Sudionici istraživanja ispunili su anketni upitnik od 46 pitanja. Pet pitanja odnosilo se na podatke o sudionicima, dok je 41 pitanje bilo vezano uz kompetencije. U upitniku su citirana očekivana učenička postignuća (kompetencije) za četvrti obrazovni ciklus (strukovne škole) u tjelesnom i zdravstvenom odgojno-obrazovnom području, a koja su navedena u Nacionalnom okvirnom kurikulumu Republike Hrvatske (NOK, 2010). Očekivana učenička postignuća su podijeljena u pet područja, a peto područje (Sprječavanje bolesti i promicanje zdravlja) podijeljeno je na pet potpodručja (Tabela 1). Za procjenu važnosti koju učenici pripisuju pojedinoj kompetenciji upotrjebljena je skala od četiri stupnja. Tražio se odgovor koliko je važno da učenici kroz nastavu steknu navedena znanja ili vještine za svoj budući život i rad, gdje 1 znači potpuno beznačajno, 2 malo značajno, 3 značajno i 4 iznimno značajno.

Za sve varijable izračunati su pokazatelji opisne statistike, a normalnost njihove razdiobe testirana je Kolmogorov-Smirnovljevim testom. Kako su sve analizirane varijable ordinalne, a njihove razdiobe značajno odstupaju od normalne, analiza razlika izvršena je korištenjem Mann-Whitney U testa i Kruskal-Wallis H testa. Statistička analiza izvršena je na razini značajnosti od 95% ($p<0,05$).

REZULTATI I DISKUSIJA

U tabeli 1 prikazane su procjene važnosti očekivanih učeničkih postignuća (kompetencija) za ukupan uzorak sudionika. Osim aritmetičkih sredina 41 varijable kompetencija, iskazani su i prosječni rezultati za pojedina područja i potpodručja. Sudionici ovog istraživanja iskazali su izrazito veliki značaj svim kompetencijama tjelesnog i zdravstvenog odgojno-obrazovnog područja, a što potvrđuju rezultati aritmetičkih sredina koje gotovo sve prelaze ocjenu „značajno" (3). Visoka prosječna ocjena svih kompetencija potvrđuje kako je za učenike tjelesna i zdravstvena kultura vrlo važan predmet te kako stjecanje kineziološkihznanja i vještina, dobro zdravlje i harmoničan razvoj osobina i sposobnosti predstavljaju važan segment neophodan za učinkovito prilagođavanje svim životnim i radnim situacijama.

Tabela 1. *Aritmetičke sredine (AS) i standardne devijacije (SD) važnosti očekivanih učeničkih postignuća izračunate na ukupnom uzorku sudionika*

	OČEKIVANA UČENIČKA POSTIGNUĆA – KOMPETENCIJE	AS	SD
I.	**TJELESNO VJEŽBANJE I ZDRAVLJE**	3,40	,410
1.	Biti osposobljen za vođenje brige o vlastitomu zdravlju i zdravlju okoline	3,50	,629
2.	Prepoznati i razumjeti zakonitosti o utjecaju tjelesnoga vježbanja na pojedine dimenzije antropološkoga statusa	3,20	,696
3.	Prepoznati i biti svjestan važnosti redovitog i pravilnog održavanja higijene sportskih objekata i prostora	3,44	,744
4.	Steći zdrave prehrambene navike o uzimanju hrane i tekućine u vrijeme povećanih tjelesnih napora	3,45	,678
5.	Promicati preventivnu ulogu tjelesnoga vježbanja u sprječavanju bolesti te čuvanju, unaprjeđivanju i zaštiti zdravlja kao općeljudske vrijednosti	3,39	,632
6.	Usvojiti osnovna znanja o sprječavanja povreda pri tjelesnom vježbanju	3,49	,723
7.	Steći naviku pravilnoga odijevanja radi zaštite od nepovoljnih izvanjskih utjecaja u različitim uvjetima vježbanja	3,30	,759
II.	**ANTROPOLOŠKA OBILJEŽJA**	3,06	,528
8.	Samostalno izračunati svoj indeks tjelesne mase (ITM)	2,70	,929
9.	Biti osposobljen za samopraćenje antropoloških obilježja	3,08	,732
10.	Prepoznati i biti svjestan potrebe o održavanju antropoloških obilježja na optimalnoj razini	2,93	,747
11.	Razviti svijest o vlastitim sposobnostima, a time i jačanje samopouzdanja i samopoštovanja	3,53	,667
III.	**KINEZIOLOŠKA TEORIJSKA I MOTORIČKA ZNANJA**	3,01	,541
12.	Steći opće i temeljne kineziološke kompetencije o pravilnoj uporabi kineziloških operatora	3,06	,762
13.	Steći specifične kineziološke kompetencije o korištenju kineziloških operatora koji su primjereni budućemu zanimanju	2,95	,803

14.	Usporediti vrijednosti između dobivenih rezultata inicijalnim, tranzitivnim i finalnim provjeravanjem	2,85	,879
15.	Biti osposobljen za samoocjenjivanje antropoloških obilježja	3,02	,797
16.	Biti osposobljeni za primjenu mjera sigurnosti na skijalištu i klizalištu	2,97	,958
17.	Prepoznati i osvijestiti temeljne zakonitosti glede opterećenja pri tjelesnomu vježbanju	3,27	,717
18.	Prepoznati i primijeniti opremu i sredstva na skijalištu i klizalištu	2,98	,943
IV.	**MOTORIČKA DOSTIGNUĆA**	3,45	,468
19.	Biti osposobljen za djelotvorno služenje naučenim u svakodnevnomu životu i radu	3,38	,670
20.	Prepoznati i osvijestiti prednosti aktivnoga odmora	3,42	,694
21.	Biti osposobljen za provođenje samostalnoga vježbanja	3,42	,730
22.	Biti osposobljen za rješavanje problema u urgentnim situacijama	3,57	,658
V.	**SPRJEČAVANJE BOLESTI I PROMICANJE ZDRAVLJA**	3,20	,401
	A) Mentalno, socijalno i emocionalno zdravlje	3,22	,528
23.	Prepoznati poruke verbalne i neverbalne komunikacije	3,16	,770
24.	Kritički vrjednovati vlastite postupke i planove u odnosu na željene životne i profesionalne ciljeve	3,23	,720
25.	Steći socijalne vještine za djelotvorno rješavanje sukoba, suočavanja s konkurencijom i promjenama u odnosima	3,27	,754
	B) Rizična ponašanja	3,28	,567
26.	Argumentirati utjecaj alkohola i psihoaktivnih tvari na ponašanje i odluke glede međuljudskih i spolnih odnosa	3,18	,845
27.	Pravilno postupiti u slučaju nezgode i hitnih stanja zbog zlouporabe alkohola ili psihoaktivnih tvari	3,35	,770
28.	Usvojiti vještine vršnjačke pomoći i podrške pri rizičnomu ponašanju u skupini ili razredu	3,30	,718
	C) Međuljudski odnosi, spolno zdravlje i roditeljstvo	3,20	,516
29.	Analizirati i prepoznati moć u međuljudskim odnosima koja može biti dobro ili loše upotrijebljena	3,20	,747
30.	Argumentirati važnost i potrebu privrženosti, povjerenja i poštovanja u emocionalnim i spolnim odnosima	3,13	,841
31.	Razlikovati posebnosti pojedinih međuljudskih i partnerskih odnosa, uključujući i brak	3,09	,831
32.	Objasniti i usvojiti pojmove odgovorna spolnoga ponašanja i odnosa	3,28	,747
33.	Analizirati važnost, trajnost i odgovornost roditeljstva te njegov utjecaj na životne mogućnosti i odabire	3,31	,778
	D) Prehrana i zdravlje	3,04	,580
34.	Razmotriti utjecaj društva i medija na prehrambene navike	3,09	,781
35.	Opisati temeljna prava potrošača na obaviještenost i poštovanje zakonskih propisa o namirnicama i prehrani	3,01	,756
36.	Pružiti vršnjačku pomoć i potporu kod problema poremećaja prehrane u skupini ili razredu	3,02	,888

	E) Sprječavanje bolesti i unapređenje zdravlja	3,25	,511
37.	Nepristrano procijeniti osobne zdravstvene potrebe	3,29	,722
38.	Analizirati načine očuvanja i unaprjeđenja zdravlja tijekom života	3,27	,746
39.	Usvojiti odgovarajuću tjelesnu aktivnost kao načelo ponašanja u svim životnim uvjetima	3,27	,773
40.	Aktivno sudjelovati u programima promicanja zdravlja i sprječavanja bolesti	3,13	,834
41.	Analizirati i procijeniti utjecaj okoliša i radnoga mjesta na zdravlje i na mogući razvoj bolesti	3,29	,767

Područja koja su učenici označili kao najvažnija su „*Motorička dostignuća*" s prosječnom ocjenom 3,45 i „*Tjelesno vježbanje i zdravlje*" s prosječnom ocjenom 3,40. Očekivana učenička postignuća koja su ocijenjena najvišom prosječnom ocjenom i koje sudionici smatraju najvažnijima su: „*Biti osposobljen za rješavanje problema u urgentnim situacijama*" (3,57), „*Razviti svijest o vlastitim sposobnostima, a time i jačanje samopouzdanja i samopoštovanja*" (3,53), „*Biti osposobljen za vođenje brige o vlastitomu zdravlju i zdravlju okoline*" (3,50) i „*Usvojiti osnovna znanja o sprječavanja povreda pri tjelesnom vježbanju*" (3,49).

Najmanje važnim učenici smatraju sljedeće kompetencije: „*Samostalno izračunati svoj indeks tjelesne mase*" (2,70), „*Usporediti vrijednosti između dobivenih rezultata inicijalnim, tranzitivnim i finalnim provjeravanjem*" (2,85), „*Prepoznati i biti svjestan potrebe o održavanju antropoloških obilježja na optimalnoj razini*" (2,93), „*Steći specifične kineziološke kompetencije o korištenju kineziološkim operatora koji su primjereni budućemu zanimanju*" (2,95), „*Biti osposobljeni za primjenu mjera sigurnosti na skijalištu i klizalištu*" (2,97) i „*Prepoznati i primijeniti opremu i sredstva na skijalištu i klizalištu*" (2,98).

A) Razlike u procjeni važnosti kompetencija s obzirom na razred

Jedan od ciljeva istraživanja jest utvrditi razlikuju li se učenici u procjeni važnosti analiziranih kompetencija s obzirom na razred koji polaze. Broj sudionika po razredima iznosio je: prvi razred 62, drugi razred 78, treći razred 54 i četvrti razred 43. S obzirom na rezultat Mann-Whitney U testa može se ustvrditi kako učenici svih razreda pridaju podjednaku važnost pojedinim kompetencijama te kako između njih nema statistički značajnih razlika. Istina, kod dvije su se kompetencije pojavile značajne razlike (*kompetencije 4 i 15*), ali one su na granici značajnosti i vjerojatno su više posljedica slučajnosti nego što je to stvarno postojanje razlika.

B) Razlike u procjeni važnosti kompetencija s obzirom na aktivno bavljenje sportom

Uzorak je podijeljen u dvije skupine: one sudionike koji su članovi sportskog kluba u kojem treniraju i natječu se (131 sudionik) i one koji se ne bave organiziranim sportom u nekom od sportskih klubova (106 sudionika). Najveći broj sudionika (67,98%) bavi se nogometom, što je bilo i očekivano s obzirom na popularnost tog sporta. Usporedi li se taj postotak i postotak od 59,8% međimurskih maturanata koji se bave nogometom dobivenom u istraživanju Markuša (2008), s brojem od 32,8% zagrebačkih maturanata koji se bave nogometom dobivenom u istraživanju Prota i Bosnar (1999), može se ustvrditi kako je nogomet u Međimurskoj županiji izrazito prihvaćen i popularan sport.

Rezultati Mann-Whitney U testa pokazuju kako postoje statistički značajne razlike u svim analiziranim područjima koja označavaju očekivana učenička postignuća. Tako u području „Tjelesno vježbanje i zdravlje" postoje značajne razlike kod kompetencija broj 1, 2, 3 i 6; u području „Antropološka obilježja" kod kompetencija broj 9, 10 i 11; u području „Kineziološka teorijska i motorička znanja" kod kompetencija broj 12, 14 i 15; u području „Motorička dostignuća" kod kompetencija broj 19 i 21; u području „Sprječavanje bolesti i promicanje zdravlja" kod kompetencija broj 24, 26, 27, 34, 37, 39 i 40.

Svim područjima i svim pojedinačnim kompetencijama u kojima je dobivena statistički značajna razlika veću važnost kompetencijama pridaju oni sudionici koji su članovi sportskog kluba i aktivno se bave nekim sportom.

C) Razlike u procjeni važnosti kompetencija s obzirom na ocjenu iz predmeta tjelesne i zdravstvene kulture

Uzorak je podijeljen u dvije skupine: one učenike koji su iz predmeta tjelesna i zdravstvena kultura u prethodnom razredu imali ocjenu „odličan" (171 sudionik) i one koji su imali neku drugu ocjenu (66 sudionika). Mann-Whitney U testom dobivene su određene razlike između skupina u odnosu na važnost koju pridaju pojedinim kompetencijama.

Učenici s odličnom ocjenom iz predmeta tjelesna i zdravstvena kultura su u odnosu na učenike s nižim ocjenama značajno važnijim procijenili sljedeća učenička postignuća: kompetencije broj 1, 12, 24, 25, 26, 27, 28, 30, 37 i 38. Kako su gotovo sve spomenute kompetencije povezane sa zdravljem, može se zaključiti da ovi učenici prepoznaju kako se nastavom tjelesne i zdravstvene kulture može izravno utjecati na čuvanje i unaprjeđenje zdravlja.

D) Razlike u procjeni važnosti kompetencija s obzirom na školski opći uspjeh

Sudionici su podijeljeni u tri skupine s obzirom na školski opći uspjeh: na sudionike koji su prethodni razred završili odličnim uspjehom (35 sudionika),

na one s vrlo dobrim uspjehom (130 sudionika) i one s dobrim, dovoljnim ili nedovoljnim uspjehom (72 sudionika). Kruskal-Wallis H test pokazao je postojanje razlika u samo tri kompetencije (kompetencije broj 23, 25 i 34). Učenici s boljim općim uspjehom spomenutim kompetencijama pridaju veću važnost.

ZAKLJUČAK

Istraživanje je imalo za cilj dobivanje informacija o tome što učenici misle o onim postavkama kurikuluma koje određuju kompetencije u tjelesnom i zdravstvenom odgojno-obrazovnom području, a koje bi oni trebali steći u strukovnom srednjoškolskom obrazovanju. Koju važnost oni pridaju tim kompetencijama. Rezultati dobiveni na uzorku od 237 učenika strukovnog srednjoškolskog obrazovanja mogu ponuditi nekoliko izravnih i neizravnih zaključaka.

Svi sudionici istraživanja (kod kojih s obzirom na razred nema statistički značajnih razlika) smatraju kako su im kompetencije tjelesnog i zdravstvenog odgojno-obrazovnog područja iznimno važne, a što potvrđuje i ukupna prosječna ocjena od 3,22. Tako visoka ocjena važnosti definiranih kompetencija govori o značaju tjelesnog i zdravstvenog područja što potvrđuju i sami učenici. Kako Nacionalni okvirni kurikulum čini polazište za izradbu nastavnih planova, odnosno definiranje optimalnoga opterećenja učenika te izradbu predmetnih kurikuluma, ovakva pozitivna usmjerenost učenika prema kompetencijama na neki način obvezuje na dobro i kvalitetno situiranje predmetnog kurikuluma tjelesne i zdravstvene kulture.

Nacionalni okvirni kurikulum unutar tjelesnog i zdravstvenog odgojno-obrazovnog područja definira veliki broj kompleksnih učeničkih postignuća za koje se očekuje da postanu njihova svojina. I do sada je tjelesna i zdravstvena kultura imala velik broj zadaća usmjerenih na zdravlje i na motorički, kognitivni, socijalni i emotivni razvoj djece i mladeži te su postojala velika očekivanja u njihovoj provedbi. Nastava tjelesne i zdravstvene kulture često je kritizirana kako ne uspijeva u realizaciji svojih zadaća, međutim, zbog njihovog velikog broja, a zbog malog raspoloživog vremena nastave te ograničenih materijalnih uvjeta rada, ona nije ni bila u mogućnosti zadovoljiti sve potrebe učenika. Nacionalni okvirni kurikulum pred tjelesno i zdravstveno odgojno-obrazovnog područje postavlja još veće zahtjeve. Oni se neće moći realizirati ako se predmetni kurikulum ne promijeni i osjetno ne poveća raspoloživi broj sati nastave, a po kojima trenutačno Hrvatska zauzima jedno od posljednjih mjesta u Europi.

Najveću ocjenu važnosti dobile su kompetencije koje definiraju područje „Motorička dostignuća". To je najvjerojatnije posljedica trenutačnog stanja u nastavi tjelesne i zdravstvene kulture u kojoj se, čini se, najveća pažnja posvećuje

motoričkim postignućima, dok su druga područja (naročito zdravstveni odgoj) ipak zapostavljenija.

Značajno veću ocjenu važnosti pridaju kompetencijama oni učenici koji se aktivno bave sportom. Takav rezultat indirektno ukazuje na važnost utjecaja na razvoj kompetencija kod učenika koji se ne bave aktivno sportom što bi za posljedicu zasigurno imalo njihovo veće uključivanje u sport i izvanškolsko, a samim tim i cjeloživotno vježbanje.

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COMPETENCIES IN THE FIELD OF PHYSICAL EDUCATION: STUDENT ASSESSMENT OF THE IMPORTANCE

ABSTRACT

The research was conducted on the total of 237 pupils who attend four-year vocational secondary education, with the aim to determine the importance of certain competences in the field of physical education pursuant to pupils' opinion. The above-mentioned competences are defined as the basic guidelines pursuant to the National Curriculum Framework in the Republic of Croatia. Furthermore, the additional goal was to determine if there are differences in assessing the importance of competences regarding grade, doing sports, general school success and the mark in physical education.

The participants in this study pointed out the great importance of all competences within the field of physical education, and marked the fields of „Motor Achievements" and „Physical Activity and Health" as the most important ones. There were no statistically significant differences in assessing the importance of competences with regard to the grade and general school success. Considering the issue of doing sports actively, there are statistically significant differences in all analyzed fields; the participants who are active members of a sports club find competences to be of higher importance. The pupils who achieved mark „A" in physical education find the competences related to health to be of higher importance.

Key words: *curriculum, pupils' competences, vocational schools*

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Preliminary communication

STUDY OF THE PHYSICAL EDUCATION, THE ASSESSMENT SYSTEM AND THE PARENTS' HOPES CONCERNING THIS SCHOOL SUBJECT AT PRIMARY SCHOOL LEVEL

INTRODUCTION

The assessment, seen as one of the three parts of the educational system, is a necessary step which constitutes a method for validating the accuracy of the educational sequences, of the component parts of the educational process and a way of delimiting and interfering with the educational contents and objectives (Cucoş, 1996), Dragnea (2000), (Badiu, 1998; Cârstea, 2000; Stoica, 2001; Tudor, 2001, etc.).

The objective of this paper is to carry out a study concerning the importance, the knowledge and the interest manifested by the parents in the physical education lesson and the assessment system for this school subject.

Hypothesis of the research

We suppose that physical education and its present-day assessment system are known by the parents and are in accordance with the parents' hopes for their children in primary school.

Subjects and terms of the research

The subjects were parents of primary school children, selected randomly in 4 different towns in Moldova: Bacău, Roman, Piatra Neamţ and Oneşti. 825 parents were invited to take part in this study. The survey was based on a questionnaire with 33 items (yes/no questions and semi-structured questions) between 15 March2010 and 21 June2010. The questionnaire included 12 fundamental items, 7 control items, 10 dissemination items and 4 identification ones.

The questionnaire was delivered and filled out with the help of 18 volunteers.

Data presentation and analysis

After the period of time devoted to filling out the questionnaires, the data processing stage followed. During the first step, out of the total number of

questionnaires, 27 were excluded for inaccuracies or mistakes made while filling out the forms, mistakes which could lead to the misinterpretation of the results.

After gathering all the data, the following graphical representations were made according to the answers to the 12 fundamental items:

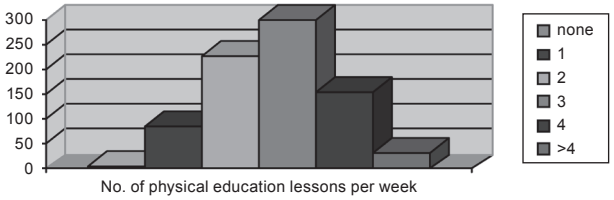


Figure 1. *Answers to item no. 8 „How many physical education lessons do you think your children should have per week?"*

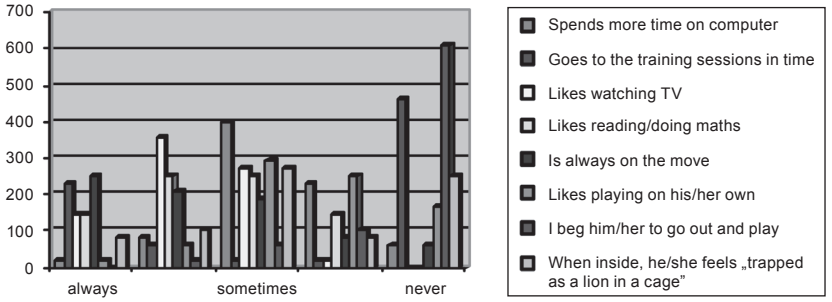


Figure 2. *Answers to item no. 11 „My child……."*

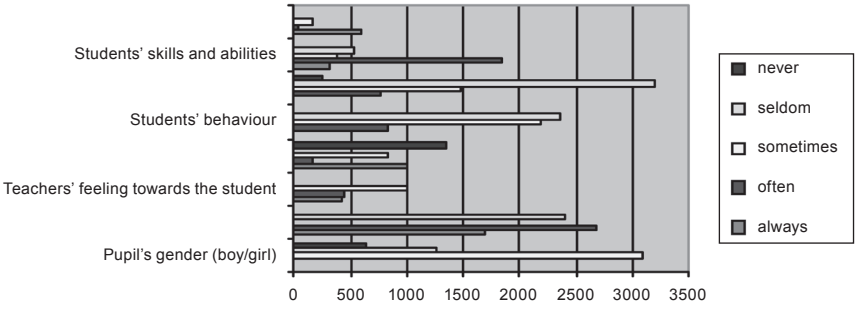


Figure 3. *Answers to item no. 14 „I believe the factors that influence the accuracy of the assessment are ……"*

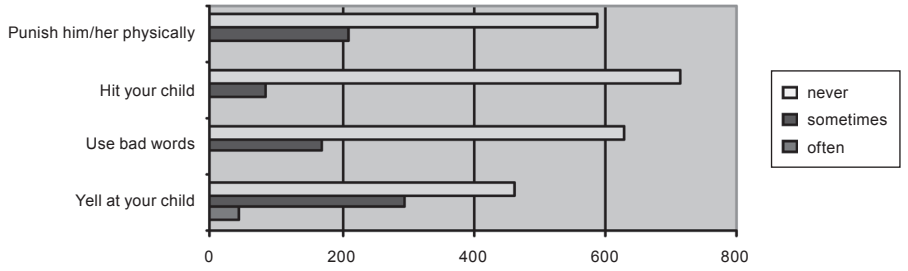


Figure 4. *Answers to item no. 17 „How often did the physical education teacher happen to ….”*

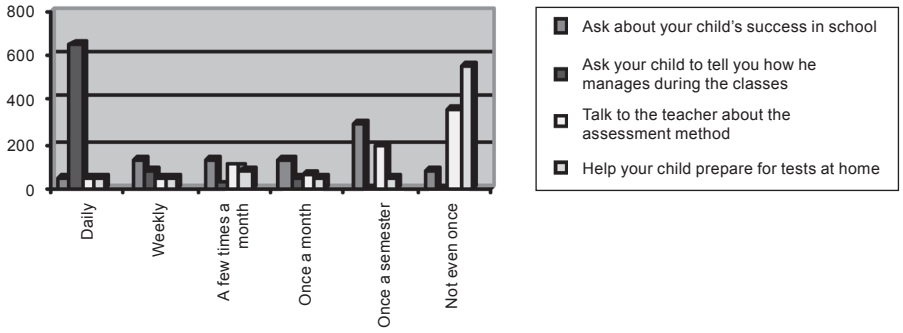


Figure 5. *Answers to item no. 18 „Concerning the physical education: how often do you ……..”*

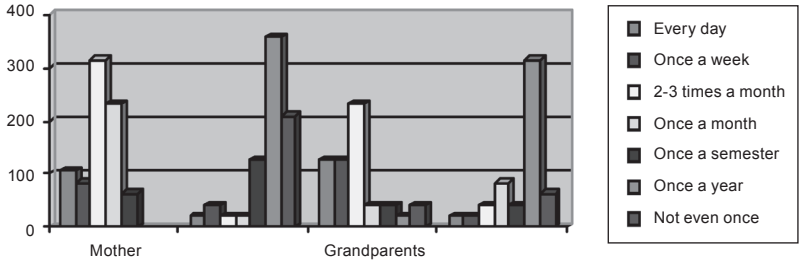


Figure 6. *Answers to item no. 19 „Who comes to school more often?”*

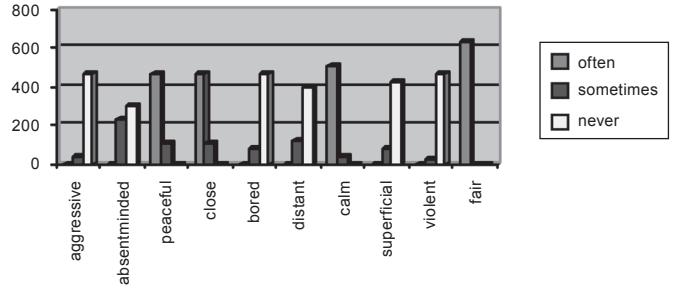


Figure 7. *Answers to item no. 22 „The physical education teacher is.....”*

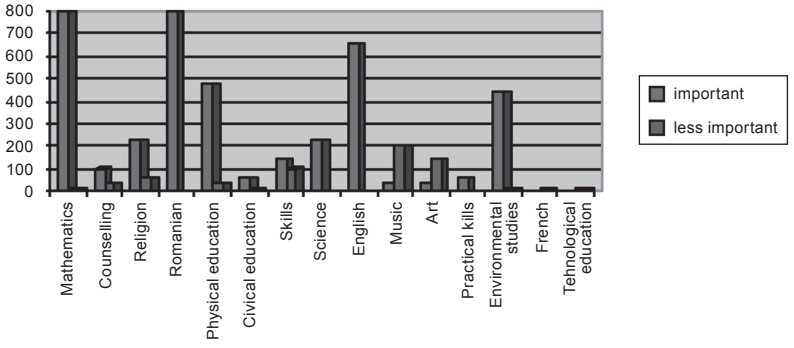


Figure 8. *Answers to item no. 24 „Please state 5 of your child's school subjects that you consider to be.....”*

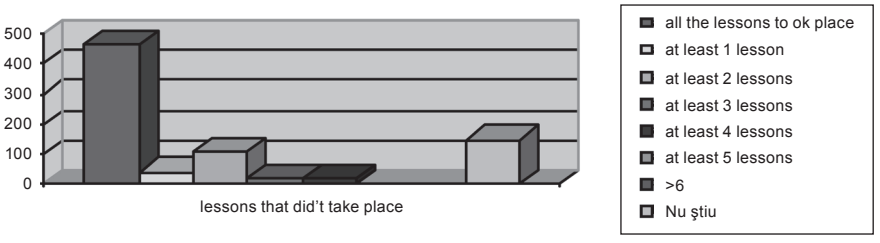


Figure 9. *Answers to item no. 26 „The number of physical education lessons included into the timetable but that did not take place during the last semester”*

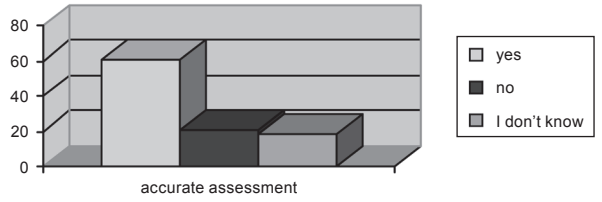


Figure 10. *Answers to item no. 30 „Do you believe that your child's assessment during physical education lessons is accurate"*

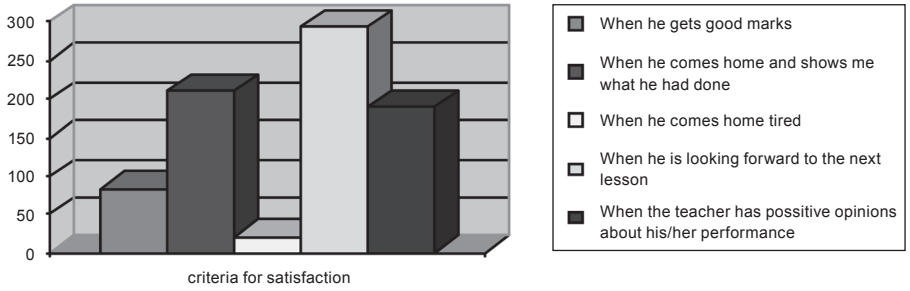


Figure 11. *Answers to item no. 32 „How satisfied are you with your child's performance during the physical education lessons"*

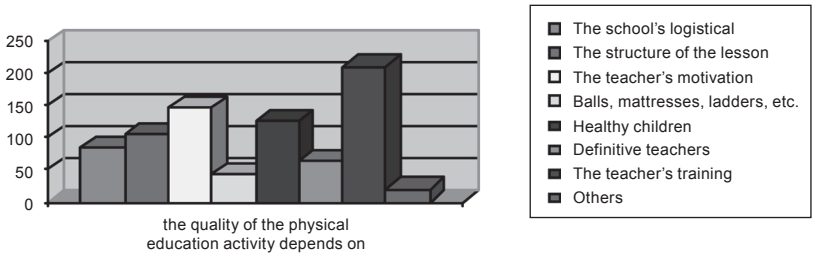


Figure 12. *Answers to item no. 33„The quality of the physical education activity depends on ……..."*

CONCLUSIONS

We believe that the objective of this paper, „conducting a study concerning the importance, the knowledge and the interest manifested by the parents in the physical education lesson and the assessment system for this school subject", has been achieved.

The hypothesis which was the starting point of the paper „We suppose that the physical education and its present-day assessment system are known by the parents and are in accordance with the parents' hopes for their children in primary school." was partially confirmed.

According to the data offered, the parents know aspects concerning the number of lessons taken by the children in school, but at the same time the data show dissatisfaction with the small number of physical education lessons included in the curricula.

The information concerning the children of the people interviewed emphasized the predominance of „active" children and their wish to inter-relate.

Questionnaire item no. 14. was „I believe the factors influencing the accuracy of the assessment are…". The replies given led to the following hierarchy: 1 „the accurate assessment", 2 „The teacher's feelings towards the student", 3 „the student's skills and abilities", 3 „the parents' contribution to improving the educational activity", 4 „the student's gender(boy/girl)", 5 „the student's behaviour", 6 „the student's family", in the last place was „the marks for the other school subjects".

The position of the physical education teacher is an important factor for the children as well as for the parents and for the school board. The answers given to item no.17 „How often did the physical education teacher happen to…" showed that in most cases (57.89%) the children were not yelled at but in 36.84% this „sometimes" happened and 5.26% stated that this kind of communication was „often" used. During the communication, the teacher did not use bad words in 78.94% of the cases, but 21.05% stated that „sometimes" offending words were used, a fact which affects the children. An aspect which nowadays should be completely excluded from the educational process, that is the teacher hitting the children, was denied by 89.47% but 10.52% stated that „sometimes" their child was hit by the teacher! Physical punishment has not been applied during the physical education classes for 73.68% of the subjects' children, while for 26.31% of the subjects' children this „correction" method is „sometimes" used.

Item 18 „During the physical education lessons: how often ……." intended to investigate the interest of the participants in some aspects of the physical education lessons. The answers showed that the interest in the child's success in this field is manifested in most of the cases - 36.84% once a semester, 81.57% stated that they talk

to the children daily about the way they manage in school. It is hard to believe that this aspect is real, considering the fact that the item refers to physical education and there are only 2 physical education lessons per week and that is why we believe that this item was understood incorrectly. In 44.73% of the cases, the parents never speak to the teacher about the assessment method during the physical education lesson! However, 68.42% of the parents help their children in preparing for the tests at home.

The „family" contact with the educational problems showed that „mother" and „grandparents" (and seldom the „father") get in touch with the school authorities.

The answers given to item no.22 emphasized an almost „idyllic" characterization of the physical education teacher, fact which can only make us happy.

The answers given by the subjects showed that the physical education is at the top of the parents' list when it comes to its importance among the school subjects included in the curricula for primary school level.

The parents' information concerning the children's attendance at the physical education lessons, as well as the teacher's presence during the lessons showed that in most of the cases (57.89%) all the lessons took place. However, the answers showed that in 5.26% of the cases at least one lesson did not take place, in 13.15% of the cases at least 2 lessons did not take place, 2.63% of the participants stated that at least 3 lessons did not take place, the same percentage stating that at least 4 lessons did not take place.

As to the way the children are assessed, 60.52% of the parents agree with it, 21.05% of them think that the assessment does not entirely reflect the qualities of their children, while 18.43% of them cannot answer this item.

The parents' satisfaction concerning their children's performance during physical education lesson was investigated through item no.32, and it showed that 10.54% are satisfied when their children get good marks, 26.31% believe that the fact that their children come home and show them what they had done during the lesson is a reason for satisfaction, 2.63% - when the child comes home tired, while most of the participants- 38.84% stated that their child's looking forward to the next lesson shows the extent of his/her satisfaction towards the performance during the physical education lesson, and 23.68% considered teacher's positive observations as a marker for their children's performance during the lesson.

The item no. 33 was „The quality of the physical education activity depends on……..", and the subjects could number 8 preset answers so that the most important item gets 8 points, while the least important one gets 1 point. This item emphasized the following results: in the first place was the „teacher's training", in the second place was the „teacher's motivation", in the third place was the „children's health", in the fourth „the lesson structure", in the fifth „the school logistics", in

the sixth the „definitive teachers", in the seventh the equipment „balls, mattresses, ladders, etc.", and in the last place „others".

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ABSTRACT

The changes specific to our era also reflect upon the educational system in Romania, bringing the problem of quality and its assessment to the attention of the theoreticians, practitioners and the decision-makers.

The modern assessment in education refuses to assume the role of a scarecrow, does not admit assessing anything but what had already been taught and learnt, helps the student discover opportunities for learning, training and development, helps the students identify themselves through these actions, offering itself as a definitive factor of freedom in education.

The natural question that we all ask ourselves and to which this study tried to find an answer was if the parents also have knowledge concerning the role and the importance of the activity performed by their children during the physical education classes, if the assessment system for the physical education activity is known, and if the parents can recognize their children's capacities and abilities within the rating system.

Key words: *physical education, assessment system, parents' hopes, primary school level*

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Pregledni rad

PSIHOLOŠKA ISTRAŽIVANJA NASTAVE TJELESNE I ZDRAVSTVENE KULTURE U HRVATSKOJ

UVOD

Nastava, kao složena pedagoška pojava, odvija se u dinamičnom i energetskom polju međusobno isprepletenih interakcija između nastavnika i učenika u razredu. Predmet Tjelesna i zdravstvena kultura zauzima važnu ulogu i mjesto u svim dijelovima odgojno – obrazovnog sustava, s jasno definiranim ciljevima i zadaćama. Jedan od primarnih ciljeva jest stjecanje i trajno usvajanje navike redovitog tjelesnog vježbanja.

Ovako postavljen cilj nastavnog predmeta TZK ne može se ostvariti bez povratnih informacija o efektima nastavnog procesa. Prijeko je potrebno uvijek imati na umu kako u tu svrhu trebamo kod učenika maksimalno uvažavati njihove potrebe, interese, razviti pravilne motive, poželjne stavove i ugodne emocije prema tjelesnom vježbanju i zdravom životnom stilu. Na kvalitetu nastave TZK utječu razni čimbenici u različitom obujmu; organizacijsko – materijalni uvjeti rada i nastavnikove stručne, pedagoške i ostale sposobnosti. Isti mogu kod učenika izazvati pozitivne, ali i negativne stavove prema temeljnim vrijednostima nastave TZK i dovesti u pitanje njihovu odluku i motiviranost za daljnjom participacijom u nastavi.

Nastava tjelesne i zdravstvene kulture važno je područje u odgoju i obrazovanju mlade generacije. Dobrim odabirom sadržaja i metodičkim oblikovanjem, kao što je utvrđivanje psihofizičkog statusa, izrada programa, realizacija i praćenje tijekom rada, osnovni su uvjeti za poboljšanje kvalitete, a time i utjecaja odgojno - obrazovnog procesa. Obzirom na to da je učenik subjekt toga procesa, njegove povratne informacije važan su doprinos boljoj i racionalnijoj realizaciji samog proesa.

Cilj je ovog rada prikupiti i analizirati dosad objavljene radove koji se bave nekim psihološkim pristupom nastavi tjelesne i zdravstvene kulture i sportskim aktivnostima u osnovnoj i srednjoj školi u Hrvatskoj.

ISTRAŽIVANJA VEZANA UZ PONAŠANJE, STAVOVE UČENIKA I NJIHOVO ZADOVOLJSTVO

Stavovi

Stavovi su kao psihološka kategorija često predmet istraživanja psihologije sporta, a prisutni su gotovo u svim aspektima društvenog života. Njihova teoretska i praktična važnost proizlazi iz toga što se mogu relativno lako mjeriti, a mjerenjem istih dolazimo do motiva koji su najvažniji za razumijevanje ljudskih postupaka, odnosno za objašnjavanje i predviđanje ljudskog ponašanja. Treba naglasiti da je veza stavova i ponašanja vrlo složena (Prišlin, 1991.).

Profesorima kineziologije stavovi učenika prema tjelesnom vježbanju zanimljivi su, ne samo zbog toga što su bitan motivacijski čimbenik za uspješnost odgojno-obrazovnog procesa, već i zbog povratnih informacija, kako o njihovoj stručnosti, tako i o odabranim sadržajima i metodama rada (Redžić, 1992.). Do sada je učinjeno više istraživanja ovoga tipa koji potvrđuju važnost takvih istraživanja.

Maršić i Bratanić (2003.) istraživali su mogućnosti definiranja kvalitete odnosa učenik-profesor primjenom nekih pokazatelja stavova učenika na uzorku od 187 učenika tro- i četverogodišnje strukovne škole. Isti autori su 2004. utvrđivali relacije između stavova učenika prema nastavniku i uspjeha u učenju. Na uzorku od 250 učenika dobili su vrlo visoku povezanost između kvalitete stavova učenika prema nastavniku i njihovog općeg školskog uspjeha. S obzirom na spol utvrđena je strukturno različita povezanost stavova i uspjeha kod učenika i učenica. Kosinac i Banović (2005.) proveli su analizu praćenja izostanaka 1136 učenika nekoliko različitih srednjih škola u Splitu s nastave tjelesne i zdravstvene kulture. Zaključeno je kako učenici redovitije pohađaju satove TZK u odnosu na učenice. Evidentno je također da su gimnazijalci na satovima najredovitiji, dok su učenici tehničkih škola najmanje redoviti. Učenice vrijeme tih izostanaka provode najčešće kod kuće, dok ga njihovi vršnjaci provode u gradu. Runjić (2005.) je utvrđivala razlike u interesima i stavovima o sadržaju predmeta TZK u odnosu na školski uspjeh. Na uzorku od 300 zagrebačkih gimnazijalki utvrđeno je da odnosi između interesa za sportske sadržaje i općeg uspjeha nisu značajni.

Neljak i sur. (2007.) utvrđivali su razlike u stupnju zadovoljstva nastavom TZK između učenica strukovnih škola i učenica gimnazije i učenika istih. Rezultati ankete su pokazali da su učenici gimnazije i strukovnih škola međusobno slični, a da su učenice strukovnih škola zadovoljnije nastavom od gimnazijalki. Zabilježene su značajne razlike između učenica i učenika u percepciji nastave TZK. Biletić i sur. (2008.) utvrđivali su stavove i interese 610 učenika i učenica osnovnih škola prema nastavi i nastavnim cjelinama TZK. Dobiveni podaci pokazuju kako učenice i učenici imaju pozitivan stav prema nastavi i kako ne postoje razlike prema spolu. Učenici

preferiraju nastavne cjeline: preskoci, igre i vis, upor i penjanje, dok učenice preferiraju plesne strukture, ravnotežne položaje i igre. Duplančić i sur. (2008.) utvrđivali su čimbenike koji su u manjoj ili većoj mjeri pridonijeli djelomičnom ili potpunom nezadovoljstvu učenika načinom izvođenja nastave TZK. Anketom provedenom na 471 ispitaniku uočen je visok stupanj nezadovoljstva nastavom TZK i to posebno materijalno-organizacijskim uvjetima rada. Škrinjarić i sur. (2008.) analizirali su interese srednjoškolaca za tjelesnu aktivnost i nastavu TZK. Rezultati anketa 218 učenica i učenika su pokazali da tjelesna aktivnost zauzima važno mjesto u njihovim životima. Učenici se nekom sportskom aktivnošću bave redovito, a učenice ponekad. Njome se bave zbog unapređenja zdravlja i estetskih razloga. Visoki postotak učenika smatra da bi trebali imati veći broj sati nastave TZK tjedno.

ISTRAŽIVANJA VEZANA UZ RODITELJE I DJECU

Roditelji i djeca

Kvaliteta bavljenja sportom djece u velikoj mjeri ovisi o roditeljskoj podršci toj aktivnosti (Brustard, 1993.). Od roditelja se očekuje da će pozitivno potkrepljivati aktivnost svoje djece u sportu. Ako i sami nisu modeli za „sportski život", očekuje se da će iskazivati vjerovanja u dobrobit bavljenja sportom (Bosnar, 2003.). Utjecaj roditelja na djecu prenosi se različitim oblicima učenja. Svojim ponašanjem roditelji će biti model za različite oblike socijalnog učenja (Zarevski, 1994.). Roditeljska aktivnost i uvjerenja o sportu značajno su povezana s uživanjem u sportu i s privlačnošću sporta za njihovu djecu (Leff i Hoyle, 1995; Brustard, 1996.; Babkes i Weis, 1999.). Bosnar (2003.) je konstruirala skalu roditeljske potpore bavljenju sportom čiji je cilj mjerenje autoritativnog ponašanja roditelja u sportskim situacijama. Lorger i Bosnar (2006.) su određivale mjerna svojstve skale roditeljske potpore djeci u sportu.

ISTRAŽIVANJA VEZANA UZ NAVIKE TJELESNOG VJEŽBANJA

Bosnar i Prot (1999.) su istraživali populaciju zagrebačkih maturanata na uzorku od 1050 učenika i 1003 učenice. Na temelju anketnog upitnika su proučavali: a- aktivno bavljanje sportom (33,5% m i 16,7% ž), b- prekinuto bavljenje sportom (41,8 m i 43,6% ž), c- nikad se nisu bavili sportom (24,7% m i 39,7% ž). Isti autori su iste godine proučavali populaciju maturantica (n=1003). 58,7% ispitanica se bavilo ili se aktivno i dalje bavi sportom. Primijećeno je da su se učenice strukovnih škola pretežno bavile sportskim momčadskim igrama, dok su gimnazijalke pretežno sudjelovale u atletici, aerobiku, tenisu, plivanju, sinkro plivanju, skokovima u vodu, skijanju i veslanju. U još jednom istraživanju iste godine isti autori su istraživali koliko se i kojim sportovima bave zagrebački srednjoškolci. Na uzorku od 1050 učenika završnih

razreda dobivene su statistički značajne razlike u oblicima bavljenja sportom kod učenika gimnazija, četverogodišnjih i trogodišnjih srednjih škola. Gimnazijalci se bave najširom lepezom sportova, a najviše košarkom, dok ostali učenici sudjeluju u najmanjem broju sportova, od toga najčešće u nogometu. Maršić i Paradžik (2006.) proveli su istraživanje putem instrumenta tipa papir-olovka na 75 srednjoškolaca s ciljem utvrđivanja niza faktora. Primijenjen je instrumentarij za mjerenje akcijskog, kognitivnog i afektivnog segmenta stava učenika prema tjelesnom vježbanju te instrumentarij za mjerenje učeničke percepcije osobina nastavnika, kao i učeničke percepcije vrijednosti koje tj. vježbanje ima u društvenoj okolini i igri. Primjenom regresijske analize utvrđeno je da faktori: nastavnik TZK-a, društvena okolina, obitelj i posebnost samog učenika objašnjavaju 65% varijance. Parcijalizacijom je utvrđeno da faktor nastavnik objašnjava 35% varijance, a ostatak pripada prije svega utjecaju društvene okoline i obiteljskog okruženja.

ISTRAŽIVANJA VEZANA UZ MOTIVACIJU

Motivacija

Motivi su pretpostavljane stanja unutar organizma koja aktiviraju ponašanje i tjeraju organizam prema cilju (Rathus, 2000.). Zadovoljstvo nastavom jedna je od ključnih sastavnica motivacije učenika, a time i izravni dugoročni čimbenik svakodnevnog i samostalnog tjelesnog vježbanja i u drugoj i u trećoj životnoj dobi.

Pri razmatranju fenomena motivacije psiholozi razlikuju više načina njezina djelovanja na ponašanje pojedinca. Smatra se da je motivacija ono što nas pokreće na neko ponašanje i što nas čini ustrajnima u tom ponašanju. Motivacija određuje kako smjer, tako i cilj i učinak ponašanja (Deci, 1992., iz Schaie, Willis, 2001.). U kontekstu nastavnog procesa motivacija je složen proces, koji, holistički gledano, uključuje motivaciju nastavnika i učenika. Motivi koji pokreću nastavnika, ali i oni koji pokreću učenike, održavaju i usmjeravaju njihove aktivnosti, ali djeluju i na uspješnost i na konačne rezultate cjelokupnog nastavnog procesa.

Horga i Štimac (1999.) utvrđivali su strukturu intrinzičnih, socijalnih i ekstrinzičnih razloga uživanja u vježbanju na uzorku od 46 učenika jedne osnovne škole. Lorger (2002.) je istraživala motivacijske procese kod 466 učenika viših razreda osnovne škole tijekom nastave TZK. Rezultati su pokazali kako upitnik ima slaba metrijska svojstva, posebno u elementima njegove pouzdanosti. Ovisno o razredu interpretiran je i različit broj faktora, a jedini faktori koji se ponavljaju kod učenika svih razreda su vježbanje zbog zdravlja i uzbuđenja. Bratanić i Maršić (2005.) utvrđivali su relacije između učeničkih stavova prema nastavniku i njihove intrinzične motiviranosti i ciljne orijentacije u nastavi TZK. Utvrđeno je da je kvaliteta i visine unutarnje motiviranosti učenika pozitivno povezana s njihovim stavovima prema

nastavniku, ali i obrnuto. Osobine nastavnika kao ličnosti i stručnjaka pozitivno su povezane s visinom i kvalitetom motiviranosti učenika za nastavni predmet koji on predaje.

Bujanić (2006.) je istraživao intrinzičnu i ekstrinzičnu motivaciju na satu TZK i slobodno vrijeme učenika srednjih škola. Želio je provjeriti pridonosi li intrinzična motivacija na satu tome da se djeca i u slobodno vrijeme češće bave kineziološkim aktivnostima. Nije dobio stat. značajnu razliku u intrinzičnoj motivaciji između grupa definiranih količinom vremena koje tjedno utroše na kin. aktivnosti izvan škole. Maršić i sur. (2006.) su se bavili spolnim razlikama u motivaciji za nastavu tjelesne i zdravstvene kulture. Utvrdili su postojanje stat. značajne razlike među spolovima. Učenici su u odnosu na učenice nešto više intrinzično motivirani, ali znatno više egoorijentirani. U orijentaciji učenika na svladavanje zadataka nema bitnih razlika među spolovima. Cetinić i Vuk (2007.) utvrdili su nepostojanje stat. značajnih razlika u ciljnoj orijentaciji između srednjoškolaca i srednjoškolki i da su obje skupine više usmjerene na zadatak, a manje na rezultat. To upućuje na zaključak da uživaju u vježbanju, ulažu mnogo truda i napora, daju sve od sebe te im je savladavanje novih vještina snažan motivator prilikom učenja. Cetinić i sur. (2008.) utvrđivali su postojanje razlika u dimenzijama intrinzične motivacije kod učenika različitog profila ciljne orijentiranosti. Istraživanjem je utvrđeno da postoje stat. značajne razlike u intrinzičnoj motivaciji kod učenika različitih profila ciljne orijentiranosti. Učenici visoke usmjerenosti na zadatak razlikuju se od nisko usmjerenih učenika na zadatak po većem uloženom naporu i većem pridavanju važnosti nastavi tjelesne i zdravstvene kulture te većem interesu za vježbanje i većem uživanju na satovima.

ISTRAŽIVANJA VEZANA UZ ODNOS NASTAVNIKA PREMA NASTAVI TZK I NJIHOVA MIŠLJENJA

Prot i sur. (1999.) utvrđivali su odnose nastavnika razredne nastave prema nastavi TZK u nižim razredima osnovne škole. 70% učitelja je izjavilo da bi se nastava TZK trebala provoditi uz pomoć profesora TZK. Rezultati također pokazuju da se u boljim materijalnim uvjetima preferira pomoć. Bosnar i sur. (1999.) utvrđivali su odnos učitelja prema provođenju nastave TZK-e. Kao i u istraživanju još jednog istraživanja Prota i sur. (1999.), ustanovljen je pozitivan odnos prema nastavi, osjećaj kompetentnosti i ne velikog opterećenja. Istodobno, učitelji pokazuju velik strah od ozljeda na nastavi i rado bi ju podijelili ili prepustili profesorima TZK. Vrbanac i sur. (1999.) istraživali su odnos učiteljica u Puli prema provođenju nastave TZK. Učiteljice dominantno iskazuju pozitivan odnos prema nastavi, ne doživljavaju je kao prekomjerni napor i osjećaju se kompetentnima za njezino provođenje, no samo petina ne strahuje pred ozljedama na nastavi, a gotovo dvije trećine bi prihvatile pomoć ili sasvim prepustile ovu nastavu profesorima TZK.

ISTRAŽIVANJA VEZANA UZ ODNOS TZK I DRUGIH SPORTOVA I METRIJSKE KARAKTERISTIKE RAZLIČITIH SKALA STAVA

Busch i sur. (1999.) su dokazali stat. značajne razlike osnovnoškolskih nstavnika u stavovima prema borilačkim sportovima. Ženski nastavnici u prosjeku imaju manje izražen pozitivan stav prema istima. Prot i sur. (1999.) određivali su mjerna svojstva skale stava prema borilačkim sportovima na uzorku osnovnoškolskih dječaka. Dobiven je instrument koji omogućuje jednostavna longitudinalna istraživanja razvoja stava prema borilačkim sportovima, a također i jednostavnu usporedbu među generacijama. Sertić i sur. (1999.) određivali su mjerna svojstva skale stava prema borilačkim sportovima, ali ovaj put na uzorku osnovnoškolskih djevojaka. Zbog dobrih metrijskih karakteristika i pouzdanosti, dozvoljeno je isti instrument koristiti kod djece i adolescenata, ali i kod odraslih ljudi. Bosnar i sur. (1999.) su na populaciji od 2053 zagrebačkih maturantica provjeravali i potvrdili metrijske karakteristike Mrakovićeve revidirane i skraćene skale K1 stava prema sportu. Bosnar i sur. (1999.) ispitivali su razlike u stavu prema borilačkim sportovima na uzorku viših razreda osnovnih škola između učenika i učenica putem skale stava SBS1. Analiza je pokazala stat. značajnu razliku u ukupnom rezultatu sa značajno manje pozitivnim stavom prema borilačkim sportovima kod djevojčica.

ISTRAŽIVANJA VEZANA UZ OSTALE TEME

Lorger (2007.). Cilj istraživanja bio je provjeriti postojanje razlika u obrazovnim rezultatima između učenika i učenica petih razreda osnovne škole tj. utvrditi postoji li razlika u nekim osnovnim antropološkim obilježjima kod ovih skupina. Utvrđene su stat. značajne razlike u svim motoričko- tehničkim disciplinama u korist dječaka. Istodobno nisu potvrđene razlike u antropometrijskim obilježjima. 2009. godine je provjeravala metrijske karakteristike i pouzdanost upitnika Flow State Scale i eventualno izlučivanje faktora uronjenosti u aktivnost tijekom nastave kineziološke kulture. Na uzorku od 53 studenta učiteljskog studija iz Petrinje pokazalo se da, iako su sadržaj postavljeni od strane voditelja i obavezni, egzistira većina dimenzija flow-a.

ZAKLJUČAK

Uvršten je 31 rad podijeljen u nekoliko kategorija od kojih je najveći broj vezan upravo uz stavove učenika i njihovu motivaciju na nastavi TZK.

Većina radova rađena je na srednjoškolskoj populaciji iako bi bilo dobro iste raditi na mlađim učenicima iz razloga što se stavovi i navike formiraju puno ranije i ako želimo pozitivno utjecati na iste poželjno je to činiti u ranijoj dobi.

Praktična primjena ovog rada leži u povećanju kvalitete nastave tjelesne i zdravstvene kulture i odgojno - obrazovnog rada općenito kroz primjenu znanja

dobivenih različitim anketama vezanim uz ponašanja, stavove, motivaciju, zadovoljstvo i navike učenika te međusobne odnose učenika, nastavnika i roditelja ili njihove odnose prema nastavi tjelesne i zdravstvene kulture te bavljenju sportom općenito.

Rezultati ovakvih istraživanja, kao povratne informacije o postojećem stanju, mogu se iskoristiti za unapređivanje i poboljšanje postojećih uvjeta u kojima se odvija veoma složeni i odgovorni odgojno - obrazovni rad. Vrijednost primjene rezultata ovakvih anketa nije samo u dobivanju povratnih informacija, već i u motivaciji učenika, ali i nastavnika, Nastavnik ima mogućnost, primjenom novih saznanja, kritički preispitati svoje stavove, zapažanja o učenicima i postupke te procijeniti u kojoj mjeri se s njima usklađuje. Rezultati ga mogu motivirati da više energije i vremena posveti poboljšanju međuljudskih odnosa vjerujući da su oni jedan od temelja uspješnosti nastave i cjelokupnog rada u školi.

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PSYCHOLOGICAL RESEARCH OF PHYSICAL EDUCATION CLASSES IN THE REPUBLIC OF CROATIA

ABSTRACT

The main goal of this work was to review a series of studies concerning psychological approach to physical education in primary and secondary schools. Data from thirty-one research have been collected and divided into several categories according to attitudes, parents and children, exercise habits, motivation, attitudes of teachers towards teaching and other. The practical application of this paper lies in increasing the quality of teaching and making a habit of regularly exercising and in increasing student and teacher motivation.

Key words: *attitudes, motivation, physical education, psychology*

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TJELESNA AKTIVNOST KOD UČENIKA STARIJE ŠKOLSKE DOBI

UVOD

Tjelesna aktivnost važan je faktor u postizanju optimalnog stanja zdravlja, a isto tako djeluje na smanjenje rizika pojave različitih bolesti, što potvrđuju mnoge studije provedene širom svijeta (Eyler i sur. 2003.; Lee i Paffenbarger, 2000.; Pate, 1995.; Blair, 1996.). Procjena razine tjelesne aktivnosti danas se smatra prvom fazom u uvođenju interventnih mjera koje mogu doprinijeti zdravlju na razini populacije (Dishman i sur., 2004.)

Zbog različitih pristupa mjerenju tjelesne aktivnosti kod mladih dolazi se do rezultata koji su potpuno oprečni, od nepostojanja do veoma čvrste veze između tjelesne aktivnosti i debljine (Hands i Parker, 2008). Rezultati tjelesne aktivnosti jako variraju i na svakom uzorku mogu biti različiti (Martinez – Gonzales i sur., 2001). Upravo je iz tih razloga bitno na svakom uzorku iznova napraviti studiju kako bi se mogle poduzeti egzatne mjere u njihovu doprinosu zdravlju.

Cilj je ovog istraživanja utvrditi postotak tjelesno aktivnih srednjoškolaca i ispitati povezanost tjelesne aktivnosti s indeksom tjelesne mase.

METODE

U istraživanju je sudjelovalo 255 mladića koji žive u Istarskoj županiji u Republici Hrvatskoj. Mladići su učenici prvih razreda dviju srednjih škola u Puli (gimnazija, medicinska) prosječne kronološke dobi 15,4 godina. Mjerenje je provedeno u razdoblju od 1. veljače do 26. veljače 2010. godine u isto vrijeme dana (± 2 sata). Nitko od ispitanika nije imao tjelesna ograničenja i svi su bili sposobni sudjelovati u redovitoj nastavi tjelesne i zdravstvene kulture u školi. Pored toga, dobivena je suglasnost i pristanak svake srednje škole u Istri uključene u ovo istraživanje, kao i suglasnost jednog od roditelja svakog učenika te pristanak svakog ispitanika.

Svi istraživački postupci izvođeni su u sklopu satova tjelesne i zdravstvene kulture na redovnoj nastavi. Članovi istraživačkog tima zabilježili su podatke o kronološkoj dobi, izmjerili masu i visinu tijela te podijelili Felsov PAQ upitnik za

prikupljanje podataka o tjelesnoj aktivnosti. Razina tjelesne aktivnosti određene osobe procjenjuje se kroz tri domene, i to kroz sport, slobodno vrijeme i kućanske poslove, kako bi se dobila ukupna razina tjelesne aktivnosti. Članovi istraživačkog tima bili su na raspolaganju za eventualna pitanja tijekom vremena popunjavanja upitnika.

Obrada podataka obavljena je programom STATISTICA (data analysis software system), version 7.1., StatSoft, Inc. (2005). Podaci su prikazani kao prosjeci i standardne devijacije, a značajnost je testirana na razini $p < ,05$. Budući da podaci nisu bili normalno distribuirani, korišten je Spearmanov koeficijent korelacije kako bi ispitali povezanost između razine tjelesne aktivnosti i indeksa tjelesne mase.

REZULTATI I DISKUSIJA

Vrijednosti ukupne tjelesne aktivnosti prikazane su u tablici 1. Ocjene 4 i 5 predstavljaju vrijednosti preporučene tjelesne aktivnosti, dok ocjene od 1 do 3 predstavljaju nedovoljnu razinu tjelesne aktivnosti. Može se reći da je svega 31,2% tjelesno aktivnih adolescenata.

Martinez – Gonzalez i sur. (2001) na reprezentativnom uzorku za Europsku uniju istraživali su sudjelovanje u tjelesnoj aktivnosti. Rezultati su pokazali da stanovnici sjevernih europskih zemalja više sudjeluju u tjelesnoj aktivnosti u slobodno vrijeme nego stanovnici južnih europskih zemalja.

Tablica 1. *Vrijednosti ukupne tjelesne aktivnosti prikazane u postocima na Likertovoj skali*

RAZINA TJELESNE AKTIVNOSTI				
1	**2**	**3**	**4**	**5**
0%	14,7%	54,1%	31,2%	0%
/	N=32	N=144	N=79	/

Najveći postotak sudjelovanja u tjelesnoj aktivnosti iskazan je u Finskoj (91,9%), a najniži u Portugalu (40,7%). Rezultati ovog istraživanja ukazuju kako ovi adolescenti imaju daleko najniže vrijednosti tjelesne aktivnosti s obzirom na Europsku uniju. Danas je poznato da je odgovarajuća razina tjelesne aktivnosti izuzetno značajan i nezamjenjiv faktor u zaštiti i unapređenju zdravlja, odnosno sniženju morbiditeta i mortaliteta zbog mnogih bolesti, dok je nedovoljna tjelesna aktivnost jedan od faktora rizika za razvoj mnogih bolesti (Ischander i sur., 2007).

Rezultati povezanosti između tjelesne aktivnosti i indeksa tjelesne mase prikazani su u tablici 2. Može se vidjeti kako je dobivena negativna značajna povezanost s ukupnom razinom tjelesne aktivnosti te područjem sporta i slobodnog vremena.

Tablica 2. *Spearmanov koeficijent korelacije (p<,05) između indeksa tjelesne mase i tjelesne aktivnosti*

	Total score	Sport score	Leisure score	Work score
Indeks tjelesne mase	-0,22 (p<0,00)	-0,16 (p<0,00)	-0,18 (p<0,00)	0,07 (p<0,57)

Dosadašnja istraživanja o povezanosti tjelesne aktivnosti i indeksa tjelesne mase kod mladih pokazuju da je indeks tjelesne mase niži što je viša razina ukupne tjelesne aktivnosti te što je učestalije bavljenje sportom, bilo u izvannastavnim sportskim aktivnostima, bilo u sportskom klubu (Guerra i sur, 2006; Sulema i sur., 2006). Ovo je istraživanje potvrdilo navedene tvrdnje, ali i ukazalo da bi nekretanju u slobodno vrijeme trebalo posvetiti posebnu pažnju. Neaktivnost u slobodno vrijeme značajno doprinosi epidemiji pretilosti koja je danas sve više rasprostranjena po svijetu (Martinez – Gonzales i sur., 2001). Tjelesna aktivnost umjerenog ili visokog intenziteta tijekom slobodnog vremena može značajno doprinijeti zdravlju jer je većinom dugotrajna (Ischander i sur., 2007; Mišigoj – Duraković i sur., 1999; i dr.).

Danas je poznato da tjelesna aktivnost znatno utječe na smanjenje prekomjerne tjelesne mase i pretilosti te se smatra najprirodnijim načinom za trošenje energije i regulatorom tjelesne mase (Hill i Wyatt, 2005).

ZAKLJUČAK

Na temelju dobivenih rezultata može se reći kako je na ovom uzorku vrlo visok i zabrinjavajući postotak osoba s nedovoljnom razinom tjelesne aktivnosti. Nadalje, pokazalo se kako će viša razina ukupne tjelesne aktivnosti te u području sporta i slobodnog vremena znatno doprinijeti nižem indeksu tjelesne mase.

Može se zaključiti kako je potrebno odmah poduzeti mjere koje će doprinijeti povećanju razine tjelesne aktivnosti ovih srednjoškolaca. Na način da ih se animira i privuče u izvannastavne sportske aktivnosti i sportske klubove te ih se raznim rekreativnim sadržajima potakne i na tjelesnu aktivnost tijekom slobodnog vremena.

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PHYSICAL ACTIVITY AMONG PUPILS IN HIGHER GRADES OF PRIMARY EDUCATION

ABSTRACT

Aims: The aim of this study was to determine the percentage of physically active students and to investigate the relationship between physical activity and body mass index. **Methods:** The study included 255 male students in Istria Region, Croatia. Physical activity was measured using the Fels Physical Activity Questionnaire for Children, and the relationship between physical activity and body mass index was determined with the Spearman correlation coefficient. **Results:** A significant negative correlation with total physical activity ($p<0.00$), the sport field ($p<0.00$) and leisure time ($p<0.00$) was obtained. There are only 31.2% of adolescents who meet the criteria of recommended physical activity. **Conclusion:** It is suggested that measures which would contribute to the increase in the levels of physical activity of these adolescents be taken as soon as possible by encouraging them to join extra-curricular sports activities and sport clubs, and to encourage physical activity during leisure time by offering a variety of recreational possibilities. These data could be the basis around which to plan the introduction of intervention measures designed to preserve and improve health in males of this age in the Istria Region.

Key words: *students, physical activity, body mass index, health*

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Abstract

SCHOOL PE AND SPORT IN HUNGARY IN THE 21ST CENTURY

Since the political changes of 1989, when the one-party system was replaced by the multi-party system, the situation of both school PE and elite sport have changed. Working in the higher education for more than 25 years, traces of the significant differences in relation to the previous years could be easily followed by the author. New dimension has been brought into body culture by the changes in education and in training sports specialists. How beneficial these changes are from professional point of view is questionable. At the same time, the appearance of newer leisure sports opened new horizons in training. But how can these new, fashionable and mostly expensive forms of motion be smuggled into the university PE lessons? All these are a great dilemma for a PE teacher. Does the very liberal handling of leisure sport serve the forming and maintaining of a healthy lifestyle? University students generally get their body movements jammed into the framework of 'party programmes'. Can we really talk about sports when they participate in various leisure sport programmes with a glass of spirits in their hands? Talking with foreign colleagues, it turns out that it is not typically a Hungarian 'illness'! Being PE teachers or sports specialists, can we do anything against these current trends? The lecture discusses these contemporary problems.

Key words: *School PE, elite sport, education changes*

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Izvorni znanstveni rad

UVODNI DIO SATA TZK: RAZLIKE U FIZIOLOŠKOM OPTEREĆENJU VJEŽBANJA TIJEKOM PROVEDBE RAZLIČITIH SADRŽAJA

UVOD I CILJ ISTRAŽIVANJA

Nastava tjelesne i zdravstvene kulture najznačajniji je organizirani i stručno vođeni oblik rada kojemu je cilj ne samo zadovoljavanje biološke potrebe za kretanjem već i utjecaj na transformaciju antropološkog statusa učenika te poticanje stvaranja navike za redovitim vježbanjem. Sve navedeno ostvaruje se kroz različite sadržaje čiji odabir ovisi o dobi i predznanju učenika, razini njihovih motoričkih i funkcionalnih sposobnosti kao i morfološkom statusu. Izbor adekvatnih sadržaja uvodnoga dijela sata osnovni je preduvjet fiziološkog i psihološkog uvođenja učenika u nastavni proces. S fiziološkog stajališta uvođenje se odnosi na početnu i opću aktivaciju lokomotornog sustava te motoričkih i funkcionalnih sposobnosti (Neljak, 2008). Primjereni sadržaji omogućuju optimalno (umjereno) doziranje opterećenja, podižu motivaciju učenika te ih kvalitetno uvode u nastavni proces. Pri izboru sadržaja svakako treba paziti na to da su sadržaji jednostavni i razumljivi za učenike te da osiguravaju izmjenu napora i odmora. Fiziološki napor u uvodnom dijelu sata mora se povećati, ali samo toliko koliko je potrebno da se organizam pripremi za drugi dio sata (Findak, 1999).

Zbog svega navedenog odabir sadržaja ključan je dio pripremanja nastavnika za sat tjelesne i zdravstvene kulture. U ovom istraživanju korištenjem monitora srčane frekvencije i uvidom u frekvenciju srca učenika razmatrat će se utjecaj različitih sadržaja u uvodnom dijelu sata na funkcionalno opterećenje učenika s ciljem kvalitetnijeg planiranja i provođenja sata tjelesne i zdravstvene kulture.

METODE RADA

Uzorak ispitanika čini 13 učenika privatne Osnovne škole „Hugo Kon" iz Zagreba prosječne kronološke dobi 11,6±0,6 godina. Uzorak varijabli čine 3 pojavnosti frekvencije srca i 5 zona intenziteta koje su izračunate za svakog učenika posebno. Sve varijable su pojedinačno navedene u nastavku:

1. **FS** $\bar{x}$ – prosječna frekvencija srca
2. **FS maks** – maksimalna rekvencija srca
3. **FS min** – minimalna frekvencija srca
4. **Zona 5** – maksimalni intenzitet → anaerobna zona – 90-100%FSmaks,
5. **Zona 4** – izrazito visoki intenzitet → aerobna intenzivna zona – 80-89%FSmaks,
6. **Zona 3** – visoki intenzitet → visoko aerobna ekstenzivna zona – 70-79%Fsmaks
7. **Zona 2** – umjereno visoki intenzitet → umjereno aerobna ekstenzivna zona – 60-69%FSmaks,
8. **Zona 1** – umjereni intenzitet → aerobna ekstenzivna zona – 50-59% FSmaks.

Učenici Osnovne škole „Hugo Kon" iz Zagreba sudjelovali su na 3 sata tjelesne i zdravstvene kulture u vremenskom razdoblju od 3 tjedna. Svaki sat provodio se s istim učenicima, u isto vrijeme i u jednakim uvjetima u dvorani osnovne škole.

Na svakom satu po pojedninim dijelovima sata provedeni su različiti sadržaji te je svaki sat bio drugačijeg tipa. U ovom radu analizirani su sadržaji uvodnog dijela sata:

1. Hvatačka elementarna igra: „Hvatanje u lanac"
2. Tržanje u krug s različitim zadatcima
3. Pretrčavanje vježbališta u valovima iz različitih startnih položaja

Tijekom sata učenicima je mjerena frekvencija srca pomoću monitora srčane frekvencije Polar RS400 te Polar Team System (Polar Electro Oy, Finland). Na kraju nastavnog sata s monitora srčane frekvencije preneseni su memorirani podatci o frekvenciji srca učenika u programski paket Polar ProTrainer 5.0 (Polar Electro Oy, Finland).

Standardnim statističkim postupcima izračunati su osnovni deskriptivni parametri varijabli: aritmetička sredina (AS), standardna devijacija (SD), minimalna (MIN) i maksimalna (MAKS) vrijednost rezultata, modalna vrijednost (MODE) te vrijeme i postotak vremena proveden u pojedinoj zoni intenziteta za svaki od sadržaja provedenih u uvodnom dijelu sata. Univarijatnom analizom varijance (ANOVA) te serijom t-testova za nezavisne uzorke utvrđeno je razlikuju li se sadržaji statistički značajno u odnosu na prosječnu frekvenciju srca i postotak vremena provedenog u pojedinim zonama intenziteta.

Obrade podataka provedene su upotrebom statističkog paketa Statistica for Windows7.0 i software-skog paketa Polar ProTrainer 5.0 (Polar Electro, Finland).

REZULTATI I RASPRAVA

U tablici 1. prikazani su rezultati dobiveni obradom podataka o frekvenciji srca učenika tijekom provedbe sva tri sadržaja uvodnog dijela sata. Za svaki sadržaj pirkazani su deskriptivni pokazatelji: aritmetička sredina, minimalna i maksimalna vrijednost kao i modalna vrijednost.

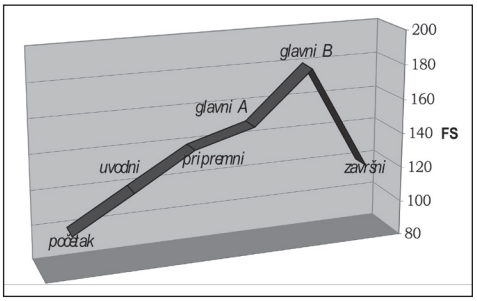
Tablica 1. *Osnovni deskriptivni pokazatelji frekvencije srca tijekom provedbe različitih sadržaja*

	Sadržaj 1.			Sadržaj 2.			Sadržaj 3.		
	AS±SD	MIN	MAX	AS±SD	MIN	MAX	AS±SD	MIN	MAX
FS $\overline{x}$	162±11,6	142	176	169±7	152	179	150±10,6	134	173
FSmin	116±6,3	105	123	110±12,8	87	139	105±9	94	120
FSmaks	185±13,7	159	204	191±4,7	181	198	172±10,3	158	192
MODE	142,9±34,6	101	187	158±42	101	191	129±35	101	187

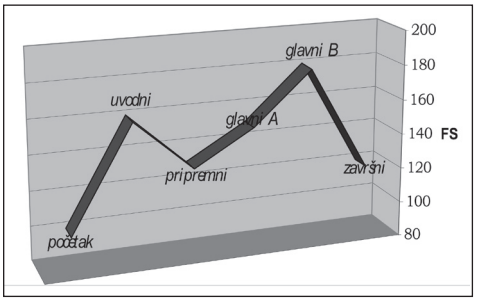
Hvatačka elementarna igra: „Hvatanje u lanac" (sadržaj 1), trčanje u krug s različitim zadatcima (sadržaj 2), pretrčavanje vježbališta u valovima iz različitih startnih položaja (sadržaj 3), aritmetička sredina (as), standardna devijacija (sd), prosječna frekvencija srca (FS $\overline{x}$), minimalna frekvencija srca (FSmin), maksimalna frekvencija srca (FSmaks), modalna vrijednost (MODE)

Raspon između minimalne i maksimalne prosječne frekvencije srca učenika ukazuje na veliku heterogenost među učenicima sa stajališta funkcionalnih sposobnosti što je u tjelesnoj i zdravstvenoj kulturi vrlo čest slučaj što uvjetuje sastavljanje homogeniziranih skupina kada god je to moguće radi maksimalizacije učinaka procesa vježbanja.

Uvidom u deskriptivne pokazatelje sva tri provedena sadržaja može se zaključiti kako s fiziološkog stajališta isti omogućuju početnu i opću aktivaciju lokomotornog sustava i funkcionalnih sposobnosti čime ispunjavaju svrhu uvodnog dijela te se preporučuju za korištenje u uvodnom dijelu sata. Dobivena krivulja fiziološkog opterećenja razlikuje se u uvodnom dijelu sata od teoretske krivulje (Findak, 1999) koja podrazumijeva postupno podizanje opterećenja od uvodnog do glavnog „B" dijela sata (grafički prikaz 1.). U ovom slučaju krivulja je u skladu s novijim istraživanjima (Prce, 2002; Tomljenović, Radošević i Grahovac, 2009) kao i praktičnim iskustvima koja govore kako intenzitet opterećenja u uvodnom dijelu sata raste prema umjerenim, a počesto i submaksimalnim vrijednostima (grafički prikaz 2.)



Grafički prikaz 1. *Teoretska krivulja fiziološkog opterećenja*



Grafički prikaz 2. *Krivulja fiziološkog opterećenja tijekom provedbe ovog istraživanja*

Tablica 2. *Razlike između frekvencije srca tijekom provedbe tri različita sadržaja utvrđene univarijantnom analizom varijance i serijom t-testova za nezavisne uzorke*

VAR	sadržaj 1	sadržaj 2	sadržaj 3	ANOVA 1 – 2 – 3		T-TEST 1 – 2	T-TEST 1 – 3	T-TEST 2 – 3
	as±sd	as±sd	as±sd	F	p	p	p	p
AS	162 ± 11,61	169 ± 7	150 ± 10,55	**14,45**	**0,00**	**0,02**	**0,01**	**0,00**

Hvatačka elementarna igra: „Hvatanje u lanac" (sadržaj 1), trčanje u krug s različitim zadatcima (sadržaj 2), pretrčavanje vježbališta u valovima iz različitih startnih položaja (sadržaj 3), aritmetička sredina (as), standardna devijacija (sd)

Statističkim programom statistica 7.0, univarijatnom analizom varijance (ANOVA), ustanovljena je F-vrijednost veća od granične vrijednosti te se, uz zadanu pogrešku od 5%, sadržaji: hvatačaka elementaran igra: „Hvatanje u lanac", trčanje u krug s različitim zadatcima, pretrčavanje vježbališta u valovima iz različitih startnih položaja, prema prosječnoj frekvenciji srca u uvodom dijelu sata, statistički značajno razlikuju.

Razlog se može tražiti u metodi vježbanja kojom se pojedini sadržaj realizira. Hvatačka elementarna igra: „Hvatanje u lanac" ne zahtjeva prekid aktivnosti, međutim vježbač vrlo često samostalno zastane kada nije u neposrednoj opasnosti od hvatanja te suprotno tome ubrza svoje kretanje kako bi izbjegao hvatanje. Ovaj sadržaj provodi se varijabilnom metodom vježbanja. To je način fiziološkog opterećenja organizma promjenjivim intenzitetima opterećenja bez prekida aktivnosti (Neljak, 2009).

Trčanje u krug s različitim zadatcima provodi se kontinuiranom metodom vježbanja s elementima varijabilne metode. Naime, ovisno o zadatcima koje vježbači izvode tijekom trčanja intenzitet može u većoj ili manjoj mjeri varirati. Kontinuirana metoda vježbanja je način fiziološkog opterećenja organizma istim intenzitetom opterećenja bez prekida aktivnosti (Neljak, 2009).

Intervalna metoda vježbanja način je fiziološkog opterećenja organizma fazama vježbanja i fazama odmora (Neljak, 2009). Tijekom provedbe sadržaja „Pretrčavanje vježbališta u valovima iz različitih startnih položaja" učenici moraju zauzeti startni položaj, istrčati na suprotnu stranu te čekati svoj red za novi zadatak što uvjetuje korištenje intervalne metode vježbanja.

Tablica 3. *Vrijeme i postotak vremena u zonama intenziteta; razlike u postotku vremena provedenog u pojedinim zonama između sadržaja*

V A R	sadržaj 1	sadržaj 2	sadržaj 3	ANOVA 1 – 2 – 3		T-TEST 1 – 2	T-TEST 1 – 3	T-TEST 2 – 3
	vrijeme (s) / %	*vrijeme (s)* / %	*vrijeme (s)* / %	F	p	p	p	p
z1	0:00:16 / 6,1	0:00:35 / 12,6	0:00:20 / 10,2	1,55	0,23	0,14	0,07	0,59
z2	0:00:36 / 13,9	0:00:28 / 10,1	0:00:44 / 21,8	**23,42**	**0,00**	0,15	**0,00**	**0,00**
z3	0:01:07 / 25,9	0:00:32 / 11,5	0:01:23 / 41,5	13,55	0,00	0,02	**0,03**	**0,00**
z4	0:01:50 / 42,3	0:01:55 / 40,9	0:01:10 / 24,8	2,94	0,07	0,85	0,06	0,06
z5	0:00:31 / 11,9	0:00:50 / 25,0	0:00:03 / 1,5	**9,46**	**0,00**	0,06	**0,02**	**0,00**

Hvatačka elementarna igra: „Hvatanje u lanac" (sadržaj 1), trčanje u krug s različitim zadatcima (sadržaj 2), pretrčavanje vježbališta u valovima iz različitih startnih položaja (sadržaj 3), vrijeme u sekundama provedeno u zoni (vrijeme(s)), postotak vremena provedenog u zoni (%), zona1 – umjereni intenzitet 50%-59%(z1), zona2 – umjereno visoki intenzitet 60%-69% (z2), zona3 – visoki intenzitet 70%-79% (z3), zona4 – izrazito visoki intenzitet 80%-89% (z4), zona5 – maksimalni intenzitet 90%-100% (z5)

Rezultati provedenog istraživanja pokazuju statističi značajnu razliku između postotka vremena provedenog u zonama 2, 3 i 5 (tablica 3.). Detaljnija analiza dobivenih podataka pokazuje kako se sadržaj 3 u zonama 2 i 5 značajno razlikuje od ostalih sadržaja (tablica 3.: t-test 1-3, t-test 2-3). Razlog su tome najvjerojatnijeopterećenja organizma vježbača fazama vježbanja i fazama odmora. Naime, jedino se sadržaj „Pretrčavanje vježbališta u valovima iz različitih startnih položaja" provodi intervalnom metodom vježbanja.

Sadržaji hvatačka elementarna igra: „Hvatanje u lanac" i „Trčanje u krug s različitim zadatcima" u 42,3% odnosno u 40,9% (tablica 3.) vremena uvodnog dijela sata opteretili su učenike izrazito visokim intenzitetom. Dobivene vrijednosti u skladu su s nekim istraživanjima (Prce, 2002; Tomljenović, Radošević i Grahovac, 2009) prema kojima na satu tjelesne i zdravstvene kulture dolazi do karakteristične krivulje povećanja frekvencije u uvodnom i glavnom B dijelu sata, a pada frekvencije srca u pripremnom, glavnom A dijelu sata i završnom dijelu sata.

Tijekom provedbe ovih sadržaja u budućnosti u obzir treba uzeti emocionalnu angažiranost učenika uslijed provedbe elementarnih igara što ih često potiče da daju sve od sebe te u tim trenutcima podignu intenzitet do maksimuma. Intenzitet se može kontrolirati promjenom broja „hvatača", smanjenjem ili povećanjem prostora za realizaciju hvatalice, češćom promjenom hvatača i/ili natjecanjem između skupina (Neljak, 2008).

ZAKLJUČAK

Rezultati provedenog istraživanja pokazuju veliku heterogenost između 13 učenika OŠ „Hugo Kon" iz Zagreba te se preporuča sastavljanje manjih homogeniziranih skupina tijekom sata tjelesne i zdravstvene kulture. Ustanovljena je prosječna frekvencija srca od 162±11,6, odnosno 169±7 o/min prilikom provođenja hvatačke elementarne igre: „Hvatanje u lanac" i sadržaja „Trčanje u krug s različitim zadatcima" čime se opisuje krivulja opterećenja koja podrazumjeva brzi porast frekvencije srca u uvodnom djelu sata čak i do submaksimalnih vrijednosti.

Rezultati su pokazali statistički značajnu razliku prema prosječnoj frekvenciji srca između sva tri provedena sadržaja što se može objasniti različitim metodama vježbanja koje je potrebno koristiti tijekom provedbe svakog pojedinog sadržaja.

Također je uočena statistički značajna razlika u postotku vremena provedenog u zonama 2, 3, i 5, a serija t-testova za nezavinse uzorke pokazala je veće razlikovanje sadržaja „Pretrčavanje vježbališta u valovima iz različitih startnih položaja" od ostalih. Navedeni sadržaj većinu vremena uvodnog dijela sata (41,5%) opteretio je učenike visokim intenzitetom, dok su ostali sadržaji podigli intenzitet do izrazito visokih vrijednosti u 42,3% odnosno 40,9% vremena uvodnog dijela sata.

Funkcionalne reakcije učenika tijekom provedbe istraženih sadržaja u skladu su s nekim istraživanjima (Prce, 2002; Tomljenović, Radošević i Grahovac, 2009) te se može zaključiti kako ispunjavaju ciljeve i zadaće uvodnog djela sata (Neljak, 2008).

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INTRODUCTORY PART OF A PE LESSON: DIFFERENCES IN THE PHYSIOLOGICAL LOAD OF EXERCISING DURING IMPLEMENTATION OF DIFFERENT CONTENTS

ABSTRACT

Research on a sample of 13 students (age 11.6±0.6, height 149.5±5.8cm, weight 39.0±8.4kg) attending „Lauder-Hugo Kon" primary school in Zagreb was conducted with the aim to analyze physiological load of students during the implementation of various contents in the introductory part of a school lesson. The differences were determined by analyzing heart rate measured with heart rate monitor in the period of three Physical Education lessons and by implementation of three different contents: elementary catching game: 'Catching in the chain' (FS $\bar{x}$ 162±11.6 bpm), 'Running in a circle with different tasks' (FS $\bar{x}$ 169±7 bpm), 'Running across the

training ground in waves from different starting positions' (FS $\bar{x}$ 150±10.6 bpm). By analyzing the values of heart rate and the time spent in a single zone of intensity, it was determined that different contents, as some research has shown (Prce, 2002; Tomljenović, Radošević and Grahovac, 2009), describe the characteristic load curve which implies increase of heart rate in the introductory part of a lesson to more than 150 bpm. Statistically significant difference between average heart rate of students during the implementation of various contents, as well as statistically significant difference in the percentage of time spent in zones 2. 3 and 5 was determined by univariate analysis of variance (ANOVA).

Key words: *physiological load, heart rate, zone of intensity, Physical Education*

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Original scientific paper

DIFFERENCES IN STRENGTH PERFORMANCES BETWEEN GROUPS OF 7-YEAR-OLD MALE MACEDONIAN STUDENTS WITH DIFFERENT LEVELS OF EXPLOSIVE STRENGTH ABILITIES

INTRODUCTION

One of the physical education (PE) curriculum aims, in early school stages is to contribute to improvement of students' motor abilities, as it is emphasized in Macedonian PE curriculum, as well as in many national curriculums for PE around the world (Klincarov, 2007). Strength performances represent a fundamental motor base closely related with other motor abilities that define the total motor space for children at this age. (Bala, 1981, 2002, 2003; Rausavljević, 1992; Rajtmajer, 1993, 1997; Pejćić & Malacko, 2005; Pisot & Planinsec, 2005). Defining the interrelations and interdependence in subspaces among strength abilities that exist at seven years old male students is the subject of the research in this paper. The aim of this research is to determine the differences in manifested explosive, repetitive and static strength performances in a group of students with different level of manifestation of explosive strength qualities.

Estimated dependences of student's subspaces of strength qualities, as well as the relations with other anthropological subspaces of children at this age should be used as a base for designing new and improved PE curricula and academic standards in the Republic of Macedonia.

The use of the results obtained in these and other similar researches, as well as a proper selection of educational contents, could be a strong base in order to ensure the most effective way for the improvement of students' motor status from the point of PE teaching process.

METHODS

A total number of 120 second grade 7-year-old students, from 5 primary schools in Skopje, Macedonian capital city, were measured on 11 motor tests hypothetically used for estimation of strength performances. The explosive strength qualities were fortified using the following tests: standing broad jump (ESSDM), throwing medicine ball (1 kg) from standing position (ESFMST), throwing medicine ball (1 kg) from sitting position (ESFMG) and standing start 20m running (ES20VS). Repetitive strength qualities were measured using following four tests: modified push-ups (RSSKL), sit-ups (RSPTR), trunk lift (PSITR), hands pulling over the diagonal Swedish bench (RSVKK), while static qualities were estimated using following three tests: hanging with bent arms (SSVZG), keeping in position lying on the stomach (SSZLM), keeping in position lying on the back (SSZLG),

A component factor analysis with Kaiser Gutman criteria for determination of principal components higher than 1, was used with the aim to determine the factor structure of analyzed motor space for estimation of explosive strength qualities among 7-year-old children.

Extracted significant principal components were transformed in orthogonal varimax factors. Factor scores were calculated for every participant. In the further procedure, based on the factor scores for defined varimax factors, using taxonomic K-means clustering analysis, three groups of participants were defined. Groups were defined on the basis of different explosive strength qualities, selected as: group 1 with low achievements, group 2 with medium achievements and group 3 with above average high achievements on tests for estimation of explosive strength qualities. Finally, using univariant analysis of the variance ANOVA, differences among groups with different levels of explosive strength abilities were estimated for all 11 tests used for evaluation of strength performances among 7-year-old students.

RESULTS AND DISCUSSION

Results obtained with factor analysis in the analyzed space for estimation of explosive strength are shown in Table 1. According to these results, two significant main components with eigenvalues above 1 were obtained, which explains 75% of the analyzed system total variability. According to the projections of analyzed variables on the defined varimax factors (V1 and V2), it could be concluded that for the analyzed sample of examinees, two different abilities for manifestation of explosive strength qualities exist.

The first varimax factor is defined as absolute explosive strength on upper body parts determined according to significant high projections on variables ESFMST and ESFMG (ESFMST=0.864; ESFMG=0.865), while variables ESSDM and ES20VS

have significant high projections (ESSDM=0.816; ES20VS =-0.876) at second varimax factor defined as relative explosive strength on lower body parts.

Table 1. *Communalities (h2), factor loadings (unrotated F1 & F2; varimax normalized V1 & V2), explored variance (Expl. Var), proportion of total variance (Prp. Totl); Extraction: Principal components*

	F1	F2	V1	V2	h^2
ESSDM	0.699	-0.479	0.229	0.816*	0.719
ESFMST	0.727	0.478	0.864*	0.099	0.757
ESFMG	0.704	0.507	0.865*	0.062	0.753
ES20VS	-0.525	0.703	0.047	-0.876*	0.770
Expl.Var	1.789	1.210	1.551	1.448	
Prp.Totl	0.447	0.302	0.388	0.362	

On both defined varimax factors V1 and V2, factor scores for every participant were calculated. Using K-means clustering procedure, examiners were grouped in three maximum distinct groups (clusters) with low (1), medium (2) and high (3) scores in defined varimax factors. Results from this analysis are presented in Table 2.

Table 2. *Means, Standard Deviations (SD) & Valid N (N); Factor scores K-means clustering of factor scores in factors V1 & V2*

Cluster	Clustering factor scores V1			Clustering factor scores V2		
	Means	SD	N	Means	SD	N
1	-0.804	0.400	58	-1.729	0.638	17
2	0.325	0.310	43	-0.294	0.355	55
3	1.720	0.651	19	0.949	0.384	48
All Groups	0.000	1.000	120	0.000	1.000	120

Results from the obtained univariant differences between defined groups with different explosive strength qualities on all of the analyzed tests used for estimation of different types of strength performance in children are presented in Table 3.

Table 3. *ANOVA results*

	Factor V1 (absolute exp. Strength)				Factor V2 (relative exp. Strength)			
	Groups	Means	F(df1,2) 2,117	p-level	Groups	Means	F(df1,2) 2,117	p-level
ESSDM	1	108.362	4.419	0.014*	1	89.941	68.723	0.000*
	2	117.000			2	107.109		
	3	120.526			3	128.875		
ESFMST	1	2.882	94.552	0.000*	1	3.156	1.984	0.142
	2	3.788			2	3.669		
	3	4.945			3	3.511		
ESFMG	1	1.428	97.132	0.000*	1	1.744	0.179	0.837
	2	1.923			2	1.761		
	3	2.524			3	1.812		
ES20VS	1	4.975	0.019	0.981	1	6.068	115.362	0.000*
	2	4.970			2	5.087		
	3	5.004			3	4.467		
RSSKL	1	13.845	0.285	0.753	1	11.765	2.568	0.081
	2	13.140			2	12.909		
	3	14.421			3	15.250		
RSPTR	1	15.414	0.162	0.851	1	11.529	4.818	0.010*
	2	14.488			2	13.255		
	3	14.316			3	18.000		
RSITR	1	16.000	0.566	0.569	1	11.471	6.412	0.002*
	2	14.907			2	13.855		
	3	13.842			3	18.229		
RSVKK	1	13.984	1.144	0.322	1	17.453	9.201	0.000*
	2	12.348			2	13.663		
	3	12.513			3	11.075		
SSVZG	1	6.689	0.883	0.416	1	5.785	3.661	0.029*
	2	7.628			2	6.396		
	3	8.457			3	8.886		
SSZLS	1	20.035	2.455	0.090	1	16.815	1.282	0.281
	2	23.802			2	24.098		
	3	29.707			3	23.723		
SSZLG	1	15.353	0.998	0.372	1	12.839	1.167	0.315
	2	17.879			2	18.070		
	3	19.471			3	17.023		

It is established that significant differences, between groups of examines with different level of absolute explosive strength of upper body parts, except in the manifest variables that define the first varimax factor (ESFMST and ESFMG), also exist in the variable ESSDM (F=4.419; p-level=0.014).

The obtained results also show that significant differences, between groups of examines with different level of relative explosive strength of lower body parts, beside in the manifest variables that define the second varimax factor (ESSDM and ES20VS), also exist in the following variables: RSPTR (F=4.818; p-level=0.010); RSITR (F=6.412; p-level=0.002); RSVKK (F=9.201; p-level=0.000); SSVZG (F=3.661; p-level=0.029).

Ability for manifestation of absolute explosive qualities on upper body parts, estimated using throwing medicine ball (1 kg weight) from standing and sitting position is not related with the manifestation of any other analyzed strength performances of repetitive and static strength character (Rajtmajer, 1993; Popeska, 2009a). We assume that the ability for manifestation of larger explosive strength through pitch out medicine ball in this age period depends on some biomechanical parameters in relation with morphologic structure of the body, as well as some other motor qualities such as absolute manifestation of maximal strength qualities that were not researched nor presented in this work.

The simultaneous manifestation of better explosive strength of lower body parts estimated through standing long jump and better absolute manifestation of explosive strength of upper body parts of children at this age still points out to a certain degree to the integration of explosive strength qualities. (Rausavljevic, 1992; Pejcic & Malacko, 2005; Pisot & Planinsec, 2005; Popeska, 2009b)

On the other hand, success in manifestation of relative explosive strength qualities on lower body parts estimated through standing broad jump and standing start 20m running is positively related with success in manifestation of some of the analyzed repetitive and static strength qualities. These points out the fact that a greater ability for explosive body translocation in space generates an increased ability for manifestation of greater repetitive strength of the trunk and upper body parts as well as a greater muscle endurance of arms and shoulders as it is confirmed in many other researches (Rajtmajer & Proje,1990; Rausavljevic, 1992; ; Lasan et al., 2005; Pejcic & Malacko, 2005; Popeska, 2009).

CONCLUSION

Analyzing the relations in the manifestation of explosive strength qualities with other types of strength performances among seven-year-old students in the Republic of Macedonia points out that:

1. Children who manifest a different level of absolute explosive strength qualities in upper body parts are not distinguished in repetitive and static strength performances.
2. Children who manifests greater absolute explosive strength qualities in the upper body parts, also have a better explosive strength in the lower body parts estimated through the test standing broad jump.
3. Children who manifest different level of relative explosive strength qualities of lower body parts are distinguished in repetitive and static strength performances.
4. Children who manifest higher relative explosive strength qualities on lower body parts also have better repetitive strength of the trunk and upper body parts estimated using following tests: sit-ups, trunk lift, hands pulling over the diagonal Swedish bench, as well as greater static strength estimated using the test hanging with bent arms.

Specific relations in motor success in a certain age period should be considered in practice, in the process of designing and enriching PE curricula as well as in the determination of PE content standards.

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ABSTRACT

This paper analyzes the differences in the manifestation of strength performance between groups of seven-year-old male Macedonian students with different level of explosive strength abilities. A total number of 120 children were measured in 11 motor tests used for estimation of explosive, repetitive and static strength qualities. Tests hypothetically used for estimation of explosive strength were factorized with component factor analysis. Orthogonal varimax factors were defined and factor scores of participants were calculated using K-means clustering procedure in order to determine groups of students with under average (low), average (medium) and above (high) average explosive strength qualities. Group univariant differences among all analyzed variables were also assessed using ANOVA analysis. It was concluded that both: defined latent dimensions of relative manifestation of explosive strength of upper part of the body and the absolute strength of lower body parts have a significant and specific influence on the success of manifestation of strength performance in students at this age. This type of findings should be used as a base for determining the qualitative physical education teaching programmes and academic standards.

Key words: *explosive, strength, abilities, physical education, students*

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Izvorni znanstveni rad

MJESTO STANOVANJA PREDIKTOR SPOLNOG DIMORFIZMA NEKIH MOTORIČKIH SPOSOBNOSTI U PRIMARNOJ EDUKACIJI

UVOD

Promjena razine motoričkih sposobnosti nedjeljiv je dio rasta i razvoja te je determinirana kronološkom, fiziološkom dobi te spolom. Pod utjecajem je niza endogenih (genetski, hormonalni) i egzogenih (prehrana, tjelesna aktivnost, socioekonomski, psihološki, klimatski, geografski i dr.) čimbenika. Spolni dimorfizam u većini parametara rasta i razvoja počinje se značajnije očitovati tijekom spolnog sazrijevanja, a do puberteta se djevojčice i dječaci razvijaju usporedno, ali i tada postoje osobitosti, kao što koštana osnova zdjelice pokazuje razlike već u intrauterinom životu, a u predpubertetskom periodu postoje razlike i u psihološkom pogledu. Veličina hipofize i njen razvoj pokazatelji su spolnog dimorfizma (MacMaster i sur. 2007). Puberalni zamah rasta započinje ranije i ranije završava u djevojaka. Prve manifestacija puberteta povezane su s početkom maksimalne brzine rasta, a menarha nastupa tek na kraju maksimalnog prirasta (Tanner, 1986). Rezultati istraživanja Metikoša i sur. (1989) pokazuju negativan utjecaj gracilne (ženske) građe skeleta užih ramena, a širih bokova, s malo aktivne mišićne mase i s natprosječnom količinom potkožnog masnog tkiva, raspoređenog prvenstveno na donjim ekstremitetima i oko bokova na kanonički faktor definiran mjerama regulirane sile, okretnosti, brzine i relativne jakosti. Iako se najmasovnije promjene uočavaju prije svega u morfološkom statusu posljedica razvoja je i promjena motoričkih sposobnosti Dob adolescencije, osim spolnog razvoja, značajnih morfoloških promjena (Kurelić i sur. 1975; Matković, 1990) ujedno je i period povećanja jakosti pokreta (Prskalo i sur. 1998). I u mlađoj školskoj dobi postoji značajan spolni dimorfizam, a rast i razvoj i s njim u vezi promjene motoričkih značajki trebaju se uzeti u obzir kod doziranja opterećenja u svim organizacijskim oblicima rada s ovim dobnim skupinama (Prskalo i sur. 2008a i b).

CILJ ISTRAŽIVANJA

Cilj je ovog istraživanje utvrditi spolno dimorfističku ulogu motoričkih sposobnosti učenika i učenica u ovisnosti o geografskom lokalitetu sa svim svojim specifičnim značajkama.

HIPOTEZA

H1 Motorička obilježja u dobi 8 godina pokazuju dimorfistički karakter bez obzira na geografsku pripadnost.

METODE RADA

Na uzorku od 150 učenika i učenica drugog razreda osnovnih škola iz Zagreba i Širokog Brijega izmjerene su sljedeće varijable: Pretklon na klupi (MPRK) taping rukom (MTR15), skok udalj s mjesta (MSD), podizanje trupa (MPT), skok uvis (MSV), izdržaj u visu zgibom (MIV). Sva mjerenja izvršena su tri puta.

Podaci su obrađeni metodama deskriptivne statistike, normalnost distribucije je testirana Kolmogorov-Smirnovljevim postupkom, a razlike sustava varijabli između subuzoraka t testom i diskriminacijskom analizom korištenjem statističkog programa Statistica licenciranog za Sveučilište u Zagrebu.

REZULTATI

Rezultati deskriptivne statističke obrade prikazani su tabelom 1. Kolmogorov – Smirnovljevim postupkom, u subuzorku djevojčica 2. razreda potvrđena je hipoteza o nenormalnosti distribucije za varijablu izdržaj u visu zgibom (MIV). Asimetričnost distribucije je pozitivna što znači da se rezultati grupiraju u zoni nižih vrijednosti međutim isključuje se U ili bimodalna distribucija te se potvrđuje kontinuiranost distribucije. Razlike između sustava varijabli ispitane su linearnom diskriminacijskom analizom čiji su rezultati prikazani tabelom 2. Diskriminacijska analiza potvrdila je značajnost razlika sustava varijabli kod podskupina definiranih temeljem spola samo u širokobriješkom subuzorku dok kod zagrebačke populacije razlike između sustava varijabli nisu potvrđene.

Tabela 1. *Deskriptivni podaci rezultata motoričkih testova učenika i učenica 2. razreda iz Zagreba i Širokog Brijega (AS - aritmetička sredina, SD - standardna devijacija, K-S p - razina značajnosti Kolmogorov Smirnovljevog postupka, t - razina značajnosti razlike aritmetičkih sredina utvrđene „t" testom, između subuzoraka temeljem spola)*

VARIJABLE	Učenici Zagreb					Učenice Zagreb					T test
	AS	SD	Asimetričnost distribucije	Spljoštenost distribucije	K-S p	AS	SD	Asimetričnost distribucije	Spljoštenost distribucije	K-S p	p
Pretklon na klupi	23,43	8,67	-0,05	-0,78	p > .20	23,86	5,53	0,68	-0,41	p < ,15	0,8008
Taping rukom	21,58	2,72	0,05	-0,66	p > .20	20,66	2,68	0,54	-0,39	p > .20	0,1460
Skok udalj s mjesta	132,00	16,28	-0,38	0,76	p > .20	121,71	14,95	0,67	0,78	p < ,20	**0,0059**
Podizanje trupa	30,70	6,86	0,07	-0,55	p > .20	28,00	7,47	-0,26	-0,59	p > .20	0,1070
Skok uvis	20,85	3,86	-1,20	3,06	p > .20	18,94	3,87	-0,31	0,28	p > .20	**0,0364**
Izdržaj u visu zgibom	11,85	10,64	2,36	6,77	p < ,20	11,37	10,05	1,46	1,22	p < ,05	0,8512
VARIJABLE	Učenici Široki Brijeg					Učenice Široki Brijeg					T test
	AS	SD	Asimetričnost distribucije	Spljoštenost distribucije	K-S p	AS	SD	Asimetričnost distribucije	Spljoštenost distribucije	K-S p	p
Pretklon na klupi	16,23	5,96	-0,27	-0,62	p > .20	20,09	6,65	0,14	0,14	p > .20	**0,0098**
Taping rukom	21,55	2,88	0,69	1,17	p > .20	22,40	3,04	0,05	-0,91	p > .20	0,2182
Skok udalj s mjesta	137,88	20,33	0,51	-0,13	p > .20	125,89	16,22	0,28	0,39	p > .20	**0,0066**
Podizanje trupa	29,15	6,98	0,03	1,97	p > .20	28,40	6,80	-1,02	1,00	p < ,15	0,6399
Skok uvis	22,88	3,57	0,67	0,54	p > .20	19,86	2,94	0,47	0,84	p > .20	**0,0002**
Izdržaj u visu zgibom	18,78	15,16	0,96	-0,06	p > .20	9,56	7,92	1,28	1,21	p < ,15	**0,0019**

Tabela 2. *Usporedni rezultati diskriminacijskih analiza za svaki lokalitet posebno u prostoru motoričkih varijabli između subuzoraka učenica i učenika definiranih na temelju spola.*

Diskriminacijske funkcije

Zagreb	Svojstvena vrijednost	Koeficijent diskriminacije	Wilksova Lambda	X^2	Stupnjevi slobode	Razina značajnosti
0	0,14	0,36	0,87	8,53	6	0,2019
Široki Brijeg						
0	0,46	0,56	0,68	26,58	6	0,0002

Faktorska struktura i centroidi diskriminacijskih funkcija

Varijable	Faktor 1 Zagreb	Faktor 1 Široki Brijeg
Pretklon na klupi		-0,46
Taping rukom		-0,21
Skok udalj s mjesta		0,48
Podizanje trupa		0,08
Skok uvis		0,68
Izdržaj u visu zgibom		0,56
		Centroidi diskriminacijskih funkcija
Dječaci		0,63
Djevojčice		-0,72

Kod širokobriješkog uzorka diskriminaciji najviše doprinose varijable skok uvis, izdržaj u visu zgibom i skok udalj koje prema projekciji centroida dominiraju u muškom subuzorku dok kod djevojčica dominira varijabla pretklon na klupi koja je instrument za procjenu gibljivosti. Ovi podaci odgovaraju rezultatima na subuzorku od 10 godina gdje je dokazana dominacija mjera fleksibilnosti u ženskom subuzorku, a skoka uvis u muškom (Prskalo i sur 2008a). Međutim kod subuzorka iz Širokog Brijega ovaj dimorfizam se značajnije očituje no u zagrebačkom subuzorku ne postoje značajne sustavne razlike ovih motoričkih varijabli u subuzorcima definiranim temeljem spola. Period prije puberteta prostor u kojem se značajno povečava masno tkivo kod učenica (Prskalo i sur. 2008b) što je s motoričkog stajališta remeteći čimbenik manifestacije motoričkih sposobnosti, ipak očekivana diskriminacija i u zagrebačkoj populaciji je izostala. Grad Zagreb prema podacima iz 2008. godine ima preko 779 000 stanovnika, a Široki Brijeg prema posljednjem popisu stanovništva iz 1991. godine preko 27 000. Osim demografskih razlika, između ovih gradova postoje značajne klimatske razlike što utječe na način života. Broj stanovnika u Zagrebu u odnosu na Republiku Hrvatsku iznosi cca 17,64 %. Koncentracija stanovništva u gradove i s demografskog stajališta nije povoljna okolnost ravnomjernog razvoja i nameće najvećem broju stanovnika Republike Hrvatske loše uvjete s ekološkog, ali i kineziološkog motrišta (Prskalo i Babin 2008). Ove okolnosti bi mogle biti uzrokom ovakvih rezultata što bi ujedno trebalo biti znak za uzbunu u velikim gradovima gdje se prirodno prisutan spolni dimorfizam prepoznatljiv i u motoričkom prostoru, gubi.

ZAKLJUČAK

Temeljem provedenog istraživanja zaključuje se kako je na uzorku od 8 godina potvrđena razlika sustava nekih motoričkih varijabli u subuzorcima definiranim prema spolu na uzorku Širokog Brijega, ali ne i onom iz Zagreba. Ta razlika bi se mogla pripisati različitom načinu života i kretnim navikama zagrebačke populacije.

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PLACE OF RESIDENCE AS PREDICTIVE OF GENDER DIMORPHISM OF SOME MOTOR ABILITIES IN PRIMARY EDUCATION

ABSTRACT

Based on the research whose aim was to determine gender dimorphic role of motor abilities of male and female students depending on geographical location with all its specific characteristics, it is concluded that in the sample of children aged 8, there exist differences in the system of some motor variables in subsamples defined according to gender on the sample from Široki Brijeg, but not in the sample from Zagreb. These differences possibly exist because of a different way of life and movement habits of the population of Zagreb.

Key words: *motor abilities, children, primary education, sexual dimorphism, geographical location*

Prikazani rezultati proizašli su iz znanstvenog projekta (Kineziološka edukacija u predškolskom odgoju i primarnom obrazovanju), provođenog uz potporu Ministarstva znanosti, obrazovanja i športa Republike Hrvatske.

Peter Rozboril ***Original scientific paper***
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COMPARISON OF THE STATE OF SPORTS FACILITIES IN BRATISLAVA GRAMMAR SCHOOLS BETWEEN 1990 AND 2010

Spatial - material conditions in physical education and sports are an inseparable part of teaching process. Not only do these conditions directly influence teaching process, they also determine it. Important preconditions for optimal teaching of physical education and sports are the schools' optimal material conditions and equipment. These conditions and aids are often limiting factors for the realization of physical education and sports at schools. The situation at a number of schools is inconvenient in the long term, mainly regarding teaching aid, apparatus, equipment, operation, reconstruction, maintenance and construction of physical education and sports buildings and facilities (Gabovič, Antala 1990, Melicher, Varga 1994, Moravec, Šimonek 1997, Peráčková 2004, Melicher 2006, Rozboril 2010). Components of physical education and sports facilities are buildings (gymnasiums, sports halls, swimming pools, etc.) with their inner architecture (equipment, dressing rooms, sanitary facilities etc.) and didactic aids (equipment in teachers` offices - didactic aids). Among the most important and the most frequently used physical education and sports facilities at schools there are gymnasiums and rooms adjusted for physical education and sports. They provide covered area for all physical activities.

The aim of the study was to update knowledge of the condition of physical education and sports facilities at schools in Bratislava and to compare the results with the results from the year 1990 (Gabovič, Antala, 1990).

METHODS

The research was conducted using questionnaires and interviews with the chairmen of subject committees (for physical education and sports) and with teachers of physical education and sports at grammar schools in Bratislava, as well as paying personal visits to the schools. Out of 28 visited schools 20 (71.4%) agreed to be involved in the research. Research sample consisted of 15 state grammar schools (70%), 2 private grammar schools (15%) and 3 church grammar schools (15%). Grammar schools were located in five boroughs in Bratislava I - V. The research sample consisted of 4 - year grammar schools, sports grammar schools, church grammar schools, bilingual grammar schools and elementary schools joined with grammar

schools. At all of the grammar schools physical education and sports was taught according to the valid norms and regulations of the State Educational Programme 2008. Gathered data were processed and analyzed using standard mathematical and statistical methods and some were graphically represented.

RESULTS

The main interest of our research was to see if there has been any change in the contemporary situation in 2010 compared to the past (year 1990). The sample of the research in 1990 consisted of 11 grammar schools (Gabovič, Antala, 1990) and the sample in 2010 consisted of 20 grammar schools, therefore, we had to convert the facilities to the same measures - to calculate separate facilities per one school (e.g. the number of gymnasium in 2010 is 28 = 28/20 = 1.4 gymnasium per one school).

In Table 1 all the facilities are given, with conversion to measures in both years and percentage decrease or increase for compared years. After the conversion, the most significant decrease occurred for sport games facilities and athletics. The number of volleyball fields decreased by 53.5%, and the number of athletic complexes decreased by more than 17%. The number of gymnasiums decreased by 10% over the 21-year period. The most significant increase occurred in renting of the facilities of other schools or organizations for improving the physical education process. Nowadays schools rent 120% more facilities compared to year 1990 (mainly swimming pools and gymnasiums). Significant increase (37.5%) occurred in the number of handball fields, while the number of football and basketball fields increased by 10%.

Table 1. *Comparison of facilities for PE and sports*

Spatial provision	Sum in 1990	Sum in 2010	Per school 1990	Per school 2010	Index 2010/1990	Increase/ decrease
Number of schools	11	20				
Gymnasium	17	28	1.5	1.4	90.6	-9.4
Room adjusted for physical education and sports	8	17	0.7	0.9	116.9	16.9
Swimming pool	1	1	0.1	0.1	55.0	-45.0
Athletic complex	6	9	0.5	0.5	82.5	-17.5
Football field	4	8	0.4	0.4	110.0	10.0
Basketball field	7	14	0.6	0.7	110.0	10.0
Volleyball field	13	11	1.2	0.6	46.5	-53.5
Handball field	2	5	0.2	0.3	137.5	37.5
General-purpose rooms	4	14	0.4	0.7	192.5	92.5
Rented space	3	12	0.3	0.6	220.0	120.0

When comparing the past and present equipment and apparatus provision, the most significant changes occurred in athletics facilities. Just one out of 20 schools has suitable spiked running shoes (in 1990 it was 6 out of 11 schools), which means there is a 91% decrease. There was also decrease in the number and quality of starting blocks (-29%), in high jump kits (-63.3%) and landing areas (-86.3%), etc. In artistic gymnastics there was a decrease in the number of carpet foam floor rolls (-63%), mats (-23%), trampolines (-50%), as well as horizontal bars, beams, parallel bars. On the other hand, there was almost 200% increase of barbells, dumbbells, skipping ropes and fitness equipment.

In general, we can say that there was a slight decrease in the number of gymnasiums, athletic complexes and more significant decrease of volleyball fields. On the other hand, there was an increase in the number of handball fields, basketball fields, and general-purpose rooms. There were no significant changes in the overall number of physical education and sports facilities, however, their structure changed.

Inseparable element of physical education process are students. Optimal number of students in the physical education classroom enables effective management of physical education process. High number of students in the class causes problems mainly in class organization and in ensuring safety of the students. A part of our research was also to determine the number of students at schools, average number of students per class and number of groups of physical education and sports. In 1990 the average number of students was 582, in 2010 it was 576, which can be considered as an approximately the same situation (Tab. 2). There was more significant change in the average number of students per class. In 1990 the average number was 34.5 students per class and in 2010 it was 27 students per class, which is 22% decrease. There was a change in the average number of students per physical education group - in 1990 the average was 17.7 students per group and in 2010 it was 15.2 students per group, which is a 14.1% decrease. The number of groups of physical education increased by 9.1%. We suppose that lower number of students in groups could have positively influenced the quality of teaching process.

Table 2. *Comparison of the number of students in the given years*

Students/Year	1990	2010		%
Average number of students	581.70	575.90	99.00	-1.00
Av. numb. of students/class	34.70	27.00	77.81	-22.19
Number of PE groups	32.90	35.90	109.12	9.12
Ave. numb. of students/group	17.70	15.20	85.88	-14.12

TEACHERS' OPINIONS

According to the opinions of the physical education and sports teachers, 60% of grammar schools do have sufficient material and spatial conditions for the realization of physical education and sports. Many teachers think that facilities at several schools are obsolete and schools do not have financial sources to repair and renovate those facilities. 30% of teachers think that the conditions are less suitable and that repair of the facilities is inevitable. Also, 10% of schools have insufficient conditions for teaching physical education, according to teachers' opinions (Fig.1).

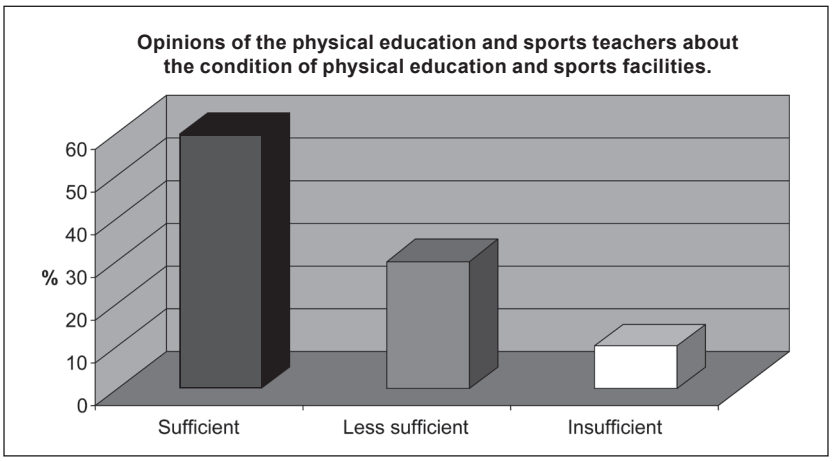


Fig. 1. *Opinions of the physical education and sports teachers about the condition of physical education and sports facilities*

CONCLUSION

It is obvious from the results that there are still reserves in spatial - material equipment of physical education and sports at grammar schools in Bratislava. Contemporary curriculum allows the schools to adjust the content of classes to material and spatial conditions and to the interests of students, which is exploited by majority of schools. The schools can include physical education and sports activities which do not require demanding spatial and material conditions for the teaching process. There is a certain stagnation of building new physical education and sports facilities, which is a result of insufficient funding of regional school systems, as well as of improperly set system of management of funds received from renting spaces and buildings to the public. Building and reconstruction of the missing physical education and sports facilities could be nowadays solved by schools and their promoters through European structural funds and becoming involved in the projects of the Ministry

of Education, Science, Research and Sport of the Slovak republic, such as „Open School" and „Bring Sport Back to Schools", where there are resources for building, reconstruction and equipment of the sport facilities set aside every year. Also updating of direction of material - technical conditions and equipment for physical education and sports at schools would be beneficial for the quality of teaching process.

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ABSTRACT

The study deals with the issue of physical education and sports facilities at grammar schools in Bratislava. The aim of the study was to update and extend knowledge of spatial - material equipment of physical education and sports at schools in Bratislava, to compare the results with the results from the year 1990, and to evaluate opinions of teachers of physical education and sports about these issues.

Key words: *physical education and sports, physical education and sports facilities, material equipment, spatial equipment*

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Original scientific paper

DIAGNOSTIC POSSIBILITIES OF MOTOR FITNESS IN PRIMARY SCHOOL CHILDREN

INTRODUCTION

According to Gallahue and Donnelly (2003) perceptual-motor abilities are rapidly developing and refining fundamental movement skills during primary school period. Cross-lateral movements often present more difficulty than unilateral movements. Gross motor control is developing rapidly and occurs sooner than fine motor control. However, with an appropriate instruction and opportunity for physical activity in educational environment during this period, movements may become very efficient and coordinated.

Primary school children are active and energetic and would often rather run than walk. Many complex movements of older children and adults are little more than highly elaborated forms of these fundamental movements (Haywood and Getchel, 2005).

A variety of tasks can be used to document levels of motor performance. But emphasis is placed on standardized tasks that can be used in the field or school setting, in contrast to those limited to the laboratory. That is considered to be a very important point for the selection of motor tests in early school age (Malina, 2003).

It is critical, though, to understand developmental characteristics of children as well as their limitations or potentials. Only in this way can we structure movement experiences for young children that truly reflect their needs and interests and are within their level of ability. The aim of this study was to apply selected motor tests to assess and compare motor performance of children in a final period of early school age in a view of its structural aspects.

METHODS

A group of 195 girls and 175 boys aged 10, randomly selected from twelve elementary schools of the East Slovakia Region, participated in the study. The sample of subjects was drawn from the population of fourth-grade children. The children attended a regular educational programme and had no health related limitations. They did not participate in any special exercising programme.

The anthropometric data were assessed together with the tests for coordination abilities on the first day of the testing. Subsequently, the second day children underwent the condition motor tests while the endurance shuttle run test was performed at length. The testing procedure occurred in the school environment.

Children were subjected to 16 motor tests: Flamingo balance (FB) - *static balance*, Plate tapping (PLT) - *frequency speed of an arm*, Sit-and-reach (SAR) - *joint flexibility of a trunk*, Standing broad jump (SBJ) - *explosive strength of lower limbs*, Handgrip (HG) - *a static strength of the dominant hand*, Sit-ups (SU) - *dynamics and endurance strength of abdominal, coxal and thigh muscle*, Bent arm hang (BAH) - *static and endurance strength of upper limbs*, Shuttle run 10×5 m (SHR) - *running speed with the change of direction*, endurance shuttle run (ESR) - *running endurance*; the tests were applied and conducted according to EUROFIT instructions (Adam, Klissouras and Ravassolo, 1988). The following motor tests: Jump with accuracy (JWA) - *kinaesthetic differentiation*, Turns on a bench (TOB) - *dynamic body equilibrium*, Run for balls (RFB) - *orientation ability*, Ball tracing (BT) - *reaction speed*, Arrhythmical tapping (AT) - *rhythmical ability*, Jump without a swing (JWS) - *movement joining*, Jump back (JB) - *movement adaptation and transfer*, were applied according to Hirtz (1985) and Raczek, Mynarski, and Ljach (1998). According to the authors, the reliability of the motor tests (JWA, TOB, RFB, BT, RFT, JWS, JB) for range 6 – 18 years is 0.7 to 0.9. In addition, 3 somatic measurements were taken: body mass (BM), body height (BH) and sum of 5 skinfolds (5SF) – triceps, biceps, subscapular, anterior suprailiac and medial calf. Body weight was measured with a precision of 0.5 kg. Stature was measured using Martin's anthropometer with a precision of 0.1 cm. Skinfolds were measured using the Harpenden calliper with a precision of 0.1 mm. Then the sum of all 5 skinfolds was calculated.

Mean values and standard deviation were calculated for all variables. Independent *t*-test was used to assess gender differences. Statistical significance was set at $p < 0.05$; if there is a higher level of confidence, it is marked separately.

The hierarchy of motor and somatic indicators was established by applying cluster analysis. It enables dividing a group of objects (variables) into disjoint internally homogeneous subgroups but heterogeneous to each other (Blahuš, 1999). Since the number of clusters had not been preset, the agglomerative hierarchical clustering was selected from several techniques. As a clustering principle, the Ward's method based on minimization of the intra-cluster sum of squares was applied.

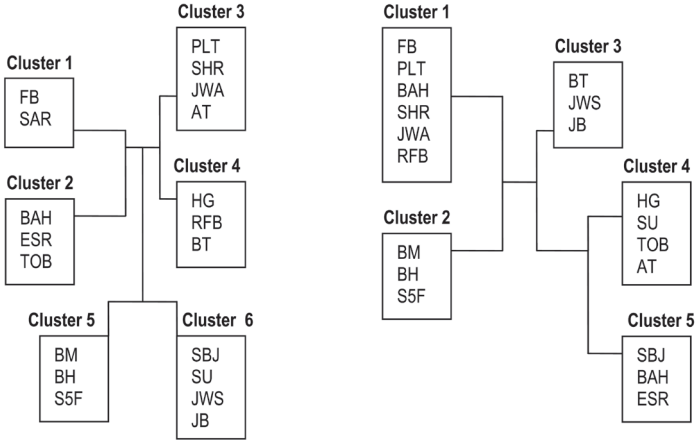
This hierarchical clustering process can be represented as a tree, or dendrogram (Hendl, 2004). Due to better „readability" the diagrams were transformed into box diagrams (Figure 1). Data were processed with statistical package SPSS 16.0 for Windows.

RESULTS AND DISCUSSION

Mean values and standard deviation together with *t-test* values indicate significant differences between group of boys and girls (Table 1). The results of *t-test* analysis pointed to a poorer level of majority of motor indicators in girls. It is evident that boys performed significantly better in speed, strength and endurance. This tendency was not absolutely repeated concerning coordination abilities. Girls performed significantly better only in rhythmical ability, boys in orientation and reaction speed. However, level of coordination abilities is similar in both examined groups. Coordination abilities can be regarded as important determinants in motor learning (Starosta, 2003) and their similar level in boys and girls indicate similar level of motor functions.

Comparison of physical development indicates similar level in both examined groups-boys are taller, but with lower level of adipose segment (Table 1).

On average, in early school age gender differences are relatively small but consistently favour boys for running, jumping, and throwing. Girls perform better, on average, in tasks that require balance, such as hopping. However, there is much overlap (Malina, Bouchard and Bar-Or, 2004; Ružbarská – Turek, 2010). The physical growth of girls and boys is very similar when viewed from a posterior position (Haywood and Getchel, 2005).



Legend: Flamingo balance (FB), Plate tapping (PLT), Sit-and-reach (SAR), Standing broad jump (SBJ), Handgrip (HG), Sit-ups (SU), Bent arm hang (BAH), Shuttle run 10×5 m (SHR), Endurance shuttle run (ESR), Jump with accuracy (JWA), Turns on a bench (TOB), Run for balls (RFB), Ball tracing (BT), Arrhythmical tapping (AT), Jump without a swing (JWS), Jump back (JB), Body mass (BM), Body height (BH), Sum of 5 skinfolds (5SF)

Figure 1. *Cluster diagram of somatic and motor variables in girls (left) and boys (right) aged 10.*

Table 1. *Descriptive statistics of the anthropometric and motor characteristics, differences in the groups of girls and boys aged 10*

	Girls		Boys		t-test
Dimensions	**Mean**	**SD**	**Mean**	**SD**	
Flamingo balance (n) / FB	8.8	4.7	7.8	4.7	
Plate tapping (sec) / PLT	17.1	2.3	17.2	2.2	
Sit-and-reach (cm) / SAR	23.2	6.1	22.1	5.7	
Standing broad jump (cm) / SBJ	133.5	15.5	145.9	19.0	*
Handgrip (kg) / HG	19.0	3.5	21.1	4.4	*
Sit-ups (n) / SU	18.1	4.5	19.2	4.4	
Bent-arm hang (sec) / BAH	11.4	7.1	17.4	11.9	*
Shuttle run 10x5 m (sec) / SHR	23.3	1.6	22.1	2.0	*
Endurance shuttle run (n) / ESR	22.6	6.5	29.0	9.2	*
Jump with accuracy (cm) / JWA	10.5	5.2	9.9	5.2	
Turns on a bench (n) / TOB	5.3	1.5	5.7	1.6	
Run for balls (sec) / RFB	20.4	1.8	18.9	2.1	*
Ball tracing (cm) / BT	130.2	18.4	116.9	18.3	*
Arrhytmical tapping (n) / AT	9.3	1.8	8.7	1.9	*
Jump without a swing (cm) / JWS	27.3	11.2	25.0	11.8	
Jump back (cm) / JB	64,51	15.5	61.2	19.1	
Body mass (kg) / BM	33.2	7,40	33.6	5.7	
Body height (cm) / BH	139.9	6.5	142.1	6.9	*
Sum of 5 skinfolds (mm) / S5F	45.2	10.4	42.9	10.0	
* $p < 0.05$					

The tests that make up a particular cluster have the property of showing relatively close relations with each other. There were 19 variables, and the cluster analysis grouped them into 6 (girls) and 5 (boys) clusters.

The structure of motor and physical indicators in the examined groups differ in a sense that the group of boys had a more compact model. Coordination and speed abilities are in close relation and probably create the basis for motor performance at that age. Some relation between coordination and condition abilities grouped in clusters is difficult to explain. Physical development presents important factor of the hierarchical model. It is obvious that the hierarchy of somatic and motor variables is gender-dependent as early as primary school age. Differences between boys and girls probably reflect the types of activities available for children, availability of suitable role models, for motor skills, and societal expectations for physical activity and motor skill.

Although the correlation between physical development and coordinative performance of children indicate possible negative consequences, there are still no distinct research results concerned with correlations between coordination abilities and physical parameters. Results of body gross motor development test for children (KTK) unveiled significantly better level for boys in comparison with girls (Graf et al., 2003).

Information on the attained levels of motor performance is not as extensive for early childhood as it is for adolescence. There is much intraindividual and interindividual variability in the level of motor abilities among young children. Changes in mean levels of performance with age should be viewed with this variability in mind (Malina, Bouchard and Bar-Or, 2004).

It should be emphasized that during this specific period of motor development, movement outcomes for the children are the evidence of their undergoing biologically-driven growth and intersection of the underlying movement capacity of coordination with the learned performance of motor skills (Miller, 2006).

CONCLUSION

Motor performance is influenced, beside physical characteristics, by motivational factors, opportunity for practice, habitual physical activity, and other factors in the cultural environment. There is a need to consider all these factors while assessing motor performance differences. These variables may be especially relevant in the context of examining gender differences in performance.

In order to identify the actual status of motor dispositions in children, not only the information on specific elements is important but also on mutual relations between them and their structure. Condition abilities are in a straight continuity with coordination abilities and considering their control function, it is necessary to study abilities in a view of their complexity.

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ABSTRACT

There is an ambiguity in approaches to application of individual test issues within the early childhood. It is necessary to start from the premise that a child is not a miniature adult. Due to these reasons, methodological approaches used with this age group are diametrically opposite and their results are difficult to compare. The aim of this study is to analyse and compare differences in the hierarchy of motor and physical indicators in primary school girls and boys. The hierarchy of somatic and motor variables is gender-dependent as early as the primary school age. Physical development affects condition as well as coordination performance independently of gender. This knowledge creates the base for the determination of more efficient diagnostic methods and retrospectively for successful development of motor competencies.

Key words: *primary school age, motor abilities, cluster analysis*

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Original scientific paper

THE COMPARISON OF THE INFLUENCE OF ATTENTIONAL--FOCUS ON THE CENTER OF MASS DISPLACEMENT OF BODY DIFFERENT SEGMENTS IN BASKETBALL SET SHOT

INTRODUCTION

Over the past two decades there has been some evidence that an individual's focus of attention has a significant influence on the motor performance and learning. In particular, it has been shown that directing a performer's attention to the movement effect (i.e. an external focus), is more beneficial than attention directed to the actual movement itself (i.e., an internal focus) (Wulf et al. 1998, 2001, Wulf, 2007 a, b). A vast majority of the research has used skills that require the manipulation of an object to achieve the action goal, such as hitting a golf ball (Wulf et al. 1999, Perkins-Ceccato et al. 2003; Wulf, & Su, 2007), shooting a basketball (Al-Abood et al., 2002, Zachry et al., 2005), kicking a football (Zachry, 2005) or soccer and volleyball (Wulf et al. 2002, 2003), hitting a tennis ball (Wulf et al., 2000), baseball (Castaneda, & Gray, 2007), and even dart throwing (Marchant, 2007). The advantages of an external focus are not only seen when compared with internal focus conditions, but also when compared with control conditions (Landers et al., 2005; McNevin, 2002, 2003). This pattern of results suggests that an external focus has the capacity to enhance performance and learning. The rationale for focusing on the movement effects rather than on the movement itself is explained by the „constrained action hypothesis" (McNevin et al., 2003; Wulf et al., 2001). This hypothesis suggests that directing one's attention to the actual movements (internal focus) might „constrain" the motor system and interfere with the automatic control processes, while focusing on the effects of the movement (external focus) actually frees the performer and enhances the automatic control processes. Overcoming this analysis paralysis, participants focus on the effects of their actions so the movement pattern becomes more „automatic", demonstrating a smooth, coordinated response. For example, balancing on a stabilometer (Wulf et al.,

2001), postural adjustments in balance tasks (Wulf et al., 1999, 2001, Wulf, 2007), hitting a target (Wulf et al., 1999, 2002) or balancing (Wulf et al. 1998, Landers et al., 1999 Shea & Wulf, 1999; Totsika & Wulf, 2003), but also for tasks that require the production of maximum forces and displacement of the center of mass (Wulf et al., 2007). Zachry et al. (2005) believed that an external focus of attention not only enhances movement efficiency, but also reduces „noise" in the motor system that delays fine movement control and disturbs the outcome of the movement. This indicates that participants produced greater forces under that condition.

Although evidence is convincing regarding the effectiveness of an external focus in practicing motor skills, there is still much to be discovered. Conflicting findings demonstrate that age (Emanuel et al., 2008) , gender (Wulf et al., 2003), skill level (Perkins et al., 2003; Ford et al., 2005; Castaned & Gray, 2007; Wulf, 2008), complexity of the skill (Poolton et al., 2006; Denny, 2010), and individual preferences (Wulf et al., 2001), sport settings (Porter et al., 2010) might all play a role regarding the efficacy of internal and external attention focus in skill performance. Recently Weiss et al. (2008) discovered that one's preferred focus of attention could play a role in the effectiveness of attention focus, suggesting that an internal focus did not necessarily lead to a decrease in performance if it was the participant's preferred strategy.

According to the contrary results, we decided to examine whether an external focus would have a great impact on the displacement of different body segments and mass centers in university male basketball beginners, compared to internal focus. If this were the case, it would complement and extend the findings of the previous studies which have almost exclusively shown benefits of external focus for tasks requiring movement accuracy. In two experiments, participants performed a shooting task under both conditions. Under external focus conditions, the participants were instructed to focus on the basket, whereas under internal focus conditions they were asked to focus on the wrist. Thus, the instructions were very similar in terms of the actual locus of attention.

METHOD

Thirty university male students (aged 18 - 30) with no knowledge of basketball shooting and not aware of the specific purpose of the study were assigned randomly to one of two experimental groups (n=15) based on their pre-test scores of 10 shots. The two matched groups were assigned one of two practice conditions. During ten consecutive practice sessions, all participants received the same initial instructions regarding the basket (external) and wrist (internal), but no feedback during the post-test. After a day of rest, participants performed a retention test consisting of 10 trials with 10 seconds rest between each trial. The task involved was the throwing ball

toward the basket from penalty line in basketball, putting markers on the subjects' center of mass of different body segments (forearm, trunk, thigh and leg) and recording the motions from sagittal and frontal surfaces by two Panasonic cameras with 100 fps speed. Motion analysis software was used to analyze information.

Descriptive statistics were calculated to report the mean performance of the two practice groups for the retention test scores (Table 1). Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 16. The criterion for significance was set using an alpha level of $p \leq 0.05$. An independent samples t-test was used to determine significance between the experimental conditions. Statistics (Mann-Whitney U) were calculated to determine the magnitude of the observed significant performance differences.

Table 1. *Center of Mass Displacement Under Internal and External Focus Conditions*

Segments	Groups	Mean	Std. deviation	T	Df	Sig.
Forearm	Internal External	3.11 3.22	0.162 0.595	- 0.694	28	0.005
Trunk	Internal External	2.18 3.22	0.409 0.765	-4.66	28	0.000*
Thigh	Internal External	3.39 3.48	0.850 0.874	-0.299	28	0.772
Leg	Internal External	3.29 3.07	0.442 0.636	1.089	28	0.285

As shown in Figure 1, the mean displacement of trunk for internal group was 2.18 and for external group it was 3.22 with F (9.58)= , $p < .05$.

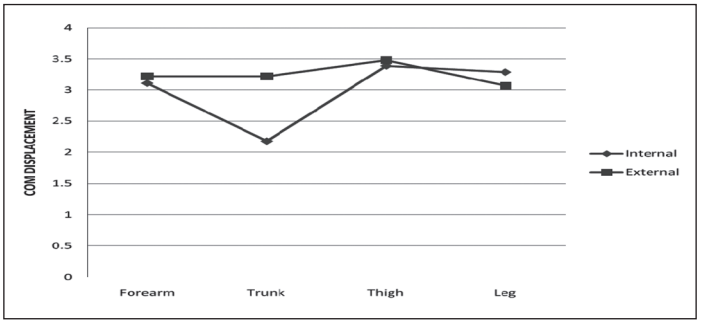


Figure 1. *Mean differences of body segments Mass centers*

RESULTS

Participants' trunk center of mass displacement reached greater changes when they were instructed to adopt opposed focus to the internal focus, (3.22) for external focus group, and internal focus (2.18), (see Table 1). Mann- Whitney U tests confirmed that the external focus condition differed significantly from the internal one for the trunk center of mass displacement, F (9.58) = , $p < .05$, and independent t-test showed a statistical significance between the two practice conditions in trunk center of mass displacement (p= .000).

DISCUSSION

The purpose of this investigation was to determine if body segments center of mass displacement in an external focus would be better than an internal focus when performing a basketball set shot. Among numerous studies on attention focus, few have considered the effects of attention focus on body segments center of mass displacement. Traditionally, coaches and teachers have been trained in teaching sport skills using an internal focus of attention. Although a common practice, some have questioned the value of an internal focus and suggested it may actually stop performance (McNevin et al., 2003). The results of this study support the view that an external focus is more effective than an internal focus in center of mass displacement of trunk when performing shooting in basketball. This finding appears to be parallel to several studies exploring the benefits of an external focus when compared to an internal focus, including the basketball free throw (Al-Abood et al., 2002), the standing soccer shot and volleyball serve (Wulf et al., 2002), the golf pitch shot (Wulf et al., 1999), putting (Poolton et al., 2006) and center of mass displacement (Wulf et al., 2007). Throwing ball to the basket used in this study involved several variables, including the attentional focus of the performer. These factors may explain the difference in the results of this study compared to other studies done on this topic. Mechanically speaking, the only way to raise the mass displacement is by increasing the magnitude of external force exerted. From a performance perspective, one can deduce that participants either increased force production, or optimized coordination between and among the segments during a task to produce a more continuous summation of segmental velocities (Wulf et al., 2007).

The results of the present study provide converging evidence that a change in the focus of attention can affect greater COM displacement (Wulf, 2007). Focusing on a target (external focus) resulted in greater mass displacement in trunk than focusing on the wrist with which the ball was to be thrown (internal focus). Moreover, attentional focus instructions have been found to affect EMG activity not only in „related" muscle groups, but also in "unrelated" ones (Zachry, et al., 2005, Vance, et

al., 2004). The present results are in line with those findings in demonstrating that the attentional focus on one part of the body can impact whole-body displacement. Wulf 's experiments (Wulf et al., 2007) showed greater vertical displacement of the center of mass. This indicates that participants produced greater forces under that condition. While it might be surprising that a simple change in an individual's focus of attention can enhance force production, previous studies have shown that an external focus results in more efficient movement patterns (Zachry, et al., 2005, Vance, et al., 2004, Marchant, et al., 2006). In those studies, the same outcome (i.e., weight lifted in a given amount of time) was achieved with less muscular activity during an external focus, as opposed to an internal or no particular focus (Vance, et al., 2004, Marchant, et al., 2006). Interestingly, muscular activity was reduced not only for agonist muscle groups, but also for antagonist muscles (Marchant, et al., 2006). This suggests that a focus on the movement effect might not only facilitate an effective recruitment of intra-muscular, but also inter-muscular coordination (Hollmann & Hettinger, 2000). Marchant et al. (2009 b) study also showed beneficial effects of an external focus on maximum force production. Using an isokinetic dynamometer, Marchant et al. (2009 b) had participants produce maximum voluntary contractions of the elbow flexors under internal-focus (i.e., focus on arm and muscles) or external-focus (i.e., focus on the crank hand-bar) conditions. The results showed that participants produced significantly greater peak joint torque when they focused externally compared with internally. Future studies, using motion analysis, for example, may be able to shed more light onto the exact mechanisms that are responsible for the greater movement effectiveness of an external focus for tasks that require maximum force, joint torque, center of mass displacement, agility and velocity.

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ABSTRACT

The purpose of this study was to determine the effect of the focus of attention (internal and external) on the center of mass displacement of the different segments of the body (forearm, trunk, thigh and leg) in university male basketball beginners, participating in learning basketball set shot. Using Udine Sky table, 360 right handed male students at average age of 18-30 with no knowledge of basketball were chosen randomly. After a 10 set shot pretest, 30 students were assigned randomly into 2 experimental groups: Internal (i.e., focus on the wrist) and External (i.e., focus on the basket). After 10 sessions of practice and a day off, a retention test was conducted for each group. Results demonstrated improvement for all groups, but these results suggest that external focus of attention has a significant effect on the trunk center of mass displacement. Data was analyzed using independent T test and Mann-Whitney U test. Analysis of the proposed hypotheses at the $p \leq 0.05$ demonstrated significant difference between Internal and External focus on the trunk center of mass displacement. The two practice conditions suggest that external feedback has a positive effect on the center of mass displacement of different segments of the body during basketball set shot. These findings indicate that the previously shown benefits of an external attentional focus can be applied to tasks requiring maximum displacement.

Key words: *extrinsic attention, intrinsic attention, center of mass*

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EFFECT OF ATTENTIONAL-FOCUS OF FEEDBACK AND GOAL SETTING ON LEARNING OF BASKETBALL SET SHOT

INTRODUCTION

A motivational tool that coaches believe improves performance of athletes is performance feedback (Smith, 1993). A number of studies have shown the effectiveness of motor skill learning can be enhanced considerably if the learner is given at least some control over the practice conditions (Wulf, 2007). One consensus in the motor behavior literature is that some amount of KR is necessary for the learning of a new motor response (Schmidt & Lee, 1999; Rosenbaum, 1991). The case recently investigated about the augmented feedback is the role of kind of feedback attention (Wulf et al., 2002). In a number of studies conducted in the past few years, the effectiveness of instructions in motor skill learning has been found to depend largely on the focus of attention they induce (Wulf at al., 2000, 2007 a). The benefits of adopting an external focus are not only seen relative to internal focus conditions, but also in comparison to control conditions without specific focus instructions (Wulf at al., 2003, 2009; Landers at al., 2005; Marchant at al., 2006). Some researchers believed that providing KR during the acquisition of a skill (external feedback) had more influence than the subject's inherent information itself, (McNevin at al., 1994; Wulf, 2010). This suggests that an external focus enhances performance and learning, presumably because individuals are inclined to adopt an internal focus even when they are not explicitly instructed to do so. But how this information will attract the persons' attention to the optimum use of information and appropriate feedback depends on the type of its emphasis on self- movement (the internal) or the result of motion (the external) (Schmidt & Wrisberg, 2000).

Frequency of the external and internal feedback are another matter that is felt a need to be done. The majority of KR studies have primarily focused on the relative frequency with which KR is given to the learner, but some studies showed the high frequency of feedback provides better results (Kohl and Guadagnoli, 1996).

Another factor affecting the performance and learning athletic skills, is goal setting. Goal setting alone has been used as a motivational approach to enhance performance in industrial/organizational settings and has also been shown to be an effective motivator for improving performance in the sport setting. Goal setting is necessary to maintain or strengthen or increase motivation and evaluating research findings about goal setting, has been shown its positive effects on enhancing athletic performance skills such as basketball, tennis, bowling and ..... (Schmidt & Lee, 1999; Wrisberg & Schmidt, 2004; Shu-Hwa, 2004), but some studies have shown that different conditions of goal settings give different effects on the performance of athletic and motor skills (Frail & Rodgers, 1997; Lane & Streeter, 2003; Eleston & K. Gennis, 2004; Correa and Periera , 2006).

Sport theorists and researchers have suggested combining KR with goal setting to enhance athletic performance and skills of various sports such as tennis, bowling, basketball, sit up, grip strength and other physical activities (Trittenwein, 1998; Fischman & Oxendine, 1993; Smith, 1993; Ugrinowitsch & Dantas, 2002; Shu-Hwa, 2004) and Schmidt has considered goal setting and feedback integration are much important in learning skills in sports, and emphasizing that combining of these two states can be contributed to the coaches and physical education teachers to promote more reveal the level of athletic skills.

In order to complete the previous findings we decided to examine the influence of combined types (internal or external) and feedback frequency (50% or 100%), with goal setting (coach setting and self- setting) on learning of basketball set shot in university male basketball beginners to find whether combining of these two techniques would be effective on improving beginners performance of sports skills or which method can be used in students education and Which amount of influence of the practices is better in sport skills.

METHODS

120 male students (age 18-30 years), with no knowledge of basketball shooting and not aware of the specific purpose of the study were assigned randomly to one of eight experimental groups (n=15) based on their pre-test scores of 10 shooting. The task involved was the throwing ball toward basket from penalty line in basketball. The goal of the movement was to score the results of throwing under eight conditions. During ten consecutive sessions of practice, all participants received the same initial instructions regarding the basket and wrist, but no feedback during the acquisition, retention and transfer test. After a day of rest, retention test; after a week a transfer test consisting of 10 trials with 10 seconds rest between each trial under eight conditions: 1) %50 Internal feedback with coach setting, 2) %100 Internal feedback with coach

setting, 3) %50 External feedback with coach setting, 4) %100 External feedback with coach setting, 5) %50 Internal feedback with self- setting 6) %100 Internal feedback with self- setting, 7) %50 External feedback with self-setting, 8) %100 External feedback with self- setting.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 16. The criterion for significance was set using an alpha level of $p \leq 0.05$. Data was analyzed by variance of $2 \times 2 \times 2$ combined design. To compare the pre-test, acquisition, retention and transfer of variance with repeated measurements, Bonferroni test was used in case of significant differences between groups.

Table 1. *Effect of Attentional-focus of Feedback and Goal Setting on acquisition test*

Sources	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	429.21*	8	53.65	27.38	.000	.66
Intercept	3618.29	1	3618.29	1846.99	.000	.94
Pre-test	4.68	1	4.68	2.39	.12	.02
Frequency	.008	1	.008	.004	.95	.000
Feedback	320.32	1	320.32	163.51	.000	.59
Goal setting	66.31	1	66.31	33.84	.000	.23
Frequency * Feedback	13.33	1	13.33	6.8	.01	.05
Frequency * Goal setting	.03	1	.03	.01	.90	.000
Feedback * Goal setting	11.57	1	11.57	5.91	.01	.05
Frequency * Feedback* Goal setting	1.41	1	1.41	.72	.39*	.00
Error	217.45	111	1.95			
Total	16060	120				
Corrected Total	646.66	119				

a. R Squared= .66 (Adjusted R Squared= .63)

As shown in table 1, $p=.39 \leq p=.05$, so there is not significant difference among type of feedback, frequency of feedback and goal setting in all experimental groups during the acqusition test.

As shown in table 3, $p=.76 \geq p=.05$, so there is not a significant difference among type of feedback, frequency of feedback and goal setting in all experimental groups during the retention test.

Table 2. *Effect of Attentional-focus of Feedback and Goal Setting on retention test*

Sources	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	392.37	8	49.04	31.59	.00	.69
Intercept	2945.95	1	2945.95	1897.96	.00	.94
Pre-test	6.91	1	6.91	4.45	.03	.03
Frequency	.63	1	.63	.4	.52	.00
Feedback	.256.71	1	256.71	165.39	.00	.59
Goal setting	97.03	1	97.03	62.51	.00	.36
Frequency * Feedback	.00	1	.00	.00	1	.00
Frequency * Goal setting	.6	1	.60	1	.53	.00
Feedback * Goal setting	22.65	1	22.65	.38	.00	.11
Frequency * Feedback* Goal setting	.14	1	.14	14.59	.76*	.00
Error	172.29	111	1.55	.09		
Total	13378	120				
Corrected Total	564.66	119				

a. R Squared= .69 (Adjusted R Squared= .67)

Table 3. *Effect of Attentional-focus of feedback and Goal Setting on Transfer Test*

Sources	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	375.80*	8	46.97	59.48	.00	.81
Intercept	2245.09	1	2245.09	2842.92	.00	.96
Pre-test	.475	1	.475	.60	.44	.00
Frequency	1.132	1	1.13	1.43	.234	.01
Feedback	248.86	1	248.86	315.13	.00	.74
Goal setting	86.83	1	86.83	109.96	.00	.49
Frequency * Feedback	4.80	1	4.8	6.07	.01	.05
Frequency * Goal setting	1.32	1	1.32	1.67	.19	.01
Feedback * Goal setting	13.69	1	13.69	17.34	.00	.13
Frequency * Feedback* Goal setting	6.88	1	6.88	8.72	.004	.07
Error	87.65	111	.79			
Total	9686	120	46.97			
Corrected Total	463.46	119	2245.09			

a. R Squared= .81 (Adjusted R Squared= .79)

As shown in table 3, p=.004 ≤ p=.05, so there is a significant difference among type of feedback, frequency of feedback and goal setting in all experimental groups during the transfer test.

Table 4. *Between group Differences in Transfer Test by Bonferroni*

Groups	Groups	Means differences	Std. Error	Sig.	%95 Confidence Interval	
					Lower Bound	Upper Bound
2	1	-.86	.32	.24	-1.99	.17
3		-4.46*	.32	.00	-5.50	-3.43
4		-3.*60	.32	.00	-4.63	-2.56
5		.04	.32	1	-.63	1.43
6		.86	.32	.24	-.17	1.9
7		-1.8*	.32	.00	-2.38	-.76
8		-1.46*	.32	.00	-2.5	-.43
2	1	.86	.32	.24	-.17	1.9
3		-3.60*	.32	.00	-4.63	-2.56
4		-2.73*	.32	.00	-3.77	-1.69
5		1.26*	.32	.00	.23	2.3
6		1.73*	.32	.00	.69	2.77
7		-.93	.32	.13	-1.97	.1
8		-.60	.32	1	-1.63	.43
3	1	4.46*	.32	.00	3.43	5.5
2		3.60*	.32	.00	2.56	4.63
4		.86*	.32	.24	-.17	1.9
5		4.86*	.32	.00	3.83	5.9
6		5.33*	.32	.00	4.29	6.37
7		2.66*	.32	.00	1.63	3.7
8		3.00*	.32	.00	1.96	4.03
4	1	3.60*	.32	.00	2.56	4.63
2		2.73*	.32	.00	1.69	3.77
3		-.86	.32	.24	-1.9	.17
5		4*	.32	.00	2.96	5.03
6		4.46*	.32	.00	3.43	5.5
7		1.8*	.32	.00	.76	2.83
8		2.13*	.32	.00	1.09	3.17
5	1	-.4	.32	1.00	43/1-	.63
2		-1.26*	.32	.00	0/2-	-.23
3		-4.86*	.32	.00	90/5-	-3.83
4		-4*	.32	.00	03/5-	-2.96
6		.46	.32	1.00	57/0-	1.5
7		-2.2*	.32	1.00	23/3-	-1.16
8		-1.86*	.32	.00	90/2-	-.83

6	1	.86	.32	.24	-1.9	.17
2		-1.73*	.32	.00	-2.77	-.69
3		-5.33*	.32	.00	-6.37	-4.29
4		-4.46*	.32	.00	-5.5	-3.43
5		-.46	.32	.00	-1.5	.57
7		-2.66*	.32	1.00	-3.7	-1.63
8		-2.33*	.32	.00	-3.37	-1.29
7	1	1.8	.32	.00	.76	2.83
2		.93	.32	.13	-.10	1.97
3		-2.66*	.32	.00	-3.70	-1.63
4		-1.80*	.32	.00	-2.83	-.76
5		2.20*	.32	.00	1.16	3.23
6		2.66*	.32	.00	1.63	3.70
8		.33	.32	1.00	-.70	1.37
8	1	1.46*	.32	.00	.43	2.5
2		.6	.32	1.00	-.43	1.63
3		-3*	.32	.00	-4.03	-1.96
4		-2.13*	.32	.00	-3.17	-1.09
5		1.86*	.32	.00	.83	2.90
6		2.33*	.32	.00	1.29	3.37
7		-.33	.32	1.00	-1.37	.70

RESULTS

The analysis revealed no significant difference among type of feedback, frequency of feedback and goal setting in all experimental groups during the aquisition ($p=.39 \leq p=.05$), and retention test ($p=.76 \geq p=.05$) (table 1 & 2). The analysis revealed significant difference among type of feedback, frequency of feedback and goal setting in all experimental groups during the transfer test, ($p=.004 \leq p=.05$) (table 3). Table 4 presents the mean differences and standard deviations for all of the variables measured in the present study. The Transfer mean scores on each 8 experimental groups are shown in Table 4 by Bonferroni test. Some important results were revealed in this research as below:

1) There is a significant difference among %50 External feedback with coach setting than %50 Internal feedback with coach and self-setting, %50 External feedback with self-setting and %100 External and Internal feedback with self-setting in transfer test.
2) There is a significant difference among %100 External feedback with coach setting than %50 and %100 Internal feedback with coach and self- setting and %50 and %100 External feedback with self- setting.
3) There is a significant difference among %100 Internal feedback with coach setting than %50 and %100 Internal feedback with self- setting in transfer test.

4) There is a significant difference among %100 External feedback with self-setting than %50 Internal feedback with coach setting, %50 and %100 Internal feedback with self- setting in transfer test.

DISCUSSION

The purpose of this investigation was to determine the effect of attentional-focus of feedback and goal setting on learning of basketball set shot. For that purpose, we selected feedback statements in eight experimental groups, the basketball free shot to compare the effects of frequency of internal- focus feedback that refer to the performer's body movements and external-focus feedback that refer to the basket combined with two different goal setting (coach and self-setting). The most important result of this investigation was, both the %50 and 100% KR frequency of external focus with coach setting had a significant difference in transfer test. More recent information processing perspectives counter the suggestion that 100% KR frequency will maximize learning effects. In fact, recent views suggest that to some extent, when a high KR frequency is provided to the learner, some KR statements serve to guide the upcoming responses. This view has been referred to as the „*guidance hypothesis*" (Salmoni et al., 1984; Schmidt, 1991). The guidance hypothesis implies that when participants receive a high KR frequency during acquisition, they fail to use additional memory processes, or seek additional information sources, that further contribute to memory development. In contrast, when participants are provided a lower KR frequency, this lower frequency encourages the engagement of additional memory processes during the no-KR trials. These additional memory processes, in turn, promote memory development. On the contrary, results from this research examining the influence of continuous concurrent feedback have not supported the guidance hypothesis, and it against the hypothesis if a high KR frequency is provided to the learner, motor learning is attenuated (Schmidt, 1991; Schmidt & Lee, 1999). This is especially true with participants who have had some experience with the criterion response, or under conditions in which the to-be-learned response is very simple (Guadagnoli et al., 1996) or with more complex tasks (Guadagnoli et al., 1996). For example, Lai and Shea (1999) compared a 100% KR frequency group to groups equated in their reduced frequency of KR, but differing in their KR schedules. The results showed that the reduced frequency groups did not differ from each other, but on the contrary, Wulf and at al. (2007) found subjects who received half the KR show greater stability in the results in the retention phase after learning.

On the other hand, when concentrating on the movements themselves, performers appear to actively intervene in the control processes, resulting in degraded performance and learning. The advantages of focusing on the outcome of one's movements might not only be important with respect to the instructions provided but

might also have implications for the feedback given to the learner. The predominant explanation for the attentional focus effects centers on the idea that an internal focus induces conscious control and constrains the motor system, whereas an external focus promotes automaticity in movement control „*constrained action hypothesis*" (Wulf at al., 2001). Support for this notion has been provided in previous studies (McNevin at al., 2003; G. Wulf at al. 2001). This assumption implies that an external focus leads to a more advanced stage of learning sooner – in which performance is not only more effective, but in which movement efficiency is enhanced as well (Wulf, 2007b). It is also interesting to note that although the emphasis is not on actual technique, players „do not need direct references to their body movements in order to acquire the correct technique" (Wulf at al., 2002). Prinz's „*action effect hypothesis*" (1997) suggests that for actions to be effective, movements need to be planned in terms of their intended outcome and the attention focused on the intended outcome of the performance of a skill will be more effective than attention focused on one's own movements. The results of this study supported those two hypothesis that an external focus was more effective than an internal focus in learning of basketball shooting. This finding appears to be parallel to several studies exploring the benefits of an external focus, including, the basketball free throw (Al-Abood et al., 2002), the standing soccer shot and volleyball serve (Wulf et al., 2002), the golf pitch shot (Wulf et al., 2002), putting (Poolton et al., 2006).

Another factor affecting in this research was the combination of goals and KR. As some studies show both can affect self-regulation of effort and persistence by informing the individual as to the discrepancy between the goal and the performance indicated by the feedback (Earley et al., 1991). Feedback can directly affect the choice of specific behaviors. This evaluative information is not present in goal setting without feedback. Therefore, both outcome and process feedback may add value in confirming present strategies. Goals affect performance by directing attention, mobilizing effort, increasing persistence, and motivating strategy development. Goal setting is most likely to improve task performance when the goals are specific and sufficiently challenging, the subjects have sufficient ability, feedback is provided to show progress in relation to the goal, the experimenter is supportive, and assigned goals are accepted by the individual (Lock, 1990).

There was improvement in learning of basketball shooting in all groups, but so much in External with coach settings were shown. As it was no any significant difference in acquisition and retention test, but a significant one in transfer test. This finding appears to be parallel to several studies exploring the benefits of combining KR with goal setting to enhance athletic performance (Fischman & Oxendine, 1993; Smith, 1993; Anderson at al., 1988;; Wolko et al., 1993).

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ABSTRACT

The purpose of this study was to determine the effect of frequency of feedback (internal and external) with goal setting intervention (coach setting and self- setting) for university male basketball beginners participating on learning of basketball set shot. 120 right handed male students by average 18-30 years with no knowledge of basketball were chosen randomly and matched into eight experimental groups: %50 Internal feedback with coach setting, %100 Internal feedback with coach setting, %50 External feedback with coach setting, %100 External feedback with coach setting, %50 Internal feedback with self- setting, %100 Internal feedback with self-setting, %50 External feedback with self- setting, %100 External feedback with self- setting one, each shooting a total of 10 shot after the pretest, 10 sessions of practice an acquisition test, a day off a retention test and transfer test was conducted a week later for each group. Data was analyzed by variance of $2 \times 2 \times 2$ combined design. To compare the pre-test, acquisition, retention and transfer of variance with repeated measurements, Bonferroni test was used in case of significant differences between groups. By analyzing the proposed hypotheses at the $P \leq .05$ demonstrated significant differences between frequency of internal and external with goal setting ones. The eight practice conditions suggesting that frequency of feedback (internal and external) with goal setting intervention (coach and self- setting) do not have significantly effect on acquisition and retention of basketball set shot, but significantly effect on transfer test. In this particular study, external focus of attention along with coach setting was found to be more effective than an internal focus of attention with self -setting. Feedback and goal commitment were identified as the two necessary conditions for goals to affect performance. This finding appears to be parallel to several studies exploring the benefits combining of KR with goal setting to enhance athletic performance (Fischman & Oxendine, 1993; Smith, 1993; Anderson et al., 1988; Wolko et al., 1993). These results suggest that the performance in basketball set shot is enhanced by external focus attention with coach setting. The present findings add to the evidence that external focus of attention with goal setting improves sport skills learning.

Key words: *Absolute feedback, frequency feedback, extrinsic attention, intrinsic attention, Goal setting*

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ANALYSIS OF THE CAPACITY OF MOVEMENT DIFFERENTIATION IN ITALIAN PRIMARY SCHOOL CHILDREN

INTRODUCTION

Physical Education (PE) lessons are compulsory in Italy for school children aged between 3 and 18; the number of hours dedicated to motor and sport sciences is limited to only 2 hours per week in both primary (3-10 years) and secondary (10-18) schools. PE teachers in secondary schools must have completed specific university training (a three-year degree course and a two-year masters course), while in primary schools PE lessons are taught, in the majority of cases, by the class teachers who do not have any specific training in PE. Class teachers do, however, undergo a short basic training programme in PE didactics. The Italian National Curriculum sets many movement coordination objectives that should be met by the end of the third and fifth grade of primary school. These also include technical movements specific to various sports disciplines. It is highly important that these skills are „practised" and assessed during this critical stage of child development (Martin, 1991), as they can condition the acquisition of new motor skills, the child's capacity for general and specific motor coordination, and even limit the long-term benefits of sport participation. The capacity of movement differentiation is considered to be the fundamental prerequisite for the achievement of maximum motor and sports performance; moreover, it needs to be developed in a specific way, above all in children. According to Blume (1986), the capacity of differentiation is the ability to achieve high precision and coordination between the individual phases of a movement or between the movement of different parts of the body, and it is expressed via the execution of movements in a highly precise and conserved manner. It is based on the exact and conscious perception of the dynamic, chronological and spatial parameters of the movement performed, the combination of which facilitates the execution of accurate movements, enabling the achievement of „movement mastery" (Starosta, 2000). Many elements need to be distinguished in the capacity of movement differentiation and its development should

involve the use of specific exercises selected and ordered by the teacher on the basis of the motor parameters (spatial, temporal and dynamic) and various parts of the body involved in the movement (e.g. the upper limbs, lower torso and movements performed with the hands, fingers, feet and head). The capacity of movement differentiation must also be assessed using motor tests that permit the accurate evaluation of this important capacity. In the literature, standard tests have been ascertained that assess all motor skills, even in adolescents, like those indicated in the protocol by Hirtz, Hotz and Ludwig (2005).

The aim of the present study was to evaluate the capacity of movement differentiation in school children aged 6-10 years.

SAMPLE

The sample comprised N=39 students, aged 6 to 10 years (mean age±S.D.: 7.8±1.1 years), from grade 1, 2, 3, 4 or 5 of an Italian primary school; N=15 males and N=24 females. Students had only 2 hours of PE per week at school.

MATERIALS AND METHODS

An initial evaluation of the students' capacities of dynamic differentiation of the upper and lower limbs took place during the first months of school year (October and November) in order to assess the motor capacities of the students before starting the teaching programme prepared by the primary school teachers. Prior to carrying out the test, the type of assessment involved, student were introduced to the times and the assessment criteria involved by means of verbal and/or visual demonstrations. During the execution of the various tests, extrinsic feedback regarding the knowledge of performance (KP) and knowledge of results (KR) obtained was provided when possible (Driouch, 1993; Mantovani, 2004). For the evaluation of the capacity of dynamic differentiation of the upper limbs, the following tests were performed: i) throwing a ball at a target while standing with one's back to the target; ii) throwing a bag of sand at a target. For the evaluation of the capacity of dynamic differentiation of the lower limbs, the following test was performed: i) Jumping on a target.

STATISTICAL ANALYSIS

For the test of throwing a ball at a target placed behind the subject, the difference between males and females was assessed for each age group (6, 7, 8, 9 and10 years) using the non-parametric Mann-Whitney test. For the test of hitting the target with bags of sand, the points obtained in each set of 5 trails (5 trails with 80 g bags; and 5 trails with 200 g bags) were added together, as indicated in the evaluation protocol.

The mean number of points obtained across each set of 5 trials was also calculated. For the jumping on a target test, the following were calculated: i) the distance in centimetres from the tip of the toe to the centre of the circle for two jumps; ii) the mean distance for the two jumps. The results obtained were compared between groups defined by age and gender.

Null hypotheses were rejected and results were considered statistically significant at $p<0.05$.

RESULTS

The results of the test of throwing a ball at a target placed behind the subject did not reveal any statistically significant differences for any of the age groups according to gender: 6-year-olds (U= 2.500, p= 0.800); 7-year-olds (U= 8.000, p= 0.667); 8-year-olds (U=10.000, p=1.000); 9-year-olds (U= 2.500, p= 0.381); 10-year-olds (U= 0.000, p=0.333).

For the test of throwing bags of sand at a target (5 trials with 80 g bags; 5 trials with 200 g bags), the mean score obtained, and the consequently the performances, improved as students' age increased (Figure 1 and 2).

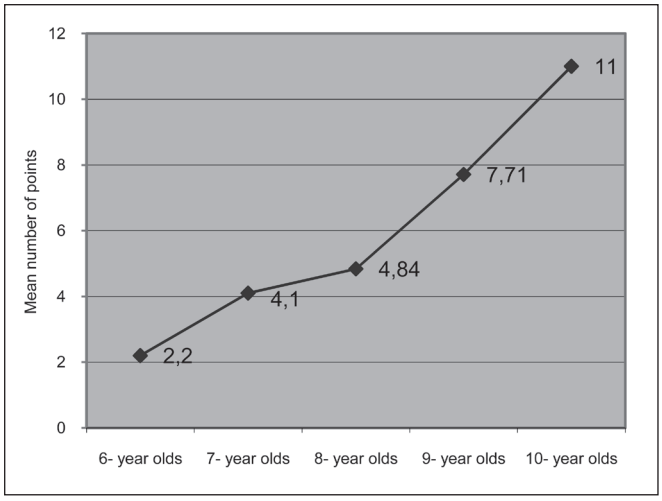


Figure 1. *Test hitting the target whith bags of sand 80 g*

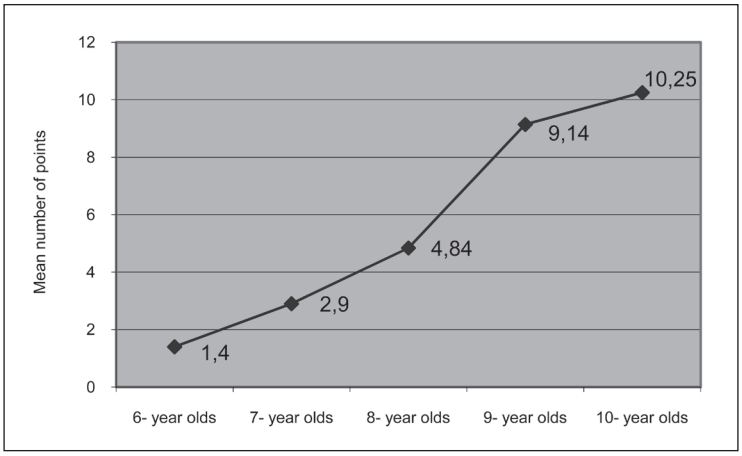


Figure 2. *Test hitting the target whit bags of sand 200 g*

The mean data obtained from the two trials of the jumping on a target test revealed the following results (Table 1):

Table 1. *Jumping on a target: mean distances for two jumps per student*

Age	Female	Male
6-year-olds	10.5	32.5
	15	69.6
	57	
7-year-olds	0	6
	33.5	30
	53.5	
	39.5	
	5.5	
	21	
	6.5	

Age	Female	Male
8-year-olds	8.5	14.5
	0	18
	7	26
	31.5	24.5
	12	19.5
	0	81.5
9-year-olds	16	4.5
	0	3.5
	13	
	3	
	0	
10-year-olds	11	16.5
	0	11.5

- in the 6-year-olds, the females obtained better results than the age-matched males;
- in the 7-year-olds, the males obtained better results than the aged-matched females despite the fact that one female achieved the maximum score of 0 points by jumping both times onto the centre of the target;
- in the 8-year-olds, the females obtained better results than the age-matched males. Two female students achieved the maximum score of 0 points by accurately jumping onto the centre of the target in both trials;
- in the 9-year-olds, the females obtained better results than the age-matched males. Once again, two female students achieved the maximum score of 0 points by accurately jumping onto the centre of the target in both trials;
- in the 10-year-olds, the females obtained better results than the age-matched males. One female student in this age group achieved the maximum score of 0 points by accurately jumping onto the centre of the target in both trials.

DISCUSSION

The results of this study confirm the hypothesis that the capacity of movement differentiation is age dependent, even though the data present some differences with respect to those of others studies reported in the literature (Pehoiu, 2010). Indeed, even if this capacity is one of the earliest to be expressed, the results obtained for the students closer to adolescence were better than those for students closer to infancy; these results do not agree with those of other studies that demonstrate a negative trend for this capacity in adolescents, due to the stagnant period linked to the growth spurt typical of this stage of maturity (Hirtz, Starosta 2000; Colella, Sannicandro, 2000).

An explanation of the results obtained for this study might lie in the fact that the considerable plasticity of the CNS (central nervous system) during infancy depends on the specific properties of the CNS and of the analyzers (Pehoiu, 2010), and produces both advantages and disadvantages with respect to motor learning: it allows the reception of an abundance of information from the environment and the competence to imitate and adapt but, at the same time, it can also generate various difficulties linked to the limited development of inhibitory processes and motor differentiation. Another explanation could be that the group of the females had the opportunity to have extra-curricular motor/sports experience that is more focussed on the development of motor coordination (e.g. dance lessons), thus helping them produce better results regarding spatial and temporal precision, while the extra-curricular motor/sports experience of the male students might be more oriented toward the acquisition of sports techniques (e.g. football skills). Another explanation could be attributed to the fact that the sample is numerically non-homogeneous (there are more females than males), and this could have influenced the results. A very important finding

emerges from these data regarding feedback. In nearly all the tests, improvements are seen in the students' abilities to perform the tasks, especially in the final trials. All the tests used involved the execution of a different number of trials, and some also involved the provision of feedback regarding the result of each trial. The capacity of movement differentiation is strongly influenced by both intrinsic and extrinsic feedback (Driouch, 1993; Mantovani, 2004) and the results obtained confirm the importance that such feedback assumes for the development of this capacity.

CONCLUSION

The results obtained through the present investigation indicate that a modest improvement of the capacity of movement differentiation depends on the insufficient exercise caused by a small number of physical education classes – 2 hours per week and by the non-specific competences of teacher (Fairclough, Stratton, 2006). In Italy, the small number of hours dedicated to PE and the lack of teachers specialized in PE in primary school do not produce a positive impact upon the development of motor capacities in children aged 3-10 years, as has previously been pointed out (Jurak et al., 2005). The problem of the limited degree of teacher competences requires appropriate strategies to be put into place to support their teaching activities during the lessons dedicated to PE. Physical exercise in the form of organized school classes is necessary and useful, both from the viewpoint of the pupils' long-term biological and psychosocial development and from the viewpoint of their future daily-life activities (Haga, 2008). Children's first formal physical education experiences occur in primary school.

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ABSTRACT

Physical Education (PE) lessons are compulsory in Italy for school children aged between 3 and 18; however, in primary schools PE lessons are taught by class teachers who do not have any specific training in PE. The aim of the present study was to evaluate the capacity of movement differentiation in 39 students, (mean age±S.D.: 7.8±1.1 years) in one Italian primary school. The protocols of Hirtz, Hotz and Ludwig (2005) for the evaluation of the capacity of movement differentiation of the upper and lower limbs are utilized. The results suggest a modest development of the capacity of movement differentiation in the sample. In Italy, a small number of lessons dedicated to PE and the lack of teachers specialized for primary school do not produce a positive impact upon the development of motor capacities in children aged 3-10 years, as has previously been pointed out.

Key words: *movement differentiation, evaluation, Physical Education, primary school*

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Professional paper

STANDARDS AND COMPETENCES – A NEW CORE CURRICULUM FOR PHYSICAL EDUCATION IN SECONDARY SCHOOLS IN LUXEMBOURG

MISSION AND OBJECTIVES

The new curriculum in physical education for secondary schools in Luxembourg (MENFP 2009) focuses on two aims[1]. This dual mission consists on the one side in the education of the young people by the means of movement, play and sports. On the other side, pupils are educated to a responsible participation in movement, play and sports culture. The aptitude to participate and the ability to judge in the context of movement, play and sports as consistent elements of an active life style provides this second mission of physical education in school. Together, both aspects of body movement culture and education must be considered as completing one each other and have to be promoted in a same way.

The concept of this curriculum is based on the „Educating PE" („Erziehender Sportunterricht"), which is wide-spread in german-speaking countries. This concept is built around three main principles of quality, which are

- „miscellaneous perspectives" („Mehrperspektivität"), meaning the didactic differentiation of movement, play and sports under different aspects and perspectives,
- „reflection" („Reflexivität"), which consists in the learning of a certain ability to judge in action situations related to sportive activity, including the examination of the ambivalence of sports,
- self-directed autonomy („Selbsttätigkeit"), which should allow the young people a certain scope for development in sportive activities.

[1] The curriculum as a download in pdf-format and more information about the concept and its implementation can be found on http://curriculum-sport.web.myschool.lu/.

COMPETENCES AND COMPETENCE EXPECTATIONS

The new PE curriculum for secondary schools in Luxembourg is based on the concept of a multi-perspective PE like described by Kurz and his concept of pedagogical perspectives (2000). Compulsory minimal standards are described as „expected competences" at the end of three different learning cycles at the end of grade 9, grade 11 and grade 13. As said before, those standards are compulsory for all educational levels in all secondary schools in Luxembourg. These expected competences in Physical Education incorporate abilities and skills, attitude and mind-set, as well as knowledge. Furthermore, there can be made a distinction between essential and continuative competences, where as essential competences are prior to continuative competences.

The competences are grouped in six perspective-based areas of competences (fig. 1) and are not specific for any subject-related contents in form of sportive activities. In those areas the main aims of pupils' competence development are described in different core competences.

Subject-related Competence Areas (CA)	
CA 1	Health and perception activities
CA 2	Social and integrative activities
CA 3	Skill and performance activities
CA 4	Play activities
CA 5	Creating and presenting activities
CA 6	Adventure and experience activities

Figure 1. *Subject-related Competence Areas (MENFP, 2009, p. 6)*

In the following, the core competences of the new curriculum are listed, with a precise representation of the competence area 1.

CA 1: Health and perception activities

Figure 2 shows the targeted competences of the competence area 1, focused by activities related to health and perception.

<table>
<tr><th colspan="4">Competence Area 1
Health and perception activities</th></tr>
<tr><th rowspan="3">Core competences</th><th colspan="3">Skill expectations</th></tr>
<tr><th>At the end of grade
6 / 9</th><th>At the end of grade
4 / 11</th><th>At the end of grade
1 / 13</th></tr>
<tr><th colspan="3">Students …</th></tr>
<tr><td rowspan="2">(1) to interpret physical signals and act adequately</td><td>experience physical reactions under exposure and recovery</td><td>react adequately to physical signals under exposure and recovery</td><td rowspan="2"></td></tr>
<tr><td>improve body awareness by varied movement experience</td><td></td></tr>
<tr><td rowspan="4">(2) to preserve and increase physical capability</td><td>are aware of the need for warming up before exercise</td><td>arrange warm-up independently</td><td rowspan="4">are able to exercise independently and goal-oriented the fitness abilities strength and endurance</td></tr>
<tr><td>stretch and vitalize functionally adequate</td><td></td></tr>
<tr><td>provide endurance performances and understand basic contexts in practice</td><td>improve their physical capacity</td></tr>
<tr><td>manage sensomotor challenges</td><td>deal critically with body ideals and fitness programs</td></tr>
<tr><td rowspan="3">(3) to rate constitutional and adverse health effects of movement and sports</td><td>are aware of the importance of moving for the physical, mental and social well-being</td><td>deal health-consciously with their body on their own authority</td><td>counteract the negative impacts of specific (job-related) physical stress</td></tr>
<tr><td></td><td>judge options to improve fitness</td><td>realize and reflect independently fitness improving measures</td></tr>
<tr><td></td><td>learn basic relaxation techniques</td><td>reflect basic relaxation techniques</td></tr>
</table>

Figure 2. *Competence area 1: Activities related to Health and Perception (MENFP, 2009, p. 10-11)*

CA 2: Social and integrative activities

Core competencies of area 2:

- keeping, changing and configuring agreements and rules
- communicating and cooperating
- taking and configuring different parts
- taking responsibility for oneself and for others

CA 3: Skill and performance activities

Core competencies of area 3:

- providing motivation and improve individual skills
- estimating the capacity of one's own and dealing responsibly with the capacity of others
- detecting, changing and configuring criteria for efforts in sports

CA 4: Play activities

Core competencies of area 4:

- configuring and reflecting games
- discovering and using responsibly facility for play
- changing, inventing and configuring creatively games

CA 5: Creating and presenting activities

Core competencies of area 5:

- working out, extending and presenting basic forms of movement and movement feats
- estimating basic forms of movement and movement feats
- turning music and rhythm into movement

CA 6: Adventure and experience activities

Core competencies of area 6:

- estimating capacity and constraints and acting adequately
- detecting and estimating dangers and acting adequately
- configuring one's own movement activities sustainably

Finally, it can be said that in PE the main objective is to develop subject-related competencies systematically and gradually during the pupil's career in school, so that young people leaving school are able to handle problem-orientated situations in

the action field of movement, play and sports. Indicators, developed by PE teachers in their schools, and written down in the school-based curriculums, show if those standards have been provided by the pupils or not.

CONTENT STANDARDS

Furthermore, content standards are described in seven „movement fields", or „movement areas", with the objective to give an indication of the activities to be worked out in PE lessons. Figure 3 lists those areas, with a small description of the possible contents in the following. Different to older curriculums, there are not only common games or sports competitions which can be subject of PE lessons, but a much broader interpretation of the different areas allows the PE teachers to focus not only on the promotion of precise and specific sportive skills, but provides the necessary place to the development of social and transversal competences by the means of sportive activities.

Movement fields in Physical Education (MF)	
MF 1	Running, Jumping, Throwing
MF 2	Moving in water
MF 3	Moving on and with devices
MF 4	Creating, Dancing, Presenting
MF 5	Playing games
MF 6	Wrestling, Scuffling and Fighting
MF 7	Moving an rolling and sliding devices

Figure 3. *Movement fields in Physical Education (MENFP, 2009, p. 38)*

MF 1: Running, Jumping, Throwing

This movement area turns around track and field activities like running, jumping and throwing in different contexts. Of course, the competitive perspective of sportive activities is a main objective of those activities.

MF 2: Moving in water

Not only swimming in different styles, but also any other sportive activity possible in the context of water is focused in this area: lifesaving, synchronised swimming, water polo, aqua gym and aqua jogging.

MF 3: Moving on and with devices

Apparatus gymnastic activities represent the main activities in this field, with movements like balancing, climbing, firming up, jumping, bouncing, swinging,

bending round, rotating, flipping over, etc. on devices like high bar, parallel bars, etc. It includes also modern aspects of these movements like in activities as „parkour" or „freerunning".

MF 4: Creating, Dancing, Presenting

With a focus on a creative and presenting perspective on sportive activities, this area contents rhythmic activities like dances, hip-hop, jazz-dance and rope skipping i. e., but also acrobatic activities including juggling, etc.

MF 5: Playing games

The improvement of play skills is one main objective of the activities or games in this movement field. On the other side, the focus lays on social competences, like cooperation, communication, the respect of rules, etc. Traditional and in Luxembourg popular collective games like football, basketball, handball and volleyball may be in the focus, just like alternative games, like baseball, flag football, rugby, Gaelic football, ultimate, intercrosse, etc. in their soft school-adapted versions.

MF 6: Wrestling, Scuffling and Fighting

Wrestling and fighting in any different school-adapted ways may be worked out in this area, with a focus on the pupils measuring their force with each other. Respecting rules, respecting each other, controlling one's emotions are further very important aims of this movement field.

MF 7: Moving an rolling and sliding devices

Cycling, very popular in Luxembourg since ever, is one activity in this area, with, if possible, skiing, surfing, canoeing, etc. as further possible activities.

PUPILS ASSESSMENT

To be complete, the three areas in which the assessment of the pupils' outcomes takes place are listed in figure 4.

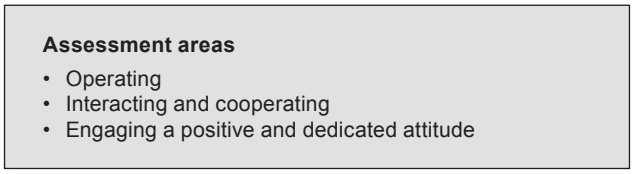


Figure 4. *Assessment areas (MENFP, 2009, p. 48)*

CHARACTERISTICS OF THE NEW CURRICULUM CONCEPT

In the following, five pedagogical principles of the new curriculum concept are listed and shortly being discussed, as seen in Stibbe & Ingelmann (2009, p. 18-20).

Core curriculum

The new curriculum for secondary schools in Luxembourg consists in a core curriculum fixing not every detail of PE and the contents of PE. Therefore, it is very important that school-based curriculum work takes place, and PE teachers of any schools work out in cooperation their own individual school curriculum. So a cooperative development of pedagogical ideas in a subject-focussed perspective takes place in the schools themselves. This allows a standard-orientated development of PE with as a main objective to help children and young people to attend the in the core curriculum described compulsory competencies.

Minimum standards

Not rule standards on an average standard level like in Germany, but minimal exigencies which any pupil has to attend are described in the curriculum.

General-comprehensive standards

Not on one precise sportive activity focused standards and competencies are described, but general and comprehensive competencies in the sense of potentially developable in any sportive activity.

Development of a subject-related competence model

The competencies are formulated in competence areas based on the concept of pedagogical perspectives of Kurz (2000, see also Kurz, 2008, p. 31-35). This idea is supported by the actual didactic discussion in German-speaking countries. Furthermore, the described competence expectations are subject-based and can only be worked out in physical education. Finally, the fact that the competences are comprehensive allows emphasising not too much specified contents and contents in general.

Educating PE

This curriculum is not a concept based on skill oriented sportive activities, but much more: as a pedagogical motivated concept of PE as an educating subject it can be described as innovative, modern and pedagogically ambitioned

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ABSTRACT

Since September 2009 a new curriculum in physical education applies in secondary schools in Luxembourg. This core curriculum is based on the concept of educating physical education and provides minimal expected competencies in six competence areas. To achieve these competencies in classes, PE teachers in schools can revert to physical activities described in seven movement fields. Further main characteristics of the new curriculum are the general-comprehensive nature of the described competencies and the subject-related competence model based on physical education activities.

Key words: *Educating Physical Education – Core curriculum – Minimal standards – PE competencies – Content standards – Movement fields*

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Original scientific paper

EFFECTS OF HIGH AND LOW AEROBICS PROGRAMME ON MOTOR ABILITIES OF THE EIGHTH GRADE ELEMENTARY SCHOOL STUDENTS

INTRODUCTION

Many studies have shown that physical activity of the children and the young is on the decline mainly because of the „sedentary" way of life (Mitić, 2001). Beside positive effects, progress, new lifestyles, overpopulation, technological development, pollution of the environment and many other factors also make discordance between motor abilities and an intensive physical growth (Kurelić et al., 1971). Physical Education, as part of general educational system, and of working education, by its activities and content, and through three thematic units: development of physical abilities; acquiring motor knowledge, capabilities and habits; and theoretical education, helps the development of various personal characteristics, such as intellectual, moral, aesthetic and physical ones with the aim to protect health, optimal growth and development of students, thus promoting a healthy lifestyle which cannot be imagined without regular physical activity. Studies up to now have shown that today's PE lessons in elementary schools are not capable of completely achieving the supposed tasks and aims, suggesting that the organisation of work in the existing circumstances of the educational system is not efficient, nor economic, but old fashioned (Saveljić,1971; Reljić, 1979; Maksimović, 2000). Enormous efforts are being made with the aim of improving PE lessons by intensifying the teaching process, and that is mainly done by working with „STATIONS", „homogeneous groups", „circular training", as well as by working with "additional exercises" (Arunović et al., 1992). Hence, the question is whether the programmed lessons of aerobics exercising to music, according to the high and low aerobics model, can positively affect optimal growth and development of students, knowing that the working principles of aerobics are identical with methodological principles of PE lessons, and whether it is possible to make aerobics an integral part of regular PE lessons (Popov, 1995; Mandarić, 2003).

That would enable a direct pedagogical work of a PE teacher and his/her insight into the motor abilities of the students, which is of crucial importance in this period of their growth, characterized by an abundance of dynamic and rapid changes of psycho-social development of the students.

Aerobics exercising to music represents a combination of simple running, skipping, power and stretching exercises done in groups, to music, and with an appropriate range and intensity of exercising (Mandarić, 2003; Stojiljković et al., 2005). It has positive effects on motor abilities, coordination, sense of rhythm, and especially on cardio-vascular system (Kuper, 1975; Vozarević, 1992; Sekulić, 1997; Ušanj, 1997; Obradović, 1999; Mandarić, 2003; Sekulić et al., 2003; Cvetković, 2007). High and low aerobics is based on aerobic dance. The intensity of exercising can be high (high-impact), and low (low-impact). Depending on intensity, the type of movement is determined. This way of exercising contributes to both a better professional and pedagogical work and introduces innovations and new working technologies into PE lessons.

The topic of the study is the effect of programmed lessons of high and low aerobics on motor abilities of the eighth grade students of elementary school.

The aim of the study is to define the effects of high and low aerobics on motor abilities of the eighth grade students of elementary school.

METHOD

The experimental programme lasted for eight weeks and it was realized within the regular physical education lessons of the eight grade students of the „Vožd Karadjordje" elementary school in Leskovac. During that period, the experimental programme was carried out three times a week, in the gymnasium of the mentioned school and lasting one school lesson. The students were divided into two groups. The experimental group (E) attended the lessons of programmed exercises according to the high and low aerobics, while the control group (K) attended the programme according to the curriculum prescribed by the Ministry of Education of the Republic of Serbia.

Sample of the students

The research was conducted on a sample of 60 students (31 girls and 29 boys) of the eighth grade of elementary school, of average age of 14, divided into:

- E – the experimental group N= 30, (E1 - 16 girls and E2 - 14 boys),
- K – the control group N= 30, (K1 - 15 girls and 15 boys).

Sample variables

Motor variables were selected from the Eurofit tests battery, recommended and standardized tests for children of school age. The following tests were applied: so called „Flamingo test" - a test for the evaluation of static equilibrium (MFLAM), Plate tapping - tests speed of limb movement (ATAPR), Sit and reach - flexibility test (MDUBRR), Standing Broad Jump - measures explosive leg power (MSDM), Sit-Ups in 30 seconds - measures trunk strength (MLESED), Handgrip test - measures static arm strength (MDIN), Bent Arm Hang - muscular endurance/functional strength (MZGVIS), 10 x 5 meter Shuttle Run - measures running speed and agility (MTR – 10 x 5m). In addition to Eurofit tests for children, the following tests in the field of general coordination and coordination to rhythm were applied in this study: eight to stoop (Osmica); Steps aside feet (KorSt); stamping and hands clapping (BubNR); jumping to the rhythm (PoRit).

Statistical analysis

All the data obtained by the study were processed by the procedures of descriptive and comparative statistical methods. In the area of the descriptive statistics the following parameters were defined: representative central and dispersive parameters: arithmetic average – M; standard deviation – S; initial and final measures. Unpaired t-test, applied in comparative statistics, was performed in order to compare the mean values of two independent data sets (experimental and control groups). Statistical analysis was performed applying SPSS statistical software.

STUDY RESULTS AND DISCUSSION

According to the results of descriptive statistics (mean values and standard deviation) shown in Table 1, it can be noticed that in the final measuring, the experimental group (E1) achieved better results on all measured variables of motor area except for two (dynamometry and side steps) compared to the students from the control group (K1).

According to the t-test and the importance level (p) shown in Table 1, a statistically significant difference can be noticed between the experimental (E1) and control (K1) groups for the following variables: „Flamingo", hand tapping, 10x5m shuttle running, stumping and hand clapping and jumping to the rhythm on the level of statistical importance of 95% and 99%.

Table 1. *Results of descriptive statistics and t-test of motor abilities of E1 and K1 groups*

			INITIAL MEASURING				FINAL MEASURING			
Variable	Group	N	M	SD	t	P	M	SD	t	p
FLAM	E1	16	10.31	4.05	0.96	0.3447	7.38	2.73	-2.56	0.0157 *
	K1	15	8.44	6.70			9.88	2.80		
TAPR	E1	16	13.92	2.00	-2.56	0.0157 *	12.77	1.80	-2.38	0.0239 *
	K1	15	16.00	2.56			14.53	2.53		
DUBPR	E1	16	26.13	5.34	1.83	0.0772	30.63	4.51	3.71	0.0008 **
	K1	15	22.13	5.86			23.25	6.55		
SDM	E1	16	164.50	13.29	1.29	0.2069	170.75	13.10	1.89	0.0685
	K1	15	156.19	22.02			158.69	21.90		
LESED	E1	16	19.31	3.42	1.34	0.1903	21.69	3.20	-0.19	0.8506
	K1	15	17.69	3.44			19.5	3.44		
DIN	E1	16	21.81	4.13	-0.77	0.4473	26.69	4.19	1.86	0.0727
	K1	15	23.13	5.46			27	5.24		
ZGVIS	E1	16	18.65	13.83	1.62	0.1157	21.02	14.64	1.75	0.0903
	K1	15	11.16	12.29			12.58	12.51		
MTR-10x5m	E1	16	21.91	1.16	-2.11	0.0433 *	20.63	1.34	-2.08	0.0462 *
	K1	15	23.13	1.99			21.81	1.83		
OSMICA	E1	16	11.17	1.46	-1.96	0.0593	10.48	1.49	-1.62	0.1157
	K1	15	12.22	1.59			11.36	1.57		
KORST	E1	16	12.53	1.01	-0.64	0.5270	11.93	0.87	-1.71	0.0976
	K1	15	11.23	1.44			10.73	1.45		
BUBNR	E1	16	10.56	1.82	0.35	0.7288	14.38	2.13	3.7	0.0009 **
	K1	15	10.31	2.24			11.13	2.80		
PORIT	E1	16	15.38	4.36	2.87	0.0075 **	19.65	2.18	3.18	0.0034 **
	K1	15	11.44	3.33			15.75	4.45		

Statistically important difference on the level of 95% * 99% **

According to the results of descriptive statistics (mean values and standard deviation) shown in Table 2, it can be noticed that in the final measuring, the experimental group (E2) achieved better results on all the measured variables of motor area, compared to the students from the control group (K2). According to t-test and the importance level shown in Table 2, a statistically important difference can be noticed between the experimental (E2) and control (K2) groups for the following variables: „Flamingo“, hand tapping, sit and reach flexibility, standing broad jump, sit-ups in 30 seconds, hand grip, 10x5m shuttle running, stumping and hand clapping

and jumping to the rhythm, on the level of statistical importance of 95% and 99%. In experimental (E1) group, from the initial to the final measuring, there is a statistically important results improvement for the variable „Flamingo“ compared to the K1 group. The programme of aerobics exercising to music based on the model of high and low aerobics resulted in the improvement of statistical balance of E1 group. Results of the study show that there is a statistically important improvement of the results in the hand moving speed variable (hand tapping) and sit and reach flexibility, from the initial to the final measuring in both experimental groups (E1 and E2) compared to control (K1 and K2) groups.

Table 2. *Results of descriptive statistics and t-test of motor abilities of E2 and K2 groups*

			INITIAL MEASURING				FINAL MEASURING			
Variable	Group	N	M	SD	t	P	M	SD	t	p
FLAM	E2	14	5.86	4.52	0.32	0.7514	6.07	3.25	-0.76	0.4538
	K2	15	5.27	5.44			7.2	4.59		
TAPR	E2	14	11.42	0.73	-5.06	0.0001 **	10.75	0.75	-4.75	0.0001 **
	K2	15	14.06	1.82			13.21	1.82		
DUBPR	E2	14	22.71	6.24	1.41	0.17	26.86	5.86	2.78	0.0098 **
	K2	15	18.90	8.08			19.8	7.61		
SDM	E2	14	209.00	15.15	2.13	0.0373 *	215.86	15.28	2.91	0.0072 **
	K2	15	196.00	16.67			198.6	16.55		
LESED	E2	14	26.00	1.84	3.51	0.0016 **	28.07	1.98	4.53	0.0001 **
	K2	15	23.47	2.03			24.93	1.75		
DIN	E2	14	39.07	8.40	2.46	0.0206 *	42	8.14	2.31	0.0288 *
	K2	15	32.00	7.08			35.13	7.84		
ZGVIS	E2	14	49.51	35.61	1.11	0.2768	51.81	35.73	1.16	0.2562
	K2	15	37.11	23.46			38.84	23.87		
MTR-10x5m	E2	14	19.76	1.03	-2.1	0.0452 *	18.88	0.84	-2.88	0.0077 **
	K2	15	20.60	1.11			19.96	1.14		
OSMICA	E2	14	10.00	1.87	0.26	0.7968	9.27	1.65	0.07	0.9447
	K2	15	9.84	1.47			9.31	1.48		
KORST	E2	14	11.23	1.44	-0.76	0.4538	10.73	1.45	-1.01	0.3214
	K2	15	11.65	1.56			11.28	1.48		
BUBNR	E2	14	12.71	3.15	0.21	0.8352	15.64	2.95	2.87	0.0079 **
	K2	15	12.40	4.79			12.07	3.69		
PORIT	E2	14	16.93	3.65	2.4	0.0236 *	20.14	1.83	3.47	0.0018 **
	K2	15	12.93	5.15			15.4	4.79		

Statistically important difference on the level of 95% * 99% **

It is obvious that experimental programme of aerobics exercising to music based on the model of high and low aerobics had an equal effect on the improvement of hand moving speed results among the eighth grade students. In experimental (E1 and E2) groups, comparison of initial and final measures shows a statistically important improvement of the results in sit and reach flexibility variable. Stretching exercises, done by both experimental groups at the end of the lesson, had a significant effect on the improvement of results of the back thigh muscles flexibility in E1 and E2 groups compared to K1 and K2. According to the results of the study, a statistically important improvement of the results of absolute power for one variable (dynamometry) in experimental (E1 and E2) groups during initial and final measuring can be noticed. Students from E1 group improved their mean values during final measuring for the above-mentioned variable. Study results show that there is a statistically important improvement for the variable of explosive power of the lower extremities (standing broad jump) among students of E2 group during initial and final measuring. Results from the model of high and low aerobics suggest its effect on the explosive power of lower extremities. Results of the study show that there is a statistically important improvement for the variable of repetitive muscle potential (sit up) among students from E2 group during initial and final measuring. The exercises done with the aim of strengthening trunk muscles after aerobics choreographies had an effect on the improvement of repetitive muscle potential of the eighth grade elementary school students. Results of the study show that there is a statistically important improvement for the variable running speed (10x5m) from initial to final measuring in both experimental (E1 and E2) groups. Results of the study also show that there is a statistically important improvement for the variable coordination in rhythm (stumping and hands clapping and jumping to the rhythm) during initial and final measuring in both experimental (E1 and E2) groups. The effect of the programmed high and low aerobics lessons led to the improvement and the highest possible progress regardless of the achieved statistical importance in variable coordination in rhythm among the eighth grade elementary school students.

CONCLUSION

According to the study results and their interpretation, it can be generally concluded that the observed changes, after carrying out an experimental programme of aerobics exercising of high and low aerobics lasting eight weeks, were significant within the tested area of motor abilities of the eighth grade elementary school students. At the same time, the results of the study confirm that the programmed exercising to music, high and low aerobics, has positive effect on transformation of motor area and students' motivation for exercise, and has practical applicability, compared to the classical and traditional PE lessons, thus suggesting the possibility of introducing aerobics exercising to music into regular PE lessons.

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ABSTRACT

Contemporary physical education is not efficient enough in the existing circumstances of the elementary school educational system. The study aims to determine the effects of high and low aerobics programme on motor abilities of the eighth grade elementary school students. The study was carried out on a sample of 60 eighth grade students (31 girls and 29 boys) of the „Vožd Karadjordje“ elementary school in Leskovac, who were divided into two groups: experimental and control group. The experimental group attended classes of high and low aerobics exercise programme to music, while the control group attended regular classes according to the curriculum prescribed by the Ministry of Education of the Republic of Serbia. The effects of high and low aerobics on motor abilities were observed (12 variables). The results showed that the high and low aerobics programme improved students' motor abilities compared to the students in the control group and proved its practical applicability in Physical Education.

Key words: *Physical Education, motor abilities, high and low aerobics*

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Original scientific paper

RELATIONSHIP AMONG THE DIFFERENT BODY FAT MEASURING METHODS

INTRODUCTION

There is growing evidence that clearly links body composition with health risks and the development of certain diseases. Detection of excess body fat percentage, in early stages may help to prevent associated complications. An autopsy is the only direct method of measuring body composition; all other methods rely on indirect measurement techniques. Most of these methods are based on the assumption that the body consists of two compartments; the body fat, which includes the entire content of chemical fat or lipids in the body, and fat-free mass, which includes all the rest of the body apart from fat. In this study, three body fat measurement methods, hydrodensitometry, skin fold technique and girth method are compared.

Hydrodensitometry, referred to as a gold standard (Heymsfield 2005), is a technique that has been validated through repeated scientific studies and against which other clinical and field method results are evaluated. Estimation of body composition through hydrodensitometry is based on the Archimedes' principle, by which the density of an object is calculated by dividing the object's weight in air by its loss of weight in water. Underwater weighing although considered a relatively precise method for assessment of body fat, is a complex technique and difficult to be widely applied. Fat beneath the skin typically represents most of the skin fold measurement and it is assumed that a direct relationship exists between total body

fat and subcutaneous fat, which is applied in girth technique (Hoeger and Hoeger, 2006). As the skin fold and girth techniques are easy to administer and relatively inexpensive, they are widely used in the field and clinical settings to estimate body fat percentages.

The objective of this study was to compare body fat percentages obtained by Hydrostatic weighing, the skin fold thickness and girth methods.

METHODOLOGY

All measurements were taken from 60 healthy males between the ages of 18 to 60 years. The skin fold measurement was taken from the chest, abdomen and thigh on the right side of the body with a Harpenden skinfold caliper. Sum of the skin fold thickness is used in mathematical regression equations, developed to calculate body fat percentage (Jackson and Pollock, 1978). For the girth technique, the waist and the wrist circumferences were measured with a measuring tape and the difference was used to calculate the BF% (Penrouse 1985).

After obtaining informed written consent from the subjects, underwater weights were obtained in the university swimming pool using an especially designed measuring device (Fig.1) which allows the subject to sit on a chair and be completely submerged underwater. Ten readings were obtained from each subject using a Salter balance and the fat percentage was calculated from the density (Hoeger and Hoeger, 2006). The paired T test was performed using SPSS (version16) to find whether there are significant changes in the values.

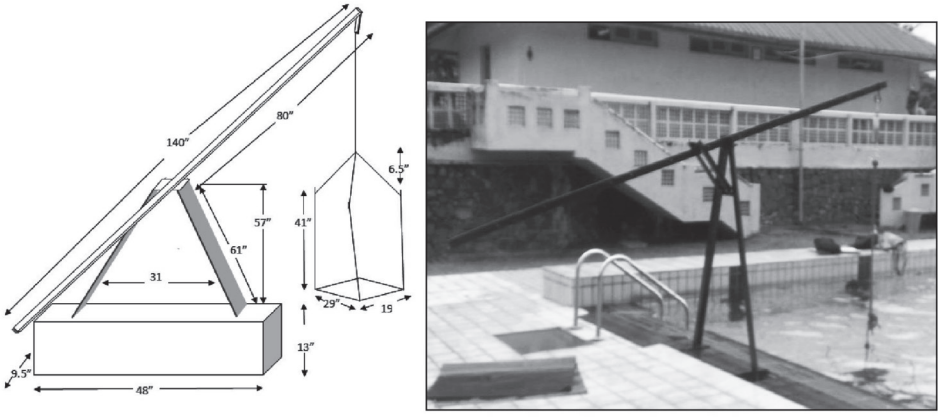


Fig. 1. *Measuring device designed to measure underwater weight of subjects (left) and the measuring device fixed to the swimming pool (right)*

RESULTS

We have considered 60 men aged between 18 and 59 (mean age of 34.55), mean height 168.81cm and mean weight 66.475 kg. Mean BMI of the subjects was 23.327.

Mean of the body fat percentages obtained from the hydro densitometer (the gold standard method) is 19.48, while the means of BF% obtained from skin fold thickness and girth were 22.58 and 21.24 respectively (Table 1).

Table 1. *Mean and standard deviation of each method*

Method	Mean	Standard Deviation
Hydrostatic weighing	19.48	5.71
Skin Fold Thickness	22.58	7.77
Girth Method	21.24	8.42

Paired T test

Mean body fat percentage measured by the gold standard was significantly different from the means of the other two methods. But when we compared skin fold and girth there were no significant differences between the results obtained using each method (Table 2).

i. Pair 1 = Hydrostatic Weighing Vs Skin fold measurement:

The difference of means is – 3.105 which indicates that mean value of the body fat percentage obtained from skin fold measurement is higher than the mean value of the body fat percentage obtained from Hydrostatic Weighing.

The P value of this pair is 0.003, which is much lower than 0.05. Therefore, the mean difference in these two methods is significant and it is not due to chance.

ii. Pair 2 = Hydrostatic Weighing Vs Girth measurement:

The difference of means is – 1.602 which indicates that mean value of the body fat percentage obtained from girth measurement is higher than the mean value of the body fat percentage obtained from Hydrostatic Weighing. But the difference is much lesser than in pair 1.

The P value is 0.021, which is lower than 0.05. Therefore, the mean difference in these two methods is significant and it is not due to chance.

iii. Pair 3 = Skin fold measurement Vs Girth measurement:

The difference of means is 1.636 which indicates that mean value of the body fat percentage obtained from skin fold measurement is higher than the mean value of the body fat percentage obtained from girth. But the difference is much higher compared to pairs 1 and 2.

The P value is 0.164, which is higher than 0.05. Therefore, the mean difference in these two methods is not significant.

Table 2. *Paired T test results*

Pair		Paired Differences			
		Mean difference	95% Confidence Interval of the Difference		Sig. (2-tailed)
			Lower	Upper	P value
1	Hydrostatic Weighing vs. Skin fold	-3.10	-5.107	-1.103	0.003
2	Hydrostatic Weighing vs. Girth	-1.76	-2.955	-0.248	0.021
3	Skin fold vs. Girth	1.34	-0.689	3.960	0.164

DISCUSSION

As shown in paired T test analysis, there were significant differences in BF% values between hydrostatic weighing vs. skin fold, and hydrostatic weighing vs. girth method. This means that both methods used in the clinical set up (i.e. skin fold or girth) would not give a reliable value of a person's BF% compared to the actual/gold standard value. Thus it appears that we cannot predict a person's BF% by looking at a value obtained either from skin fold or girth method. The most likely reason being, both skin fold and girth methods measure only the subcutaneous fat and not also the visceral fat.

But when carefully looking at the mean values of each method, it is obvious that mean values obtained from both skin fold and girth methods were higher compared to the hydrostatic method. So, it is questionable as to why this happened despite the fact that skin fold and girth methods were accessing only the subcutaneous fat and those two methods were expected to give lower values compared to the hydrostatic weighing.

The fact that skin fold method is not a reliable method was established by another study while comparing it with Dual Energy X ray Absorptiometry (DEXA),

mentioning that accuracy of most of the skin fold-thickness equations for assessment of BF% in adolescents was poor at the individual level (Rodríguez 2005). But, in another study which compared DEXA, skin fold and Bio impedance (BIA), there was a systematic tendency for DEXA values to be higher than those derived from skin fold-thickness measurements and BIA (Gutin 1996), Although in our study we were not comparing DEXA and BIA, we could not identify a systematic tendency in the results, either to be higher or lower compared to the skin fold measurements.

When considering the skin fold and girth techniques, there were no a significant difference in our study. This means according to our study there is not much difference either using skin fold or girth to assess body fat percentages. A study published in Journal of postgraduate medicine mentioned that the difference in body fat percentage content calculated by both methods was found to be significant in young men but not for middle aged men (Hegde 1996). The controversy between this study and ours may be due to the wide age range in our study.

Strengths and drawbacks

As a student group we were able to construct an instrument in order to get the underwater weight of the subjects. This was a supplementary objective of our study and to our knowledge none of the other university departments in Sri Lanka has such a measuring device, or do underwater weighing to measure body fat percentage. We hope there would be more studies in this area using this measuring device.

We would like to mention a few drawbacks when we were conducting the study using the hydrostatic weighing. All the subjects ideally should have been fasting for around 8 hrs prior to taking the readings, however due to practical difficulties this was not practiced. Secondly, the subjects' residual volume was obtained using a predicting equation and thus could have decreased the accuracy of this method. Also, while the underwater weight was being obtained, the subjects were informed to completely exhale all the air before submerging, but we were unable to confirm if this was truly so, and that could have altered the readings, too. Finally, since we have used the University swimming pool as our study area and not a controlled tank, the water was not an ideal set up and it might have affected the readings as well.

When measuring body fat using the skin fold method the major drawback is that one may also include muscle tissue together with the subcutaneous fat, and thus may obtain a false high value. To minimize that error, one specific member of the group was trained to take the measurements, and the measurement was done thrice.

Suggestions for further study

It is important to find out an association between the gold standard and the skin fold. For example it would be beneficial both in clinical and field set up if we could postulate a formula to obtain the actual BF% by measuring skin fold.

CONCLUSION

From our study it is clear that accuracy of skin fold or girth measurement as body fat measuring methods are poor. But when compared with girth measurements, the skin fold method for measuring body fat percentage appears to be more reliable.

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ABSTRACT

Objective

This study compares three body composition assessment techniques, namely, skin fold, girth, and hydrostatic weighing.

Methods

All measurements were taken from 60 healthy males between the ages of 18 to 60 years. Underwater weight was measured in a swimming pool and the body fat percentage (BF %) was calculated from the density. Skinfold thickness was measured at three places on the body: chest, abdomen and thigh with a Harpenden caliper, and BF% was calculated. For the girth technique, the waist and the wrist circumferences were measured with a measuring tape and the difference was used to calculate the BF%. Differences in values obtained were compared by the paired T test.

Results

Means of BF% obtained from each method are 19.48 in hydrostatic weighing, 22.58 in skin fold and 21.24 in girth. Significant differences were observed in BF% values between hydrostatic weighing versus skin fold ($p=0.003$ and mean difference = -3.10), and hydrostatic weighing versus girth measurement ($p=0.021$ and mean difference = -1.76).

Conclusion

The paired T test analysis shows that compared to hydrostatic weighing method, the other two methods are not reliable to measure an individual's BF%.

Key words: *body composition, skin fold, girth, hydrostatic weighing*

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IKONA KINEZIOLOGA

UVOD

Implementirati osobna znanja, praksu, dugogodišnja iskustva drugih kolega iz struke, biti u tijeku s kulturom sredine u kojoj živi, doprinositi kroz kineziološke sadržaje osvještavanju mladih prema cjeloživotnim vrijednostima koje će ponijeti u sebi i njegovati ih kroz svoj životni vijek te time čuvati fizičko i psihičko zdravlje pojedinca i društva u cjelini – tako se stvara ikona kineziologa.

Najprepisivaniji lijek današnjice je tjelovježba. U gotovo svakoj prevenciji bolesti spominje se preporuka zdravstvene organizacije o pravilnoj prehrani i umjerenoj tjelovježbi. Uloga kineziologa u prevenciji bolesti kroz stvaranje ozračja potrebe vježbanja koja će osnažiti generacije i generacije buduće radne snage svake zemlje. Često smo svjedoci da se osoba školuje tijekom svog života 8+4+5 godina do visokoškolske naobrazbe. Dok završi pripravnički staž i skupi nešto radnog iskustva dođe u 30-e godine svog života. Nemjerljiva je korist ako takav mladi čovjek u usponu uspije održati kondiciju i vitalnost kroz najstresniji period svog života - školovanje, na koje se nadovezuje zapolenost na radnom mjestu, često se zasniva obitelj moguće s pojačanim angažmanom oko djece i kućnih ljubimaca, a tu je još i niz egzistencijalnih potreba.

Razapete svakodnevicom još su ugroženije žene koje zbog stava društva balansiraju između posla i obitelji, nerijetko nauštrb svog slobodnog vremena. Još ako ne postoji svijest o potrebi tjelesnog vježbanja i ako ne postoji podrška okoline, žene se ne bave sportom pa čak niti hodanjem „jer nemaju vremena". Tu ući u glave" mladih ljudi kroz osnovnoškolsko i srednjoškolsko obrazovanje je od neprocjenjive važnosti. Razviti stav- da nije privilegija baviti se sportom, nego njihovo pravo, nasušna potreba koja će im sačuvati vitalnost. Dolaskom u 40-e godine života već počinju zdravstvene tegobe. Što da napravi jedan kirurg koji se školovao više od 20 godina, specijalizirao i sada, kada bi trebao dati najviše, ne može operirati zbog bolova u leđima? A takvih primjera je sve više u svim strukama. Bolesti lokomotornog sustava drugi su najčešći razlog bolovanja u Hrvatskoj (Zavalić, 2003).

Pridobiti mladog čovjeka da se kroz vježbanje osjeća ugodno, čini nešto za svoje zdravlje, čuva svoju lokomotornu pokretljivost, nauči osnovne zakonitosti kretanja,

načela vježbanja i podigne svoj duh i samopouzdanje kroz kretanje, čini nemjerljivu dobrobit za svako društvo. Socijalna interakcija koja iz toga proizlazi je dodatni vid koristi koja se ostvaruje vježbanjem. Društvenost, prijateljstvo, konstruktivno rješavanje najrazličitijih situacija, uključujući i sukobe, sve se to uči kroz sport.

ULOGA TZK U SVAKODNEVNOM ŽIVOTU

U ranoj dobi kroz sadržaje TZK djeca nauče što je suradničko učenje (ciljevi: poticanje suradnje), odgoj za razumijevanje, odgoj za snošljivost (toleranciju), njegovanje pozitivnog razredno-nastavnog ozračja, učiti dogovarati se, rješavati sukobe, odgovornost, samoinicijativnost, ustrajnost, naučiti kritički vrednovati svaki potez ekipe i svaki svoj uradak, stjecanje prijatelja, suradništvo (kooperativnost) i snošljivost kao obilježje ličnosti, značenje igre kao takve, sve je to stjecanje iskustava važnih za život.

Prolaskom kroz razvojne faze od djeteta do srednjoškolca, od mlađeg maloljetnika pa do starijeg maloljetnika, primjenjuju se u svakodnevnom životu znanja stečena kroz predmet TZK (ne samo kineziološka), nego i spoznajna te emocionalna saznanja.

Kaže se da emocionalno obojeni sadržaji najbolje prianjaju uz dječju dušu. Pa obojimo im djetinjstvo i mladost ljepotom i veseljem sportskih sadržaja. Potaknimo ih da budu stabilni, pravedni, iskonski sretni kroz svoje odrastanje uz nastavu TZK, Školska sportska društva ili Sportske klubove. Mnogima u osnovnoj školi to jest najdraži predmet. Učinimo da im kretanje postane biološka potreba „*Condicio sine qua non*" (uvjet bez kojega se ne može) da bismo očuvali generacije za one koji dolaze, generacije koje su „fit" u svim aspektima svog života. Takav način rada proteže se i kroz druge predmete, u korelaciji je s projektnom nastavom koja se potiče u osnovnim školama te se međusobno isprepliće kroz iste ciljeve: poboljšanje motivacije i interesa učenika za učenje, poboljšanje razrednog i skupnog ozračja, poticanje i njegovanje samopouzdanja, stjecanje motoričkih i društvenih vještina, odgajanje osobina ličnosti (dogovaranje i poštivanje dogovorenog, pomaganje učenicima iz razreda, pridržavanje postavljenih pravila, primanje priznanja i pohvala, doživljavanje uspjeha, stvaranje pozitivne slike o sebi, provjera vlastite upornosti).

SADRŽAJI ODGOJA I NJIHOVE ZNAČAJKE[1]

Sadržaji učenja sadrže tri sastavnice:

1. spoznajne
2. čuvstvene
3. motivativne (akcijske)

[1] (prema Pastuović, 1999)

1. U sadržajima obrazovanja (znanjima) prevladava kognitivna sastavnica (znanja o nečemu). Prenesimo im znanja iz općih pripremnih vježbi, trčanja, skokova, bacanja, upora, visova, ravnotežnih položaja, plesnih struktura, borilačkih struktura, igara i posebnih programa.
2. U sadržajima odgoja (vrijednostima, stavovima, navikama) prevladava čuvstvena i/ili motivativna sastavnica. Prenesimo im znanja o važnosti vježbanja na svoje zdravlje, društvenim vrijednostima (npr. važnost „team buildinga" u radnoj sredini), važnosti navike vježbanja. Naučimo ih kroz kineziološke sadržaje osjećajima povezanima s određenim ciljevima, objektima pa čak i bukvalno naučimo ih koristiti dvorane (sportska kultura u objektima), bazene, klizališta, skijališta, prirodne ljepote planina, jezera kroz pješačke ture, institucijama u vlastitom mjestu ili gradu – vodimo ih na tematske izložbe vezane uz sport, senzibilizirajmo ih na osobe s posebnim potrebama kroz sportske sadržaje koji se organiziraju u javno-zdravstvenim akcijama, pozovimo sportaše da nam uveličaju školska sportska natjecanja, neka imaju čast podijeliti medalje našim učenicima.

   Na taj način pedagog tjelesne i zdravstvene kulture pridonosi suradnji sa subjektima izvan škole (bazen, klizalište, institucije, druge osobe od uzora) i pomaže praćenju i unapređivanju društvenih odnosa u svojoj sredini.
3. Motivativno (akcijsko) – očituje se u potrebi osobe da djeluje u skladu sa svojim vrijednostima, stavovima i navikama (prema N. Pastuović). Dakle, kroz školovanje naučimo ih vrijednostima ponašanja kroz sportske igre, važnim dugoročnim ciljevima upražnjavanja vježbanja nekog sporta. Znanje u nekoj mjeri doprinosi formiranju vrijednosti, no ključnu ulogu u vrijednosnim preferencijama imaju osobna iskustva i genetski uvjetovane sklonosti. Stav se određuje kao naučena čuvstvena reakcija (Pastuović, 1999), zato pružimo djeci i mladima kineziološke sadržaje pune rada, zadovoljstva, zabave i veselja. Navike su naučene težnje (tendencije) ponašanja, navike se mogu formirati i bez spoznajne (kognitivne) osnove, ali uloga kineziologa jest proširiti i dati znanja mladima da mnogo znaju o kineziologiji i imaju naviku vježbanja u skladu s postojećim znanjem.

Zato je izuzetno važno uključiti kineziologa u rad odgojnih skupina od predškolske dobi preko osnovnoškolske dobi pa sve do fakulteta u programu redovnog školovanja i kroz izvannastavne aktivnosti te obavezno u radu sportskih klubova i rekreacije, osoba s posebnim potrebama i osoba s teškoćama u razvoju te radu sa starijom populacijom ljudi kojima nedostaje takvih sadržaja.

Osnovna znanja i vještine koje kineziolog prezentira kroz svoj rad su:

- izražene organizacijske sposobnosti i smisao za rukovođenje,
- samostalnost u donošenju odluka i organiziranje nastave ili treninga,
- izražena proaktivnost i inovativnost,
- razvijene komunikacijske vještine,
- aktivno poznavanje barem jednog stranog jezika,
- adekvatno znanje korištenja računala.

To je najčešće dinamična i odgovorna osoba sa sklonošću timskom radu i spremna na stručna usavršavanja i profesionalno napredovanje, moguće je da postane uzor drugima. To su upravo ona znanja i vještine koje kroz svoje djelovanje ispoljava kineziolog kroz kineziološke sadržaje, ona znanja i vještine koja su uz formalnu naobrazbu danas i najtraženija na tržištu rada.

ZAKLJUČAK

Kroz osobnost kineziologa kao sukreatora nastavnog procesa, ali i sukretora načina života budućih odraslih ljudi svake zemlje, njihovoj radnoj, profesionalnoj i obiteljskoj učinkovitosti, mogu se odlično ostvariti sadržaji odgoja generacija i generacija učenika ili sportaša u nekoj sportskoj grani.

Za kraj ne zaboravimo da su sportaši ambasadori svoje zemlje, često i brand koji je prepoznatljiv u odnosu na zemlju iz koje dolazi. Te sportaše je netko i učinio onim što oni jesu danas za sebe (uz svoj talent i osobno zalaganje) i za svoju zemlju, a netko je obrazovao i stručnjake i roditelje koji su tim sportašima prenijeli svoje znanje i ljudske kvalitete.

Često kineziolog kao stručnjak u obrazovnom procesu ili trener u nekoj sportskoj grani ima jedinstvenu mogućnost da oblikuje djevojčice i dječake u najbitnijim godinama njihovog odrastanja. Često utjecaj sportskog trenera bude veći od utjecaja drugih odraslih u životima mladih. Sigurno je cilj svakog Kineziološkog fakulteta obrazovati stručnjake za izvrsnost. Značaj ikone kineziologa nije samo u broju odigranih utakmica ili osvojenih prvenstava, već i u utjecaju na učenike ili sportaše za cijeli život, s ciljem stvaranja sretnog, ispunjenog čovjeka koji će doprinijeti stvaranju kvalitetnog društva u cjelini.

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THE ROLE OF KINESIOLOGIST

ABSTRACT

Humans are biological beings with their physical, emotional and psychological needs that can be fulfilled through modern and well-programmed subject of Physical Education. In countries without adequate PE infrastructure (such as Croatia) the emphasis should be on the creativity and innovative teaching, usability of natural resources and existing infrastructure of each community and the promotion of educational and health components of the subject with focusing on the development of skills and abilities that every young person would need in the process of lifelong learning.

Key words: *lifelong learning, exercise, the role of kinesiologist, health*

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Izvorni znanstveni rad

PROVJERA METRIJSKIH KARAKTERISTIKA SKALE K1 STAVA PREMA SPORTOVIMA NA UZORCIMA ZAGREBAČKIH MATURANATA I MATURANTICA

UVOD

Mrakovićeva skala K1 stava prema sportu (Mraković, 1970) nastala šezdesetih godina pokazala se zanimljivim instrumentom za procjenu općeg stava prema sportu. Uz brojne primjene, i sama je skala bila predmetom više istraživanja i doživjela je više revizija i prilagodbi različitim populacijama. N. Fiolić (1984) skratila je skalu na 50 čestica i prilagodila je uzrastu desetogodišnjaka. Početkom devedesetih, A. Hošek skalu je tekstualno osuvremenila i zamijenila je dio čestica. Skala u reviziji A. Hošek u verziji sa 68 čestica primijenjena je u dva navrata na uzorcima studenata Fakulteta za fizičku kulturu (Alebić, 1991; Kernec, 1991). Ova je verzija podvrgnuta novoj reviziji (Bosnar i Prot, 1993) na podacima studenata Fakulteta za fizičku kulturu. Skraćena je tako da se uz što manje čestica još uvijek postižu rezultati zadovoljavajućih metrijskih karakteristika što je rezultiralo verzijom skale K1 od 30 čestica. Isti autori (Prot i Bosnar, 1995) ponovno su modificirali skalu K1 i to tako da su odgovore „točno" i „netočno" zamijenili Linkertovim skalama s pet stupnjeva. Verzija s povećanim mogućim rasponom odgovora provjerena je na studentima i studenticama Fakulteta za fizičku kulturu i pokazala je odlične metrijske karakteristike. Pouzdanost skale procijenjena je s 0.9 na oba uzorka studenata i studentica.

Verzija s 30 čestica i odgovora na Linkertovoj skali pet stupnjeva pokazala se dosad najefikasnijom i metrijski najpogodnijom u primjeni. No, kako je revizija i provjera mjernih svojstava učinjena na studentima koji se po mnogočemu razlikuju od prosječne populacije, postavilo se pitanje provjere skale na drugim uzorcima. U ovom radu učinjena je provjera metrijskih karakteristika skale na reprezentativnim uzorcima maturanata i maturantica zagrebačkih škola.

METODE

Skala K1 u verziji od 30 čestica s odgovorima na ljestvici od 1 do 5 (Prot i Bosnar, 1995) primijenjena je na 997 maturanata i 942 maturantice zagrebačkih gimnazija, četverogodišnjih škola sa završnim zanimanjem i trogodišnjih stručnih

škola. Istraživanje je provedeno 1996. godine te je uzorak definiran iz populacije maturanata i maturantica srednjih škola u Zagrebu, muškog i ženskog spola, starih 17 i 18 godina. Iz tako definirane populacije izabrana su sljedeća dva uzorka: prigodni uzorak od 1.939 ispitanika od kojih je 997 maturanata (329 učenika gimnazijskog smjera, 344 učenika tehničkog smjera i 324 učenika obrtničkog smjera) i 942 maturantice (324 učenica gimnazijskog smjera, 361 učenica tehničkog smjera i 257 učenica obrtničkog smjera). Za svaki uzorak prethodno su definirani uvjeti koje je morao zadovoljiti svaki ispitanik. Homogenizacija svih ispitanika izvršena je obzirom na dob, spol i edukacijsku razinu dok socijalni status i ostale karakteristike osobe variraju slučajno kod svih ispitanika. Istraživanje je provedeno na različitim lokacijama grada Zagreba. Uzorak ispitanika je reprezentativan, a dobiveni rezultati mogu se smatrati pouzdanim i relevantnim za zaključke s uzorka na cijelu populaciju maturanata grada Zagreba godine kada je istraživanje realizirano.

Za svaki uzorak posebno učinjena je analiza metrijskih karakteristika čestica i cjeline skale standardnom procedurom RELIABILITY iz statističkog paketa SPSS/PC+(Specer i Buboltz, 1988).

REZULTATI

U tablicama 1 i 2 navedene su frekvencije, postoci odgovora i deskriptivni parametri (AS, SD) maturanata i maturantica na čestice skale stava prema sportu (K1).

Tablica 1. *Frekvencije, postoci odgovora i deskriptivni parametri (AS, SD) maturanata na čestice skale stava prema sportu (K1)*

	Potpuno netočno	Uglavnom netočno	Nisam siguran	Uglavnom točno	Potpuno točno	AS	SD
Život bi trebalo tako organizirati da u njemu bude zastupljeno svakodnevno tjelesno vježbanje.	55 (5.5%)	64 (6.4%)	190 (19.1%)	366 (36.7%)	322 (32.3%)	3.84	1.11
Kada bih mogao, svo slobodno vrijeme proveo bih u sportskoj aktivnosti.	81 (8.8%)	159 (15.9%)	255 (25.5%)	269 (27.0%)	233 (23.4%)	3.42	1.23
Pristao bih da se i ubuduće tjelesnim vježbanjem bavim svakodnevno.	79 (7.9%)	116 (11.6%)	212 (21.3%)	311 (31.2%)	278 (27.9%)	3.59	1.23
Sportom se želim afirmirati.	99 (9.9%)	124 (12.4%)	315 (31.6%)	269 (27.0%)	190 (19.1%)	3.33	1.20
Kada mogu, redovito posjećujem sportske priredbe.	130 (13.0%)	199 (20.0%)	219 (22.0%)	263 (26.4%)	186 (18.7%)	3.18	1.30

Natječem se na raznim prvenstvima i javno nastupam.	369 (37.0%)	250 (25.1%)	163 (16.3%)	106 (10.6%)	109 (10.9%)	2.33	1.35
Želim biti član sportskog kolektiva.	195 (19.6%)	130 (13.0%)	232 (23.3%)	233 (23.4%)	207 (20.8%)	3.13	1.40
U sportu imam najbolje prijatelje.	213 (21.4%)	215 (21.6%)	239 (24.0%)	203 (20.4%)	127 (12.7%)	2.82	1.32
Da imam mogućnosti da se aktivno bavim sportom ne bih pomišljao na poroke.	173 (17.4%)	135 (13.5%)	252 (25.3%)	187 (18.8%)	250 (25.1%)	3.21	1.41
Rado se natječem za boje ustanove kojoj pripadam.	173 (17.4%)	120 (12.0%)	211 (21.2%)	247 (24.8%)	246 (24.7%)	3.27	1.41
Tjelesnim vježbanjem bavim se svakodnevno i organizirano u sportskom kolektivu.	216 (21.7%)	294 (29.5%)	175 (17.6%)	188 (18.9%)	124 (12.4%)	2.71	1.33
Zahvaljujući sportu okolina me počela više cijeniti.	214 (21.5%)	222 (22.3%)	303 (30.4%)	174 (17.5%)	84 (8.4%)	2.69	1.22
Rado kupujem i čitam sportske knjige.	252 (25.3%)	233 (23.4%)	189 (19.0%)	221 (22.2%)	102 (10.2%)	2.69	1.33
Volio bih kada bi me netko upućivao kako treba vježbati.	125 (12.5%)	134 (13.4%)	191 (19.2%)	365 (36.6%)	182 (18.3%)	3.41	1.27
Tjelesnim vježbanjem bavio sam se organizirano od svoje 12. godine ili još i ranije.	218 (21.9%)	199 (20.0%)	146 (14.6%)	189 (19.0%)	245 (24.6%)	3.04	1.50
Pohvale i nagrade uvijek me pobuđuju da još više vježbam.	160 (16.0%)	151 (15.1%)	162 (16.2%)	308 (30.9%)	216 (21.7%)	3.27	1.38
Tjelesnim vježbanjem bavim se da bih postao snažan.	145 (14.5%)	187 (18.8%)	248 (24.9%)	280 (28.1%)	137 (13.7%)	3.08	1.26
Uvjeren sam da bi ljudi bili mnogo sretniji da se mogu baviti tjelesnim vježbanjem.	79 (7.9%)	88 (8.8%)	251 (25.2%)	363 (36.4%)	216 (21.7%)	3.55	1.16
Od svih sportova najviše volim sportske igre.	101 (10.1%)	107 (10.7%)	295 (29.6%)	279 (28.0%)	215 (21.6%)	3.40	1.22
Zamjeram onima koji mi onemogućuju bavljenje tjelesnim aktivnostima.	121 (12.1%)	131 (13.1%)	217 (21.8%)	307 (30.8%)	221 (22.2%)	3.38	1.29
Sportom želim poboljšati svoj izgled.	100 (10.0%)	110 (11.0%)	202 (20.3%)	374 (37.5%)	211 (21.2%)	3.49	1.22
Službeno se natječem u više sportova.	482 (48.3%)	251 (25.2%)	135 (13.5%)	87 (8.7%)	42 (4.2%)	1.95	1.16
Svoje uzore često nalazim u sportašima.	282 (28.3%)	175 (17.6%)	183 (18.4%)	222 (22.3%)	135 (13.5%)	2.75	1.42

Nikad ne vodim računa koliko vremena provodim u tjelesnom vježbanju.	158 (15.8%)	196 (19.7%)	232 (23.3%)	261 (26.2%)	150 (15.0%)	3.05	1.30
Zahvaljujući tjelesnom vježbanju postajem sigurniji u sebe.	144 (14.4%)	111 (11.1%)	277 (27.8%)	306 (30.7%)	159 (15.9%)	3.23	1.26
Redovito pratim sportske događaje u tisku.	169 (17.0%)	146 (14.6%)	148 (14.8%)	266 (26.7%)	268 (26.9%)	3.23	1.44
Sport je još jedini koji zbližava,a ne razjedinjuje ljude.	105 (10.5%)	94 (9.4%)	233 (23.4%)	297 (29.8%)	268 (26.9%)	3.53	1.27
Nema te aktivnosti koju bih pretpostavio sportu.	170 (17.1%)	144 (14.4%)	349 (35.0%)	179 (17.7%)	158 (15.8%)	3.01	1.28
Tjelesnim vježbanjem želim učvrstiti zdravlje.	78 (7.8%)	90 (9.0%)	161 (16.1%)	347 (34.8%)	321 (32.2%)	3.75	1.22
Aktivno treniram tri ili više puta tjedno po dva i više sati.	316 (31.7%)	221 (22.2%)	150 (15.0%)	150 (15.0%)	160 (16.0%)	2.62	1.46
UKUPNO K1						**93.95**	**25.17**

Tablica 2. *Frekvencije, postoci odgovora i deskriptivni parametri (AS, SD) maturantica na čestice skale stava prema sportu (K1)*

	Potpuno netočno	**Uglavnom netočno**	**Nisam siguran**	**Uglavnom točno**	**Potpuno točno**	**AS**	**SD**
Život bi trebalo tako organizirati da u njemu bude zastupljeno svakodnevno tjelesno vježbanje.	40 (4.2%)	48 (5.1%)	144 (15.3%)	335 (35.6%)	375 (39.8%)	4.02	1.07
Kada bih mogao, svo slobodno vrijeme proveo bih u sportskoj aktivnosti.	85 (9.0%)	128 (13.6%)	268 (28.5%)	267 (28.3%)	194 (20.6%)	3.38	1.21
Pristao bih da se i ubuduće tjelesnim vježbanjem bavim svakodnevno.	75 (8.0%)	79 (8.4%)	240 (25.5%)	290 (30.8%)	258 (27.4%)	3.61	1.20
Sportom se želim afirmirati.	99 (10.5%)	127 (13.5%)	350 (37.2%)	243 (25.8%)	123 (13.1%)	3.17	1.14
Kada mogu, redovito posjećujem sportske priredbe.	217 (23.0%)	315 (33.4%)	188 (20.0%)	142 (15.1%)	80 (8.5%)	2.53	1.23
Natječem se na raznim prvenstvima i javno nastupam.	591 (62.7%)	195 (20.7%)	81 (8.6%)	40 (4.2%)	35 (3.7%)	1.66	1.05
Želim biti član sportskog kolektiva.	251 (26.6%)	181 (19.2%)	245 (26.0%)	138 (14.6%)	127 (13.5%)	2.69	1.36

U sportu imam najbolje prijatelje.	355 (37.7%)	251 (26.6%)	168 (17.8%)	103 (10.9%)	65 (6.9%)	2.23	1.25
Da imam mogućnosti da se aktivno bavim sportom ne bih pomišljao na poroke.	214 (22.7%)	120 (12.7%)	257 (27.3%)	168 (17.8%)	183 (19.4%)	2.99	1.41
Rado se natječem za boje ustanove kojoj pripadam.	290 (30.8%)	170 (18.0%)	272 (28.9%)	131 (13.9%)	79 (8.4%)	2.51	1.28
Tjelesnim vježbanjem bavim se svakodnevno i organizirano u sportskom kolektivu.	334 (35.5%)	344 (36.5%)	99 (10.5%)	113 (12.0%)	52 (5.5%)	2.16	1.20
Zahvaljujući sportu okolina me počela više cijeniti.	417 (44.3%)	243 (5.8%)	193 (20.5%)	64 (6.8%)	25 (2.7%)	1.98	1.08
Rado kupujem i čitam sportske knjige.	426 (45.2%)	252 (26.8%)	108 (11.5%)	116 (12.3%)	40 (4.2%)	2.04	1.20
Volio bih kada bi me netko upućivao kako treba vježbati.	110 (11.7%)	99 (10.5%)	164 (17.4%)	362 (38.4%)	207 (22.0%)	3.49	1.27
Tjelesnim vježbanjem bavio sam se organizirano od svoje 12. godine ili još i ranije.	376 (39.9%)	183 (19.4%)	86 (9.1%)	141 (15.0%)	156 (16.6%)	2.49	1.53
Pohvale i nagrade uvijek me pobuđuju da još više vježbam.	274 (29.1%)	117 (12.4%)	142 (15.1%)	235 (24.9%)	174 (18.5%)	2.91	1.51
Tjelesnim vježbanjem bavim se da bih postao snažan.	357 (37.9%)	245 (26.0%)	175 (18.6%)	122 (13.0%)	43 (4.6%)	2.20	1.21
Uvjeren sam da bi ljudi bili mnogo sretniji da se mogu baviti tjelesnim vježbanjem.	83 (8.8%)	73 (7.7%)	194 (20.6%)	351 (37.3%)	241 (25.6%)	3.63	1.20
Od svih sportova najviše volim sportske igre.	143 (15.2%)	155 (16.5%)	279 (25.7%)	242 (25.7%)	123 (13.1%)	3.05	1.25
Zamjeram onima koji mi onemogućuju bavljenje tjelesnim aktivnostima.	173 (18.4%)	172 (18.3%)	204 (21.7%)	222 (23.6%)	171 (18.2%)	3.05	1.37
Sportom želim poboljšati svoj izgled.	84 (8.9%)	62 (6.6%)	115 (12.2%)	336 (35.7%)	345 (36.6%)	3.85	1.24
Službeno se natječem u više sportova.	660 (70.1%)	173 (18.4%)	62 (6.6%)	27 (2.9%)	20 (2.1%)	1.49	0.90
Svoje uzore često nalazim u sportašima.	435 (46.2%)	180 (19.1%)	142 (15.1%)	115 (12.2%)	70 (7.4%)	2.16	1.32
Nikad ne vodim računa koliko vremena provodim u tjelesnom vježbanju.	256 (27.2%)	174 (18.5%)	195 (20.7%)	196 (20.8%)	121 (12.8%)	2.74	1.39

Zahvaljujući tjelesnom vježbanju postajem sigurniji u sebe.	212 (22.5%)	120 (12.7%)	252 (26.8%)	236 (25.1%)	122 (13.0%)	2.93	1.34
Redovito pratim sportske događaje u tisku.	345 (36.6%)	219 (23.2%)	108 (11.5%)	175 (18.6%)	95 (10.1%)	2.42	1.40
Sport je još jedini koji zbližava, a ne razjedinjuje ljude.	123 (13.1%)	102 (10.8%)	245 (26.0%)	261 (27.7%)	211 (22.4%)	3.36	1.30
Nema te aktivnosti koju bih pretpostavio sportu.	227 (24.1%)	167 (17.7%)	344 (36.5%)	119 (12.6%)	85 (9.0%)	2.65	1.23
Tjelesnim vježbanjem želim učvrstiti zdravlje.	79 (8.4%)	74 (7.9%)	133 (14.1%)	376 (39.9%)	280 (29.7%)	3.75	1.20
Aktivno treniram tri ili više puta tjedno po dva i više sati.	473 (50.2%)	228 (24.2%)	89 (9.4%)	85 (9.0%)	67 (7.1%)	1.99	1.27
UKUPNO K1						**83.08**	**23.29**

Rezultati iz tablica 1 i 2 pokazuju poželjne karakteristike za sve čestice i u muškom i ženskom uzorku. Prosjeci rezultata u česticama kreću se od 1.95 do 3.84 za učenike , i od 1.49 do 4.02 za učenice. Standardne devijacije čestica su u rasponu od 1.11 do 1.46 za maturante i 0.90 do 1.53 za maturantice. S obzirom na raspon odgovora od 1 do 5, sve čestice pokazuju zadovoljavajući varijabilitet.

Korelacija čestica s ukupnim rezultatom u skali su srednje do visoke i kreću se od 0.43 do 0.72 kod učenika te 0.46 do 0.71 kod učenica. Bez sumnje, valjanost čestica nije upitna, bez obzira na kojem spolu su primijenjene. Kvadrati multiplih korelacija pojedine čestice s preostalima pokazuju da sve čestice pripadaju istom skupu i dijele vidljiv do značajnog dijela varijance. Kreću se od 0.36 do 0.71 za maturante i od 0.31 do 0.70 za maturantice.

Najveće determinacije pokazuju čestice slične sadržajem, pokazale su visoke međusobne korelacije u oba uzorka (0.75 i 0.76) i time doprinijele visokim determinacijama. Predlaže se izbacivanje 15 čestica od 30 ili ih treba zamjeniti novim pitanjima.

Pouzdanost skale K1 u oba uzorka je upadljivo velika. Prosječne frekvencije među česticama dovoljno su visoke da bi upućivale na homogenost skupa, a ne prevelike da bi upućivale na veći broj čestica koje nose istu informaciju.

Aritmetičke sredine rezultata nešto su veće kod maturanata koji iskazuju i veći varibilitet rezultata. U oba uzorka prosjeci su blizu polovine mogućeg raspona ukupnog rezultata (30-150) pa je skalom K1 moguće razlikovati iznadprosječne i ispodprosječne u stavu prema sportu.

ZAKLJUČAK

Na uzorku 997 maturanata i 942 maturantice zagrebačkih srednjih škola primijenjena je revidirana Mrakovićeva skala K1 (Mraković, 1970; Prot i Bosnar, 1995). U primjeni na ovoj populaciji skala je ponovo pokazala posebno dobre metrijske karakteristike kod maturanata i maturantica, pouzdanost skale premašuje 0.9. Aritmetičke sredine i standardne devijacije ukupnog rezultata pokazuju da će se skalom moći dobro razlikovati i iznad prosječne i ispodprosječne pripadnike opće populacije u stavu prema sportu. Od ukupno 30 čestica valjanost se ne bi izgubila izbacivanjem 15 čestica od 30 koje se nalaze u skali K1.

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ASSESSMENT OF METRIC CHARACTERISTICS OF K1 ATTITUDE TOWARDS SPORTS SCALE ON THE SAMPLE OF SECONDARY SCHOOL GRADUATES IN ZAGREB

ABSTRACT

The K1 scale with 30 items and answers on a scale from 1 to 5 (Prot and Bosnar, 1995) was used with 997 male and 942 female secondary school graduates of four-year secondary schools and three-year vocational schools in Zagreb, with the aim to verify the metric characteristics of the scale based on representative samples of the mentioned population.

The scale has shown especially good metric characteristics on male and female graduates- the reliability of the scale exceeds 0.9. Means and standard deviations of the overall results show that with the scale it will be possible to differ well between good and above-average, same as below-average members of the general population in their attitude towards sports. From a total of 30 items, validity would be retained even if 15 out of 30 items were removed from the K1 scale.

Key words: *attitude, scale K1, graduates*

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Stručni rad

NASTAVA TJELESNOG ODGOJA NA SVEUČILIŠTU U ODNOSU NA BOLONJSKU DEKLARACIJU

UVOD

Porast životnog standarda i nagla informatizacija, ponegdje odvojeno a ponegdje zajedno, donijeli su vrlo zabrinjavajuću pojavu, pojavu tzv. „sedentarne generacije" kojoj pripadaju i djeca i odrasli, a možda najviše brojna studentska populacija. U svakodnevnom životu studenata izrazito je prisutna statička komponenta: za vrijeme predavanja, vježbi i ispita studenti uglavnom sjede ili stoje po nekoliko sati dnevno. Kod kuće često satima sjede uz kompjutor ili tv, služe se javnim ili osobnim prijevozom čak i za prelaženje vrlo kratkih udaljenosti. Naglašena statička komponenta direktno ugrožava zdravlje studenata jer se prisilno zatomljuje urođena potreba za kretanjem. To dovodi do pada svih funkcionalnih sposobnosti; smanjuje se sposobnost koncentracije, javlja se psihomotorni nemir, sveopći umor, ponekad depresija.

Već preko 45 godina na Zagrebačkom sveučilištu je kolegij tjelesna i zdravstvena kultura obavezan kolegij tijekom prve dvije godine studija za sve studente.

NASTAVA TJELESNE I ZDRAVSTVENE KULTURE NA ZAGREBAČKOM SVEUČILIŠTU

Ciljevi nastave TZK na Sveučilštu su očuvanje i unapređenje zdravlja studentske populacije, zadržavanje stečenih psihomotornih sposobnosti na postignutom nivou, savladavanje nekih novih motoričkih struktura i osposobljavanje sudenata za samostalno programiranje trenažnih opterećenja.

Početak studija za mlade ljude često znači prestanak sportskih aktivnosti kojima su se do tada bavili i nastava tjelesne i zdravstvene kulture (TZK) za većinu studenata je jedina mogućnost organiziranog bavljenja nekom sportskom aktivnošću (1, 2, 3, 4).

Nastava je namijenjena svim studentima. Za zdravu populaciju egzistiraju mnogobrojni programi različitog intenziteta i trajanja. Najlakši i najkraći programi namijenjeni su studentima s manjim fondom motoričkih znanja i nižim stupnjem motoričkih sposobnosti koji se mogu brzo i uspješno savladati. Pojedini nastavni

programi kreiraju se individualno (npr. za studente s akutnim i kroničnim zdravstvenim poteškoćama ili za studente s posebnim potrebama) (5).

Dio studenata se preko izbornih programa uključuje u nove i atraktivne sportske programe koji im u srednjoškolskom nastavnom programu nisu bili dostupni jer se odvijaju na specifičnim lokacijama (klizanje, veslanje, rolanje, streljaštvo, squash i sl.). (Ove aktivnosti provode se u kvalitetnoj suradnji s različitim sportskim klubovima.)

Većina sastavnica Sveučilišta nema na raspolaganju nikakve sportske objekte. Raznovrsni jednostavni nastavni programi realiziraju se dobrim dijelom i na slobodnim gradskim površinama, u bližoj okolici grada, na obroncima obližnje gore Medvednice, u gradskim parkovima, na riječnom nasipu, na rekreativno-sportskim terenima namijenjenim građanstvu i sl. Ukratko, i bez posebnih uvjeta, održava se redovita i kvalitetna tjelovježba za brojnu studentsku „sedentarnu" populaciju.

Sveučillišna sportska natjecanja su dobrovoljna i dostupna studentima svih godina studija; student sam odlučuje da li će u njima sudjelovati ili ne. Priznaju se kao redovita nastava, sukladno tome studenti u sustavu redovitih treninga i natjecanja nemaju obavezu pohađanja nastave

KORISNOST NASTAVE TJELESNE I ZDRAVSTVENE KULTURE ZA STUDENTE SVEUČILIŠTA

Korisnost redovite nastave TZK na Sveučilištu je višestruka i njeni učinci su lako uočljivi (zdravstveni, obrazovni, odgojni, direktni, indirektni itd.):

- *preventivno djelovanje na štetne posljedice smanjene aktivnosti* – edukacija studenata u cilju sprječavanja profesionalnih mišićno – koštanih oboljenja kojima će biti izloženi tijekom radnog vijeka, preferira se nastava plivanja
- *samostalnost* – student nauči kako programirati vlastito opterećenje, trajanje i intenzitet opterećenja, kako rasporediti odmore. (Vrlo pogodan je tzv. hiking / walking program.) Rezultati se vide relativno brzo (pravilnije držanje tijela, hod postaje pravilniji i ljepši, poboljšava se fleksibilnost i koordinacija ruke – noge, znatno ojača trbušna i leđna muskulatura itd.).
- osigurava se *kvalitetno provođenje slobodnog vremena* (6)
- *snalaženje u prirodi* uz upotrebu kompasa i čitanje karte
- razvija se *kultura svakodnevnog hodanja*
- *sportska natjecanja* isključivo unutar studentske populacije razvijaju osjećaj pripadnosti akademskoj zajednici, odgovorno ponašanje prema samom sebi i prema kolektivu, naročito kod sportskih igara loptom
- potiče se *socijalizacija*, odgaja kulturna sportska publika

- *zdravstveni seminar* pruža studentima saznanja o pravilnoj prehrani, načinima zdravog življenja i samoočuvanju zdravlja, izrađuju se individualni programi vježbanja itd.
- *kreativnost* – studenti kategorizirani sportaši priređuju prezentaciju svoje sportske aktivnosti, organiziraju posjet treningu ili natjecanju u svrhu promocije svog sporta

TJELESNA I ZDRAVSTVENA KULTURA I BOLONJSKI PROCES

Uvođenjem studiranja prema Bolonjskoj deklaraciji, Senat Zagrebačkog sveučilišta donio je odluku o novom položaju kolegija TZK na Sveučilištu (7,8). Od tada se nastava TZK izvodi izvan satnice. I dalje je obavezna samo u prvoj i drugoj godini redovnog dodiplomskog studija po 30 sati u svakom semestru, a neobavezna u svim ostalim godinama studija. (Studenti diplomskog studija mogu sudjelovati samo u dobrovoljnim ali neobaveznim sportskim natjecanjima.)

Službeno ime kolegija na svim sastavnicama Sveučilišta je TZK1, TZK2, TZK3 i TZK4 bez obzira na nastavni sadržaj i mjesto realizacije. Kolegij je prenosiv, studentu se priznaje odrađenih 30 sati tijekom semestra na matičnom fakultetu ili na nekoj drugoj visokoškolskoj ustanovi (tzv. prijenos potpisa u indexu). Student ne polaže ispit, ne dobiva ocjenu, ali niti 1 ECTS bod (9).

Neke sastavnice unutar Sveučilišta ipak su uvele pripis 1 ECTS boda po jednom odrađenom semestru. Tako se dešava da student s ostvarenim i upisanim ECTS bodovima prijelazom na studij koji ga ne dodjeljuje biva direktno oštećen, ti bodovi se „gube".

Nedodjeljivanje ECTS boda obaveznom kolegiju TZK na preddiplomskom studiju jako je izmijenilo ponašanje studenata u odnosu na kolegij i sudjelovanje u sportskim natjecanjima. U tijeku je od strane nekoliko autora obrada podataka višegodišnjeg praćenja studenata na nekoliko sastavnica Zagrebačkog sveučilišta. Prema dosad obrađenim podacima uočljiv je povećani broj neopravdanih izostanaka s nastave, program se sve češće odrađuje tzv. nadoknadama propuštenih termina, a znatno je smanjen broj studenata aktivnih u sveučilišnim sportskim natjecanjima. Te pojave dovode u pitanje osnovni cilj kolegija - preventivno djelovanje na štetne utjecaje modernog načina života.

ZAKLJUČAK

Nastava TZK na Sveučilištu ima jasno postavljene dugoročne ciljeve. Iako većina sastavnica Sveučilišta nema na raspolaganju sportske objekte, redovito se održava kvalitetna i raznovrsna tjelovježba za brojnu studentsku „sedentarnu" populaciju, što dokazuje da vježbanje ne treba biti teško da bi bilo korisno i da nije potrebna

skupa sportska oprema (iako bi trebalo osigurati dostupnost sportskih objekata svim sastavnicama Sveučilišta).

Istraživanja studentske populacije koja su u tijeku zasigurno će znatno pridonijeti da se nastavi TZK na visokoškolskim ustanovama posveti više pažnje. Dosadašnja istraživanja pokazala su da je obavezna nastava TZK za većinu studenata jedina mogućnost bavljenja nekom organiziranom tjelovježbom. U cilju promocije zdravih stilova života dobro bi bilo nastavu TZK uvesti i na treću godinu dodiplomskog studija, te barem kao izborni kolegij na obje godine diplomskog studija.

Bolonjski proces direktno je otežao realizaciju nastave: stavljanjem kolegija „izvan satnice" student ne dobiva nikakvo priznanje za uložen trud i savladan program što znatno smanjuje motivaciju za redovito pohađanje nastave i za sudjelovanje u sveučilišnim sportskim natjecanjima, a povećava broj neopravdanih izostanaka i „odradu" obaveznih sati u dodatnim terminima, često i u slijedećem semestru.

Kolegiju TZK tebalo bi svakako dodijeliti barem 1 ECTS bod po odrađenom semestru. Tada se više ne bi događalo da se bod „izgubi" prilikom prijelaza s jedne visokoškolske ustanove na drugu, a student bi dobio priznanje adekvatno uloženom trudu i potrošenom vremenu.

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ABSTRACT

Young people are physically, mentally, socially and ethically very sensitive, which reflects on their working capacity sooner or later. In order to prevent the health damage caused by the noxiousness of modern but sedentary style of life (coming of „*sedentary generation*"), for more than 45 years the *physical education courses* at the University of Zagreb have been part of the *University study curriculum* as compulsory course during two first years of each study programme. Various sport competitions are organized all the time but they are not compulsory; students themselves can decide if they want to take part or not.

Research results about Croatian university students show that the compulsory physical education courses and sport competitions at the University are, for most students, the only opportunity for the participation in any type of physical activity during a long academic year.

Acceptance of *Bologna Declaration* as a model of University study curriculum created an entirely new position for physical education university courses. Courses are still compulsory for all the students during first two years of study at the University of Zagreb, but without acknowledging any *ECTS credits*.

Key words: *sedentary generation, physical education courses, University study curriculum, Bologna Declaration, ECTS credits*

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Professional paper

REALISING AN IDEAL IMAGE OF A SPORTS STUDENT

INTRODUCTION

At Gimnazija Šiška, we have been working with sports students from different sports disciplines for twenty years. Ten years ago we founded a college type class of footballers in cooperation with the Football Association of Slovenia. In this way we attended to the complete educational system of footballers, their health and sports development. We took into account specific needs of young football players, we offered them quality schooling and training, appropriate dormitory care, sports nutrition, regeneration, psychological and medical care. In these ten years we have carried out different projects with which we have tried to ascertain the best conditions for successful development of football players in the sports as well as in the school field. In continuation, two projects are introduced briefly, while the third one is presented in detail.

CROSS-CURRICULAR APPROACHES AND TEAM TEACHING

Physical education and football trainings go on from Monday to Friday. Physical education curriculum is adapted to the demands of football training, it complements and upgrades it. It is also interwoven with other educational work and enriched with specific contents. With cross-curricular approaches to psychology, biology, chemistry, physics and history, there is a lot of cooperative learning. The upgrade of this project is a new project „Experimental elements of specialist sports grammar school" which is being carried out as an experiment with two classes of the first year students in this school year.

REGENERATION, INJURY PREVENTION AND PSYCHOLOGICAL PREPARATION OF SPORTS STUDENTS IN FOOTBALL CLASSES

Once a week all students in football classes participate in regeneration training, and at school there is a sports psychologist help available for all students as well as medical care (physiotherapist) in the dormitory. Every year we prepare a complete theoretical contents programme in which the sports way of life and ways of taking responsibility in the development of their sports career are described. The starting points of this project are also upgraded in the project „Experimental elements of specialist sports grammar school".

THE FOOTBALL CLASS SHOULD START WITH „BREATHING"

The students are taught to reasonably organise the time left after finishing classes, football trainings and satisfying other needs. This project became a necessity when teachers, coaches and supervisors suddenly faced inadequate knowledge standards of students, their skipping classes, rejecting dormitory rules, lack of interest in classes and training, injuries and illnesses. This project has developed as a need to protect the goal and purpose of college football classes. It is useful in a different schooling system and different environment, too.

AN IDEAL IMAGE OF A SPORTS STUDENT

According to experts, the qualities necessary for a successful sportsman are good physical condition, technical knowledge, stamina, speed, strength, accuracy, suppleness, skilfulness, intelligence, the ability of complex and analytical thinking, maturity, psychological preparation, being focused on work or match, stability, positive aggressiveness, fighting spirit, consistency, reliability, ability to adjust and work in a team, mental strength, emotional stability, trustfulness, self-confidence, orderliness and wish for progress. It is hard to expect brilliant results in both, school and sports field if the youngster does not develop adequate motivation for work, if he does not accept systematic work and he does not endeavour to build up his personal characteristics.

CURRENT SITUATION, CAUSES AND CONSEQUENCES

The concept of college football classes is in its basis different than the concept of other sports classes at our school. There are 22 students in each class, only boys, who spend five days a week together in the classroom, football field and dormitory. Their daily schedule is carefully worked out. It includes everything from classes, training, studying, meals to the evening „leisure activities". The time for getting up and going to sleep is also defined. The nights out and staying up late are not allowed, watching TV or computer games are rather an exception than a rule. Many students have considerable problems adjusting to such a way of life. Students are expected to respect order at school, during training and in the dormitory. If the rules are broken, different measures are taken. At first, the students who manage to get a place in this class are proud of their success and try hard to be ideal students and sportsmen. But only after a few months, some students show the first signs leading to failure. They do not do their homework, or they do it superficially, they prepare badly for testing and grading, they are inattentive during classes, they do not take notes, they doodle, play with their mobile phones, chat, come late to lessons, go to the toilette during lessons, have headache, or stomach-ache, etc. In the dormitory they sleep during

studying hours, in the evening they are unwilling to go to the bathroom, they wander to other students' rooms, leave the dormitory with no excusable reason, they do not tidy their rooms, etc. Students have the fewest problems at trainings, but gradually, the consequences appear there, too, for example, not being motivated enough for exercises. Especially in the third and fourth year there are a lot of students who are injured and train less intensively. Unsuccessfulness is intensified and shown in all fields and most often the students cannot find a way out by themselves.

Where are the reasons? We can look for them everywhere. Because first year students are fifteen years old, which means in adolescence, because they are footballers, because they are boys, because they are not used to living without their parents, television, computer, mobile phone, because they did not have to learn in the primary school and now they do not know how to learn, because there is too much noise in the dormitory to learn, because they perceive school and dormitory as a prison, etc. Each of the above stated reasons has its causes. Many students come from environment (hometown, parents, primary school) where they were „young stars" of football. They were popular, praised, and on account of popularity they got good grades, did not have to follow the same behaviour rules and obligation standards as other students, their parents overindulged them, they did not help them develop working habits, they pictured them the wrong image of a successful and rich footballer to be. When they suddenly find themselves in a classroom with 21 such „young stars", nobody stands out anymore, everyone is treated in the same way and all of a sudden, they have all the same rights and obligations. (Hidden) struggle for survival starts. Some of them cannot immediately adjust to new demands and conditions. They insist on old patterns, they are convinced they will sooner or later succeed. Because this does not happen, they face bad grades, they are disappointed and they try to prove themselves - or resist the system, because they cannot cope with the defeat. They resort to inexplicable virosis, headache, vomiting, nausea, etc., to breaking school or dormitory rules (doodling, texting messages during classes, chatting, contradicting teachers, watching through the window, etc.) some of them even become aggressive to their schoolmates or other students. Such a student, dissatisfied with himself, perceives school as hostile, his false self-image is being ruined, and soon the consequences of his emotional and psychological instability are shown also in the football field. In football, the student's acceptance of discipline and persistence as the condition for success is quite self-evident. In football, he can prove himself to others and to himself. Exaggeration leads to injuries and in such a way he may lose the ultimate support, football.

THE PURPOSE OF THE PROJECT

Football is something that a young footballer does for his own pleasure and is not obligatory but school is and it is also obligatory to grow up and become independent. There are four conditions to pass the final exams (Matura) successfully and to become good football players: motivation, sacrifice, discipline and persistence (Žorž, 1997). There is no result without effort. The major part of the effort is needed just because of sacrifice, because to accomplish one goal you have to sacrifice something else. Discipline and persistence are not inborn characteristics, they have to be imparted with a great deal of external pressure, for example with the help of teachers, coaches, supervisors and parents. There is a need for a considerable degree of consistency which should not change into rigidity. A rigid order enslaves and depersonalizes a person. But without order and discipline a man is not free either, he becomes the slave of his momentary needs, impulses, wishes or circumstances (Žorž, 1997).

We help students transform the false self-image brought from their home environment to their own needs, wishes and goals. They have to set it to their own capabilities, they have to be aware of themselves, to build „their own" self-image. Self-image is a system of an individual's identifications, which enable the individual to become aware of himself. The real self-image includes attention to his internal needs, awareness of his own experiences, knowing his own capabilities. If it is complemented with awareness of objective environmental conditions, it forms authenticity. This authentic self-image grows, matures, develops in accordance with the maturity of an individual. In the process of growing up, the individual increasingly refrains from the external support (which gives him the false self-image) and replaces it with his internal support (Žorž, 1997).

We encourage and teach students to optimize the planning of their workday, we try to get them used to setting short-term goals to increase their persistence, we teach them to develop working habits, we educate them to take responsibility for their own actions. Every week we check their organisation plan and how they follow it. We help them if they fail to organise or carry out the plan successfully.

Beside daily plan, each student has to work out his long-term schedule or plan where he writes down all sports obligations, longer periods of absence, planned grade assessment at all subjects. In this way he can plan studying without time shortage. If a student is well-organised and follows the plan, he is almost always successful in both school and sports field.

CONCLUSION

Since this project started, we have noticed that soon after the beginning of the project the students' motivation for classes increases, better grades increase the students' self-confidence, improve the climate in the class, dormitory and their concentration in the football field, encourage the respect of values, diminish the need for punishment measures. The students have concluded that they also have more time for leisure activities.

The success in sport and successfully finished high school is a wish of every young sportsman. It is realisable only on condition that the young sportsman adjusts and accepts the responsibility of sacrifice when he is coordinating two such demanding areas. The wish itself is not enough for success, discipline and persistence are very important.

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ABSTRACT

Working with football college classes demands a specific approach, of which all people involved are aware. We are conducting different projects to enable students to carry out two demanding activities (grammar school programme and active football training) at the same time, to help them get through the adolescence years and educate them to become trustworthy and responsible sportsmen and future intellectuals.

Key words: *sports grammar school, Gimnazija Šiška, football class, education of a sportsman*

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Original scientific paper

MOTIVATION OF FEMALE SECONDARY STUDENTS TOWARDS PARTICIPATION IN PHYSICAL ACTIVITIES IN HONG KONG

INTRODUCTION

In recent years, Hong Kong has been making significant progress in sport achievements. It undertook the responsibility of hosting the equestrian events of the 2008 Beijing Olympics; and hosted the East Asian Games in 2009. In the year 2010, Asian Games, Hong Kong also secured five gold medals, seven silver medals and five bronze medals which placed it at the 11th position among 45 participating countries. However, behind this prosperous scene, school educators alerted that there has been a dramatic drop in fitness among school children which was a result of decrease in their activity level. Previous studies in Hong Kong found that local secondary school children were quite sedentary; and watching television, playing computer games and shopping were their major recreational activities (Ng, 1996). There was also a tendency among school children to avoid physical education lessons in schools, and this phenomenon was especially prominent among female secondary students (Cruz, 1998; Li, Chow and Yeung, 1995). According to Dishman (1990), participation was related to attitude, hence this study aimed to explore the attitude of female secondary school children towards physical activities.

In this study, the self-determination approach (Deci and Ryan, 1985) was used to understand the motivation of the participants. Self-determination theory suggests that behaviour can be broadly categorized as intrinsically motivated, extrinsically motivated, or amotivated. Intrinsically motivated behaviours are undertaken out of interest in the activity itself. In contrast, extrinsically motivated behaviours are controlled by external sources such as awards, trophies, money or praise. Amotivation refers to the situation where there is an absence of motivation and individuals are reluctant to get involved. Deci and Ryan (1985) further described four types of extrinsic motivation. External regulation refers to behaviour that is controlled by external sources, such as material reward or constraints imposed by others. Introjected regulation occurs when the external source of motivation has been internalized and such behaviours are reinforced through internal pressures such as guilt or anxiety. With identified regulation, the outcomes of behaviour are highly valued and are performed with less pressure. Finally, integrated regulation is in operation when the individual

comes to value and judge the behaviour as important and, therefore, performs it out of choice. From the perspective of self-determination, integrated regulation can hardly be distinguished from intrinsic motivation. The different types of motivated behaviours can be ordered along a self-determination continuum. Starting from higher to lower levels of self-determination there are: intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation. The theory predicts that high levels of intrinsic motivation and internalized extrinsic motivation, that is, self-determined forms of motivation, should lead to positive effects and should be associated with greater effort in participation. On the other hand, external regulation and introjected regulation which are controlling forms of motivation, would lead to boredom and eventually dropout.

METHOD

A total of 160 female school students from the same school participated in this study. Half of them (n=80) were junior secondary (Secondary 1) students with a mean age of 12.45 (SD=0.82); while the other half (n=80) were senior secondary (Secondary 5) students with a mean age of 16.67 (SD=0.77). They completed a questionnaire measuring the different motivational types developed by Goudas, Biddle, and Fox (1994). Students were asked to respond according to a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5) which followed the stem „I take part in the PE class …".

After data collection, the questionnaire items were reduced to five subscales: intrinsic motivation, identified regulation, introjected regulation, external regulation and amotivation. Descriptive data analysis were used to examine the motivational status of the participants, independent sample t-test was used to find out the differences in attitude between the junior and senior female school students towards participation in physical activities.

RESULTS AND DISCUSSION

Attitude of the female students towards participation in physical activities

Mean scores, obtained using descriptive analysis, revealed that intrinsic motivation (m=3.75, SD=.73) and identified regulation (m=3.76, SD=.65) were significantly higher than other scales of introjected regulation (m=2.83, SD=.93) and external regulation (m=3.30, SD=.58); while the lowest score (m=2.19, SD=.76) was obtained for amotivation.

Table 1. *General Attitude of the Whole Sample (n=160) towards Participation in Physical Activities*

Items	Mean	*SD*
Intrinsic motivation	3.75	.73
Identified regulation	3.76	.65
Introjected regulation	2.83	.93
External regulation	3.30	.58
Amotivation	2.19	.76

These findings shed a positive light on the participation motives of this group of female secondary school students in physical activities. They participated in physical activities out of intrinsic motivation and identified regulation which were at the higher level of the self-determination continuum. According to previous studies (Deci and Ryan, 1985; Vallerand and Losier, 1999), this self-determined form of motivation would lead to greater effort in participation and in turn would elicit positive effect among this group of students. Based on the findings, it can be predicted that the intention of this group of students towards physical activities would be physically active.

Age differences in attitude of female secondary students towards participation in physical activities

Age differences were inferred from the comparison of junior (Secondary 1, mean age=12.45) and senior (Secondary 5, mean age=16.67) secondary school students. Results from Independent sample t-test revealed that significant differences were observed in intrinsic motivation ($t_{(158)}$=6.34, p<.001) with junior students' results (m=4.13, SD=.56) being significantly higher than those of senior students (m=3.37, SD=.67); in identified regulation ($t_{(158)}$=3.38, p<.01) with junior students' results (m=4.01, SD=.64) significantly higher than senior students' results (m=3.35, SD=.58); also in introjected regulation ($t_{(158)}$=3.44, p<.01) with junior students' results (m=3.14, SD=.94) also significantly higher than those of senior students (m=2.52, SD=.82). For the other two motivated behaviours, the differences were not significant.

Table 2. *Comparison of Attitude between Junior (n=80) and Senior (n=80) Female Students towards Participation in Physical Activities*

Items	Junior (n=80)		Senior (n=80)		T-value	p-value
	Mean	*SD*	Mean	*SD*		
Intrinsic motivation	4.13	.56	3.37	.67	6.34	.000
Identified regulation	4.01	.64	3.51	.58	3.38	.001
Introjected regulation	3.14	.94	2.52	.82	3.44	.001
External regulation	3.38	.60	3.22	.54	1.39	.172
Amotivation	2.14	.81	2.20	.72	.38	.709

These findings revealed that, although both groups of students participated out of self-determined motivation, there was a significant decrease in the more self-determined factors of intrinsic motivation, identified regulation and introjected motivation in the senior students' group. This implied that when the female students grew older, their interest in participation in physical activities would fade. They did not feel participation as satisfying and intentional. According to the self-determination theory, their intention to participate would decrease, their participation would be associated with increasing boredom and they would exert less effort.

RECOMMENDATIONS

In light of the self-determination theory (Deci and Ryan, 1985) and based on the results from this study, several recommendations for school PE curriculum can be highlighted. Several studies have tried to identify the factors associated with students' avoidance of school physical education classes. Boredom, repetition, and lack of meaningful work within the lessons were suggested as the causes in some studies (Fox and Biddle, 1988; Rice, 1988); teachers' behaviour was also mentioned (Figley, 1985); and competitive class environment was also one of the factors (Robinson, 1990). At present, the school PE curriculum is dominated by competitive sports activities such as athletics and major ball games which place special emphasis on formal competitions. Devereux (1976) has indicated that children may be robbed of valuable learning experiences because formal competition undermines informal games and the ability to organize and run games themselves. School physical educators can strive to help school children recognize their personal improvement in these formal competitive activities, and it is also recommended that informal non-competitive physical activities such as Tai Chi, challenge courses, gymnastics and jazz be included in the curriculum. When considering the trend of PE lessons in Hong Kong, there also exist favourable conditions for encouraging females to participate

in sport and physical activities. There have been a growing amount of activities that are being incorporated in the school PE curriculum, that cater for the interest of female students such as rhythmic activities, aerobic classes, netball and outdoor adventurous activities. Recently, the trend of relating body image and developing health-related fitness within the school PE curriculum in Hong Kong (Curriculum Development Council, 2000) is a practical and constructive move in re-structuring the curriculum, especially when considering that children move into adolescence in their senior secondary years, and they are more aware of their body image. Students believed that regular physical activities promote health and allow them to have a better body shape, and they can gain satisfaction and enjoyment through participation in physical activities. Thus, this should be the future direction for the promotion of sport and physical activities.

According to a study on sport development among Asian countries (Waters and Smith, 2002), using the National Sport Development Index (NSDI) which was comprised of three domains representing the nation's sport delivery system, among 14 nations Hong Kong ranked 1st in elite sport, but 6th in mass sport and 7th in educational sport. This reflected the skewing of the national psyche towards elite sport in Hong Kong. Thus, in order to help our next generation, the allocation of resources needs to be re-considered, for example, there should be more investment in educational and mass sport as suggested in a recent study (Fu, 2002).

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ABSTRACT

The study was based on the Self-determination Theory (Deci and Ryan, 1985) to examine the motivation of female secondary students in Hong Kong towards physical activities. 160 students from secondary one and secondary five participated in the study by completing the questionnaire developed by Goudas, Biddle and Fox (1994) to examine the underlying motivational orientations. Results were positive and they revealed that intrinsic motivation and identified regulation were the main factors underlying the participation in physical activities. However, in examining the age differences, there was also a significant decrease in motivation towards participating in physical activities with higher forms ($p<.001$). It was suggested that schools, in promoting physical activities to female students, should shift the traditional school PE curriculum from focusing on competitive sports to aesthetic activities that could help students achieve physical fitness and an attractive physical appearance.

Key words: *Self-determination Theory, motivational orientations, physical activities*

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Original scientific paper

DIFFERENCES IN HEALTH-RELATED PHYSICAL FITNESS STATUS AMONG ELEMENTARY SCHOOL GIRLS IN CROATIA

INTRODUCTION

Health-related physical fitness refers to cardiorespiratory fitness, muscular strength, speed-agility and body composition (Moliner-Urdiales et al., 2010). Although the components of health-related fitness to a significant degree depend on constitutional/genetic differences (Bouchard, 1993a), they are affected by habitual physical activity and are related to health status (Bouchard, 1993b). A lifestyle of regular physical activity presumably contributes to a more efficient functioning of various systems, weight maintenance, reduced risk of mortality (Erikssen et al., 1998) and overall improvement of the quality of life (Bouchard, 1994). There is increasing evidence that high levels of fitness during childhood and adolescence have a positive influence on adult health status (Malina, 2001).

It is frequently assumed that physical activity is an integral part of growing up, but many studies show that children and adolescents are often physically inactive (Armstrong et al., 1990; Heath et al., 1994; Malina, 2001). Recent studies also show evidence of greater inactivity among girls in both vigorous and medial activities (Trost et al., 1996). Also, males have better physical fitness levels than females for both chronological and biological age groups (Ortega, 2008).

The aim of the present study was to determine the levels of several health-related physical fitness components among Croatian elementary school girls from fifth to eighth grade.

METHODS

Subjects

The sample for this study consisted of 790 fifth grade girls, 917 sixth grade girls, 1,041 seventh and 868 eighth grade girls, students of elementary schools in Croatia. A total of 3,616 school girls were chosen to participate in the present study, as a representative sample of all parts of Croatia. The schools were selected from various

geographical areas depending on their level of urbanization. All participants were healthy and participated regularly in two obligatory PE classes per week. The data were collected from February until the end of April 2009. Prior to the participation in the study, a written informed consent was obtained from every participant's parent and a permission to conduct the study from the school principals. This paper presents the results of a larger study with the aim of validating tests and measurements for assessing kinanthropometric characteristics of school children in Croatia.

Instruments and Procedure

Methods for evaluating health-related physical fitness may vary according to the structure of the study. The AAHPERD (AAHPERD, 1984) test battery designed for the assessment of health-related physical fitness in children was used as guidance in determining our test battery with slight modifications in consolidation with the Eurofit test battery (Adam et al., 1988). Body height, body weight and body mass index (BMI) were used as anthropometric measures. Five components of physical fitness were tested (four motor and one cardiovascular health-related fitness test). These included 20-meter dash (as a measure of movement speed), standing long jump (as a measure of explosive power), sit and reach (as a measure of lower back/upper thigh flexibility), dynamic sit-ups completed in 60 seconds (as a measure of abdominal strength and endurance) and distance run (as a measure of cardiorespiratory endurance).

Anthropometric assessment:

Standing height was measured to the nearest 0.5 cm with the Martin-type anthrop meter for the standing posture. Weight was measured to the nearest 0.1 kg using portable digital scales (Omron BF500 Body composition monitor). The measurements were made while the children were wearing light clothes and no shoes. BMI was calculated as weight in kilograms divided by the square of height in meters ($BMI = kg/m^2$).

Physical fitness:

The 20-meter dash was performed from the standing start position. The test measured the time elapsed to the nearest 0.1 second from the starting signal to crossing the finish line. Three trials were administrated alternating with the resting pause. The mean value was calculated and included in the analysis. This test measured the explosive power of the lower extremities, which indicates the ability of maximum movement speed.

The standing long jump (SLJ), as a measurement of explosive power, was measured to the nearest cm as the distance from the standing start to the point of

landing heels. Three trials were administered and the mean value was included in the analysis.

The sit and reach (SAR) measured the distance of the performed stretch to the nearest cm. Before the test, the shoes were removed and the subjects were instructed to slowly reach forward with their knees fully extended as far as possible with palms facing downward. This test represents flexibility in the lower back and upper thighs. Three trials were administrated and the mean value was taken in the analysis.

The maximum number of sit-ups achieved in 60 seconds was recorded. The subjects were instructed to keep their arms across the chest while curling up to a sitting position until their elbows touched their thighs. This test gave us insight into abdominal strength and endurance. One trial was given.

A distance run (600 meters) was measured as the time elapsed to the nearest second from the starting signal to crossing the finish line. This test presents an example of cardiorespiratory endurance. The time necessary to cover the proposed distance was recorded in minutes and seconds. One trial was administrated.

DATA ANALYSIS

A data analysis was conducted using the Statistical Package for Social Sciences (v18.0, SPSS Inc., Chicago, IL). The descriptive statistics were computed for all the experimental data and separately for each grade (mean, standard deviation, range, skewness and kurtosis). In addition, the Kolmogorov-Smirnov test was used for testing the normality of distribution before further analysis. The differences between the children's physical fitness profiles from grade to grade were determined using analysis of variance ANOVA with Bonferroni correction. The statistical significance was estimated at the level of $p \leq .000625$.

RESULTS

Table 1 shows the health-related physical fitness means and standard deviations stratified by grades. Overall, one way ANOVA showed that all of the health-related physical fitness variables showed statistical significance and higher results in older girls.

Pair wise comparison analysis in body height, as well as in body weight, between all grades showed statistical differences ($p<0.000$). In BMI there was statistical significance between sixth and seventh grade ($p=0.04$), but no statistical significance between fifth and sixth grade ($p=0.211$) nor seventh and eighth grade ($p=0.252$). Ability of maximum movement speed, represented by the 20 meter dash, showed statistical difference between fifth and sixth ($p=0.000$), and sixth and seventh grade

(p=0.04) but no difference was found between seventh and eighth grade (p=1.000). In standing long jump differences were found between fifth and sixth, and sixth and seventh grade, respectively (p=0.000, p=0.006), but no difference between seventh and eighth grade (p=0.454). Sit and reach test showed no statistical significance only between sixth and seventh grade (p=1.000) as opposed to difference in fifth and sixth (p=0.000), and seventh and eighth grade (p=0.000). Statistical significance was obtained between all grades in maximum number of sit-ups (p<0.03). Distance run test showed significant differences between fifth and sixth grade (p=0.01) and seventh and eighth grade (p=0.000) but there was no difference between sixth and seventh grade (p=0.456).

Table 1. *ANOVA results and health-related physical fitness means and standard deviations stratified by grades*

	X ± SD				P value
Variable	Fifth grade	Sixth grade	Seventh grade	Eighth grade	
Height (cm)	152.17 ± 7.80	157.79 ± 7.26	162.46 ± 6.63	164.67 ± 6.46	0.000
Body mass (kg)	46.04 ± 10.85	50.07 ± 11.49	54.51 ± 10.70	56.84 ± 9.97	0.000
BMI (kg/m^2)	19.79 ± 3.79	20.14 ± 3.76	20.67 ± 3.45	20.99 ± 3.22	0.000
Dash (sec)	4.22 ± 0.48	4.12 ± 0.44	4.05 ± 0.45	4.04 ± 0.45	0.000
SLJ (cm)	15.35 ± 22.01	158.29 ± 22.93	161.59 ± 22.22	163.39 ± 22.75	0.000
SAR (cm)	43.07 ± 8.00	44.62 ± 7.76	44.90 ± 8.45	46.47 ± 8.66	0.000
Sit-up (n/60sec)	35.17 ± 8.64	37.71 ± 8.58	39.37 ± 8.56	40.45 ± 9.58	0.000
600 m (sec)	212.96 ± 58.83	202.50 ± 53,69	207.04 ± 58.70	195.73 ± 56.55	0.000

BMI - Body mass index, Dash - 20-meter dash, SLJ - standing long jump, SAR - sit and reach, Sit-up - number of sit-ups completed in 60 seconds, 600 m - distance run

DISCUSSION

The results obtained in this study show that the performance on all of the physical fitness variables is generally higher in older girls despite recent study evidences of populations' sedentary behaviour. In this study, school girls were grouped by grades, irrespective of their chronological age and biological development, so some misclassification for children and adolescents in relation to their biological development may occur. Therefore, it is of interest to examine the associations between health-related physical fitness components and biological age in young girls.

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ABSTRACT

Health-related physical fitness refers to cardiorespiratory fitness, muscular strength, speed-agility and body composition. There is evidence of greater inactivity among girls in both vigorous and medial activities, as well as lower physical fitness levels. The aim of the present study was to determine the levels of several health-related physical fitness components among Croatian elementary school girls from fifth till eighth grade. A total of 3,616 school girls were tested for anthropometry and physical fitness. The results obtained in this study show that the performance in all of the physical fitness variables is generally higher in older girls.

Key words: *physical fitness, health-related, school girls*

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Original scientific paper

KEY COMPETENCES OF CZECH STUDENTS IN PE LESSONS WITH DIFFERENT CONTENT

BACKGROUND

Key student competences at Czech secondary schools are being prepared as a part of a new school reform. This reform is going to be undertaken at middle and upper secondary schools in September 2012, but some schools have already been teaching according to the newly prepared school education programme. This reform integrates Physical Education and health education (with contents such as: healthy lifestyle, human relationships, prevention against civil diseases, etc.) into wider area „Humans and Health".

Physical Education, according to this new reform document, advocates permanent attitude of pupils towards physical activities and their optimal development of physical, mental and social competences (Výzkumný ústav pedagogický, 2007). It is necessary to perceive the problem area of health in a wider sense, not only as one school subject, but as a lifestyle. Thus competences obtained in PE lessons should help to create physically educated young people. One of the main aims for PE that should be discussed in details seems to be the development of physical literacy. This term is defined by Whitehead (2010) „... physical literacy can be described as a disposition, evidenced through the motivation, confidence, physical competence, knowledge and understanding to maintain physical activity throughout the life course".

The key competences focused on in this paper are rather latent in the process of teaching PE that is more oriented to movement skills, performance, fitness, feeling good about one's achievement, and challenging atmosphere. Key competences are a sum of knowledge, understanding, abilities, attitudes and values important for personal development and involvement in the society. Key competences in the new school reform for secondary schools should be achieved by all students by the end of secondary school education. These are: learning competence, problem-solving competence, communication competence, social competence, civil competence, „spirit of enterprise" competence. These competences are not linked to a particular school subject; they should be developed in students within the whole educational process through various school activities and should continue as part of lifelong learning.

We feel that physical literacy (physical competence is not in the new school reform) comprises all key student competences that are a part of the educational process in schools. There is no specific tool to confirm this. However, the questionnaire focusing on pupils' attitude towards PE lessons that had been applied for many years seemed a useful tool. After looking into its questions and discussing with experts, we decided to use some questions to identify four key competences.

OBJECTIVE

The main aim is to compare four key student competences (educational, problem-solving, communication, and social competence) in different types of PE lessons to help teachers prepare better their school education programmes.

METHODS

During students' teaching practice from 2008 to 2010, the questionnaire (pupils' attitude towards physical education lesson) (Frömel, Stratton, Vasendova, & Pangrazi, 2002) was applied in one typical PE lesson and one fitness oriented PE lesson. Fitness oriented PE lesson means that the content of exercise was the same as in typical lesson but exercising was more demanding (for instance, with extra tasks, higher heart rate or with higher load). The content of the lessons was games (football, volleyball, basketball, and others), athletics, gymnastics, exercising (fitness, conditioning), and dance (including aerobics). PE lessons were taught by experienced teachers.

Participants were pupils aged 12-19 from various elementary schools, middle secondary schools and secondary school students in the Czech Republic. In total, questionnaires from 4,247 pupils and students were gathered.

The questionnaire (pupils' attitude towards PE lesson) is designed to evaluate pupils' and students' attitude towards PE lesson. It contains 24 questions divided into six sections and one complementary section (pupil's role) (for more details see Frömel et al. (2002)). For this research, four questions have been chosen to describe each student's competence. *Learning competence* means that a pupil is able to plan and organise his/her own learning, to effectively use various strategies to obtain and process new information that is critically accepted, and to admit criticism from others, etc. (described by questions number 1, 7, 13, and 19). *Problem-solving competence* comprises, for instance, an identification of a problem, finding its core, suggesting ideas how to solve this problem; a pupil uses suitable methods for problem-solving, is critical, open-minded to all suggestions and evaluates pros and cons of particular solutions (questions 6, 8, 12, and 16). *Communication competence* means that a pupil uses various types of communication means (verbal and non-verbal), expresses himself/herself clearly in speaking and writing with respect to the audience and the

aim of a message, presents his/her work in front of familiar/unfamiliar audience, etc. (questions 4, 18, 20, and 22). *Social competence* comprises active cooperation with other people, prediction of own behaviour and dealing with others, adaptation to new working conditions and responsible relationships to personal and others' health (questions 2, 3, 10, and 15). Maximum score for each competence is 4 points (ordinal data).

In order to perform statistical analysis, score had to be counted for each competence, and three types of schools, two types of PE lessons and their content were specified. For statistical analysis, Kruskal-Wallis test was used for non parametric data to find differences between schools, the type of lessons and the content of PE lessons. To calculate „effect size", η^2 (Morse, 1999) and its formula: $\eta^2=H/(n-1)$ was used.

RESULTS

We analysed 4,247 pupils' (2,341 girls' and 1,906 boys') questionnaires for evaluation of PE lessons. Mean and median values were calculated and compared according to the type of schools (Table 1). Four values were maximum values in each competence.

In PE lessons, students and pupils can learn the most at elementary school while in secondary schools they are more oriented to problem-solving competence. Communication competence is on the same level regardless of the type of school. No significant difference was found there. Students from secondary schools scored highest in social competence (M=2.77).

Table 1. *Mean values for students' competences divided according to the type of school*

	Elementary school (n=1686)	Elementary school – secondary school type (n=1407)	Secondary school (n=1154)	H	η^2
Learning competence	2.35	2.23	2.24	12.35**	0.003
Problem-solving competence	2.42	2.35	2.47	6.22**	0.001
Communication competence	2.35	2.35	2.40	1.84	0.000
Social competence	2.62	2.66	2.77	11.74**	0.003

Legend: H – Kruskal-Wallis test; **p<0.01; η^2 – effect size

If pupils' load during exercising in PE lessons is increased, there is decrease in obtaining certain competences (Table 2). Only social competence remained the same. Such a type of PE lesson had different objective than fulfilment of key students' competences; we can say, another added value for students.

Table 2. *Mean values for students' competences in typical PE lesson and fitness oriented PE lesson*

	Typical PE lessons (n=2274)	Fitness oriented PE lesson (n=1973)	H	η^2
Learning competence	2.32	2.23	6.61*	0.002
Problem-solving competence	2.44	2.38	1.97	0.000
Communication competence	2.40	2.31	8.17**	0.002
Social competence	2.67	2.68	0.29	0.000

Legend: H – Kruskal-Wallis test; **p<0.01, *p<0.05; η^2 – effect size

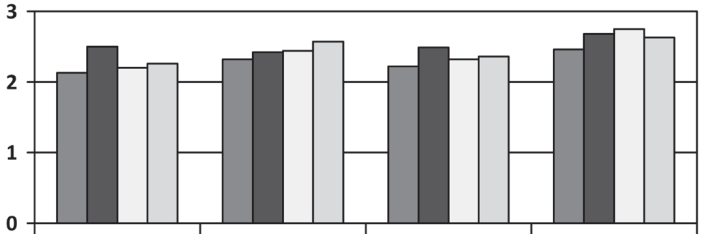
The comparison of PE lessons with various contents showed interesting results (Table 3). Learning competence, as well as social competence is best obtained in PE lesson containing dance or aerobics. Such content is not so typical for PE lessons (teachers must be skilful and experienced) and students (mainly girls) can learn new figures, new dancing styles, new terminology, etc. Problem-solving competence is best obtained in gymnastics lesson; partly because the content is oriented more to combining different exercises to create gymnastics line. It is not a separate task but a complex one. Communication competence is also mainly connected to gymnastics; sometimes as an inseparable part of problem-solving tasks where students are to communicate and discuss their solutions.

Table 3. *Mean values for students' competences in PE lessons with different content*

	Games (n=2624)	Athletics (n=356)	Gymnastics (n=338)	Fitness (n=808)	Dance (n=121)	H	η^2
Learning competence	2.22	2.50	2.57	2.19	2.64	64.48**	0.015[a]
Problem-solving competence	2.41	2.52	2.54	2.32	2.40	16.34**	0.004
Communication competence	2.31	2.45	2.58	2.36	2.57	38.49**	0.009
Social competence	2.57	2.78	2.69	2.85	3.39	99.84**	0.024[a]

Legend: H – Kruskal-Wallis test; **p<0.01, *p<0.05; η^2 – effect size; a – small effect size

In Figure 1 different games lessons were compared. Learning and communication competences are best obtained in basketball (n=1,282). Problem-solving competence is put forward into volleyball lessons (n=403). PE lessons with other games (e.g. floorball, ringo, Frisbee, handball, etc.) (n=604) are the best in offering problematic tasks and pupils are forced to discuss and work with other classmates. In football lesson (n=335) students recognised improvement in social contacts and personal relationships. Differences in median in all four competences were found as statistically significant, but effect size coefficient was calculated as small only for learning competence and social competence.



	Learning competence	Problem-solving competence	Communication competence	Social competence
Basketball	2,13	2,32	2,22	2,46
Volleyball	2,5	2,42	2,49	2,68
Football	2,2	2,44	2,32	2,75
Other games	2,26	2,57	2,36	2,63

Figure 1. *Students' competence in PE lessons with games (n=2624) according to questionnaire*

DISCUSSION

This study concentrated on the comparison of four key students' competences in different types of PE lessons to help teachers prepare better their school education programmes. Despite the fact that there is no suitable and standardised tool for survey, we used our questionnaire for assessing pupil's attitude to PE lessons to obtain information about four key competences. This is one of the limitations of the study at the same time. Another limitation is an unequal number of questionnaires obtained in each type of PE lessons and schools.

Obtaining key competences throughout school education should prepare a student to lead successful life and to know how to deal with various obstacles. For a PE lesson to be considered 'high quality', a study by Haydn-Davies (2005) concludes that it should be actively aiming to prepare children and youth „to participate in lifelong physical activity (LLPA) by focusing on skills and attitudes to be used outside

limited curriculum time". In PE lessons teachers often concentrate more on pupils being good at specific sports thus acquiring various physical skills, and the problem of transferring this ability into adult life is not satisfactory solved.

Our findings, after we compared key competences in different types of schools, showed that there is a bigger gap between obtaining four competences in PE at secondary schools. Students there perceived social competence as more important than learning competence. Social contacts with their classmates in PE are more specific than in other subjects where they sit at the desk most of the time. Typical PE lesson enhanced learning and communication competences more than fitness oriented PE lessons. Learning outcomes are different in those two types and it is perceived by students as well. Programme and content of fitness oriented PE lessons comes from a typical lesson. The main difference is that exercises are more demanding (more possibilities of exercising, higher heart rate and so on) for pupils. In our analysis of the PE lessons content, it was found that learning competence is best recognised in dance and aerobics lessons and least developed in fitness (conditioning) lessons. Combination of action, new figures, and movements enrich pupils in knowledge sphere. Problem-solving (critical thinking) as well as communication competences are well developed in gymnastics lessons. Such educational gymnastics lessons (focusing on body management) are the basis of all other sports and can become a key aspect of developing physical literacy (Baumgarten & Pagnano-Richardson, 2010). Social competence is well developed in dance and aerobics lessons. This interesting finding can stipulate further research because in aerobics pupils exercise by themselves while dance in education involves purposeful and varied interaction with others in performance, composition and appreciation (Killinbeck, Bowler, Golding, & Sammon, 2007).

Games dominate in curricular PE and can be used as one strategy of helping students acquire key aspects of physical literacy (Mandigo & Holt, 2004). In volleyball, students enhance learning and communication competences; football is best to enhance social competence and in other games students solve problems connected with games strategy.

Potentially, teachers may incorporate key competences in all PE lessons regardless of the type and content. This study serves as the reflection on what and how things are taught and instructed in contemporary PE lessons and might help teachers to prepare better physical education programmes with respect to physical literacy.

CONCLUSION

Developing key students' competences in PE lessons tends to be the fundamental task for PE teachers. They should not only develop and enhance movement, technical and tactical skill but also students should be supported to solve and communicate problems within PE contents. It is, among others, inseparable part of the so-called physical literacy.

Findings from our research indicate that PE teachers should preferably concentrate on developing learning competence in secondary school students and problem-solving competence in students from elementary school or middle secondary schools. Given that games tend to dominate many PE programmes, we highlight game literacy as part of physical literacy. Volleyball, gymnastics and dance, including aerobics are the best contents of PE lessons for students' competence enhancement. Yet, teachers should try to concentrate on key competences also in PE with other content to be more effective.

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ABSTRACT

Background: Key student competences at Czech middle and upper secondary schools are being prepared as part of the new school reform. This reform is going to be applied in September 2012, but some schools have already been teaching according to the newly prepared school education programmes.

Objectives: The main aim is to compare four key student competences (learning, problem-solving, communication, and social competence) in different types of PE lessons. The paper analysed 4,247 pupils' evaluation questionnaires of PE lessons. Four questions were chosen as indicators of each competence.

Results: Learning competence in PE lessons is best recognised in dance and aerobics lessons and developed least in fitness lessons. Problem solving competence as well as communication competence are best developed in gymnastics lessons. Social competence is best developed in dance and aerobics lessons.

Conclusion: PE teachers should preferably concentrate on developing learning and problem-solving competence in students.

Key words: *learning competence, questionnaire, problem-solving competence, communication, school reform, physical literacy*

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Izvorni znanstveni rad

MOTIVACIJA ZA ANGAŽIRANJEM, POSTIGNUĆA U NASTAVI TJELESNOG ODGOJA I DOB UČENIKA

UVOD

Tjelesni odgoj, navode Allison et al. (2000) predstavlja predmet u školskom sistemu u kojem se od učenika očekuje da stekne znanja i vještine u području sporta i tjelesne aktivnosti. Kako je cilj nastave pomoći učenicima da shvate, razviju i usvoje obrasce zdravog načina života, neophodno je istražiti i potaknuti njihovu motivaciju za usvajanje ovakvog ponašanja. Ovo nije lak zadatak, s obzirom na to da mnogi činioci mogu interferirajućedjelovati.

Drudy & Uí Chatháin (2002) smatraju da je obrazac interakcije na relaciji profesor - učenik važan dio procesa usvajanja znanja te da na tu interakciju mogu bitno utjecati spol nastavnika, veličina odjeljenja, spolna struktura razreda, kao i rodno tipiziranje aktivnosti koja se izvršava (feminina vs maskulina). Koka & Hein (2003) smatraju da nastavnik svojom povratnom porukom može doprinijeti jačanju motivacije kod učenika i želje da se ostvare dobri rezultati i da se maksimalno angažira u nastavi. Jedan od osnovnih oblika i potkrijepljivanja i davanja povratne informacije učenika o njegovim aktivnostima u školskom sistemu je upravo ocjena. Pozitivna ocjena može biti pokazatelj djetetove uspješnosti, zalaganja i zanimanja, ali i važan motivator za daljnje bavljenje tjelesnom aktivnošću, budući da utječe na djetetov doživljaj tjelesne i sportske kompetentnosti. Oni su utvrdili da postoji visoka korelacija između dobivanja povratne informacije i zanimanja za angažiranje u nastavi tjelesnog odgoja.

Stoga je cilj ovog rada da se utvrdi postoje li na različitim uzrastima razlike po pitanju školskog postignuća i motivacije za aktivno sudjelovanje u nastavi tjelesnog odgoja učenika.

Hipoteze:

- nivo motivacije za aktivno sudjelovanje na satima tjelesnog odgoja bit će veći kod mlađih učenika i bit će najveći kod učenika IV. razreda

- ocjena iz nastave tjelesnog odgoja kod najvećeg će broja učenika biti „odličan" bez obzira na uzrast
- opći će uspjeh kod najvećeg broja učenika biti „odličan" bez obzira na uzrast
- najmlađi će se učenici u najvećoj mjeri aktivno baviti sportom dok se najstariji učenici u najvećem broju neće baviti sportom
- najstariji učenici će u najvećoj mjeri smatrati da je znanje koje se dobiva na satovima fizičkog odgoja „dovoljno za sve učenike".

METODE

Varijable u istraživanju:

Nezavisne varijable:

- Uzrast – varijabla je kategorički izražena u odnosu na razred koji su učenici pohađali u trenutku popunjavanja upitnika (IV, V, VI, i VII. razred)
- Ocjena iz tjelesnog odgoja promatrana je kroz pet kategorija (nedovoljna, dovoljna, dobra, vrlo dobra i odlična)
- Opći uspjeh učenika iz prethodnog razreda svrstan je u pet kategorija (nedovoljan, dovoljan, dobar, vrlo dobar, odličan)
- Mišljenje učenika o dovoljnosti znanja stečenih kroz nastavu tjelesnog odgoja dobiveno je zaokruživanjem odgovora – „dovoljna za neke učenike", „dovoljna za većinu učenika" i „dovoljna za sve učenike"
- Jedno od pitanja odnosilo se i na to bave li se i na koji način (aktivno ili rekreativno) učenicisportom.

Zavisna varijabla u istraživanju bila je skor na skali motivacije angažiranja učenika u tjelesnom odgoju.

Instrumenti istraživanja:

Skala motivacije za mjerenje angažiranja u tjelesnom odgoju i upitnik u vezi učeničkih postignuća (opći uspjeh iz prethodnog razreda, ocjena iz tjelesnog odgoja, pitanje u vezi bavljenja sportom i pitanje o dovoljnosti stečenih znanja u nastavi tjelesnog odgoja).

Skala motivacije za mjerenje angažiranja u tjelesnom vaspitanju revidirani instrument MSP za potrebe doktorske disertacije Barjaktarević (2001). Orginalna skala potiče iz instrumenta Motiva sportskog postignuća (MSP) Lazarevića i Havelke (1981), odakle je preuzeta subskala motiva postignuća. Skala motivacije za mjerenje angažiranja u tjelesnom odgoju sastoji se od 29 tvrdnji. Neke su u originalu preuzete

iz subskale Motiva sportskog postignuća (iz instrumenta MSP). Pojedine tvrdnje preuzete su iz instrumenta Motiva opšteg postignuća (MOP), autora Lazarevića i Havelke (1981). Jedna je tvrdnja pridodana od strane Barjaktarević (2001). U odnosu na originalnu skalu, način je bodovanja izmijenjen i vrši se na osnovi petostepene skale Likertovog tipa (1 = nikad do 5 = uvijek). Unutrašnja konzistentnost skale mjerena je $\alpha = 0,84$ ($F = 87,05$, $df = 28$, $p < .000$).

Način obrade podataka: Podaci su obrađivani u programu SPSS pri čemu su korišteni deskriptivna statistika, χ^2 test i tabele kontingencije, ANOVA.

Uzorak ispitanika: Uzorkom je obuhvaćen 401 ispitanik, od toga 92 učenika IV. razreda, 50 učenika V., 97 učenika VI. razreda i 162 učenika VII. razreda osnovne škole. Istraživanje je provedeno u dvije beogradske osnovne škole centralnog gradskog područja Beograda, sa standardnim uvjetima za realizaciju programa nastave tjelesnog odgoja.

Procedura: Istraživanje je provedeno na kraju školske godine, na prigodnom uzorku. Podaci su prikupljani u učioničkom ambijentu, a upitnik je bio anoniman.

REZULTATI

U nastavku su prikazani rezultati dobiveni u istraživanju. Opći uspjeh učenika na kraju prethodnog razreda u najvećem je broju slučajeva bio odličan, ali ipak postoje statistički značajne razlike. Vrijednost χ^2 testa je iznosila 44,781 za $df = 12$ i $p < .000$.

Tablica 1. *Opći uspjeh na kraju prethodnog razreda učenika IV – VII. razreda*

OPĆI USPJEH	RAZRED				
	IV	V	VI	VII	UKUPNO
DOVOLJAN		1		3	4
DOBAR	1	2	4	18	25
VRLO DOBAR	14	10	40	62	126
ODLIČAN	77	37	53	79	246
UKUPNO	92	50	97	162	401

Kada je u pitanju ocjena iz tjelesnog odgoja, pokazalo se da velika većina učenika ima ocjenu „odličan" bez obzira na uzrast, što je potvrdilo i odsustvo statistički značajne razlike ($\chi^2 = 10,707$ za $df = 9$ i $p < .296$).

Tablica 2. *Ocjena iz tjelesnog odgoja učenika IV – VII. razreda*

OCENA IZ TJELESNOG ODGOJA	RAZRED				
	IV	V	VI	VII	UKUPNO
DOVOLJAN				3	3
DOBAR	1			1	2
VRLO DOBAR	5	2	10	19	36
ODLIČAN	86	48	87	139	360
UKUPNO	92	50	97	162	401

Ispitivanje odnosa uzrasta i mišljenja o dovoljnosti stečenih znanja u nastavi tjelesnog odgoja pokazalo je da postoji statistički značajna razlika u procjeni između učenika različitih uzrasta ($\chi^2 = 18{,}044$ za $df = 9$ i $p < .035$).

Tablica 3. *Mišljenje o dovoljnosti znanja koja se stiču na satovima tjelesnog odgoja učenika IV. – VII. razreda*

MIŠLJENJE O DOVOLJNOSTI ZNANJA	RAZRED				
	IV	V	VI	VII	UKUPNO
DOVOLJNO ZA SVE UČENIKE	41	20	30	36	127
DOVOLJNO ZA VEĆINU	29	18	38	77	162
DOVOLJNO ZA NEKE	22	12	29	49	112
UKUPNO	92	50	97	162	401

Značajan broj učenika bavi se sportom ($\chi^2 = 18{,}621$ za $df = 6$ i $p < .005$) s tim da se taj broj s uzrastom povećava i u pogledu natjecateljskog i u pogledu rekreativnog sporta.

Tablica 4. *Bavljenje sportom učenika IV – VII. razreda*

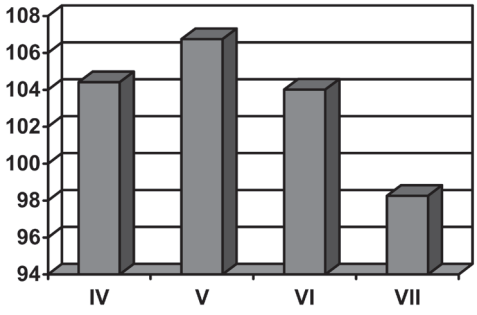
BAVLJENJE SPORTOM	RAZRED				
	IV	V	VI	VII	UKUPNO
NE BAVI	18	12	9	16	55
REKREATIVNO	17	6	21	51	95
BAVI	57	32	67	95	251
UKUPNO	92	50	97	162	401

Kada je u pitanju motivacija, analizom varijance utvrđeno je da postoji statistički značajna razlika između učenika različitih uzrasta na Skali motivacije za mjerenje angažovanosti u tjelesnom odgoju. ($\chi^2 = 5{,}556$ za $df = 3$ i $p < .001$).

Tablica 5. *Skorovi na Skali motivacije za merenje angažovanosti u tjelesnom odgoju*

Ukupan uzorak	MIN	MAX	M	SD	N
	53	137	102,13	16,33	401
IV razred	72	137	104,42	14,37	92
V razred	55	137	106,74	19,24	50
VI razred	65	135	104,02	15,48	97
VII razred	53	131	98,27	16,23	162

Da bi se utvrdilo koje se grupe učenika statistički značajno razlikuju po pitanju motivacije, u post hoc analizi koristili smo Scheffeov test. Post hoc usporedba je pokazala da postoje statistički značajne razlike između učenika IV. i VII. ($p < .036$), kao i V. i VII. ($p < .015$) razreda u nivou motivacije za aktivno sudjelovanje u nastavi tjelesnog odgoja.



Slika 1. *Grafički prikaz odnosa skorova učenika IV – VII. razreda na Skali motivacije za mjerenje angažiranosti u tjelesnom odgoju*

Nivo motivacije za angažiranje u nastavi tjelesnog odgoja gotovo je jednak kod učenika IV. i VI. razreda. Najveći je kod učenika petog razreda (iako ne statistički značajno viši u odnosu na ove razrede), a do uočljivog pada dolazi kod učenika VII. razreda.

DISKUSIJA

Postignuća učenika mogu biti rezultat efikasnosti ukupnog obrazovnog procesa na određenom nivou školovanja, ali se parcijalno mogu promatrati i kao rezultat obrazovnog procesa pojedinog predmeta. (Višnjić, 2004) Svi pokazatelji postignuća u nastavi tjelesnog odgoja prate se i iskazuju između ostalog i ocjenom iz tjelesnog odgoja. Ocjena iz nastave tjelesnog odgoja, mada u velikoj mjeri može biti subjektivna, jedan je od pokazatelja postignuća učenika i rezultata nastave. (Martinović, 2003)

Ovim istraživanjem potvrđeno je da najveći broj učenika ima „odličan" školski uspjeh, ali i to da većina učenika, bez obzira na uzrast, ima odličnu ocjenu iz tjelesnog odgoja i tu nisu dobivene statistički značajne razlike.

Dobiveni rezultati u ovom istraživanju potvrdili su glavnu hipotezu da su mlađi učenici motiviraniji, da se aktivno angažiraju na satima tjelsnog odgoja, ali je ta motivacija bila najveća kod učenika V. razreda. Već u VI. razredu dolazi do vraćanja na nivo motivacije iz IV. razreda, a kod učenika VII. razreda taj pad postaje i statistički značajan. Ovi nalazi su u suglasnosti s rezultatima Van Wersch et al. (1992) i Xiang et al. (2003) koji su pokazali da što su učenici stariji sve su manje zainteresirani za bavljenje tjelsnom aktivnošću, slabi njihova motivacija i uvjerenje u vlastitu tjelesnu kompetentnost te da se uslijed toga njihovo aktivno učešće i zalaganje na satovima tjelesnog odgoja značajno smanjuje.

Rezultati ovog istraživanja pokazali su i da je aktivno bavljenje sportom prisutno u jednakoj mjeri na sva četiri uzrasta, dok se rekreativno bavljenje sportom značajno povećava na starijim uzrastima.

Sallis & McKenzie (1991) tvrde da je zapravo najvažnija uloga suvremene nastave tjelesnog odgoja da se djeca pripreme za usvajanje zdravog i aktivnog načina života. Oni smatraju da je to značajno zbog usvajanja intrinzične motivacije za vježbanje što ima za posljedicu aktivno bavljenje nekim oblikom tjelesne aktivnosti tokom cijelog života.

Međutim, dobivene su statistički značajne razlike između učenika različitog uzrasta u pogledu mišljenja o dovoljnosti znanja koja se stiču na časovima fizičkog vaspitanja. Učenici IV. razreda smatrali su da su znanja koja stječu dovoljna za sve učenike, učenici V. razreda su u gotovo jednakom broju smatrali da je stečeno znanje dovoljno za sve odnosno za većinu učenika, dok su učenici VI. i VII. razreda u najvećoj mjeri smatrali da je znanje dovoljno za većinu učenika. Čini se da je V. razred ključan za promjenu mišljenja o kvalitetu i količini stečenih znanja, a da je nezadovoljstvo posebno prisutno kod učenika VII. razreda.

ZAKLJUČAK

Zanimanja motiviraju učenika da poveća količinu pažnje, da se kognitivno fokusira da bude uporan u obavljanju određene aktivnosti te da se afektivno i emocionalno uključi u tu aktivnost. S druge strane, zanimanja se zasnivaju na uvećanju znanja, pozitivnih emocija i povećanom pridavanju značaja i želji za postizanje uspeha u određenoj aktivnosti. Stoga je, poznavanje interesovanja učenika od velikog značaja za poboljšanje motivacije za aktivno angažovanje u nastavi fizičkog vaspitanja, ali i za preventivno delovanje na starijim uzrastima u cilju očuvanja adekvatnog nivoa motivacije za bavljenjem fizičkom aktivnošću. Pošto se pokazalo da na starijim uzrastima dolazi do nezadovoljstva količinom i kvalitetom znanja koja se stječu u nastavi (obrat se javlja u V. a kulminacija nezadovoljstva u VII. razredu). To je jedan od mogućih razloga za umanjenje nivoa motivacije za aktivno sudjelovanje u nastavi tjelesnog odgoja kod učenika VII. razreda. Bilo bi korisno više pažnje posvetiti upoznavanju učenika s nekim elementarnim pravilima i znanjima o vježbanju i vježbanjima (bilo da se radi o upoznavanju učenika s pravilima određenog sporta ili s vježbama koje mogu doprinijeti pravilnom rastu i razvoju), kako bi mogli da ih upražnjavaju u slobodnom vremenu sada, ali i po završetku školovanja.

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MOTIVATION FOR INVOLMENT, ACHIEVEMNTS IN PHYSICAL EDUCATION AND CLASSES OF MALE STUDENTS

ABSTRACT

Physical education plays a central role in increasing the level and quality of physical activity, especially among young people, with a tendency for such a pattern of behaviour to become life-style one day. Since physical ability, level of interest and commitment varies among students, the study of motivational problems regarding active involvement in physical activity is very important, especially if these fluctuations are correlated with achievements, which, in physical education, are a synthesis of several components. The relationship of academic success and motivation for active involvement in physical education was examined on a sample of 401 pupils from the fourth to seventh grade of elementary schools. There was a statistically significant difference between the groups of students when it comes to the overall success, but not regarding the mark in physical education. In addition, boys in the fifth grade attained the highest scores on the motivation scale.

Key words: *motivation, academic achievement, physical education, boys*

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Pregledeni rad

FUNKCIONALNE SPOSOBNOSTI UČENIKA U OSNOVNOJ ŠKOLI

UVOD

Etimološki se pod pojmom funkcije, u biološkom smislu, podrazumijeva specifični rad organa odnosno rad organizma uopće (Klaić, 1987.). Međutim, kineziološka praksa, a pod time i nastava tjelesne i zdravstvene kulture, uobičajeno obuhvaća pod navedenim pojmom rad srčano-žilnog i dišnog sustava. Navedeni sustavi najzaslužniji su u obavljanju zadaće opskrbe i prijenosa kisika te odstranjivanja štetnih tvari. Dišni sustav predstavlja prvu kariku prijenosnog sustava za kisik te razlikuje dvije osnovne funkcije: ventilaciju zraka (izmjena zraka između atmosfere i pluća) i alveolarnu difuziju (izmjena kisika iz alveolarnog prostora u krv, odnosno prijem ugljičnog dioksida iz krvi u prostor alveola) (Mišigoj-Duraković, 1999.). Srčano-žilni sustav (sa srcem kao pokretačkom *pumpom* i krvnim žilama kao zatvorenim sustavom cijevi) sudjeluje u transportu kisika, hranjivih i otpadnih tvari te izmjeni plinova. (Hole, 1993.)

Važnost adekvatne razine funkcionalnih sposobnosti proizlazi primarno iz zdravstvenih razloga, kao svojevrsna mjera zaštite od pretežito sedentarnog načina života te njegovim posljedicama: pojavom sve većom gojaznosti i šećerne bolesti (Hills i sur; 2007.)

Uobičajena praksa mjerenja funkcija krvožilnog sustava obuhvaća mjerenje frekvencije srca u mirovanju, mjerenje frekvencije srca pri radu te mjerenje arterijskog krvnog tlaka, dok mjerenje funkcija dišnog sustava najčešće podrazumijeva procjenu maksimalnog primitka kisika. (Heimer, 1997). Obzirom na nedostupnost i kompliciranu primjenu navedenih mjera u nastavi tjelesne i zdravstvene kulture, najprimjerenija procjena funkcionalnih sposobnosti učenika (opće aerobne sposobnosti) izvodi se pomoću trčanja 3 minute (F3) za učenike razredne nastave, odnosno 6 minuta (F6) za učenike viših razreda osnovne škole i za učenike srednje škole (Findak, 1999.).

Ovaj rad napisan je s ciljem pregleda dosad objavljenih radova vezanih za funkcionalne sposobnosti učenika osnovne škole. Izbor radova napravljen je iz

zbornika radova Ljetne škole kineziologa Hrvatske te je ukupno uvršteno 17 radova, od kojih 3 vezanih za niže razrede, odnosno 14 za više razrede.

TESTIRANJA FUNKCIONALNIH SPOSOBNOSTI U OSNOVNOJ ŠKOLI

Niži razredi

Procjena funkcionalnih sposobnosti u nižim razredima provodi se putem testa trčanja u trajanju od tri minute (F3) (Findak i sur; 1996.). Cetinić i Petrić (2010.) proveli su istraživanje vezano za razlike u funkcionalnim sposobnostima obzirom na spol. Statistički značajne razlike pronađene su između učenika i učenica u 1. i 4. razredu. Babin i sur. (2004.) proveli su istraživanje s eksperimentalnom i kontrolnom skupinom učenika prvih razreda s ciljem dokaza pozitivnih učinaka dopunskih vježbi u nastavi TZK. Utvrđen je pozitivan utjecaj modaliteta rada sa dopunskim vježbama te značajne razlike u testu F3 u korist eksperimentalne grupe. Bavčević i sur. (2004.) proveli su slično istraživanje s učenicama prvih razreda te dobili bolje rezultate u testu F3 s eksperimentalnom grupom koja je provodila složene oblike rada za razliku od kontrolne koja je provodila polovicu vremena složene, a ostatak jednostavne oblike rada. Opći podaci iz navedenih radova nižih razreda nalaze se u tablici 1.

Tablica 1. *Prikaz rezultata testa F3 kod nižih razreda*

	RAZRED - obilježje	N	SPOL	F3 REZULTAT (m) A.S.±S.D.
Cetinić i Petrić, 2010.	1.	50	M	540,86±81,65
	1.	50	Ž	483,6±73,72
	2.	50	M	569,88±70,35
	2.	50	Ž	544,16±79,89
	3.	50	M	573,1±69
	3.	50	Ž	553,82±71,01
	4.	50	M	592,62±80,19
	4.	50	Ž	552,68±104,37
Babin i sur. 2004.	1. eksp. ini.	48	M	430,42
	1. eksp. fin.	48	M	517,5
	1. kontr. ini.	52	M	427,31
	1. kontr. fin.	52	M	440,75
Bavčević i sur. 2004.	1. eksp. ini.	56	Ž	411,23
	1. eksp. fin.	56	Ž	503,5
	1. kontr. ini.	58	Ž	398,66
	1. kontr. fin.	58	Ž	415

N – broj entiteta, A.S.-aritmetička sredina, S.D.- standardna devijacija, (m) – metar, eksp.- eksperimentalna grupa, kontr. – kontrolna grupa, ini. – inicijalno testiranje, fin.- finalno testiranje.

Viši razredi

U višim razredima osnovne škole procjena funkcionalnih sposobnosti odvija se putem testa trčanja u trajanju od 6 minuta (F6) (Findak i sur; 1996.). Breslauer i sur. (2005.) napravili su istraživanje učenika četvrtih i petih razreda koji su pohađali izvanastavne aktivnosti atletike, ekipnih sportskih igara i ostalih sportova. Ista grupa autora napravila je slično istraživanje s učenicama. U radovima nije navedeno jesu li analiza i statistička obrada rezultata F3 i F6 provedene odvojeno, stoga rezultati ostaju nedorečeni. Međutim, u oba istraživanja dobivene su značajne razlike u vrijednostima testa F3, odnosno F6 u korist učenika koji su pohađali izvannastavnu aktivnost atletike. Petrić je proveo istraživanje (2009.) utvrđivanja razlike između učenika urbanih i ruralnih sredina u odnosu na test F6 te dobio bolje rezultate kod učenika ruralne sredine. Polančec i sur. (2007.) proučavali su razlike u funkcionalnim sposobnostima između učenica 5-ih razreda dvije različite osnovne škole i nisu utvrdili statistički značajne razlike. Petrić i Blažević su (2008.) utvrdili značajno bolje rezultate F6 testa kod učenika iz urbane škole u odnosu na ruralnu. Lorger i sur. su (2008.) pokušali odrediti antropološki model uspješne rukometašice u školskom sportu te dobili vrijednosti F6 testa više od ocjene izvrstan u usporedbi s orijentacijskim normama (Findak i sur; 1999.). Budinšćak i sur. (2005.) proveli su istraživanje u razlici F6 testa između dvanaestogodišnjih hrvača i džudaša te nisu pronađene značajne razlike u toj varijabli. Slično istraživanje proveli su Sertić i sur. (2005.) uspoređujući dvanaestogodišnje judaše i dječake koji se ne bave sportom te dobili značajne razlike u testu F6. Na sličnoj populaciji Baić i sur. su (2001.) proveli istraživanje s hrvačima 6-og razreda te nakon šestomjesečnog trenažnog tretmana nisu ustanovili promjene u varijabli F6. Sertić i sur. su (2008.) istraživali promjene na učenicima tijekom 3 godine te zaključili negativan trend razvoja rezultata u varijabli F6. Na populaciji osmih razreda Prahović i sur. (2007.) proveli su istraživanje između nogometaša, košarkaša i rukometaša (s minimalnim dvogodišnjim bavljenjem sportom) te dječaka koji se ne bave sportom s orijentacijskim normama te ustanovili kako prosječni rezultat grupe sportaši u varijbli F6 odgovara iznadprosječnim rezultatom, dok dječaci nesportaši postižu u istoj varijabli prema normama loše rezultate. Slično istraživanje proveli su Granić i Krstić (2006.) testirajući grupu koja je pored redovne nastave TZK pohađala i tri puta tjedno trening košarke s dječacima koji su samo pohađali redovitu nastavu TZK te su pronađene značajne razlike u testu F6 u korist košarkaša. Jozić je (2001.) testirao istu grupu djece želeći utvrditi transformacijske vrijednosti izabranih tema nastavnog plana i programa. U varijabli F6 nisu pronađene statističli značajne razlike. Petrić i Cetinić (2010.) bavili su se istraživanjem razlika između učenika s normalnom i prekomjernom tjelesnom masom te učenicima s visokom razinom pretilosti. Pronađene su razlike u vrijednostima testa F6 između učenika s normalnom tjelesnom masom i ostale dvije skupine, međutim između učenika prekomjerne tjelesne mase i visoke razine pretilosti razlika nije bilo.

Tablica 2. *Prikaz rezultata testa F6 kod viših razreda*

	RAZRED - obilježje	N	SPOL	F6 REZULTAT (m) A.S.±S.D.
Breslauer i sur. 2005.	4. i 5. ATL	23	M	9,39±1,27 (F3 i F6)
	4. i 5. ESI	21	M	7,19±2,82 (F3 i F6)
	4. i 5. OST	24	M	3,71±3,71 (F3 i F6)
Delija i sur. 2005.	4. i 5. ATL	22	Ž	8,64±1,81 (F3 i F6)
	4. i 5. ESI	17	Ž	4,41±2,6 (F3 i F6)
	4. i 5. OST	17	Ž	6,12±2,23 (F3 i F6)
Petrić, 2009.	5. URB	136	M i Ž	1120±228,67
	5. RUR	181	M i Ž	1218±140,85
Polančec i sur. 2007.	5.	97	Ž	1006,25
	5.	85	Ž	1030,82
Petrić i Blažević, 2008.	5. URB.	33	M	1227,5±111,26
	5. RUR.	25	M	804,55±545,06
Lorger i sur, 2008.	5. i 6.	51	Ž	1151,6±108,97
Budinšćak i sur. 2005.	6. JUDO	67	M	1171,63
	6. HRV	60	M	1166,7
Sertić i sur. 2005.	6. NESPORTAŠI	97	M	1110,6
	6. JUDO	67	M	1171,64
Baić isur. 2001.	6. HRV ini.	25	M	1155±79,88
	6. HRV fin.	25	M	1162±96,38
Sertić i sur. 2008.	5. ini.	22	M	1004,57±113,98
	6. tranz.	22	M	1109,77±157,75
	7. fin.	22	M	1076,85±147,13
Prahović i sur. 2007.	8. NESPORT.	50	M	1121,7
	8. NOGOMETAŠI	16	M	1454,1
	8. KOŠARKAŠI	13	M	1393,6
	8. RUKOMETAŠI	19	M	1414,5
	8. PROSJEK SPORTAŠI	48	M	1420,7
Granić i Krstić, 2006.	8. KOŠARKAŠI	34	M	1371,29±103,84
	8. NESPORT.	46	M	1261,26±150,13
Jozić, 2001.	8.	50	M	1299,85
Petrić i Cetinić, 2010.	8. NORMALNA TM	51	M	1376,21±173,68
	8. PREKOMJERNA TM	20	M	1258,25±164,87
	8. VIS. RAZ. PRET.	15	M	1212,83±134,27

N – broj entiteta, A.S.-aritmetička sredina, S.D.- standardna devijacija, (m) – metar, eksp.- eksperimentalna grupa, kontr. – kontrolna grupa, ini. – inicijalno testiranje, tranz. – tranzitivno testiranje, fin.- finalno testiranje. ATL –atletika, ESI – ekipne sportske igre, OST – ostali sportovi, HRV – hrvanje, URB - urbano, RUR - ruralno, nesport. – nesportaši, TM – tjelesna masa, vis. raz. pret. – visoka razina pretilosti.

KONAČNI ZAKLJUČCI

Navedena istraživanja u nižim razredima osnovne škole otkrivaju bolje rezultate kod učenika koji su nastavu TZK provodili koristeći složenije metodičke organizacijske oblike rada i rad s dopunskim vježbama. Razlike u rezultatima testiranja u testu F6 po spolu samo su djelomično potvrđene.

Iz rezultata provedenih na učenicima viših razreda proizlazi nekoliko generalnih zaključaka: (a) djeca koja osim redovite nastave tjelesne i zdravstvene kulture pohađaju dodatne izvannastavne ili izvanškolske sportske aktivnosti postižu bolje rezultate u testu za procjenu funkcionalnih sposobnosti, (b) djeca uključena u strukturalno slične izvannastavne ili izvanškolske sportske aktivnosti postižu slične rezultate u testu za procjenu funkcionalnih sposobnosti, (c) postoje oprečni rezultati procjene funkcionalnih sposobnosti obzirom na tip ljudskih naselja (ruralno/urbano), (d) postoji pomanjkanje istraživanja utjecaja i programiranja različitih operatora unutar propisanog plana i programa TZK na povećanje funkcionalnih sposobnosti, i (e) manjak longitudinalnih istraživanja. Dodatno, većina autora apostrofira u svojim radovima nedostatan broj sati redovne nastave TZK-a tjedno za moguće i potrebne transformacijske procese kod učenika.

Obzirom na sve navedene činjenice te ograničavajuće objektivne faktore provođenja nastavnog procesa tjelesnog vježbanja, nastavnici tjelesne i zdravstvne kulture bi u svrhu unaprijeđenja funkcionalnih sposobnosti osnovnoškolaca trebali maksimalno ciljno usmjereno programirati nastavu koristeći se utilitarnim sadržajima i složenim metodičkim oblicima rada te dodatno, poticati djecu na bavljenje izvannastavnim i izvanškolskim kineziološkim aktivnostima.

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FUNCTIONAL ABILITIES OF PRIMARY SCHOOL PUPILS

ABSTRACT

The main goal of this work was to review a series of studies (n=17) concerning functional abilities of primary school pupils in Croatia. Four main findings emerged from this review: (a) complex exercise models and supplemental exercise increase functional abilities, (b) extracurricular and out-of-school activities increase functional abilities, (c) lack of experimental studies of certain curricular operators, and (d) lack of longitudinal studies. The practical application of this study includes suggestions for programming PE classes in order to increase functional abilities in pupils.

Key words: *functional abilities, F3, F6, primary school pupils*

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Stručni rad

MEĐUPREDMETNA PROJEKTNA NASTAVA U SVRHU STJECANJA OSNOVNIH ZNANJA I RADNIH NAVIKA

UVOD

Težnja suvremene nastave znanja su utemeljenja na razumijevanju, ali i na praktičnoj utemeljenosti. Projektna nastava, kao jedan od oblika aktivnog učenja bazira se na istraživanju problema, rješavanju problema i prezentaciji konačnog produkta. Ova strategija učenja vrlo je česta u današnjem sustavu osnovnoškolskog obrazovanja, no ne i u predmetu tjelesne i zdravstvene kulture (TZK). Prednosti projektne nastave očituje se u uglavnom samostalnom i suradničkom radu učenika gdje ih se potiče na aktivno učenje razmišljanjem i zaključivanjem, rješavanje postavljenih problema u svrhu razvoja sposobnosti poput opažanja, opisivanja, pisanog i usmenog izražavanja te praktičnog izvođenja radova (Cindrić, 2006). Uzimajući u obzir namjenu projekta potrebno je razlikovati *proces projekt* i *produkt projekt*, a glavna razlika očituje se u svrsi gdje je u prvom tipu projekta cilj stjecanje vještina planiranja, opažanja i slično, dok u produkt projektu cilj je stjecanje praktičnih znanja (Cindrić prema De Zan, 2006). Nastava tjelesne i zdravstvene kulture ne samo da omogućuje iskazivanje potencijala i znanja, već omogućuje praktičnu primjenu konačnog produkta projekta što za razliku od nekih drugih predmeta, no naravno ovisi o zadanom problemu, nije moguće.

O darovitosti i talentu nema točno definiranih definicija, no može se reći kako naslijeđene i stečene osobine i sposobnosti pojedincima omogućuju nadprosječna ostvarenja na jednom ili više polja ljudske djelatnosti. Grupiranjem manjeg ili većeg broja učenika, različitih osobina i sposobnosti, u radne skupine omogućuje kvalitetno i svestrano rješavanje zadanog problema. Primjera radi, rijetki su ljudi koji funkcioniraju u poslovnom svijetu samostalno, okupljanje kvalitetnih timova prioritet je firmi na putu do uspjeha. Upravo kvalitetnom organizacijom i preraspodjelom zadataka postižu se najbolji rezultati, dok je upravo cilj obrazovnog sustava pripremiti osobu za daljnje funkcioniranje i rad. Iz toga razloga projektna nastava, odnosno njen grupni oblik rada omogućuje kvalitetnu interakciju između učenika, ali i ostalih sudionika odgojno-obrazovnog proces te otvorenu i dvosmjernu komunikaciju, zatim pridonosi stvaranju pozitivnih odnosa među učenicima te jača socijalne sposobnosti učenika, potiče manje motivirane učenike (Peko, 2006) i potiče snalaženje u novim

situacijama te pridonosi stjecanju osnovnih znanja, iskustava i radnih navika (Papotnik i sur., 2008). Prethodno spomenuto aktivno učenje kroz suradnički i grupni oblik projektne nastave ostavlja dovoljno prostora za vlastito otkrivanje, razumijevanje i razvoj kompetencija učenika (Peko, 2006).

Oblike projektne nastave možemo podijeliti prema (Cindrić, 2006):

- trajanju projekta
- broju uključenih učenika
- tipu projekta
- broju uključenih predmeta.

Posljednja navedena činjenica upravo zauzima važan dio ovoga rada, odnosno cilj rada je predstaviti kako maksimalno iskoristiti razne predmete u stjecanju vještina i znanja. U ovom radu to se odnosi na dva naizgled nespojiva predmeta: tjelesnu i zdravstvenu kulturu i likovnu kulturu (LK).

Učenike se uglavnom uči kako funkcionirati pomoću brojeva, slova i drugih karakterističnih oznaka koje su kognitivne funkcije lijeve polutke mozga (Buzan,2006). Likovna kultura je predmet koji potiče kreativnost, imaginaciju i vlastitu interpretaciju pomoću desne polutke mozga. Korištenjem obje polutke povećavaju se sposobnosti sinergijskog mišljenja te na taj način povećava potencijal učenika (Buzan, 2006).

U ovom radu bit će predstavljeni razni rekviziti, mogući načini izrade i njihova upotreba na satu tjelesne i zdravstvene kulture. Složenost projekta ovisit će o dobi učenika, predstavljenom zadatku, odnosno jesu li zadane upute ili učenici rade na način koji sami žele. Najsloženiji oblik, prema mišljenju autora, bio bi osmišljavanje nove igre, štafete, zadatka kojeg učenici od početka do kraja provode samostalno ili u grupama uz potporu i pomaganje naputcima nastavnika. Osmišljavanje igara, pismena i usmena prezentacija, izrada potrebnih rekvizita na satu likovne kulture te naposljetku provedba i praktična primjena na satu tjelesne i zdravstvene kulture zasigurno će maksimalno angažirati učenike, otkriti njihove potencijale, osigurati zdravu radnu okolinu i stjecanje radnih navika, a dakako i naučiti učenike kako projekti ne završavaju na papiru nego tek njihova praktična primjena označava kraj projekta i njegovu uspješnu provedbu.

PRIMJERI JEDNOSTAVNIH ZADATAKA ZA PROJEKTNU NASTAVU

Prvi zadatak odnosi se na izradu rekvizita pomoću kojeg se na nastavi TZK mogu provoditi elementarne i štafetne igre s ciljem utjecaja na motoričku sposobnost preciznost. Rekvizit se sastoji od postolja s raznim tuljcima i od malih obruča kojima se gađaju tuljci.



Slika 1. *Primjer izgleda prvog rekvizita (D.Š.S., 2010)*

a) primjer izrade (LK)

Od dna kartonske kutije izreže se kvadratni oblik željene veličine. Iz kućanstva se uzmu kartonski tuljci (dobivenih ih raznih folija ili kuhinjskog papira) koji se izrežu na razne duljine. Na kartonskom kvadratu označe se polja različitih dimenzija koja se potom obojaju u željene boje, a na svaku boju kartona se zalijepi tuljac iste boje. Od novinskog papira napravi se oblik obruča i selotejpom krajevi zalijepe. Konopom se obruč učvrsti da dobije na težini, a dio obruča se zatim oboji u određenu boju.

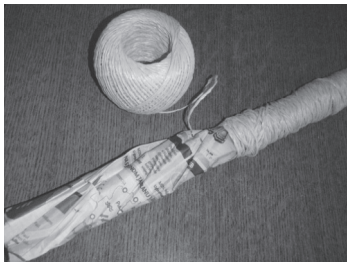
b) primjer nastavnih sadržaja (TZK)

ELEMENTARNA IGRA: Učenike se postavi u 2-4 kolone nasuprot postolju odmaknute 2-5 m. Na zadani znak učitelja, prvi učenici u kolonama bacaju obruč prema tuljcu iste boje. Nakon bacanja odlaze hodajući po obruč, predaju ga sljedećem u koloni te odlaze na kraj kolone. Bodovanje: pogodak tuljca iste boje – 2 boda, pogodak tuljca druge boje – 1 bod, promašaj – 0 bodova. Pobjednik je ona kolona koja skupi najviše bodova.

Moguće je da svaka kolona predstavlja radnu grupu koja je na satu likovne kulture napravila svoj rekvizit, no onda je važno da budu istih dimenzija.

ŠTAFETNA IGRA: Učenike se postavi u 2 kolone na udaljenost 10 m od postolja. Na zadani znak učitelja, prvi učenici iz kolona trče do bijele oznake na 5 m, bacaju obruč prema postolju, trče po obruč oko postolja te predaju obruč idućem učeniku u koloni. Bodovanje: pogodak tuljca iste boje – 5 boda, pogodak tuljca druge boje – 2 boda, promašaj – 0 bodova. Pobjednik je ona kolona koja u zadanom vremenu (npr. 2 min) skupe najviše bodova. Moguće opcije – dozvoljeno/nedozvoljeno zadržavanje na bijeloj oznaci, bacanje jednog ili više obruča itd.

Drugi zadatak odnosi se na izradu štafetnih palica pomoću kojih se na nastavi TZK mogu provoditi opće pripremne vježbe i štafetne igre s ciljem utjecaja na motoričku sposobnost brzine, preciznost, koordinacije, odnosno *timing-a*. Rekvizit se može izraditi na razne načine.

a)  b) 

Slika 2. *Primjeri dva različita načina izrade štafetne palice.*

a) primjer izrade (LK)

1. Kartonski tuljac, dužine oko 30 cm po želji se oboja temperama ili se naprave otisci dlana ruku točno kakvi bi bili kod pravilne primopredaje štafetne palice.
2. Dva do tri novinska papira se zgužvaju i zarolaju u tuljac te se potom oko njega omota tanki konop kako bi se učvrstio, a potom se oboja po želji.

b) primjer nastavnih sadržaja (TZK)

OPĆE PRIPREMNE VJEŽBE S POMAGALIMA (štafetne palice): Čučanj skok s uzručenjem, rotacije trupa – uzručenje s palicom, bočno kruženje rukama s predajom palice, jumping jacks s predajom palice u uzručenju itd.

ELEMENTARNA IGRA: Šest samostojećih štafetnih palica postavljeno je u trokut (npr. 3 radna mjesta). Jedan po jedan učenik izbija palice s udaljenosti od 10 m spužvastom loptom. Učenik koji iz najmanjeg broja pokušaja izbije sve palice je pobjednik. Maksimalan broj pokušaja je 5.

ŠTAFETNA IGRA: Učenici su podijeljeni u radne grupe, odnosno kolone. Na zadani znak učitelja trče unatrag jedan krug u dvorani s palicom u ruci te u označenom prostoru predaju palicu idućem učeniku u koloni. Štafeta koja prva završi je pobjednička.

Treći zadatak odnosi se na izradu plahte, loptica i tunela pomoću kojih se na nastavi TZK-a mogu provoditi opće pripremne vježbe i momčadske igre s ciljem utjecaja na motoričku sposobnost preciznost, koordinacije, odnosno timing-a. Rekviziti se mogu izraditi na razne načine.

a) primjer izrade (LK)

Plahta se rastegne te oboja na željeni način (tempere, boje za tkaninu, 3D – boje, svjetlucavi prah itd.). U sredini plahte napravi se rupa promjera 20 – 30 cm. Loptice

od stiropora obojaju se po želji ili se naprave od novinskog papira, kojeg se zgužva i omota selotejpom te na kraju oboja. Tuneli se također mogu napraviti od novinskog papira koji se zgužva, zarola i savine, a potom omota konop i oboja.

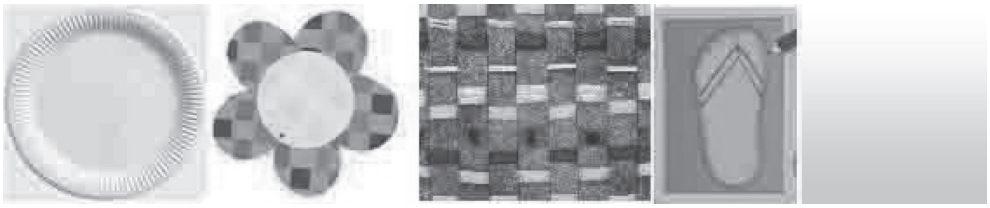
b) primjer nastavnih sadržaja (TZK)

OPĆE PRIPREMNE VJEŽBE S POMAGALIMA (loptice): Krugovi lopticom oko tijela, rolanje loptice na tlu u osmicu oko stopala, predaja loptice ispod noge u prednoženju s poskokom itd.

MOMČADSKA IGRA: Učenici su podijeljeni u 2 ekipe te se svaka nalazi na svojoj polovici odbojkaškog terena. U zadnjim redovima svake ekipe nalaze se 4 učenika koji drže plahtu nategnutu i kreću se po terenu lijevo – desno. Ispred njih nalazi se ostatak učenika čiji je zadatak braniti plahtu i bacati loptice prema drugoj strani, odnosno postići pogodak. U igri se nalazi 20-ak loptica, a ekipa koja zabije najviše pogodaka je pobjednička ekipa.

ŠTAFETNA IGRA: Učenici su postavljeni u 2-4 kolone, a ispred svake kolone nalazi se 4-5 tunela s razmakom jednog metra. Na zadani znak učitelja prvi učenik u koloni baci lopticu tako da se kotrlja po tlu ispod tunela, ukoliko loptica zapne, baca ju s početnog mjesta, ukoliko je loptica prošla kroz sve tunele, trči po lopticu te je trčeći predaje drugom učeniku u koloni. Kolona koja prva završi je pobjednička.

Četvrti i posljednji zadatak predstavljen u ovom radu jednostavna je izrada kliznih podloga koje u nastavi tjelesne i zdravstvene kulture omogućava provedbu opće pripremnih vježbi te ostalih igara s ciljem utjecaja na motoričku sposobnost jakost, koordinaciju, fleksibilnost itd.



Slika 3. *Primjeri oblikovanja papirnatog tanjura kao klizne podloge.*

a) primjer izrade (LK)

Dva kartonska tanjura, okruglog ili pravokutnog oblika, zalijepe se zajedno te se potom gornja stranica oboja po želji, napravi otisak dlana, stopala ili se napravi papirnato tkanje koje se potom zalijepi za gornju stranu kartonskih tanjura i odrežu

u željeni oblik dovoljno velik da stane stopalo ili dlan. Paziti da su rubovi savinuti prema gore.

b) primjer nastavnih sadržaja (TZK)

ŠTAFETNA IGRA: 1. Slalom klizanje, s „tanjurima" pod stopalima, oko markera. Na zadani znak prvi iz kolone trči do linije, udaljene 5 metara od starta, na kojoj se nalaze dva „tanjura", radi slalom klizajući oko markera, vraća se do linije te trči do drugog učenika u koloni. **2.** Medvjeđa štafeta. Na zadani znak prvi učenik iz štafete kreće se kližući rukama i nogama po tlu do strunjače, radi povezani kolut naprijed i natrag te se kližući vraća do drugog u koloni. U obje štafete pobjednik je ona štafeta koja prva završi.

ISTEZANJE: Postavljenjem jednog ekstremiteta na kliznu podlogu, odnosno „tanjur", klizno se udaljava od tijela, zadržava se pojedina pozicija i time povećava opseg pokreta pojedinog ekstremiteta.

ZAKLJUČAK

Grupna izrada pojedinih rekvizita na satu likovne kulture te njihova primjena u nastavi tjelesne i zdravstvene kulture kod učenika će razviti osjećaje zadovoljstva te poštovanja prema svim rekvizitima koja se koriste u nastavi. Također nedostatak pojedine opreme ne mora biti ograničenje u nastavi već poticaj da se grupnim projektom i suradnjom između predmeta (fizika, tehnička kultura itd.) osmisli najbolja zamjena. Npr. ukoliko nedostaje odbojkaška mreža ili konop za skok u vis, može se izraditi adekvatna zamjena (slika 4) ili ukoliko nedostaju vijače i one pomoću konopa mogu izraditi (slika 5).



Slika 4. *Konop sa zastavicama (Watt, 2008)*



Slika 5. *Uže za preskakanje (D.Š.S., 2010)*

Oblik odnosno složenost projekta ovisit će o već prije navedenim faktorima no kao najvažniji je dob učenika, ali i primjenjivost u nastavi. U tablici 1. nalazi se prijedlog kako međupredmetnu suradnju nastaviti kroz razrede povećavaju složenost projekta.

Tablica 1. *Primjer postupne progresije složenosti projektnih zadataka*

RAZRED	LIKOVNA KULTURA	TJELESNA I ZDRAVSTVENA KULTURA
5.	Definiranje zadatka izrade rekvizita te načina izrade.	Provedba nastavnih sadržaja koje definira učitelj.
6.	Definiranje zadatka izrade rekvizita, no način izrade ostavlja se na izbor učeniku.	Provedba nastavnih sadržaja koje definira učitelj.
7.	Definiranje zadatka izrade rekvizita, no način izrade ostavlja se na izbor učeniku.	Provedba nastavnih sadržaja koje odabiru učenici.
8.	Izrada rekvizita i pomagala na temelju novih osmišljenih nastavnih sadržaja.	Provedba dosad nepoznatih, odnosno osmišljavanje novih nastavnih sadržaja.

Kao najveću prednost projektne nastave autori bi istakli suradnju učenika, razvijanje socijalnih sposobnosti, isticanje potencijala učenika, idejnih i izvedbenih te povećana osjetljivost učenika za postizanjem cilja.

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CROSS-CURRICULAR PROJECT TEACHING AIMED AT DEVELOPING BASIC KNOWLEDGE AND WORK HABITS

ABSTRACT

The tendency of modern teaching is development of skill such as understanding, but also a practical application of knowledge. Cross-curricular project teaching as a form of active learning is based on the research, problem solving, and presentation of the final product and in some cases a practical application. Group creation of certain props and equipment in art class, and its application in physical education class can develop a sense of satisfaction and respect for all the props and equipment used in the classroom and can also give a teacher much more information about students than in conventional classes.

Key words: *project, class, teaching, cooperation*

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Pregledni rad

NOVIJI NASTAVNI PROSTORI I POMAGALA U SVRHU UNAPREĐENJA KOMPETENCIJA UČENIKA

UVOD

Gledajući povijesni vremeplov od Mezopotamije, Asirije, Egipta, Grčke, Rimskog carstva, preko viteštva, filantropizma do pojave modernog sporta, Pierre de Coubertina, tjelesno vježbanje kao i sam sport zauzima važno mjesto u razvoju čovjekovih osobina i sposobnosti. Brojni arheološki nalazi ukazuju da su trčanje, plivanje, veslanje, jedrenje, hrvanje, bacanje kamenja i koplja, mačevanje štapovima i ples predstavljali tjelovježbene tehnike koje su razvijene u uvjetima borbe za svakodnevno preživljavanje (Jajčević, 2010). Čovjek je prilično rano uočio vezu između tjelesnih sposobnosti i učinkovitosti svojega djelovanja kao bi mogao uspješno loviti da bi preživio te su proizvodili opremu od prirodnog materijala.

S ciljem poboljšavanja tjelesne snage koristili su brojna pomagala koja su omogućavala poboljšanje snage ruku, brzinu (toljage, sjekire, bumerang, koplje, luk i strijela, mač, pripitomljeni konji). Lopte su bile napravljene od slame i istkanog palmina lišća, opšivene kožom ili platnom. Opće shvaćeno je da tjelesno vježbanje potiče harmoničnost razvoja tjelesnih i mentalnih snaga, omogućava ravnotežu duha i tijela te da tjelesno vježbanje ima pozitivan utjecaj na razvoj čovjekovih osobina, sposobnosti, znanja i postignuća te da je sustavno vježbanje jedan od glavnih preduvjeta za optimalno zdravlje.

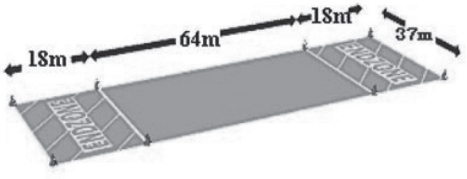
Munjevita ekspanzija znanja te brojna tehnička otkrića smanjila su udio čovjeka u radu. Uslijed ograničenog kretanja, što je posljedica suvremenog načina života koji karakterizira smanjeno kretanje, ugrožene su sve kategorije pučanstva, a posebno djeca i mladež (Findak i Mraković, 1998). Radi čovjekovih potreba za razvoj njegovih osobina i sposobnosti, te zadovoljavanje njegovih potreba za druženjem i potreba sreće ovisi o osmišljavanju novih i unapređenju starih materijalnih uvjeta rada. Pod materijalnim uvjetima rada podrazumijevaju se prostori i oprema za provođenje tjelovježbenih aktivnosti (Neljak, 2010), gdje istoimeni autor naglašava da materijalni uvjeti rada nisu presudan, već samo veći ili manji ograničavajući čimbenik rada.

PROSTORI I OPREMA U NASTAVI TJELESNE I ZDRAVSTVENE KULTURE

Prostor je stvarnost u kojoj živimo i u kojoj se krećemo. Nas zanima više strana kretanja u kojima možemo zadovoljiti sve one strane koje nas usrećuju, koje nam omogućavaju razvoj i pokazivanje naših osobina i sposobnosti. Prema tome, takvi prostori moraju zadovoljavati neke standarde, moraju biti usklađeni sa zahtjevima određene kineziološke aktivnosti, moraju biti sigurni. Prostori koji se koriste u tjelesnoj i zdravstvenoj kulturi otvorenog su i zatvorenog tipa. U prostore otvorenog tipa ubrajaju se: specijalizirana sportska igrališta, višenamjenska igrališta, atletske staze, skakališta, bacališta, poligoni, trim staze, dječja igrališta, bazeni, klizališta, zelene površine, sanjkališta, skijališta (Neljak, 2010). U zatvorene prostore ubrajaju se: sportske dvorane, dvorane za korektivnu gimnastiku, teretane, trim kabineti, zatvoreni bazeni, zatvorena klizališta, prilagođene prostorije (Neljak, 2010) i oratoriji.

Kineziološka pomagala su predmeti koji se koriste za razvoj i održavanje motoričkih sposobnosti. Mogu se koristiti na otvorenim i zatvorenim prostorima i u svim dijelovima sata. U kineziološka pomagala ubrajamo: lopte (različite veličine, kakvoće, namjene), obruče, palice, vijače, markere, bučice.

PRIMJER NOVIJIH NASTAVNIH PROSTORA KOJI SE KORISTE U NASTAVI TZK-a



Prostori za frizbi: Igra se 7 protiv 7 na otvorenom, odnosno 5 protiv 5 kada se igra u dvorani, a utakmice se igraju ili na određeno vrijeme ili do određenog broja pogodaka. Sve probleme igrači rješavaju između sebe pa suci na terenu nisu potrebni. Kod rekreativnog ultimatea veličina terena se određuje prema broju igrača i njihovoj kondicijskoj spremi. Službeno se ultimate frizbi igra na igralištu dimenzija 37 x 64 metara s dvije gol zone duboke 18 metara. Cilj je igre uhvatiti disk (promjera 27cm i težine 175 grama) u protivničkoj gol zoni. S diskom nije dozvoljeno trčati te je potrebno proslijediti disk suigraču unutar deset sekundi. Dozvoljeno je kretanje diska u bilo kojem smjeru. U slučaju netočnog dodavanja (tj. kada disk padne na pod, izađe izvan granica terena ili ga presretne igrač suprotne momčadi), obrana preuzima disk i postaje napad.



Adrenalinski park - visinski poligon izgrađen od drvenih stupova, na visini od 8 do 14 metara, koji su povezani međusobno čeličnim sajlama. Sastoji se iz različitih elemenata - zadataka i prepreka koje sudionik mora proći. Cilj je ovih vježbi savladavanje straha, vježba ravnoteže, motorike i koncentracije. Vrlo je zabavno i potpuno sigurno. Sve se vježbe izvode pod nadzorom iskusnih instruktora. Adrenalinski je park namijenjen svakome: djeci, odraslima, grupama, tvrtkama. Za posjet parku ne trebate imati posebnu fizičku kondiciju. Svaki sudionik ima posebnu opremu: pojas za penjanje, komplet za samoosiguranje te kacigu.



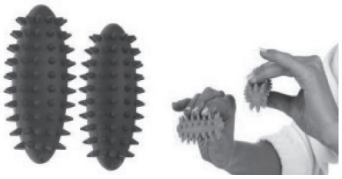
Otvoreni prostori za orijentacijsko trčanje - sport koji nas vodi iz gradova, iz zagušljivih sportskih dvorana na čist zrak, u šume, na planine. Neki ovaj sport nazivaju obiteljskim sportom jer na istom natjecanju postoji mogućnost sudjelovanja djece i roditelja. Sport u kojem natjecatelj uz pomoć karte i kompasa trči od starta do cilja preko niza kontrolnih točaka koje su postavljene na nepoznatom pošumljenom terenu. Niz kontrolnih točaka naziva se staza. Staza kojomo se prolazi nije ničim označena već natjecatelj sam bira i određuje put između kontrolnih točaka na osnovu podataka koje dobiva čitanjem karte i uspoređujući ih s okolinom. Uz samu potrebu za orijentiranjem natjecatelj mora savladavati prirodne prepreke kao što su srušena stabla, potoci, jarci, gustiši itd. Karta i kompas najvažniji su segmenti orijentacijskog trčanja.

Prostori za streličarstvo



Metno streličarstvo disciplina je koja je prvenstveno podijeljena na vanjsko (gađa se na otvorenom prostoru) i dvoransko. Kada se gađa na otvorenom onda su to obično ravne livade ili stadioni na kojima se izmjere daljine, postave mete u nizu, odrede stajališta odakle se gađa i sve ostalo što ide uz takva natjecanja. **Poljsko streličarstvo** u svijetu poznato kao Hunter & Field vrlo je popularna disciplina. Natjecanja se odvijaju na otvorenom, u prirodi, kombinirano po livadama i šumama. **3D streličarstvo** je disciplina vrlo slična poljskom streličarstvu, a glavna je razlika što se ovdje gađaju plastične figure raznih životinja u stvarnoj veličini, a ne u mete i papirnata lica s krugovima. Postoje figure jelena, srndaća, medvjeda, muflona, vuka, pantere, svisca, purana, lisice itd.

PRIMJER NOVIJIH KINEZIOLOŠKIH POMAGALA U NASTAVI TZK-a



Senso Walking trainer Plus – istovremeno služi za jačanje mišića gornjih ekstremiteta, posebice šake i podlaktice. Ergonomskog je oblika, različite mekoće i jednostavan je za upotrebu i higijensko održavanje. Senso Walking trainer Light – zbog svoje veličine i upotrebljivosti namijenjen je za poboljšavanje i povećavanje protoka krvi u šakama.



Vortex – karakterističnog izgleda i dimenzija, pri čemu se vidi da ima aerodinamične karakteristike koje mu omogućavaju postizanje velikih daljina. Specifičan oblik zahtijeva držanje na način kako se drži koplje, što čini još jednu sponu između ova dva bacačka rekvizita. Vortex je dugačak 34cm, pri čemu je glava duga 17cm, rep 17cm, obim glave iznosi 17cm, a težina ovog rekvizita je 135g. Prednost ovog rekvizita za obučavanje tehnike bacanja koplja i razvijanje tehničkog majstorstva ogleda se u: obliku glave, koji zahtijeva držanje kakvo se primjenjuje pri držanju koplja, težini, koja ne zahtijeva veliku snagu niti dozvoljava mogućnost povređivanja mekih tkiva ramenog pojasa i lakta, dužini, koja omogućava lako rukovanje.

Način na koji se ovaj rekvizit baca identičan je načinu bacanja koplja. Dakle, tehnika bacanja vortex-a potpuno je ista kao tehnika bacanja koplja i sastoji se od već opisanih faza: pripremna faza, faza prestizanja sprave, faza maksimalnog napora i faza održavanja ravnoteže. Bacanje ovog rekvizita je uvedeno i na natjecanjima kao atletska disciplina za uzrast do 17 godina.



Balans kotači – služe za razvoj ravnoteže, koordinacije i reakcije. Može se koristit za jačanje ruku, nogu i leđnih mišića.



Pedasan – vrlo izazovno kineziološko pomagalo. Služi za razvoj i usavršavanje ravnoteže. Istraživanja su pokazala da je nakon korištenja „Pedasona" postignuta bolja ravnoteža na gredi kod gimnastičara. Služi za jačanje stopala i skočnog zgloba te za razvoj koordinacije.



Pomagala za „žongliranje" – Žongliranje poboljšava koordinaciju, povećava snagu mišića, smanjuje stres i napetost, vježba obje polutke mozga. Učenje žongliranja može privremeno promijeniti strukturu mozga (Drust, 2006). Žongliranje se može definirati kao uspjeh održavanja ili pokretanja dviju ili više objekata u isto vrijeme. Žongliranje dodatno, kao i gimnastika, udružuje znanosti fizike i biomehanike. Geometrijski uzorci kretanja se mogu proučavati matematički, a povijest žongliranja i uloga u društvu bi mogle biti predmetom zanimljivih društvenih istraživanja. Pri svemu tome također je prisutan i duhovni aspekt, odnosno moguće je žongliranje promatrati također i kao jednu zasebnu duhovnu disciplinu. Mnogo je predmeta s kojima se može žonglirati, ipak najučestalije su razne loptice i čunjevi. Loptice napravljene sašivenim krpicama ispunjenih rižom ili slično se smatraju odličnim za učenje žongliranja.



Padobran – odličan način za razvoj ruku i ramenog pojasa. Vježbanjem s padobranom poboljšavamo izdržljivost. Koristiti se za poboljšavanje timskog rada i suradnju grupe te poboljšava osnovne motoričke sposobnosti i osjećaj za ritam. Postoje različite aktivnosti s padobranom kao što su izvođenje valova, kišobrana, planina, itd.

ZAKLJUČAK

Radi čovjekovih potreba za razvoj njegovih osobina i sposobnosti, te zadovoljavanje njegovih potreba za druženjem i potreba sreće ovisi o osmišljavanju novih i unapređenju starih materijalnih uvjeta rada. Tvorcu nastavnog procesa bitno je da zainteresira i motivira za rad i igru sve učesnike nastavnog procesa različitim improviziranim kineziološkim spravama i pomagalima, tehničkim spravama i prostorima. Svaki bi sat trebao biti drugačiji, noviji i za učesnike procesa interesantniji te da u njima probudi kreativnost, volju za vježbanjem, druženje i prijateljske odnose.

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RECENT TEACHING FACILITIES AND REQUISITES FOR THE IMPROVEMENT OF STUDENTS´ COMPETENCES

ABSTRACT

The new scientific and technical discoveries, cybernetics and information technology are all affecting human need for movement by reducing it, thus influencing its natural balance, social status and experience of happiness. Man's need for the development of the abilities and characteristic features, as well as satisfying the need for companionship and happiness depends on the new and old material improvement of working conditions. For the creator of the teaching process it is essential to interest and motivate all the participants of the teaching process to work and play using a variety of improvised kinesiological equipment, technical devices and exercise areas.

Key words: *cybernetics, teaching, kinesiology equipment and props*

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Izvorni znanstveni rad

POVEZANOST KVALITATIVNE I KVANTITATIVNE PROCJENE BIOTIČKIH MOTORIČKIH ZNANJA

UVOD

Biotička motorička znanja definiraju se kao standardne motoričke aktivnosti koje tvore osnovu za naprednije i specifičnije motoričke aktivnosti (Wickstrom, 1983). Kvalitetnim svladavanjem ovih znanja osigurani su dobri preduvjeti za uspješnu realizaciju specifičnih motoričkih znanja (Burton i Miller, 1998) s tim da je tjelesna aktivnost ključni faktor za njihov razvoj (Gallahue i Ozmun, 1998). Da bi se biotička motorička znanja usvojila tijekom rane školske dobi, neophodno je formirati adekvatne kineziološke programe te konstruirati pouzdane i valjane mjerne instrumente za praćenje stupnja njihove usvojenosti. Mjerni instrumenti za procjenu biotičkih motoričkih znanja mogu se podijeliti na testove koji su usmjereni na kvantitetu izvedbe i testove koji su usmjereni na kvalitetu izvedbe. Kvantitativni pristupi procjene biotičkih motoričkih znanja uključuju mjerenje rezultata izvedbe. Jedinični rezultat je broj ili količina, primjerice vrijeme u sekundama potrebno za pretrčavanje 20 metara, dužina skoka u centimetrima ili broj uspješnih skokova i hvatanja u 10 sekundi. U novije vrijeme, najčešće korišteni testovi za procjenu biotičkih motoričkih znanja primjenjuju kvalitativne mjere koje se fokusiraju na formu ili tehniku pokreta, odnosno na to kako se znanje izvodi. Primjer ovakvog testova je „Test of Gross Motor Development - 2" (Ulrich, 2000). Uzimajući u obzir definiciju kvantitativnog pristupa procjene biotičkih motoričkih znanja, testovi kao što su skok udalj iz mjesta, bacanje loptice iz mjesta, trčanje na 20 m koji su kod nas prepoznati kao testovi za procjenu motoričkih sposobnosti djece mlađe školske dobi u svijetu su također prepoznati i kao testovi za procjenu biotičkih motoričkih znanja koji su usmjereni na rezultat izvedbe. S tim u vezi, može se zaključiti, kako su potrebna nova istraživanja koja će nam pružiti još jasniju sliku o stvarnoj povezanosti između rezultata i procesa izvedbe, kao i saznanja koja će pojasniti procjenjuju li prethodno navedeni motorički testovi sposobnosti i/ili biotička motorička znanja djece mlađe školske dobi. U skladu s navedenim, osnovni je cilj ovog istraživanja analiza povezanosti između produkta i procesa izvedbe kod testova za procjenu biotičkih motoričkih znanja.

METODE RADA

Uzorak ispitanika

Istraživanje je provedeno na uzorku od 73 djece (36 dječaka – 8.0 ± 0.23 i 37 djevojčica – 8.1 ± 0.23) polaznika drugih razreda OŠ Pojišan u Splitu. Prosječna vrijednost tjelesne mase dječaka iznosila je 26.30 kg, tjelesne visine 133.17 cm i indeksa tjelesne mase 16.45. Djevojčice su u prosjeku bile visoke 134.03 cm, masa tijela iznosila je 29.70 kg i indeks tjelesne mase 16.44. Jedini kriterij prilikom selekcije učenika bio je da su klinički zdravi i bez aberativnih pojava. Prije samog početka eksperimenta, održan je sastanak na kojem su roditelji bili upoznati s ciljevima i osnovama samog istraživanja.

Uzorak varijabli

Kako bi se utvrdila kvaliteta izvedbe biotičkih motoričkih znanja korišten je test „TGMD-2" (Ulrich, 2000). Temeljem rezultata dosadašnjih istraživanja (Houwen i sur., 2007; Mazzardo, 2008) može se zaključiti kako „TGMD-2" test ima zadovoljavajuće metrijske karakteristike. Test „TGMD-2" procjenjuje biotička motorička znanja djece u dobi od 3 do 10 godina na osnovi kriterija. „TGMD-2" test sadrži ukupno 12 motoričkih testova. Svako od ovih motoričkih znanja raščlanjeno je na tri do pet komponenti. Ispitivač analizira biotička motorička znanja u testu kao bi odredio je li komponenta prisutna (1) ili nije prisutna (0). Za potrebe ovog istraživanja korištena su tri testa, i to dva testa za procjenu lokomotornih znanja (trčanje i horizontalni skok) i jedan test za procjenu manipulativnih znanja (bacanje loptice).

S druge strane, kako bi se realizirala kvantitativna procjena biotičkih motoričkih znanja izvršen je izbor baterije od tri standardna mjerna instrumenata, i to: skok udalj iz mjesta, trčanje na 20 metara iz visokog starta i nadramensko bacanje loptice od 200 g iz mjesta (Krstulović i sur., 2010).

Metode obrade podataka

Nakon provedenog mjerenja, dobiveni podaci uneseni su u program Statistica for „Windows Ver.7.0". Analizirali su se osnovni statistički parametri (aritmetička sredina, standardna devijacija, minimalni i maksimalni rezultati mjerenja, skewness, kurtosis i Kolmogorov-Smirnov test). Kako bi se utvrdile povezanosti kvantitativnih i kvalitativnih testova za procjenu biotičkih motoričkih znanja primijenjena je klasična korelacijska analiza.

REZULTATI

U tablici 1. prikazani su deskriptivni statistički parametri varijabli za procjenu biotičkih motoričkih znanja. Rezultati Kolmogorov-Smirnovog testa (max D) ukazuju kako nema statistički značajnog odstupanja od normalne distribucije rezultata kod svih testova za procjenu procesa i rezultata izvedbe.

Tablica 1. *Deskriptivna statistika varijabli za procjenu biotičkih motoričkih znanja (AS - aritmetička sredina; SD - standardna devijacija; MIN - minimalni rezultati mjerenja; MAX - maksimalni rezultati; SKE - skewness; KURT - kurtosis; D max - Kolmogorov-Smirnovljev test)*

Varijable	AS	SD	MIN	MAX	SKE	KUR	D max
MDALJ (cm)	124.93	14.99	89.33	176.67	0.37	1.19	0.06
MBAC (m)	10.75	4.27	3.77	22.70	0.99	0.57	0.13
MT20M (sek)	4.54	0.33	3.84	5.28	0.15	-0.67	0.07
MDALJ (ocj)	4.58	2.23	0.00	8.00	-0.26	-0.67	0.10
MBAC (ocj)	3.89	2.44	0.00	8.00	0.03	-1.26	0.14
MT20M (ocj)	5.42	2.02	0.00	8.00	-0.50	-0.17	0.13

Legende: MDALJ - skok udalj iz mjesta; MBAC – bacanje loptice iz mjesta; MT20M – trčanje 20 metara iz visokog starta i Dmax za N = 73, p < 0.154.

Rezultati Pearsonovog koeficijenta korelacije (Tablica 2) ukazuju kako kod ukupnog uzorka ispitanika postoji statistički značajna povezanost uspjeha u testovima za procjenu znanja svladavanja prostora (r = - 0.64; p = 0.001), prepreka (r = 0.62; p = 0.001) i manipulacije objektima (r = 0.56; p = 0.001). Iako je predznak parcijalne povezanosti između dviju varijabli za procjenu svladavanja prostora negativnog predznaka, zbog obrnute skaliranosti varijable za procjenu kvantitete izvedbe (MT20M), povezanost između analiziranih varijabli pozitivnog je karaktera.

Tablica 2. *Rezultati povezanosti kvalitativne i kvantitativne procjena biotičkih motoričkih znanja*

	MDALJ (cm)		MBAC (m)		MT20M (sek)	
	r	*p*	*r*	*p*	*r*	*p*
MDALJ (ocj)	0.62	**0.001**				
MBAC (ocj)			0.56	**0.001**		
MT20M (ocj)					-0.64	**0.001**

Legende: MDALJ - skok udalj iz mjesta; MBAC – bacanje loptice iz mjesta; MT20M – trčanje 20 metara iz visokog starta

RASPRAVA

Temeljem provedene korelacijske analize dobiveni su rezultati koji ukazuju na značajnu povezanost dvaju pristupa za procjene biotičkih motoričkih znanja. Potvrda dobivenim rezultatima spoznaje su dosadašnjih istraživanja (Roberton i Konszak 2001; McIntyre, 2000; Miller, 2002) koji ukazuju kako postoji statistički značajna povezanost između rezultata izvedbe i procesa izvedbe. McIntyre (2000) potvrdio je značajnu povezanost između rezultata izvedbe i kvalitete izvedbe prilikom izvedbe nadramenskog bacanja loptice kod djece između 7 i 12 godina. Istraživanje Roberton i Konszak (2001) također ukazuje na značajnu korelaciju između kvantitativnih (brzina izbačaja) i kvalitativnih (znanje izbačaja) rezultata prilikom izvedbe znanja bacanja kod djece mlađe školske dobi. Miller (2002) je potvrdio značajnu povezanost između produkta i procese izvedbe kod motoričkih testova koji su uključivali znanja bacanja i hvatanja.

Utvrđivanje biotičkih motoričkih znanja tijekom procesa odgoja i obrazovanja djece mlađe školske dobi prvenstveno se provodi kako bi učitelji dobili informacije koje će im koristiti u procesu ocjenjivanja. U tom kontekstu, valjano je ocjenjivanje učinjeno onda kada je dijete uključeno u relevantne, sadržajne i motivirajuće aktivnosti koje se odvijaju u poznatom i ugodnom okruženju, pri čemu je proces motoričkog ocjenjivanja generalno ispravan ako realizacija aktivnosti koja se ocjenjuje uključuje proces izvedbe biotičkih motoričkih znanja. Uvažavajući spoznaje dosadašnjih istraživanja, kao i rezultate provedenog mjerenja te uzimajući u obzir sve prednosti i nedostatke kvantitativnog i kvalitativnog pristupa procjene biotičkih motoričkih znanja (vrijeme koje je potrebno za realizaciju testiranja, potrebne kompetencije ocjenjivača, materijalne uvjete, metrijske karakteristike testova, mogućnosti testiranja većih grupa, dobivene informacije o tehnici izvedbe, usporedbu rezultata izvedbe između ispitanika) može se pretpostaviti kako bi ocjenjivanje biotičkih motoričkih znanja u sklopu nastave TZK moglo kvalitetnije i jednostavnije realizirati putem kvantitativnog mjernog instrumenta. Ipak, potrebno je ukazati da kvantitativno mjerenje biotičkih motoričkih znanja ne pruža informacije je li djetetovo sporo trčanje rezultat kratkog koraka, nejednakog rada ruku, niskog podizanja koljena ili svega navedenog. Zbog toga se efekti transformacijskih postupaka prvenstveno trebaju kontrolirati putem kvalitativne procjene biotičkih motoričkih znanja jer će tek tada učitelj ili trener znati koje komponente znanja dijete treba vježbati. Moguće je zaključiti, kako se putem produkta i procesa izvedbe mogu dobiti pouzdane informacije o biotičkim motoričkim znanjima osmogodišnje djece, pri čemu odabir kvalitativnog ili kvantitativnog testiranja generalno ovisi o osnovnom cilju istraživanja.

ZAKLJUČAK

U skladu s osnovnim ciljem istraživanja na uzorku od 73 djece, primijenjena su tri motorička testa za procjenu biotičkih motoričkih znanja (skok u dalj iz mjesta, nadramensko bacanje loptice i pravocrtno trčanje). Za procjenu kvalitete izvedbe korišten je test „Test of Gross Motor Development – TGMD-2" (Ulrich, 2000), dok je za procjenu kvantitete izvedbe korišten rezultat izvedbe kod primjenjenih motoričkih testova. Rezultati istraživanja ukazuju kako kod ukupnog uzorka ispitanika postoji statistički značajna povezanost između procesa i rezultata izvedbe. Autor je mišljenja kako su potrebna daljnja istraživanja koja će pružiti još jasniju sliku procjenjuju li primijenjeni testovi postignuća i/ili biotička motorička znanja djece mlađe školske dobi.

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CONNECTION BETWEEN QUALITATIVE AND QUANTITATIVE ASSESSMENT OF BIOTIC MOTOR SKILLS

ABSTRACT

The main aim of current research was to identify the correlation between the quantitative and qualitative assessment of fundamental movement skills. The research was conducted on a sample of 73 children (36 boys and 37 girls) aged eight. TGMD-2 was used for the qualitative fundamental movement skills assessment while the quantitative assessment was made with the use of the following test results: standing long jump, 20 meter run and overhand throw. The results show a statistically significant correlation between the quantitative and qualitative assessment for the total sample. Authors suggest further research to investigate applied tests and their appropriateness for either motor ability or fundamental movement skills assessment in school children.

Key words: *TGMD-2, fundamental movement skills, qualitative assessment, quantitative assessment*

Sekcija
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Session
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Original scientific paper

IMPROVING THE BIATHLON JUNIOR ATHLETE PERFORMANCES BY OPTIMIZING THE TECHNICAL TRAINING FOR THE SHOOTING EVENT

INTRODUCTION

The biathlon skiers have a severe training programme, because in addition to the learning of ski movement techniques (the downhill, flat, valley sliding, valley turns, etc.), they must be aware of the fact that the moment when they pass through the shooting range can be critical.

If the start in the event is made at the highest parameters, when the athlete enters the shooting range he/she must have his/her respiratory functions, heart rate, and concentration at an optimum level for obtaining the perfect results, as well as making the specific movements, like stopping at the shooting place, leaving the ski poles on the ground, bringing the gun in target position, regulating his/her breathing, aiming and shooting, as precisely as possible, otherwise the athlete could lose extra seconds, which could lead to him/her losing the race.

Starting from the idea that all of these actions can be perfected, we talked to the coaches who allowed us to introduce new elements in order to improve the training programme.

RESEARCH HYPOTHESES

In addition to the problems regarding the sliding, pushing, change in direction, etc., actions that can be remedied by numerous means of perfecting the basic technique of the athlete (the running, etc.), the specific shooting range actions play a decisive role in attaining top performance.

In elaborating the hypotheses of this research, we started from the following assumptions:

1. Through dexterity exercises, performed in a speedy manner, we can achieve a series of automatisms that are necessary for the shooting range moment, up until the first fire, for the prone position, and through coordination exercises, with

a high number of repeatings in a time unit, we can automatize the moment of getting into the shooting position;

2. The shooting can be perfected by holding the rifle, to which more weight was added, simulating the shooting, and retaking the aiming position; thus, through a large number of repeatings for ending the shooting and exiting the shooting range, we can attain perfection for restarting the sprint in optimal conditions.

We can say from the beginning that these exercises can lead to an improvement of the total time during the event, and, by default, of the time spent in the shooting range. The exercises must be performed as stand-alone elements, and not as part of higher amplitude actions.

RESEARCH TASKS

Starting from the idea that the Romanian athletes have reasonable enough time averages in the ski sprint and shooting, we concluded that there somewhere must be a fault in the training: motor activity, methodology, etc. After analyzing many sets of results, we could observe that the shooting range, due to certain factors, dependent or independent of the motor activity, is or can be the place where the final result can be turned.

The aims of this research are:

1. learning the action proceedings up until the first fire is shot:
   - putting the ski poles on the ground at an optimal distance;
   - taking the shooting position with the least amount of complementary actions;
   - positioning the rifle for shooting the first fire;
   - assessing the shots, and self-assessing one's own actions according to the immediate result;
   - repeating the final actions of leaving the shooting range until they become automatic.
2. performing the 5 shots in a rhythmic manner, according to the heart and respiratory rate.

The subjects of the experiment

We formed a group of four athletes, who, due to their academic schedule, worked separately, only the week-end trainings being common: **C. S., Sz. I., Cs. A., S. M. - the experimental group**. This group attained its objectives, its training plans being mostly identical with the ones for the control group, the difference being in the specific shooting range training exercises.

Due to the favourable conjuncture, these athletes were trained differently than their colleagues, who previously had better results.

The team members were **A. L., B. B., K. J., P. Zs**. **The control group** was represented by the ones who performed their training according to the plan set by the coach, based on their previous training level, effort adapting ability, and the goals of each athlete. The experimental group participated in the set programme, with a very good presence records.

PERSONAL CONTRIBUTION

The results of the trainings, besides enhancing the athletes' effort capacity, their arm strength through dumbbell and barbell exercises, would be development of their internalization and automation of the actions in the shooting range through certain groups of special exercises of medium intensity.

Through the rhythm of the performance of the exercises, we aimed for a better personal adaptation to the speed of the shooting range performances; through the number of performances, combined with sprinting, we aimed for a certain dosage and a self-control of the athlete when exposed to a premature tiredness, the athlete's search for an optimal effort dosage.

These forms of training, the variety of uses of the means in the specific training programme, lead to mental demands regarding self-assessment, forming an approaching tactic for a less valuable race. Through changes and combining elements from the specific shooting range exercise, we aimed for the internalization and automatisation of certain means for correcting, concentration, etc. These exercises were based on the actual shooting range activity.

For this experiment, we applied the following shooting range training exercises, their dosage and combinations being chosen by the athletics trainer, or by the head coach.

- taking the rifle from its stand, situated at 10 m from the shooting position;
- putting the rifle on the back - the ski sprint position;
- putting the ski poles on the ground;
- getting into the aiming position;
- simulating the shooting;
- lifting and moving the rifle on the back;
- getting ready for sprint.

The exercises can be combined with roller skis, on a loop of 300m, 500m, 750m, performing 2, 3, 4, or 5 shootings, or different combinations.

The athlete can perform series of sprints on the same distance, or progressive-regressive, taking into account the type of training at the moment of that performance (endurance, speed, agility). What is important is a high number of performances in the same time unit.

Regarding these exercises, we can see that they were in no particular order, no solution was given, but the action itself was only recorded. The performance of these exercises supports the idea that each moment in time is different from the other, the creativity and the performance having to be oriented towards the moment of performing the specific motor acts in the shortest time possible.

We had to emphasize in some manner the role this specific training has played. Hence, we established a set of control rules, in which, besides the subjects, two timing referees participated, having the task to follow the athletes from their entrance in the shooting range, to their exit, within a well-defined space. Each time was registered and accounted for by a secretary.

The control drills were performed a week after the first training stage began, when the physical and the shooting training were just starting, and the effort capacity was at medium level.

PRESENTATION AND INTERPRETATION OF THE RESULTS

Following the structure, this research aimed to determine the causes of poor results at international biathlon competitions of the Romanian team; the results show several issues:

1. regular participation in training is a major problem;
2. guns and cartridges yield athlete quality results in polygon;
3. using means of preparation sometimes varied by details of some cases can have damaging effects.

Direct results of this research are presented in the following tables:

Table 1. *Initial control test 10 km Ski Roller - 4 shooting (Down - Feet - Down - Feet) - June 2009*

	Control group				Experimental group			
Athlete	**A.L.**	**B.B.**	**K.J.**	**P.ZS.**	**C.S.**	**SZ.I.**	**CS.A.**	**S.M.**
Running	8'56"	9'01"	9'05"	9'10"	8'51"	9'05"	9'11"	9'16"
Shooting range	1'10"	1'12"	1'16"	1'20"	1'13"	1'16"	1'20"	1'26"
Penalties	1	2	1	2	1	3	1	2
Running	9'11"	9'13"	17"	9'20"	9'14"	9'17"	9'22"	9'27"
Shooting range	1'06"	1'18"	1'20"	1'23"	1'09"	1'20"	1'23"	1'29"
Penalties	0	1	0	3	1	2	2	3
Running	10'35"	10'30"	10'40"	10'35	10'38"	10'34"	10'44"	10'40"
Shooting range	1'15"	1'15"	1'20"	1'25"	1'18"	1'19"	1'26"	1'32"
Penalties	1	2	3	2	2	2	3	2
Running	12'48"	13'01"	13'05"	14'00"	12'51"	13'05"	13'11"	14'07"
Shooting range	1'20"	1'18"	1'21"	1'24"	1'23"	1'20"	1'26"	1'31"
Penalties	2	2	1	3	2	2	1	3
Total penalties	**4**	**7**	**5**	**10**	**6**	**9**	**7**	**10**
Running time	**41'30"**	**41'45"**	**42'07"**	**43'05"**	**41'42"**	**42'01"**	**42'28"**	**43'30"**
Shooting range time	**4'51"**	**5'13"**	**5'17"**	**5'32"**	**5'03"**	**5'15"**	**5'25"**	**5'58"**
Total time	**46'51"**	**46'58"**	**47'14"**	**48'37"**	**46'45"**	**47'16"**	**48'03"**	**49'28"**

Table 2. *The final control test 10 km Ski Roller - 4 shooting (Down - Feet - Down - Feet) - October 2009*

	Control group				Experimental group			
Athlete	**A.L.**	**B.B.**	**K.J.**	**P.ZS.**	**C.S.**	**SZ.I.**	**CS.A.**	**S.M.**
Running	8'45"	8'55"	9'00"	9'00"	8'51"	8'50"	9'02"	9'12"
Shooting range	1'10"	1'11"	1'15"	1'14"	1'01"	1'02"	1'06"	1'16"
Penalties	1	2	2	1	1	1	1	2
Running	9'01"	9'08"	9'15"	9'20"	9'10"	9'15"	9'22"	9'25"
Shooting range	1'02"	1'15"	1'16"	1'16"	1'02"	1'03"	1'13"	1'18"
Penalties	1	1	1	1	1	1	1	1
Running	10'28"	10'25"	10'32"	10'25"	10'22"	10'30"	10'46"	10'40"
Shooting range	1'10"	1'13"	1'15"	1'20"	1'10"	1'08"	1'20"	1'17"
Penalties	2	1	1	1	2	1	2	2
Running	12'20"	12'30"	12'33"	13'50"	12'30"	12'40"	12'45"	13'01"
Shooting range	1'13"	1'17"	1'18"	1'20"	1'18"	1'20"	1'16"	1'20"
Penalties	0	2	2	3	1	0	2	1
Total penalties	**4**	**6**	**6**	**6**	**5**	**3**	**6**	**6**
Running time	**40'34"**	**40'18"**	**40'08"**	**42'35"**	**40'13"**	**40'35"**	**41'15"**	**42'18"**
Shooting range time	**4'35"**	**4'56"**	**5'04"**	**5'12"**	**4'31"**	**4'33"**	**4'55"**	**5'11"**
Total time	**45'19"**	**45'14"**	**45'12"**	**47'47"**	**44'44"**	**45'08"**	**46'10"**	**47'29"**

As can be seen from the comparative analysis of results, the progress made by the experimental group members is more than notable. The first hypothesis was that all the components in the experimental group would exceed their performance speed in the shooting range and the results confirmed this. Fear of the result or effect of „encouraging" by announcing times, lack of experience, or distraction has caused poorer results at the last shooting range drill. Penalties acquired in the experimental group were also significantly lower than in previous drills. Regularity in the Report Control - contemplating a more detailed experiment proved its best education.

Table 3. *Ratings of 8 players after the test*

	Athlete	Time	Penalties	Total time	Place
Control group	A.L.	45'19"	4	49'19"	2
	B.B.	45'14"	6	51'14"	5
	K.J.	45'12"	6	51'12"	4
	P.ZS.	47'47"	6	53'47"	8
Experimental group	C.S.	44'44"	5	49'44"	3
	SZ.I.	45'08"	3	48'08"	1
	CS.A.	46'00"	6	52'00"	6
	S.M.	47'29"	6	53'29"	7

Following this classification we can say that there was a mixing of power. Progress made by the experimental group regarding the concentration, rhythm coordination of actions carried out safety in the shooting range, the power concentration gain before and during the shooting are phenomena that appear to well-trained athletes. Ratings were made on test at the two most important proposed research plans and kept for subsequent comparisons, analysis of research.

Table 4. *Penalties and shooting time*

Ratings:	
Total penalties	**Total shooting range time**
3 - 4 = VG	4'30" – 4'35" = VG
5 – 6 = B	4'36 – 5'00" = G
7 – 8 = S	5'01" – 5'15" = S
over 9 = NS	over 5'16" = NS

In order to graphically emphasize the ratings the athletes got after participating in all of the control drills, we gave them the following values:

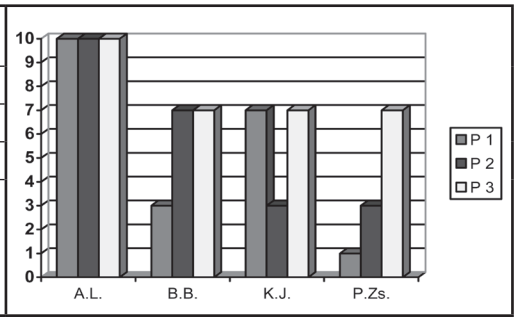
Table 5. *Score according to ratings*

Score according to ratings:	
VG =	10 points
G =	7 points
S =	3 points
NS =	1 point

Table 6. *Ratings for the three control drills - total penalties*

Control group

Drill Athlete	Initial	Intermediary	Final
A.L.	VG	VG	VG
B.B.	S	G	G
K.J.	G	S	G
P.ZS.	NS	S	G



Experimental group

Drill Athlete	Initial	Intermediary	Final
C.S.	G	G	VG
Sz.I.	NS	B	VG
Cs.A.	S	S	G
S.M.	NS	S	G

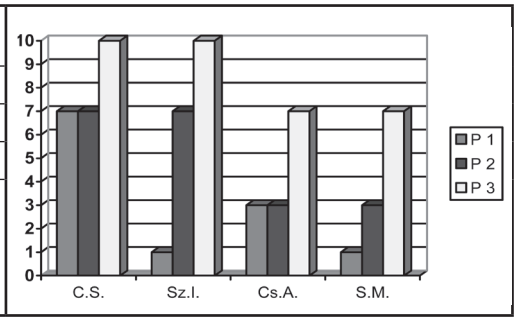
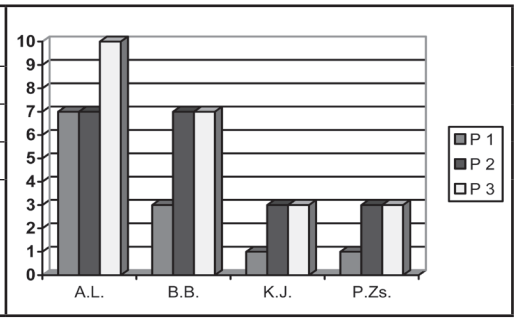


Table 7. *Ratings for the three control drills - shooting range time*

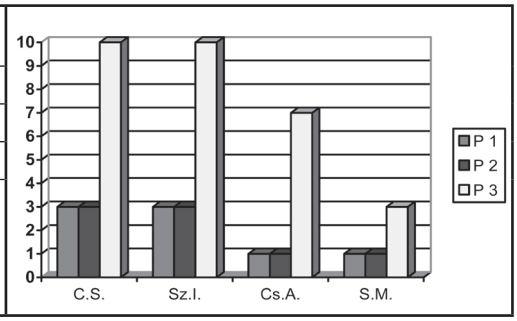
Control group

Drill Athlete	Initial	Intermediary	Final
A.L.	G	G	VG
B.B.	S	G	G
K.J.	NS	S	S
P.Zs.	NS	S	S



Experimental group

Drill Athlete	Initial	Intermediary	Final
C.S.	S	S	VG
Sz.I.	S	S	VG
Cs.A.	NS	NS	B
S.M.	NS	NS	S



After analyzing the results of the two groups, following the training during the two stages, June - September, we can make several observations. The most important of these observations regard the shooting range actions.

Given the fact that biathlon is an individual event, including the relay being based on personal results, and its composition being based on the physical fitness of the athletes during the event, the general results tend to give a general idea of the individual training, of personal mobilization for attaining goals, and not in the least, of the athlete's focus in trying to attain optimum shooting range actions.

CONCLUSIONS

After interpreting the experiment results, we can conclude the following:

1. After conducting this research, analyzing the data, and interpreting the results obtained during the control drills, we can confirm that the final time can be improved through a more thorough training of the shooting range actions.

2. The athletes' presence during the training must have a rate as high as possible, while the „aimed" and „accomplished" ratio must be closer to 1 (100%).
3. The recorded data shows indisputably the critical importance that a willingness to perfect the training programme can have, as far as the actions of the athlete, from his/her entrance in the shooting range until his/her exit, are concerned.

As a final conclusion, we can say that where the biathlon, an individual and a team event (for the relay events, where the individual results count directly) is concerned, the athlete can improve his/her results only through a systematic and systemic analysis of all the possibilities for reducing the wasted time.

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ABSTRACT

In addition to the problems regarding the sliding, pushing, change in direction, etc., actions that can be remedied by numerous means of perfecting the basic technique of the athlete (the running, etc.), the specific shooting range actions play a decisive role in attaining top performance. We can say that the exercises presented in this paper led to an improvement of the total time during the event, and by default, of the time spent in the shooting range. After conducting this research, analyzing the data, and interpreting the results obtained during the control drills, we can confirm that the final time can be improved through a more thorough training of the shooting range actions.

Key words: *biathlon, shooting event, junior athlete*

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Stručni rad

TENIS U ŠKOLE

UVOD

Povijesno gledajući, tenis je smatran elitnim sportom. Učenici u dosadašnjim uvjetima počinju igrati tenis isključivo u privatnim klubovima ili školama koji su zatvoreni za nečlanove. Međutim, u zemljama koje imaju navedeni sport u školskim programima kao što su Francuska, Belgija, SAD i ostale vodeće teniske zemlje učenici imaju upravo priliku upoznati se s teniskim športom u sklopu svojeg školskog sportskog programa. Mnogi veliki igrači počeli su igrati tenis u školama nakon čega su počeli trenirati i u klubovima. Imajući te podatke u vidu pokrenut je program tenis u škole, a cilj je da tenis postupno preraste u 'školski sport za sve'. Činjenica je da se u posljednjih petnaestak godina redovito igraju prvenstva škola i sveučilišta u tenisu, a da je program tenisa zaživio tek 2010. godine kao izvanastavna aktivnost ili nastavna aktivnost. Navedeno govori o velikom interesu učenika za teniski sport jer se veliki broj učenika bavi istim unutar klupskih programa. Što bi se tek dogodilo da učenici mogu tenis upražnjavati u svoje slobodno vrijeme, u sklopu svojeg školskog programa izvanastavnih aktivnosti?

Tenis je sport kojim se ljudi bave tijekom cijelog života. Upražnjavaju ga učenici u teniskim igraonicama, ali isto tako možemo vidjeti kako ga s izuzetno velikim zadovoljstvom upražnjavaju i osobe treće životne dobi. U navedenom smislu tenis može značajno utjecati na kvalitetu cjelokupnog življenja jedne osobe. Isto tako istraživanja su pokazala kako ljudi koji se bave tenisom od osnovne i srednje škole imaju znatno bolji zdravstveni status od osoba nesportaša.

Tenis je izvrstan sport za djecu, mlade i odrasle kako na profesionalnoj razini tako i na amaterskoj, nudi jednake mogućnosti za muškarce i žene. Omogućuje osobi da se izrazi individualno, ali i kao član ekipe.

Gledajući našu zemlju i njezine mogućnosti postoji izuzetan prostor za povećanje broja učenika koji igraju tenis, a što je upravo i cilj pokretanja programa „tenis u škole" kroz koji učenici imaju sjajnu priliku da se u sklopu izvannastavnih sportskih aktivnosti upoznaju s još jednim izuzetnim olimpijskim sportom.

Cilj je ove inicijative upoznati djecu polaznike od prvog do četvrtog razreda s teniskim sportom. Program u značajnoj mjeri utječe na poboljšanje njihovog zdravstvenog i psihosocijalnog statusa te omogućava većem broju učenika mogućnost da nauče igrati tenis. Provođenjem plana i programa „tenis u škole" povećava se baza učenika koji igraju tenis u školama čime bi se ostvarila i promocija hrvatskog školskog i športskog sustava na međunarodnom nivou.

Što nudi program?

Program „Tenis u škole" jedan je od najučinkovitijih načina upoznavanja učenika s tenisom na aktivan i atraktivan način, a to se događa upravo iz razloga što se filozofija programa temelji isključivo na igri i zabavi. Utvrđeno je kako na taj način učenici i učenice brže uče igrati tenis te postižu veći užitak tijekom tjelesnog vježbanja.

Zašto ovaj program?

- Može se organizirati gotovo svugdje; dvorana (parket), vanjski tereni (beton, tartan...)
- Jednostavan je i zabavan
- Brzim svladavanjem kontrole lopte učenici se pripremaju za ulazak u 'pravi sport'
- Uspjeh u savladavanju teniske tehnike na zabavan način pomaže u izgradnji samopouzdanja djeteta za daljnje bavljenje sportom
- Učenici se igraju u okolini koja je kompatibilna s njihovim fizičkim sposobnostima (mali reketi, lakše i sporije loptice...)
- Idealan je način za učenje tenisa u osnovnoj školi
- Izvrstan je način za otkrivanje nadarene djece (za daljnje juniorske razvojne programe)
- Nudi jedinstvenu priliku da se u teniski sport privuku brojni novi sudionici

Ciljna skupina i vremenske odrednice programa

- Ciljna skupina: učenici od prvog do četvrtog razreda osnovne škole (7 - 10 godina).
- Treninzi se provode u grupama do 30 polaznika.
- Budući da se radi o učenicima mlađe školske dobi treninzi su organizirani zajednički za djevojčice i dječake.

Program će se kontinuirano provodi jednom tjedno za svaku grupu od 30 učenika tijekom nastavne godine (u tjednu ili vikendom obzirom na mogućnost korištenja dovorane ili igrališta). Program predviđa trideset 30 nastavnih sati.

CILJ I ZADAĆE PROGRAMA

Cilj: Podučiti djecu teniskom sportu koji potiče zdrav život, fair play, kulturno i dostojanstveno ponašanje.

Zadaci:

Obrazovni:

Usvojiti motorička i teorijska znanja izvođenja tehnike osnovnih udaraca u tenisu. Naučiti djecu pravilima ponašanja te pružiti učenicima mogućnost da tenis koriste u rekreacijske i natjecateljske svrhe.

Odgojni:

Razviti pozitivan odnos prema radu u skupini i individualnom doprinosu, razvijati osjećaj sigurnosti i samopouzdanja koje nastaje uslijed procesa uspješnog savladavanja programskih sadržaja.

Kinantropološki:

Utjecaj na antropometrijske karakteristike – utjecati na skladan rast i razvoj djeteta te redukciju potkožnog masnog tkiva.

Utjecaj na motoričke sposobnosti – razvoj opće motorike s posebnim naglaskom na razvoj koordinacije cijelog tijela te repetitivne snage nogu, ruku i trupa kao i ravnoteže.

Utjecaj na funkcionalne sposobnosti – poboljšati rad srčanog i plućnog sustava.

Edukacija profesora – u školama kako da provode kreativnu, raznovrsnu i zabavnu nastavu koristeći tenis kao edukacijski sadržaj.

NAČIN REALIZACIJE PROGRAMA

Prvi korak

Hrvatski teniski savez izradio je anketne listiće i kratku brošuru o programu. Sukladno prijavljenim školama, zainteresiranim za provođenje programa koordinator programa je na temelju prethodno obavljenih posjeta odredio škole koje su spremne i prikladne za sudjelovanje u programu. U cilju što bolje pripreme za provođenje programa Hrvatski teniski savez organizirao je i dvodnevni seminar za učitelje i licencirane trenere zainteresirane za provođenje programa.

Drugi korak

Nakon održanog seminara koordinator je pismenim putem obavijestito škole koje su prihvaćene u program. Prednost se dao školama koje mogu pružiti – osigurati adekvatne uvjete za provođenje programa kroz stručno vodstvo učitelja TZK.

Treći korak

Koordinator je kao odgovorna osoba Hrvatskog teniskog saveza povezao odabrane škole i profesore s licenciranim trenerima zaduženim za provedbu programa.

Četvrti korak

U dogovoru s Ministarstvom znanosti, obrazovanja i športa određeno je da program započne 2010. godine. Odredio se točan broj klubova, imena licenciranih trenera i profesora kao i broj razreda obuhvaćenih programom. Ustanovio se i ciljani broj škola te polaznika za predstojeći period.

Stručni kadar i materijalni uvjeti za provedbu programa

Treninge u školama provode zajednički učitelji tjelesne i zdravstvene kulture i licencirani treneri Hrvatskog teniskog saveza u školskim dvoranama odabranih škola. Potrebna sredstva i pomagala za provođenje programa osigurali su Ministarstvo znanosti, obrazovanja i športa, Zbor teniskih trenera Hrvatske, Hrvatski teniski savez i sponzori.

Skrb za zdravlje, tjelesni razvoj i sigurnost polaznika

Licencirani trener i profesor zajdnički se brinu da se postupak vježbanja odvija u maksimalno sigurnim uvjetima, kako i nalažu planirani programski sadržaji i teme. Temeljem dobivenih podataka o zdravstvenom statusu učenika program se provodi u maksimalno sigurnim uvjetima za sve.

PLAN I PROGRAM AKTIVNOSTI

Broj učenika u grupi:	do 30
Trajanje programa:	tijekom cijele školske godine
Ukupan broj sati:	30
Broj sati tjedno:	1
Trajanje sata:	60 min
STRUKTURA SATA	Organizacija vremena poduke
Uvodni dio sata	6 minuta
Pripremni dio sata	7 minuta
Glavni dio sata:	„A" dio 30 minuta
	„B" dio 12 minuta
Završni dio sata	5 minuta

Unutar programa od 30 sati u uvodnom dijelu sata obrađuje se 13 tema, u glavnom „A" 84 teme, u glavnom „B" dijelu sata 13 tema i u završnom dijelu sata 10 tema.

POMAGALA

Košara za teniske lopte, spužvaste lopte, teniske lopte, mekše teniske loptice (50% i 70%) mali reketi, male dodatne mreže, oznake, čunjevi,...

ZAKLJUČAK

Inicijativa za provođenje ovakvog programa može u značajnoj mjeri utjecati na obogaćivanje izvannastavnih aktivnosti osnovnih škola kao i kompetencije učenika. Ovakav program organizacijski i provedbeno omogućuje učenicima da se upoznaju sa još jednim olimpijskim sportom izuzetne popularnosti. Tenis danas više nije privilegija najbogatijih, broj aktivnih tenisača konstantno raste. Programom se omogućuje učenicima da nauče i spoznaju teniske osnove u najranijoj mladosti kao bi tenis postao jedan od sportova kojim se mogu baviti tijekom cijelog života.

Program „Tenis u škole" prikazan je kao jedna vrsta igre i zabave što je osnovna potreba učenika ove dobi. Svaki sat sadržajno je bogat, a osnovni elementi tehnike usvajaju se kroz različite oblike vježbi. Učitelj primjenom raznovrsnih sadržaja doprinosi skladnom razvoju djeteta i omogućava njegov višestrani psihosomatski razvoj. Ovakvim kreativnim korištenjem raznovrsnih i primjerenih sadržaja učitelji mogu bolje zaokupiti pažnju učenika i omogućiti im da stvore pozitivan odnos prema tenisu i sportu općenito.

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INTRODUCING TENNIS TO SCHOOLS

ABSTRACT

The aim of this paper was to present the starting basis and the manner in which a successful programme of out-of-school activity called „introducing tennis to schools" can be successfully accomplished. The above-mentioned programme has been verified by the Ministry of Education and Sports, and launched in 2010 arousing a great interest among children and schools. The results show that the implementation of this programme has had an extremely positive impact on the students' competence and their more active participation is sports.

Key words: *tennis, school programme, students' competences*

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Izvorni znanstveni rad

UTJECAJ BAZIČNIH I SPECIFIČNIH MOTORIČKIH SPOSOBNOSTI NA PRECIZNOST ŠUTIRANJA U RUKOMETU

UVOD

Današnji moderni rukomet igra je izuzetno brzih, eksplozivnih i višestruko složenih pokreta, razvoja akcija, situacijskih rješavanja problema, a koje sve zajedno obilježava visoki intenzitet aktivnosti što zahtijeva od igrača visoku razinu sposobnosti, kako bazičnih tako specifičnih.

Utjecaj bazičnih motoričkih sposobnosti čini osnovu za daljnju nadogradnju specifičnih motoričkih sposobnosti koje su direktno odgovorne za postizanje kvalitetnih rezultata. Postojanje pet latentnih situacijsko-motoričkih dimenzija u rukometu potvrđeno je od strane brojnih autora (Gabrijelić 1977, Pavlin,Šimenc i Delija 1982, Vuleta 1984), a to su: preciznost, baratanje loptom, brzina kretanja igrača s loptom, brzina kretanja igrača bez lopte i snaga izbačaja lopte. Jedna od najbitnijih sposobnosti koja određuje uspješnost ekipa između ostalog je i preciznost obzirom da se manifestira kod šutiranja i direktno utječe na rezultatski uspjeh ili neuspjeh, obzirom da su postignuti golovi jedino mjerilo uspješnosti ekipa u raznim natjecanjima. Preciznost se definira kao sposobnost koja omogućava da se aktivnostima gađanja ili ciljanja pogodi određeni statični ili pokretni cilj koji se nalazi na određenoj udaljenosti, a osim u šutiranju još se manifestira u prostorno-vremenskom tajmingu, u dodavanju, u nekim obrambenim aktivnostima. Brzina i točnost dva su dominantna faktora u bacanju lopte, bilo tipa dodavanja ili šutiranja, koje da bi bilo uspješno mora biti brzo i točno.

Još su 1983. Kuleš i Šimenc istraživali utjecaj bazičnih motoričkih sposobnosti na uspjeh u rukometu i utvrdili da eksplozivna snaga (horizontalne i vertikalne skočnosti te tipa bacanja), preciznost, brzina kretanja igrača s i bez lopte te koordinacija definiraju efikasnost rukometaša. U novijim istraživanjima Tillaar i Ettema (2003) istraživali su utjecaj upute na brzinu i preciznost lopte upućene prema vratima i zaključili da se preciznost izvedbe povećava kada se izbačaj lopte izvodi maksimalnim ili skoro maksimalnim intenzitetom. Vuleta i suradnici (2006) utvrdili

su povezanost između nekih bazičnih motoričkih sposobnosti i specifične motoričke sposobnosti definirane preciznošću šutiranja na gol.

CILJ ISTRAŽIVANJA

Cilj je ovog istraživanja utvrditi utjecaj bazičnih i specifičnih motoričkih sposobnosti na preciznost u rukometu.

METODE ISTRAŽIVANJA

Uzorak ispitanika

Ovo istraživanje provedeno je na uzorku od 22 rukometeša RK „Maksimir Princ" koji su se natjecali u 2. HRL starosti 20-25 godina. Svi ispitanici bili su urednog zdravstvenog stanja, bez oštećenja lokomotornog sustava te su prošli osnovnu izobrazbu u elementima tehnike rukometne igre.

Uzorak varijabli

Bazične motoričke sposobnosti testirane su primjenom baterije mjernih instrumenata prikazanih u tablici 1.

Tablica 1. *Prediktorski skup varijabli za procjenu moričkih sposobnosti*

	VARIJABLA	NAZIV	INTENCIONALNI PREDMET MJERENJA
1	MAGKUS	Koraci u stranu	Lateralna agilnost
3	MEP5V	Prolaz vođenjem lopte na 5 metara	Eksplozivna snaga tipa sprinta
4	MEMAX	Skok sa zamahom rukama	Eksplozivna snaga mišića donjih ekstremiteta
5	BML3	Bacanje medcinke iz ležanja	Eksplozivna snaga tipa bacanja
6	RADAR4	Bacanje rukometne lopte iz sjeda	Specifična eksplozivna snaga tipa bacanja
7	RADAR6	Bacanje rukometne lopte iz osnovnog stava	Specifična eksplozivna snaga tipa bacanja
8	RAD_SS	Bacanje rukometne lopte iz skok šuta	Specifična eksplozivna snaga tipa bacanja
9	MRSPT6	Podizanje trupa u 60''	Repetitivna snaga donjeg dijela trupa
10	MSSEL	Izdržaj u leđnoj ekstenziji	Statička snaga u izdržaju ekstenzora leđa
11	MFLIP	Iskret palicom	Fleksibilnost ruku i ramena

Specifična motorička sposobnost testirana je primjenom varijable:

1. SRP7ST – preciznost šuta sa 7 metara iz stava

Metode obrade podataka

Deskriptivnom statistikom definirani su parametri centralne tendencije i disperzivni parametri prediktorskih varijabli (aritmetičke sredine, standardne devijacije, minimalne i maksimalne vrijednosti, te zakrivljenosti distribucije). Regresijskom analizom definirana je povezanost između bazičnih i specifičnih motoričkih sposobnosti i specifične motoričke sposobnosti - preciznost u rukometu.

REZULTATI I RASPRAVA

Rezultati mjerenja bazičnih i specifičnih motoričkih sposobnosti prikazani su u tablici 2. Iz dobivenih rezultata vidljivo je da je motorička učinkovitost na očekivano visokoj razini za mušku populaciju rukometaša tog ranga. Analiza distribucijskih parametara pokazuje da su sve varijable bez značajnih odstupanja od normalne raspodjele, što znači da su varijable pogodne za daljnju statističku obradu.

Tablica 2. *Deskriptivna statistika varijabli za procjenu motoričkih sposobnosti kod rukometaša*

	N	AS	Min	Max	Raspon	Std.Dev.	Skewness	Kurtosis	d K-S	p
MAGKUS	22	7,26	6,66	8,73	2,07	0,24	0,49	1,33	0,11	> 0,20
MEP5V	22	1,46	1,31	1,64	0,34	0,01	0,10	0,32	0,11	>0,20
MEMAX	22	54,35	43,25	62,65	19,40	25,53	5,05	-0,16	0,11	>0,20
BML3	22	55,21	42,67	65,67	23,00	39,24	6,26	0,21	0,12	>0,20
RADAR4	22	58,28	50,67	63,13	12,47	10,57	3,25	-0,48	0,09	>0,20
RADAR6	22	86,10	77,77	93,57	15,80	20,96	4,58	-0,15	0,15	>0,20
RAD_SS	22	94,82	84,90	107,60	22,70	31,47	5,61	0,43	0,14	>0,20
MRSPT6	22	56,36	43,00	70,00	27,00	42,81	6,54	-0,10	0,10	>0,20
MSSEL	22	79,00	35,00	105,00	70,00	329,52	18,15	-0,75	0,14	>0,20
MFLIP	21	89,80	55,33	102,67	47,33	160,80	12,68	-1,54	0,24	<0,10
SRP7ST	22	8,50	2,00	13,00	11,00	9,79	3,13	-0,18	0,12	>0,20

Povezanost prediktorskog skupa s kriterijem (tablica 3) opisana je koeficijentom multiple korelacije čije je vrijednost od 0,87 testiranjem pomoću F-distribucije za stupnjeve slobode df1=10 i df2=10, pokazala statistički značajnom na razini p=0,03.

Zajednički varijabilitet sustava prediktora i kriterijske varijable je oko 77% (multiple R^2=0,77).

Tablica 3. *Multivarijatni regresijski pokazatelji utjecaja prediktorskog skupa varijabli na kriterije uspješnosti definiran preciznošću šutiranja sa 7 m iz osnovnog stava*

KRITERIJ	SRP7ST
MULTIPLE R	0,87
MULTIPLE R²	0,77
F(10,10)	3,40
p	<0,03
std. err. of estimate	2,15

Parcijalni pokazatelji regresijske analize (tablica 4) otkrivaju da kod bacanja medicinke iz ležećeg položaja (BML3; p=0,01, BETA=-0,68), bacanja rukometne lote iz skok šuta (RAD_SS; p=0,02, BETA=0,66), koraka u stranu (MAGKUS; p=0,03, BETA=-0,59), prolaza vođenjem lopte na 5 metara (MEP5V; p=0,03, BETA=0,59), izdržaja u leđnoj ekstenziji (MSSEL; p=0,03, BETA=0,46) i skoka sa zamahom rukama (MEMAX; p=0,05, BETA=-0,46) postoji statistički značajan doprinos rezultata u rezultatima kriterijske varijable definirane preciznošću sutiranja sa 7 metara iz stava.

Tablica 4. *Parcijalni regresijski koeficijenti analize utjecaja prediktorskog skupa varijabli na kriterije uspješnosti definiran preciznošću šutiranja sa 7m iz osnovnog stava*

	BETA	Std.error of BETA	B	Std.error of B	t(10)	p-level
Intercpt			-60,71	22,57	-2,69	0,02
MAGKUS	-0,59	0,23	-3,91	1,55	-2,52	0,03
MEP5V	0,59	0,24	19,85	8,14	2,44	0,03
MEMAX	0,46	0,21	0,28	0,13	2,23	0,05
BML3	-0,68	0,23	-0,34	0,12	-2,96	0,01
RADAR4	0,17	0,26	0,16	0,25	0,66	0,53
RADAR6	0,34	0,31	0,24	0,22	1,10	0,30
RAD_SS	0,66	0,23	0,40	0,14	2,85	0,02
MRSPT6	-0,01	0,23	-0,01	0,11	-0,06	0,95
MSSEL	0,46	0,19	0,08	0,03	2,46	0,03
MFLIP	-0,08	0,21	-0,02	0,05	-0,38	0,71

Prema parcijalnim regresijskim pokazateljima u kojima *izdržaj u leđnoj ekstenziji* (MSSEL) ima statistički značajan doprinos u opisu povezanosti sa prediktorskom varijablom može se zaključiti da su oni ispitanici koji imaju stabilniju posturu tijela precizniji od onih koji nemaju dovoljno razvijenu muskulaturu bitnu za pravilan izbačaj lopte.

Oni testovi za *procjenu eksplozivne snage bacanja* koji zahtijevaju više koordinacije, tj. preciznosti izvedbe vezane uz trajektoriju izbačaja lopte (BML3, RAD_SS) imaju veći doprinos utjecaja na preciznost od onih testova kod kojih je zahtjevnost bila osnovana uglavnom na eksplozivnoj snazi, a ne toliko na tehnici izvedbe (RADAR4, RADAR6). Takvi rezultati mogu se objasniti time što izvedba u testu RAD_SS zahtjeva kvalitetnu tehniku izvedbe koja kod testova RADAR4 i RADAR6 nije presudna za dobar rezultat iako su ti testovi po strukturi puno sličniji kriterijskoj varijabli. Kod testa BML3 do izražaja dolazi zahtjevnost za pravilnom izvedbom obzirom na trajektoriju izbačaja i leta medicinke i na bazičnu snagu izbačaja, a razlikuje se od RAD_SS po tome što se kod izbačaja medicinke izolira kompletna muskulatura tijela izuzev muskulature ruku i ramenog pojasa, dok se kod bacanja rukometne lopte iz skoka uključuje muskulatura cijelog tijela.

Značajan doprinos rezultatima u testu preciznosti imaju i tri testa koji indirektno zahtijevaju različite manifestacije preciznosti izvedbe. To su: MAGKUS-*koraci u stranu*, (preciznost se manifestira u poziciji postavljanja stopala u odnosu na liniju kod koje se radi promjena pravca), MEP5V-*prolaz vođenjem lopte do 5 metara* (preciznost se manifestira kod usmjeravanja lopte pod određenim kutem u odnosu na podlogu prolikom vođenja lopte), MEMAX-*skok sa zamahom rukama* (preciznost se manifestira kod trzaja i blokade zamaha rukama prilikom izvođenja skoka).

ZAKLJUČAK

Krajnji rezultat ovisi o mnogim faktorima koji direktno ili indirektno utječu na rezultat u rukometu. Preciznost kao specifična motorička sposobnost ima velik udio u krajnjem rezultatu što se manifestira kroz sposobnost pogađanja nepokretne mete (gola) iz najčešće kretanja, ali i iz statičke pozicije.

Rezultati ovog istraživanja potvrđuju činjenicu da se na razvoj preciznosti može utjecati *direktno* (sadržajima vezanim za izbačaj lopte), ali i *posredno* (sadržajima koji unaprijeđuju prostorno-vremensku usklađenost izvedbe).

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THE INFLUENCE OF BASIC AND SPECIFIC MOTOR ABILITIES ON SHOOTING ACCURACY IN HANDBALL

ABSTRACT

The aim of this study was to determine the impact of basic and specific motor abilities on accuracy in handball. The study was conducted on a sample of 22 players HC „Maksimir Princ" that competed in second Croatian handball league. 10 variables of basic motor abilities were used (MAGKUS, MEP5V, MEMAX, BML3, RADAR4, RADAR6, RAD_SS, MRSPT6, MSSEL, MFLIP) for determening main objective of the study, and one variable for assesing specific motor abilities as a criterion variable. A significant influence was found in those tests for the evaluation of explosive power of throws that require more coordination, precision of performance (BML3, RAD_ SS), while the tests in which the demanding was found mainly on the explosive force (RADAR4, RADAR6) a smaller contribution was found. A significant contribution to the results in test of accuracy have three tests that indirectly require different manifestations of the precision performance (MAGKUS, MEP5V, MEMAX). It can also be concluded that those respondents who have a stable body posture (MSSEL) are more accurate than those with underdeveloped muscles essential for a right throw of the ball.

Key words: *handball, precision, younger age groups*

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Stručni rad

MOGUĆNOST PRIMJENE NEFORMALNOG I INFORMALNOG OBRAZOVANJA U STUDENTSKIM SPORTSKIM UDRUGAMA I SAVEZIMA

UVOD I CILJ

Procesi globalizacije zahtijevaju nove obrazovne i odgojne potrebe kako bi se ublažila i neutralizirala kriza vrijednosti i kriza morala te devastacijske pojave koje obilježavaju suvremeni svijet. Dokumentom Gospodarske komisije Ujedinjenih naroda za Europu koji je prihvaćen na Konferenciji ministara okoliša i obrazovanja u Viliniusu 17. - 18. ožujka 2005. daje se visok obrazovni prioritet radi odmicanja od tradicionalnih stavova obrazovanja. Dokument kojeg je donio UNESCO, a koji se odnosi na globalno partnerstvo UN-ovog desetljeća za održivi razvoj od 2005. do 2014. pridaje važnost novih načela i vrijednosti koje podrazumijevaju međugeneracijsku i spolnu jednakost, društvenu toleranciju, zaštitu i obnavljanje okoliša, pravedno i miroljubivo društvo. U ovom uratku naglašava se mogućnost praktične primjene navedenih vrijednosti i načela kroz neformalno i informalno obrazovanje, u sklopu procesa cjeloživotnog učenja, pri studentskim sportskim udrugama i savezima koji objedinjuje te udruge. Rad u navedenim organizacijama omogućuje studentima uz stjecanje različitih odgojnih vrijednosti i stjecanje znanja, vještina i kompetencija koje će im biti od koristi, a moći će ih primijeniti i u budućem društvenom i poduzetničkom radu.

Cilj je ukazati na potrebu snažnijeg uključivanja studenata u proces cjeloživotnog učenja za održivi razvoj u skladu sa *Strategijom obrazovanja za održivi razvoj*, kao i mogućnost primjene istog radom i socijalizacijom u studentskim udrugama i savezima sportskog karaktera.

POLAZIŠTA ODGOJA I OBRAZOVANJA STUDENATA ZA ODRŽIVI RAZVOJ

Obrazovanje za održivi razvoj proces je koji povlači korjenite reformske promjene koje podrazumijevaju nužnost aktivnijeg sudjelovanja studenata u organizaciji i upravljanju visokim obrazovanjem[1]. Stoga je potrebno osigurati uvjete u kojima će se na moderan i studentu primjeren način omogućiti u budućnosti ostvarenje kvalitetnog življenja suvremenog čovjeka. Prihvaćanje nacionalne koncepcije cjeloživotnog učenja pretpostavlja rekonceptualizaciju odgoja i obrazovanja studenata. Dosadašnji tradicionalni način obrazovanja podrazumijevao je samo formalno obrazovanje kao jedini i osnovni model usvajanja znanja, i vještina. Suvremeni koncept cjeloživotnog učenja dopunjen je usavršavanjem i osposobljavanjem za stjecanje različitih znanja, vještina, kompetencija, razmjenu iskustava i izvan formalnog obrazovanja. Realizacija takvog načina učenja i usavršavanja moguća je kroz neformalno obrazovanje, samoobrazovanje i informalno učenje. Približavanje Hrvatske Europskoj uniji podrazumijeva prihvaćanje i približavanje europskim standardima. Proces suvremenog obrazovanja studenata podrazumijeva društvene transformacije koje će istima dati uz znanja i vještine, stajališta i vrijednosti kroz koje će doprinijeti vlastitoj dobrobiti, a isto tako i dobrobiti zajednice i nacije kojoj pripadaju. Autori triju oblika obrazovanja: formalnog, neformalnog i informalnog, P.H. Combs i M. Ahmed (prema:Tuijnman, Bostrom, 2002) smatraju da proces obrazovanja nije više moguće vezati za samo jednu starosnu grupu i za određene institucije kao što su škole i fakulteti. Omogućavanje dodatnog razvoja sposobnosti studenata ima direktan značaj na slobodu i blagostanje, a indirektan utjecaj na socijalne i ekonomske promjene.

Tipične karakteristike obrazovanja za održivi razvoj[2], a koje mogu usvojiti i studenti kroz različite dodatne oblike u okviru cjeloživotnog učenja:

- *isticanje vrijednosti kriterija*
- *razvijanje kritičkog i stvaralačkog mišljenja u rješavanju problema*
- *poticanje različitih oblika kreativnog učenja, učenje kroz rad*

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[1] http://free-gs.t-com.hr/osnovna_skola_Donji_Lapac/bolonjski_proces.htm (skinuto 26.12. 2010.): Ministarsko priopćenje iz Praga (2001) „*Praško priopćenje naglašava i potrebu cjeloživotnog učenja; aktivniju ulogu studenata u organizaciji i sadržaju obrazovanja, kao i socijalnu dimenziju studenata, te poticanje transnacionalnog obrazovanja. ...po prvi puta naglašava studentsku participaciju kao ključnu u Bolonjskom procesu, te se uključivanje studenata u proces odlučivanja smatra najvećim razvojem u vremenu od Bolonjske deklaracije*".

[2] Pavešić, V. (2008). Globalne dimenzije održiva razvoja u nacionalnom školskom kurikulumu, Cjeloživotno učenje za održivi razvoj, svezak 1 (str. 59). Sveučilište u Rijeci, Učiteljski fakultet u Rijeci.

- *iskustveno učenje, produktivne i tolerantne diskusije*
- *razvijanje sposobnosti samostalnih donošenja odluka.*

Formalnim obrazovanjem prednost se daje stjecanju znanja, a zanemaruju se ostale vrste učenja, kao i odgoja, pa u kontekstu cjeloživotnog učenja za održivi razvoj više dolazi do izražaja neformalno i informalno obrazovanje. Organizacije i udruge civilnog društva upravo su primjer stručne i inovativne ponude odgojnih i obrazovnih modela u neformalnom i informalnom odgoju i obrazovanju (Drucker, 1992., Spajić-Vrkaš, 2002., Wyatt, 2004., Bežovan, 2004., Žiljak, 2005.). Studentske sportske udruge i savezi idealan su poligon za stvaranje aktivnog odnosa svih sudionika odgojno-obrazovnog procesa. Ravnopravni dijalog, izjašnjavanje i odlučivanje, suradnja, zajedništvo, individualni i kolektivni identitet, poštivanje raznolikosti pojedinaca i zajednica, učvršćivanje odnosa među ljudima u zajedničkom radu i aktivnostima, rješavanje sukoba, samo su neke od odrednica koje se mogu usvajati i razvijati u studentskim organizacijama sportskog karaktera.

PRIMJENA NEFORMALNOG I INFORMALNOG OBRAZOVANJA U PRAKSI I RASPRAVA

Svjedoci smo u novije vrijeme uvođenja reformi, donošenja mnogih nacionalnih programa, strategija, akcijskih planova kao i ostalih uredaba koji nisu garancija da će se u svim područjima i na različitim razinama provest s papira u djelo. Tradicionalistička razmišljanja ne dozvoljavaju uvijek primjenu suvremenih odgojno obrazovnih oblika i sadržaja u praksi, što često ovisi od multikulturalnih raznolikosti, kao i osobnih interesa pojedinaca i zajednica. Tradicionalnu doktrinu karakterizira stereotipni oblik organizacije i komunikacije kojima nije moguće ostvariti nov znanstveno-tehnološki i društveno-civilizacijski milje, što podrazumijeva uključivanje i provođenje zadaća temeljnih društvenih vrijednosti poput: slobode, jednakosti, pravde, poštovanja ljudskih prava i racionalnosti (Uzelac, 2007, prema Huckle 2005). Provedba navedenog uz aktivno sudjelovanje studenata moguća je ukoliko su ostvarena partnerstva u duhu transparentne i pravične suradnje, uz postojanje međusobne koristi. Primjena neformalnog i informalnog obrazovanja u studentskim sportskim udrugama ostvariva je, što je vidljivo iz primjera Sveučilišta u Rijeci, gdje već godinama studenti uz partnerske odnose s manjom skupinom kineziologa stječu znanja, vještine i iskustva u organizaciji i provođenju studentskih sportskih manifestacija. Da bi obrazovanje za održivi razvoj u sportskim društvima pojedinih fakulteta kao i u Riječkom športskom sveučilišnom savezu (RŠSS) bilo uspješno, treba biti na onoj razini na kojoj će studentima dati praktične vještine primjenjive i u životu nakon završetka studija.

Ključne kompetencije (osposobljenosti) za cjeloživotno učenje sastoje se od znanja, vještina i stavova, a one su[3]:

- *komuniciranje na materinskom jeziku*
- *komuniciranje na stranom jeziku*
- *matematička i prirodoslovna pismenost*
- *digitalna kompetencija*
- *umijeće organiziranja i uređivanja vlastitog učenja*
- *međuljudska i građanska kompetencija*
- *poduzetništvo*
- *kulturološko izražavanje (glazba, medij, tjelesna kultura i očuvanje zdravlja, književnost, umjetnost).*

Praktična znanja vještine i stavovi koje studenti stječu u sportskim udrugama i savezima:

- *pravila i propozicije koji se primjenjuju u pojedinom sportu*
- *sistemi i sustavi natjecanja*
- *znanja vezana za organizaciju samog natjecanja*
- *osnove menadžmenta u sportu*
- *vođenje sjednica i skupština*
- *izrada izvještaja, planova i programa rada*
- *vođenje web stranice Saveza*
- *uređivanje i kreiranje studentskih sportskih novina*
- *informiranje, reklamiranje i fotografiranje*
- *djelotvorna usmena, pismena i elektronička komunikacija*
- *razmišljanje i planiranje unaprijed (predviđanje vremena)*
- *kritičko razmišljanje o pitanjima vrijednosti*
- *sposobnosti da se pomakne od svjesnosti do znanja do akcije*
- *suradnički rad s drugim ljudima*
- *korištenje procesa: znati, ispitivati, istražiti, djelovati, prosuđivati, povezivati, vrednovati i izabirati*
- *odvajanje kvantitete, kvalitete i vrijednosti.*

[3] Lončarić Jelačić, N., (2007). Europski okvir ključnih kompetencija za cjeloživotno učenje: http://www.azoo.hr/admin/fckeditor/File/Kljucne%20kompetencije%20za%20cjelozivotno%20ucenje(1).ppt (skinuto 27. 12. 2010.)

Jedan od glavnih ciljeva Strategije gospodarske komisije UN-a[4] glasi: *ljudima pružiti znanje i vještine za održivi razvoj, učiniti ih stručnijim i pouzdanijim te povećati njihove mogućnosti za djelovanje u korist zdravog i produktivnog života u skladu s prirodom te uz brigu za socijalne vrijednosti, jednakost spolova i kulturnu raznolikost.*

U skladu s navedenim ciljevima, studenti uključeni u samostalan rad pri fakultetskim sportskim društvima i u RŠSS-u stječu različita znanja i iskustva učeći ponajprije društveno, što podrazumijeva da je takvo učenje integrirano u život zajednice - socijalno je ustrojeno u manjoj ili većoj skupini. Kod studenata koji su uključeni u rad u navedenim organiziranim skupinama sportskog karaktera stvorena je želja za postajanjem i ostajanjem članom, a sudjelovanjem u zajedničkoj praksi stvorena je i motivacija za učenjem. Formulaciju da je učenje čin sudjelovanja, a znanje ovisi o uključenosti u praksu[5], možemo povezati sa studentima koji su angažiranjem stekli određena znanja jer je kod istih stvoren osjećaj vlastitog doprinosa, što omogućuje prepoznatljiv identitet u uvjetima zajednice. Uzajamno razumijevanje, komunikacija i sklad uči studente kako živjeti zajedno. Rješavanje sukoba mirnim putem stvara razumijevanje shvaćanja složenih odnosa među ljudima s čime će se često suočavati i kasnije u poslovnom i društvenom životu. Takav način studente će naučit kako u budućnosti prevladavat krizne situacije.

Samostalno odlučivanje na sjednicama i skupštinama daje studentima dodatnu potporu te ih osnažuje, osamostaljuje i ispunjava osjećajem povjerenja. Samostalno vođenje sjednica, skupština i studentskih skupova omogućuje im aktivno sudjelovanje u svim sferama društvenog života. Važnost volonterskog rada ima dodatnu težinu u životu suvremenog čovjeka. Učestalo sudjelovanje na sportskim aktivnostima i manifestacijama proširuje kod studenata svijest o potrebi redovite tjelesne aktivnosti u specifičnim suvremenim uvjetima života što je značajan doprinos i ekološkoj povezanosti s održivim razvojem.

[4] Strategija Ujedinjenih naroda za Europu za obrazovanje za održivi razvoj - usvojena na sastanku na visokoj razini: http://www.unece.org/env/esd/strategytext/Srategy.Croatian.pdf (skinuto 27.12. 2010.)

[5] Jurić, V. (2007). Školsko (formalno), neformalno i informalno obrazovanje. U: V. Previšić, N. Šoljan, N. Hrvatić (ur.) Pedagogija prema cjeloživotnom obrazovanju i društvu znanja, (str. 78), Zagreb, Hrvatsko pedagogijsko društvo.

Nakon što se usvoji Europski kvalifikacijski okvir, na osnovu kojeg će Povjerenstvo za izradu Hrvatskog kvalifikacijskog okvira utvrdit kompetencije i načine njihovih provjera, iste će se moći steći u sklopu neformalnog i informalnog obrazovanja[6] u različitim ustanovama, tvrtkama, udrugama, centrima i sportskim društvima[7].

ZAKLJUČNO RAZMIŠLJANJE

Glavna je namjera bila skrenuti pozornost na mogućnost i važnost povezivanja suvremenih spoznaja o povezanosti globalnih promjena na Zemlji sa stjecanjem onih pozitivnih vrijednosti koje će omogućiti studentima prevladavanje duboke civilizacijske krize i pripremu za uspješne poduzetnike i društvene djelatnike. Na navedenom primjeru stvaranja zajednice prakse u sportskim udrugama Sveučilišta u Rijeci, želi se ukazati na prevladavanje suvremenih transformacija školstva, prema kojima u novije vrijeme teži i kineziologija, u odnosu na tradicionalna razmišljanja koja su „kočnica" u procesima promjena koje vode društvenom, kreativnom i stvaralačkom boljitku svakog pojedinca kojeg obrazujemo i odgajamo. Donošenje reformi, strategija, nacionalnih programa za mlade, akcijskih planova, neće biti samo „mrtvo slovo na papiru" ukoliko zajednički krenemo u realizaciju istih u praksi. Neformalno i informalno obrazovanje moguće je primijeniti u studentskim sportskim udrugama i savezima, čime će se pridonijeti usvajanju znanja, vještina, stavova, stjecanju različitih kompetencija a isto tako i onih odgojnih vrijednosti, koje će studentima omogućiti kvalitetniju pripremu za život. Time ćemo doprinijeti edukaciji djelatnika i volontera koji će biti osposobljeni obavljati različite društvene i organizacijske funkcije pri mnogim sportskim klubovima. *Odnos nastavnika i studenata neosporno utječe na proces odgojno obrazovnog rada*[8] pa uspjeh međusobnih partnerskih odnosa

[6] http://www.ypgd.org/arhiva/article.php?id=662 (skinuto 27.12. 2010.): „Hrvatska Vlada 27. rujna 2010. donijela je odluku o osnivanju Povjerenstva za izradu Hrvatskog kvalifikacijskog okvira, sastavljenog od 27 članova, na čelu kojega je ministar znanosti, obrazovanja i športa. Polazne osnove Hrvatskog kvalifikacijskog okvira Vlada je prihvatila u srpnju. One predviđaju mogućnost stjecanja određenih kvalifikacija kroz cjeloživotno obrazovanje, dakle ne samo formalnim obrazovanjem, učenjem ili studijem u školi ili visokoškolskim ustanovama, nego i informalnim (tzv. prirodnim) i neformalnim (izvanškolskim odnosno izvanfakultetskim) obrazovanjem".

[7] http://orion.fesb.hr/dotnetnuke/Cjelo%C5%BEivotnoobrazovanje/tabid/423/Default.aspx (skinuto 27.12. 2010.)

[8] Kosinac, Z., Bonacin, D. (1991). Funkcija nastavnika tjelesne i zdravstvene kulture u modeliranju nekih temeljnih odgojno-obrazovnih vrijednosti izražena kroz stav učenika i studenata, Napredak, Zagreb, Vol. 132 br. 2 (str. 183).

ovisi i od količine angažmana kineziologa u studentskim sportskim organizacijama, *njegove sposobnosti pedagoškog djelovanja i kulturne razine* (Kosinac, Z., Bonacin, D. (1991). Primjenom novih i suvremenih koncepata omogućit ćemo studentima stvarnu poziciju subjekta u odgojno-obrazovnom procesu te okupljenim u sportskim studentskim udrugama pružiti priliku da uz aktivno sudjelovanje budu sudionici procesa cjeloživotnog učenja za održivi razvoj. Možemo se s velikom sigurnošću nadati da će se u opisanom okruženju, sistemom logičnog slijeda, stvorit veća povezanost studenata sa sportom i sportskom rekreacijom, što podrazumijeva i sa saznanjem o potrebi redovitog tjelesnog vježbana tijekom cijelog života.

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THE POSSIBILITIES FOR THE APPLICATION OF NON-FORMAL AND INFORMAL EDUCATION VIA STUDENT SPORTS ASSOCIATIONS AND FEDERATIONS

ABSTRACT

In this paper, the tendency is to point to the possibility of acquiring additional knowledge, skills and attitudes among students beyond formal education, and the realization of the value of a new global ethics based on the respect for universal human rights. More active students' participation in the organization and contents of formal and informal education in the student sports associations and federations, along with the involvement in decision-making process, is applicable with the partnerships with physical education professors or teachers. An example in practice proves conclusively that the use of new and modern concepts can provide students with an active position of participants in the process of lifelong learning, as well as adequate preparation for life. Belonging to a group that has the task to animate organizing and implementing sports events, will enable the development of awareness of the importance of sports and physical exercise in the new life conditions.

Key words: *student sports associations and federations, non-formal and informal education, lifelong learning, preparation for life*

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EXTRA-CURRICULAR PHYSICAL ACTIVITY EFFECT ON GIRLS WITH POOR PHYSICAL FITNESS

INTRODUCTION

Physical activity is suggested to be an essential part of everyday life, especially during growth and rapid development of school-aged children. The benefits of physical activity (PA) are numerous: it has a positive effect on the prevention of various diseases in schoolchildren (Rankinen, Bouchard, 2002) and on their cognitive development (Burdette, Whitaker, 2005); it increases self-esteem and controls the levels of anxiety and stress (Dunn et al., 2001; O'Neal et al., 2000; Taylor, 2000), normalizes the state of mind (Burdette, Whitaker, 2005), and positively affects the level of physical fitness (PF) (Malina et al., 2004; Dencker et al., 2006). Despite all these health benefits many children all over the world did not meet these guidelines (Katzmarzyk, Craig, 2006; Lamprecht et al., 2008; Samdal et al., 2007; Riddoch et al., 2004).

It is well known that girls are less physically active than boys, and that affects their involvement in extra-curricular physical activities (McKenzie et al., 2000). Girls experiencing insufficient physical activity in childhood and adolescence are also at a greater risk to be less physically active in adulthood (Wallace, 2003; Ridgers et al., 2006).

Although physical activity and physical fitness relationship studies indicate an optimal rate of physical activity for school-aged children to be 3-4 hours daily, Helasoja et al. (2003) stated that more than 60 percent Lithuanians prefers to have sedentary leisure time activities. Especially alarming is the prevalence of insufficient physical activity among schoolchildren (Biddle et al., 2004).

The documents determining the activities of physical education (PE) teachers in Lithuania suggest that schoolchildren who are less physically fit and/or of poor health should be attended carefully, and their inclusion into PE classes and extra-curricular activities should be ingeniously performed by the PE teacher. The same imperatives are accentuated by PE professionals in other countries, too, although it should be

noted that curriculum implementation difficulties arise when girls are mentioned (Wechsler et al., 2000; Gibbons, Humbert, 2008).

Schools should provide and ensure all the potentials of comprehensive education for schoolchildren. Extra-curricular education is one of the purposeful activities aiming to develop personal, socio–educational, and professional competencies of schoolchildren who have chosen art, sport, technology, healthy lifestyle or similar activities. In many countries the promotion of PA during an extra-curricular education is in focus; Lithuania is no exception (BHFNC – Physical Activity, Sport & Education, 2007).

Although physical activity and physical fitness of schoolchildren in Lithuania have been studied previously (Helasoja et al., 2003) and a tendency of physical activity to affect physical fitness change was determined (Mikaitienė, Volbekienė, 2002; Volbekienė et al., 2008), the research data on the influence of extra-curricular physical activity on schoolchildren with poor physical fitness has not been found.

Aim

The aim of this study was to determine whether extra–curricular physical activity produces an effect on pupils with poor physical fitness.

MATERIALS AND METHODS

The initial sample consisted of 208 fifth- and sixth-grade schoolgirls (average age: 11 ± 0.5 and 12 ± 0.5 years old, respectively). At the beginning of the experiment the PF level of the girls was assessed. Only the girls with poor PF level (n = 82) were included in the study. These girls were divided into two groups: an experimental (E) group (n ± 42), and a control (C) group (n ± 40) (Fig. 1). The E group girls had two extra-curricular physical activity classes weekly for 9 months. During each class the girls played active games (~45 min.) and had exercises improving their physical fitness (~25 min.). The C group girls had no extra–curricular physical activity loads, i.e. they had only two PE lessons weekly. The PE classes and extra-curricular training sessions were performed by the same teacher.

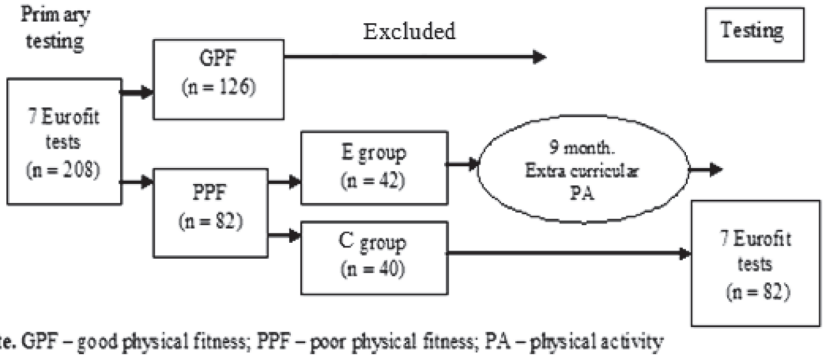


Fig. 1. *Mean (±SD) characteristics of the study subjects (n=80)*

The following Eurofit tests were used for the assessment of the following health-related physical fitness components of the study subjects (Eurofit, 1993) before and after the 9 month extra-curricular physical activity programme: *20 m endurance shuttle run test* – to measure endurance of cardio- and respiratory systems; *sit–and–reach test* – to measure flexibility; *bent arm hang* and *sit–ups tests* - to measure muscular strength and endurance. Performance (skill)-related fitness components were assed with: *plate tapping test* - to measure speed of limb movement; *standing broad jump test* – to measure explosive strength; and 10 x 5 m *shuttle run test* - to measure speed/agility.

Statistical analysis was performed with *MS Excel* in *STATISTICA* programmes. In order to compare the data, the mean ($\bar{x}$) and the *standard deviation* (SD) were calculated. Parametrical *t-test* criterion for dependent and independent samples was used to evaluate the differences and the reliability of value differences. The level of significance was set at $p<0.05$.

RESULTS

The results of health-related physical fitness in experimental and control groups are presented in Table 1. The results of applying extra–curricular physical activity have demonstrated certain health related physical fitness improvements of girls with poor physical fitness. Results of cardio- and respiratory systems endurance before the experiment in both groups were not significantly different ($p>0.05$). After the experiment the results of cardio- and respiratory systems endurance in both groups improved ($p<0.05$). Flexibility results in both groups did not differ significantly before and after experiment ($p>0.05$), but a tendency of improvement in flexibility was identified in experimental group. The mean result of *bent arm hang* test of E

group girls before the experiment was 49.6 s; after the experiment the mean result was significantly better – 77.2 s, however, the change was not statistically significant ($p>0.05$). Before the experiment, the girls performed in average 19.3 (E group) and 13.7 (C group) sit ups in 30 seconds; after the experiment, only E group girls results were statistically improved ($p<0.05$).

Table 1. *Health-related physical fitness components results in experimental and control groups before and after experiment ($\bar{x} \pm SD$)*

Group	Fitness component and tests	Result before experiment	Result after experiment	T test; p level
Experimental (n = 42)	Endurance of cardio- and respiratory systems - *20 m endurance shuttle run* (min)	2.2 ± 0.92	3.5 ± 1.1	**t = 3.65; p < 0.05**
	Flexibility - *sit–and–reach test* (cm)	21.2 ± 4.26	23.7 ± 4.44	t = 1.65; p > 0.05
	Muscular strength and endurance - *bent arm hang* (ms)	49.6 ± 22.10	77.2 ± 23.09	t = 1.42; p > 0.05
	Muscular strength and endurance - *sit–ups tests* (t/30s)	19.3 ± 3.62	22.5 ± 3.07	**t = 2.41; p < 0.05**
Control (n = 40)	Endurance of cardio- and respiratory systems - *20 m endurance shuttle run* (min)	1.8 ± 1.12	3.1 ± 1.43	**t = 3.57; p < 0.05**
	Flexibility - *sit–and–reach test* (cm)	17.1 ± 6.48	17.9 ± 8.27	t = 1.25; p > 0.05
	Muscular strength and endurance - *bent arm hang* (ms)	43.2 ± 17.63	64.6 ± 20.25	t = 2.01; p > 0.05
	Muscular strength and endurance - *sit–ups tests* (t/30s)	13.7 ± 7.87	17.4 ± 7.46	t = 1.64; p > 0.05

After the implementation of extra-curricular physical activity classes for 9 months, out of performance(skill)-related fitness components, the explosive power and limb movement speed has been improved ($p<0.05$), and a tendency of speed and agility improvement was identified ($p>0.05$) (Table 2).

Table 2. *Performance(skill)-related physical fitness components results in experimental and control groups before and after experiment ($\bar{x} \pm SD$)*

Group	Fitness component and tests	Result before experiment	Result after experiment	T test; p level
Experimental (n = 42)	Explosive strength - *standing broad jump test* (cm)	157,8 ± 2.33	168.0 ± 2.27	**t = 3.76; p < 0.05**
	Speed/agility - 10 x 5 m *shuttle run test* (ms)	226.6 ± 12.8	215.7 ± 14.06	t = 1.23; p > 0.05
	Speed of limb movement - *plate tapping test* (ms)	134.0 ± 2.02	118.5 ± 1.71	**t = 3.87; p < 0.05**
Control (n = 40)	Explosive strength - *standing broad jump test* (cm)	142.6 ± 4.48	151.1 ± 4.45	t = 1.63; p > 0.05
	Speed/agility - 10 x 5 m *shuttle run test* (ms)	236 ± 19.67	231.6 ± 15.3	t = 0.89; p > 0.05
	Speed of limb movement - *plate tapping test* (ms)	142.1 ± 3.16	127.4 ± 3.72	**t = 3.96; p < 0.05**

According to Primary and Secondary School Curriculum (2008), it is suggested that physically less fit schoolchildren should have individual tasks to improve and maintain those physical abilities, which would help them experience success, boost motivation and self-confidence. Same issues are emphasized by foreign authors (MacQuarrie et al., 2008). Physical fitness is one of the main components of health, especially when predicting the rate of morbidity caused by various chronic diseases (Lohman et al., 2008). Although PF results may be greatly determined by genetic heredity, daily PA and health status influence them, too (Malina et al., 2004). Many studies have shown that more physically active schoolchildren have better indications of muscle, cardiovascular, respiratory and other systems than their less active counterparts (Wilmore, Costill, 1999). However, it is not known to what extent regular physical activity of schoolchildren may be related with physical fitness.

As it was expected, the PF results of both groups of girls were similar before the experiment, the differences between the means of all tests were not significant. After the experiment, the health-related physical fitness components (i.e. cardio-respiratory endurance and trunk strength) of the E group girls had significantly increased ($p<0.05$). It concurs with other studies, which found that cardio-respiratory system and skeletal muscles adapt to a sustained regular physical activity (Pober et al., 2004; Emeljanovas, 2007).

Performance (skill)-related fitness components (i.e. the explosive power and limb movement speed) of E group girls had also improved significantly ($p<0.05$). It supports the results of other studies (Wilmore, Costill, 1999; Emeljanovas, 2007), where PA was found to have influenced the processes of growth and development and altered the muscular capacity.

After the experiment, only limb movement speed and cardio-respiratory endurance results of the C group girls had improved significantly ($p<0.05$). Because the results of cardio-respiratory endurance of both groups of girls have changed consistently, we may suggest that it is related with the changes caused by the natural processes of growth and maturation (Munchmeier, 2001).

Analyzing the results of our study, some questions regarding PF improvement may arise, i.e. whether the duration of the experiment was sufficient or whether the games and PF improvement exercises were appropriately chosen, etc. Nevertheless, the data of the experiment has clearly demonstrated a tendency of PF improvement.

On the other hand, the results of our study have confirmed once again the claim by other researchers, that success of physical education in many cases depends on the ability to purposefully organize and adjust the type and content of the activity (Gibbons, Humbert, 2008). In our study, the purposive extra-curricular physical activity for the girls with poor PF level had a positive effect on physical fitness, i.e. the E group girls' PF had improved to a greater extent than those of the C group.

Corresponding to the previous findings (Mikaitienė and Volbekienė 2002), that increasing PA directly affects the PF change, we may also conclude that the regular 9-month extra-curricular PA programme produced a positive effect on the physical fitness level of the schoolgirls with poor physical fitness.

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ABSTRACT

Schools provide a range of opportunities for pupils to engage in physical activity, such as break-time, travel to and from school, physical education lessons and extra-curricular clubs. The aim of this study was to determine whether extra–curricular physical activity produces an effect on pupils with poor physical fitness. In total, 82 fifth- and sixth-grade schoolgirls (11-12-year olds) with poor physical fitness were the subjects of the analysis. They were divided into two groups: an experimental group (E), the girls who had two extra-curricular classes weekly (~45 min. for active games and ~25min. to improve physical fitness), and a control group (C), without extra–curricular physical activity. After applying the extra-curricular physical activity programme for 9 months, the following improvements were identified: an explosive power and limb movement speed has increased ($p<0.05$), and a tendency of speed and agility improvement has been noticed ($p>0.05$).

Key words: *extra-curricular physical activity, poor physical fitness, girls*

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Original scientific paper

INTERRELATIONS OF PUPILS' PHYSICAL DEVELOPMENT, FUNCTIONAL CONDITION AND PHYSICAL COMPETENCE

INTRODUCTION

The improvement of the new generation's lifelong learning is impossible without a holistic perception of young person's psychic and physical actions and deep studies of psychophysical determinants in all stages of continuous education. Nevertheless, today this principle enters the physical education process at a very slow pace. This is the reason for an inadequate attitude of a large portion of the population towards physical activities and sport. Recently with the development of information technologies and with the increase of the schoolchildren's study load, children and youth spend more time sitting at the computer or doing homework, instead of in sports classes or other physical activities. Therefore it is not a wonder that due to lack of movement, a part of Latvian young people suffer from such problems as obesity, posture disorders, disorders of the cardio-vascular system, as well as different other health disorders caused by motionlessness and emotionally tight study regimen (Selga, Lāriņš et al., 2008). Sufficient physical activity and sound nutrition is essential for successful growth and development of one's organism (Rubana et al., 2008). Movements facilitate the development of the CNS' (CNS-central nervous system) regulative and coordinative mechanisms, as well as the activity of an organism's humoral regulation (Malina et al., 2004). In the inquiry about physical activities where physical activity is defined as any action that increases the frequency of heart and breathing and this activity lasts at least for 60 minutes, it was found out that 3.5% of schoolchildren had been inactive, 8% - had been physically active for one day, but the majority of schoolchildren had been physically active for more than two days.

Physical competence is applied as a competence that is expressed as a complex kinetic expression of movement literacy in the realisation of movement skills (Giles, 2000). Very often it is referred to as general fitness that is the foundation for further progressive development of school children.

Regular physical activity participation has been suggested to contribute to optimum growth and development (Malina et al., 2004), develop and maintain optimal

fitness and health (Armstrong and Welsman, 1997). The insufficient parameters of physical condition and health of Latvia secondary school pupils make it necessary to study the causes and work out strategies to improve pupils' health.

RESEARCH AIM

To state the interrelations between the pupils' physical development, the parameters of the functional conditioning and the parameters of their physical competence. The research was carried out within the framework of the project „Implementation of sports education at school – to promote pupils' health in a long-term period in Latvia".

METHODS

Physical competence measured by physical performance tests: push ups against the bench (girls); pull-ups (boys); hanging from the lying position (girls); hanging with the arms bent (boys); sit-ups (the legs flexed, the arms on the chest) 30s; standing long jump; shuttle run 3 x 10 m; 30 m running; endurance run 6 min; bending while standing on elevation; Harvard Step Test, anthropometry, pulsometry, mathematical statistics.

SAMPLE

12 Riga schools with 1170 pupils were involved, results of 697 pupils were analyzed: grade 6 – 371 (196 boys, 175 girls); grade 8 - 172 (83 boys, 89 girls); grade 11 – 154 (34 boys, 120 girls).

RESULTS

A great dispersion of the results can be observed in all parameters of the pupils' physical development, the functional condition and physical competences, taking into account the pupils' age and gender. Mostly there are correlative connections between the parameters of the pupils' physical development, the functional condition and physical competences, and it shows the dependence of the physical competences parameters on pupils' peculiarities of physical development. As seen in Table 1, there are interrelations between grade 6 boys' parameters of physical development and physical competences (r_s=0.14 – 0.26, $p<0.01$), except for the results of the exercise – sit ups 30 s. There is weak correlation between the grade 6 girls' parameters of physical development and physical condition (r_s=0.15 – 0.29, $p<0.01$), except for the results of the exercises - push ups against the bench, standing long jump and shuttle run 3x10 m. The boys' results in standing long jump, 30 m run, 6 min endurance run and bending when standing on elevation correlate both weakly positively and weakly

negatively with load power in the Step test. There is positive correlation between all the girls' parameters of physical competence and load power in the Step test. The girls' results in hanging from the lying position (r_s=0.19, p<0.05), 30 m running (r_s=0.18, p<0.05), 6 min endurance run (r_s=0.19, p<0.05), bending when standing on elevation (r_s=0.17, p<0.05) correlate with pulse frequency after load in the Step test.

Table 1. *Correlative connections between the parameters of the pupils' (grade 6) physical development (PD), functional condition (FC) and physical competence (PC)*

PD/FC PC	*PD* Body mass (kg)	*PD* Height (standing) (cm)	*PD* Height (sitting) (cm)	*PD* Lower extremities: R (cm)	*PD* Lower extremities: L (cm)	*PD* Upper extremities: R (cm)	*PD* Upper extremities: L (cm)	*FC* Step test: load power (kg m/min)	*FC* Step test: pulse rate after load (bpm)
Hanging with bent arms (boys) (s)	,11	,13	,08	,17*	,17*	,14*	,14*	,04	-,09
Pull-ups (boys) (r)	,12	,13	-,03	,11	,11	,15*	,15*	,07	-,11
Standing long jump (boys) (m)	,19**	,25**	,08	,19**	,18*	,17*	,17*	,14*	-,11
Shuttle run 3x10 m (boys) (s)	,03	,05	-,03	,05	,04	,09	,09	,03	,01
30 m running (boys) (s)	,19**	,27**	,10	,23**	,23**	,26**	,25**	,21**	-,07
Endurance run 6 min (boys) (m)	-,23**	-,17**	-,03	-,07	-,06	-,17*	-,17*	-,18*	,01
Bending while standing on elevation (boys) (cm)	-,23**	-,21**	-,13	,00	,00	-,14*	-,15*	-,18*	,11
Push ups against the bench (girls) (s)	-,05	,11	-,03	-,02	,02	-,04	-,04	,72**	,15
Hanging from the lying position (girls) (r)	,04	,25**	,15*	,10	,05	,11	,10	,58**	,19*
Sit-ups (legs flexed, arms on the chest) (girls) 30 s	,12	,08	,19*	,11	,09	,09	,09	,22**	,13
Standing long jump (girls) (m)	-,03	-,02	-,09	,10	,11	,12	,11	,46**	,10
Shuttle run 3x10 m (girls) (s)	,03	,04	-,13	,01	,03	-,02	-,03	,37**	,08
30 m running (girls) (s)	-,09	-,16*	,15	,07	,10	-,01	-,01	,53**	,18*
Endurance run 6 min (girls) (m)	,14	,23**	,29**	,20**	,19*	,07	,09	,52**	,19*
Bending while standing on elevation (girls) (cm)	,11	,18*	,06	-,01	,02	-,06	-,06	,69**	,17*

* Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level (2-tailed)

As seen in Table 2, there is weak (r_s=0.27 – 0.39, p<0.01) and medium correlation (r_s=0.51 – 0.63, p<0.01) between grade 8 boys' parameters of physical development and physical competences, except the results of the exercises – pull ups and bending while standing on elevation. There are weak (r_s=-0.22 – 0.36, p<0.01) correlative connections between the grade 8 girls' parameters of physical development and physical competence, except the results of the exercises – push ups against the bench, sit ups 30 s and bending while standing on elevation. The boys' results in hanging with bent arms, standing long jump correlate both positively and weakly negatively with load power in the Step test. There is negative correlation between the following girls' parameters of physical competence – 6 min endurance run and load power (r_s= - 0.33, p<0.01), pulse frequency after load in the Step test (r_s= - 0.52, p<0.01)

Table 2. *Correlative connections between the parameters of the pupils' (form 8) physical development (PD), functional condition (FC) and physical competence (PC)*

PD/FC PC	*PD* Body mass (kg)	*PD* Height (standing) (cm)	*PD* Height (sitting) (cm)	*PD* Lower extremities: R (cm)	*PD* Lower extremities: L (cm)	*PD* Upper extremities: R (cm)	*PD* Upper extremities: L (cm)	*FC* Step test: load power (kg m/min)	*FC* Step test: pulse rate after load (bpm)
Hanging with bent arms (boys) (s)	-,31*	-,17	-,17	-,04	-,30*	-,33**	-,33**	-,27*	,13
Pull-ups (boys) (r)	,04	-,15	-,13	-,20	-,07	-	-,16	-	-
Standing long jump (boys) (m)	,51**	,52**	,22	,37**	,53**	,58**	,57**	,53**	-,08
Shuttle run 3x10 m (boys) (s)	-,16	-,22	-,63**	-,39**	-,57**	-,12	-,12	-,11	,05
30 m running (boys) (s)	-,09	-,16	-,37**	-,15	-,34**	,18	,22	-,05	-,01
Endurance run 6 min (boys) (m)	,07	-,06	-,19	-,15	-,02	,27*	,31*	,04	-,13
Bending while standing on elevation (boys) (cm)	-,09	-,05	-,02	-,03	,06	,12	,15	-,09	-,19
Push ups against the bench (girls) (s)	-,15	-,05	-,02	,09	,11	-,03	-,03	-,12	,07
Hanging from the lying position (girls) (r)	-,03	-,13	,10	-,27**	-,29**	,01	-,03	-,06	,10
Sit-ups (legs flexed, arms on the chest) (girls) 30s	,03	,09	,10	-,08	-,10	,01	,07	,08	,15
Standing long jump (girls) (m)	,09	,16	,16	,29**	,25*	,19	,15	,09	,18
Shuttle run 3x10 m (girls) (s)	,02	,04	-,30**	,03	,04	-,05	-,02	,02	-,07

30 m running (girls) (s)	,07	-,08	-,36**	-,17	-,19	-,08	-,03	,12	,12
Endurance run 6 min (girls) (m)	-,29**	-,22*	-,01	,07	,08	-,18	-,14	-,33**	-,52**
Bending while standing on elevation (girls) (cm)	-,01	,08	,12	,16	,13	,10	,14	,04	,05

* Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level (2-tailed)

As seen in Table 3, in grade 11 there are weak (r_s=0.36 – 0.39, p<0.01) and medium close (r_s=0.43 – 0.58, p<0.01) correlations between boys' parameters of physical development and physical competences, except for the results in standing long jump. There is correlation (r_s=-0.25 – 0.29, p<0.01) and medium close (r_s= -0.40, p<0.01) between the grade 11 girls' parameters of physical development and physical competences, except the results of the exercises – push ups against the bench, shuttle run 3x10 m and bending while standing on elevation.

Table 3. *Correlative connections between the parameters of the pupils' (form 11) physical development (PD), functional condition (FC) and physical competence (PC)*

PD/FC PC	*PD* Body mass (kg)	*PD* Height (standing) (cm)	*PD* Height (sitting) (cm)	*PD* Lower extremities: R (cm)	*PD* Lower extremities: L (cm)	*PD* Upper extremities: R (cm)	*PD* Upper extremities: L (cm)	*FC* Step test: load power (kg m/min)	*FC* Step test: pulse rate after load (bpm)
Hanging with bent arms (boys) (s)	,19	,49**	,58**	,45**	,51**	,15	,14	,26**	-,09
Pull-ups (boys) (r)	,26	,46**	,56**	,48**	,57**	,15	,18	,58**	,13
Standing long jump (boys) (m)	-,09	,30	-,21	-,00	,00	,52**	,49**	-,41*	-,30
Shuttle run 3x10 m (boys) (s)	,13	,31	-,01	,10	,03	,32	,27	-,20	,36*
30 m running (boys) (s)	,39*	,24	,31	,36*	,44**	,30	,31	,19	,14
Endurance run 6 min (boys) (m)	,43*	,21	,50**	,50**	,54**	,30	,29	,17	-,08
Bending while standing on elevation (boys) (cm)	,32	,45**	,26	,21	,171	,39*	,33	-,39**	,79**
Push ups against the bench (girls) (s)	,12	,02	,16	-,09	-,06	-,05	-,08	-,42**	,96**
Hanging from the lying position (girls) (r)	,15	,11	,25**	-,04	-,05	-,11	-,10	-,01	-,40**

Sit-ups (legs flexed, arms on the chest) (girls)30s	,00	-,11	-,40**	-,24**	-,26**	-,03	-,04	,40*	,25
Standing long jump (girls) (m)	-,10	,18	,29**	,15	,15	,02	,04	-,13	-,13
Shuttle run 3x10 m (girls) (s)	-,01	-,04	-,15	-,12	-,10	,15	,09	,35**	-,36**
30 m running (girls) (s)	-,03	-,02	-,25**	-,03	-,06	,03	,01	-,03	-,16
Endurance run 6 min (girls) (m)	-,28**	-,09	-,02	,03	,01	,03	,02	,14	-,21*
Bending while standing on elevation (girls) (cm)	,11	,04	,07	,05	,06	-,00	-,04	-,48**	-,12

* Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level (2-tailed)

The boys' results in hanging with bent arms, pull-ups, standing long jump, bending when standing on elevation correlate both weakly positively and weakly negatively with load power in the Step test. There is weak and medium positive and negative correlation between the following girls' parameters of physical competence – push ups against the bench, sit-ups (legs flexed, arms on the chest), shuttle run 3x10 m, bending while standing on elevation and load power in the Step test. There is high correlation between girls' pulse frequency after load in the Step test and push ups against the bench (r_s=0.96, $p<0.01$), hanging from the lying position (r_s= -0.40, $p<0.01$), shuttle run 3x10 m (r_s= -0.36, $p<0.01$) and 6 min endurance run (r_s= -0.21, $p<0.05$).

CONCLUSION

1. Predominantly there are correlative connections between pupil's parameters of physical development, functional conditioning and physical competence that prove the dependence of the parameters of physical competence on pupil's peculiarities of physical development.
2. Results suggest that during puberty, the intensive development of the organism and individual differences of the pupils' physical development might have an impact on physical competence. A difficulty in evaluation of the effects of activity on indicators of health and fitness in pupils relates to the fact that the outcome variables change with normal growth and maturation. There is a need to select adequate exercises for ipsative evaluation of the effect of a physical activity promotion program at school on the national level.

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ABSTRACT

The aim of the research was to state the interrelations between the pupils' physical development, functional conditioning and the parameters of their physical competence. The research was carried out within the framework of the project „Implementation of sports education at school – to promote pupils' health in a long-term period in Latvia". The research methods included physical competences testing, Harvard Step Test, anthropometry, pulsometry and mathematical statistics. 12 Riga schools with 1170 pupils were involved. Results: a great dispersion of the results is observed in all parameters of the pupils' physical development and physical condition. Mostly, there were correlative connections between the parameters of the pupils' physical development and physical competences, and it showed the dependence of the physical competences parameters on pupils' peculiarities of physical development.

Key words: *pupils' physical development, pupils' functional condition, pupils' physical competence*

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Original scientific paper

VESTIBULAR STIMULATION AND CARDIOVASCULAR CHANGES IN 10-12-YEAR-OLD RHYTHMIC GYMNASTS

INTRODUCTION

Rhythmic gymnastics is a sport that develops a variety of motor abilities (whole-body coordination, dynamic balance and static balance, sense of kinaesthesia, whole-body movement time, and eye-hand coordination), and perceptual abilities (whole-body reaction time, anticipation of coincidence, and depth perception) (Kioumourtzoglou et al. 1997; Pavlova and Alexandrova 2001). Some up-to date studies have considered the physiological and anthropometric determinants of rhythmic gymnastics, and also flexibility, explosive strength, aerobic capacity, body dimensions, and anaerobic metabolism (Pavlova and Alexandrova 2001; Douda et al. 2008; di Cagno et al. 2008). Gymnasts start training at a very young age. It is known that the function of vestibular sensitive system differs slightly from those of adults (Gavriiski et al. 2006). The beginning of puberty growth and development in girls is at about the age of 11-12. Characteristic feature for this age group is asynchronous development of heart and blood vessels, and uncompleted functional and morphological development (Wilmore and Costill 1999; Gavriiski et al. 2006). The rhythmic gymnastics impacts permanently on the balance that is complex-conditioned by different functional systems. Naturally, the vestibular sensitive system plays an essential role for stable static and dynamic equilibrium of the gymnast's body. From the accessible published data, the information about cardiovascular changes affected by vestibular stimulation was not obtained. The results of our previous study show improvement of the assessment for the vestibular stability of 9 to 12-year-old rhythmic gymnasts subjected to Losanov- Baychenko Test (Pavlova and Alexandrova 2001). With a view to the asynchronous development in this age period, it is important to study that sort of vestibular and autonomic reactions. Therefore, the aim of the present study is to elucidate the controlled vestibular stimulation effect on cardiovascular function and evaluate the vestibular stability through Losanov-Baychenko Test in 10-12- year-old rhythmic gymnasts.

METHODS

Eleven rhythmic gymnasts, 10-12 years old (training experience 2-4 years), from two rhythmic gymnastics sports clubs participated in this study. The girls

were subjected to Losanov-Baychenko Test (Gandelsman 1968; Bitchev et al. 1998). The following experimental protocol was applied: 3 min pre-vestibular stimulation measurements, 10 times controlled rotation in 20 s on Barani chair stimulating the semicircular canals, only one post-vestibular stimulation measurement. Heart rate (HR) and arterial blood pressure (RR) were monitored by Sport tester and the apparatus for automatic measurement. RR was also measured auscultatory to ensure double control. The assessments in degrees have been found on the basis of RR and HR difference values between pre- and post- Barani chair rotation by the Losanov-Baychenko Table. The highest degree is 5. In the original approach mean arterial pressure (MAP), pulse pressure (PP), systolic volume (SV), cardiac output (CO), and double product/rate-pressure product (RPP) were computed to examine the cardiovascular function using the Losanov-Baychenko Test. MAP, PP, SV, CO, and RPP values were calculated by the following equations:

1. Mean values for arterial pressure

   MAP (mmHg) = RRd + [0.333 X (RRs – RRd)]

   RRd - diastolic blood pressure; RRs - systolic blood pressure
2. Pulse pressure

   PP (mmHg) = RRs – RRd
3. Systolic volume

   SV (ml) = 93 + 0.54 X (RRs – RRd) – 0.47 X RRd – 0.61 X age (in years)
4. Cardiac output

   CO ($l.min^{-1}$) = SV. HR

   HR (bpm) – heart rate
5. Double product/rate-pressure product

   RPP = RRs X HR

Descriptive statistics, 2 Related Samples Tests (Wilcoxon T) and nonparametric correlations (Spearman's Rho) were used for statistical analysis.

RESULTS

Descriptive statistics (Mean values±SD) of cardiovascular parameters heart rate (HR), systolic blood pressure (RRs), diastolic blood pressure (RRd), mean arterial pressure (MAP), pulse pressure (PP), systolic volume (SV), cardiac output (CO), and double product/rate-pressure product (RPP) pre- and post-vestibular stimulation are given in Table 1.

Table 1. *Descriptive statistics of cardiovascular parameters pre- and post-vestibular stimulation*

Pre vestibular stimulation			Post vestibular stimulation		
Variable	**Mean**	**SD**	**Variable**	**Mean**	**SD**
HR [bpm]	88.18	8.04	HR [bpm]	90.36	11,70
RRs [mmHg]	103.64	15.05	RRs [mmHg]	98.36	9,59
RRd [mmHg]	63.27	9.68	RRd [mmHg]	60.55	13,08
MAP [mmHg]	76.71	11.21	MAP[mmHg]	73.13	11,34
PP [mmHg]	40.36	7.39	PP [mmHg]	37.82	8,58
SV [ml.min^{-1}]	78.51	4.03	SV [ml.min^{-1}]	78.42	10,0449
CO [l.min^{-1}]	6.92	.66	CO [l.min^{-1}]	7.12	1.44
RPP	9196	1892	RPP	8915	1593

The comparison (2 Related Samples Tests -Wilcoxon T) of HR, RRs, RRd, MAP, PP, SV, CO, and RPP between before and after Barani chair rotation shows no significant differences ($p>0.05$).

The assessments obtained from the Losanov-Baychenko Table are 2.66±1.04 for all rhythmic gymnasts, and 2.06 ±0.37 (10yrs), 2.50±0.98 ((11yrs), 4.25±10 (12yrs) for gymnasts divided into age groups (Fig. 1).

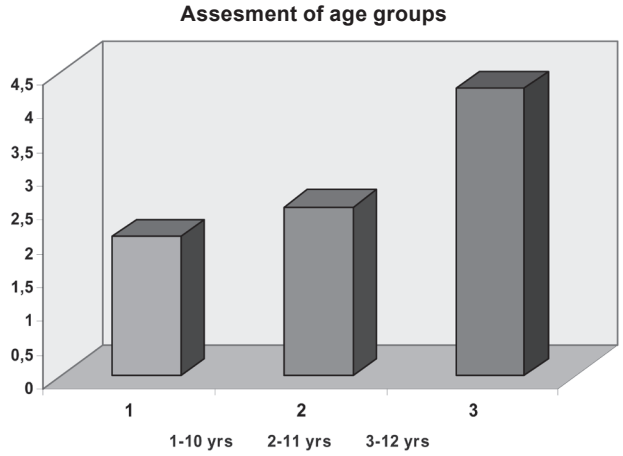


Figure 1. *Assessment according to rhythmic gymnasts age groups: 1 - 10 years old; 2 - 11 years old; 3 - 12 years old*

This trend of assessment increase when comparing10 to 12-year-old girls is similar to the reported data of rhythmic gymnasts in our previous research carried out in the field (Pavlova and Alexandrova 2001).

Significant correlations (NPar Spearman's Rho) of the assessment, training experience and age have been considered (Fig. 2).

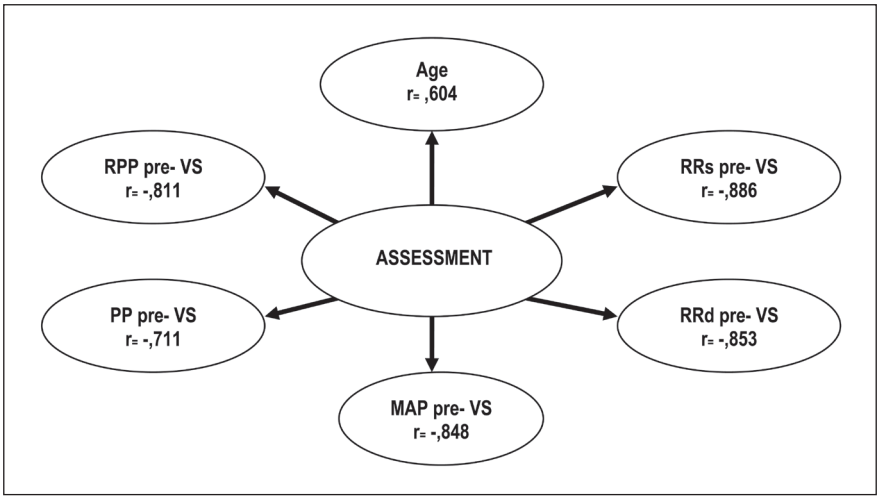


Figure 2. *Correlations of the assessment with cardiovascular parameters RRs, RRd, MAP, PP, RPP pre-vestibular stimulation (VS), and positive correlation with age*

The variable assessment correlates negatively with RRs, RRd, MAP, PP, and RPP measured before vestibular stimulation. Positive correlation was found according to age. The training experience has a negative correlation (r = - ,841) with HR before rotation, and the age correlates positively (r = .604) with the assessment (at the 0.05 level of significance).

DISCUSSION

There are no published studies of children dealing with this topic, and especially for rhythmic gymnasts at the age of 10-12. Thus, the present findings are compared partially to some previous reports. Hemodynamic parameters of heart rate, systolic blood pressure and diastolic blood pressure have values like those of healthy children at the same age (Kasakova (1988; Oskolkova 1988; Wilmore and Costill 1999). The established insignificant differences from the comparison of cardiovascular parameters between pre- and post-vestibular stimulation show vestibular stability

and slight impact on the autonomic hemodynamic indices. Similar effects but of repeated optokinetic stimulation on human autonomic function have been found in a published paper (Peters 2000). The assessment results from the rank test of Losanov-Baychenko in university students - athletes are higher than that of our subjects. (Pavlova et al. 1999; Pavlova et al. 2000). These outcomes and those obtained from a previous report (Pavlova and Alexandrova 2001) confirm the present findings and interpretation that the Losanov -Baychenko degree assessment depends on the age. The essential relationship of the training experience with pre-rotation HR is in keeping with the standpoint that regular sport training rises the cardiac activity effectiveness (Gavriiski et al. 2006). It is interesting that correlation structure of assessment is closely associated only with the cardiovascular parameters measured before vestibular stimulation and with the age as has already been debated. In this respect, it could be assumed that the gymnasts' functional condition that refers to cardiovascular parameters together with the age is a reliable predictor for Losanov-Baychenko rank assessment. Undoubtedly, the applied original research approach in studying vestibulo-autonomic responses by Barani chair rotation and Losanov-Baychenko table degree assessment is a thorough analysis that could be suggested for exercise physiological study and testing in sports practice.

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ABSTRACT

The aim is to study the vestibular stimulation (VS) effect on cardiovascular function (CVF) and vestibular stability by Losanov-Baychenko Test (LBT) in rhythmic gymnasts (10-12 yrs). 11 girls performed LBT on Barani chair. Heart rate (HR), arterial blood pressure (RR), mean arterial pressure (MAP), pulse pressure (PP), systolic volume (SV), cardiac output (CO), and rate-pressure product (RPP) were studied and compared pre- and post- VS. The comparison shows insignificant differences ($p>0.05$) that are interpreted as having slight impact on CVF. The established assessments increase from 10 to 12-year-old girls. Interesting correlation of assessment was only found for the cardiovascular parameters measured pre-VS and for the age. In conclusion, this original research approach in studying vestibulo-autonomic responses and degree assessment could be suggested for exercise physiological study and testing in sports practice.

Key words: *rhythmic gymnast, vestibular stimulation, Barani chair, cardiovascular function*

Pavol Hrnčiarik ***Original scientific paper***
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THE ANALYSIS OF GAME PERFORMANCE OF GOALKEEPERS IN THE U19 EUROPEAN CHAMPIONSHIPS QUALIFIER MATCHES

THEORETICAL ANALYSIS

Observational analysis of players' physical activity (game activity) focuses on monitoring physical activity during the match. The aim of observation is to get information about the whole content and intensity of physical activity and also to obtain information about typical player's profile characteristics. This information leads to interpretation of physical and physiological demand on player's performance and implication on the training process, too.

We can say that coach causes changes in player's activities and consequently, activities cause changes in game performance. These analyses provide knowledge which improves the quality of managing and planning the training process as well as organising the training practice (Hoek, 1998).

In practice, these analyses will help to understand the casual explanation of real game performance. In addition, they will help understand the normative model of game performance and training process which make concrete intervention and bring the right practical steps into the process (Peráček, Hrnčiarik, Kostolanský, 2008).

Effects of many related factors have impact on the level of game performance (Daniel, 1993) (Hohmann, Brack, 1983).

Many factors significantly affect the game performance and are important for the quality of performance. The different requirements of game regarding various functions of players should be taken into account, too (Bischops, K., Gerards, H., Wallraff, J., 2000). Nowadays functions of players are significantly affected by developing trends (universalism). For this reason, we agree with the idea of Disham, R.K., Washburn, R.A., Schoeller, D. A. (1996), who say that the only specialist in a game is the goalkeeper.

The game skills make up the individual game performance of goalkeeper. The quality of skills reflects the level of goalkeeper's capability of game performance of the team (Konzag, G., 1984).

Majority of analyses focus on top level game performance of adults. These studies pay attention to differences in models of physical activity (game activity) of players involved in various functions, including the goalkeeper in football (Whall, 2001).

AIM OF RESEARCH

The aim of our research is to analyse the chosen aspects of individual game performance of goalkeepers – juniors – in defensive and offensive phase of game during selected U19 European Championships qualifier matches in France.

RESEARCH TASKS

1. To innovate the sheets for analysing the chosen aspects of individual game performance of goalkeepers.
2. To observe game activity, localization and frequency of chosen game performances of goalkeeper in selected European Championships qualifier matches in 2010. Game activities will be indirectly observed by using the graphical record method of DataCoach Manager program 1.25.
3. To compare results with chosen aspects of individual game performance of goalkeepers in senior top level category.

RESEARCH METHODS

The research sample included goalkeepers playing in international U19 European Championships qualifier matches in 2010 (born in 1991):

- England – Finland
- Hungary – Russia
- Slovakia – Norway

Second research sample included two goalkeepers of senior category playing for Spain (I. C.) and (J. L.) Germany in European Championship matches in 2008. They played in monitored match

- Spain – Germany, the finals of European Championship in 2008.

We researched both goalkeepers in all matches, with each of them playing 90 minutes.

To obtain the research data, we used indirect observation – delayed. We monitored the physical strain (game activities) with such choice and number of monitored game characteristics to be the nature and quality of observed game activity provided. Observational analysis of game activities was applied to obtain as comprehensive

information as possible. The obtained information included models of external strain of junior and senior goalkeepers (game activity) – time (frequency) and place of realization (localization).

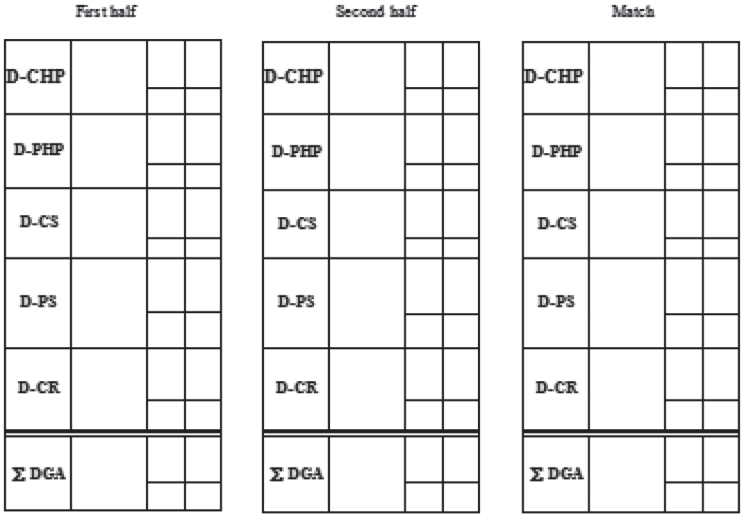
In our delayed and categorized observation, we used the evaluation of game activity through the chosen game activities of goalkeepers. Particular categories were divided into 5 defensive game activities and into 3 offensive game activities of goalkeepers (Tarkovič, 2000).

Defensive game activities of goalkeepers

Catching - shoot	(CS)
Punching - shoot	(PS)
Catching - high pass	(CHP)
Punching - high pass	(PHP)
Crossing (run against the ball	(CR)

Offensive game activities of goalkeeper

Playing by foot	(PF)
Playing by hand	(PH)
Kick from hand	(KH)



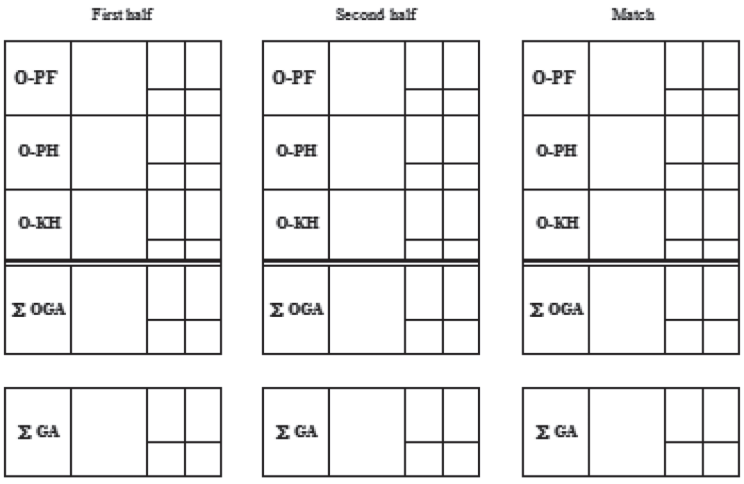


Figure 1. *Game activities of a goalkeeper in match (1st half, 2nd half, match)*

To record required parameters of game activity techniques we used graphical symbol (football ball), which was always located in the place where the game activity was realised. The place of game activity realization is always described with placed abbreviation.

The playground was divided into three sections, where the game activity was evaluated.

Methods of processing and evaluation of data

We used the basic statistical methods of evaluation such as logical methods – induction, deduction, analysis and synthesis.

RESULTS

Game activity analysis of goalkeepers

The goalkeepers touched the ball in the middle part of the penalty area (Fig. 2) the most (120 times). Almost the same number of game activities (41/47) was recorded out of the penalty area and at goal area.

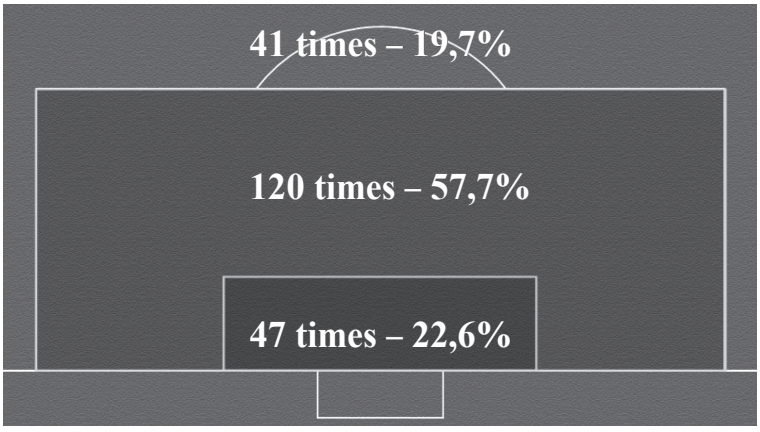


Figure 2. *The number of game activities of up to 19 year category of goalkeepers*

The major part of goalkeepers' game performance was playing by foot. Goalkeepers used this activity after the pass from teammate, catching the long ball behind the defensive line and when the direct free kick was played. This could be a signal to the coaches to involve keepers into team training practice, and during group or individual practice constantly work to improve keeper´s playing by foot. Crossing the ball was played the most when referring to the most played defensive game activity (Fig. 3, 4).

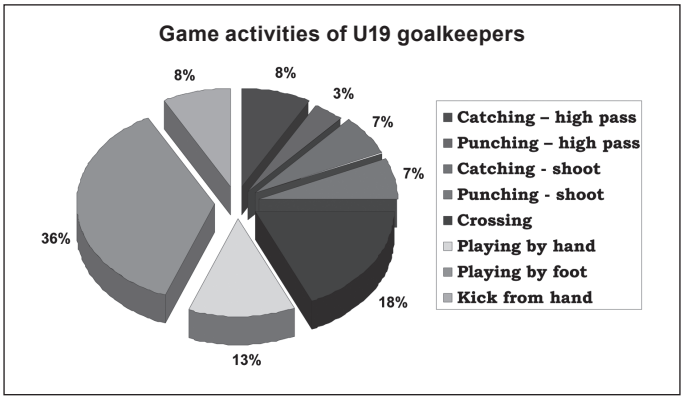


Figure 3. *Proportion of game activities of U19 goalkeepers in qualification matches*

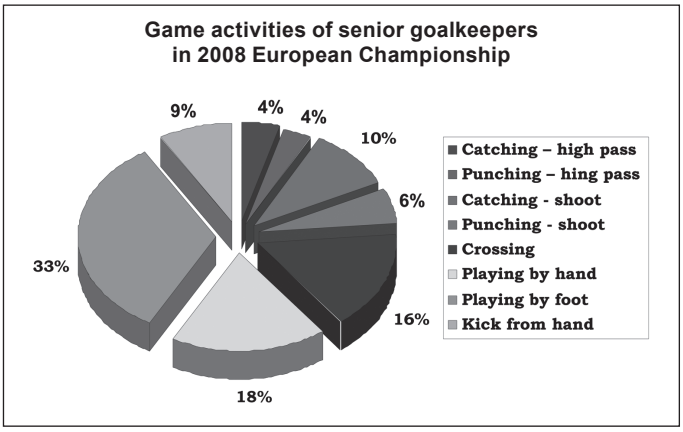


Figure 4. *Proportion of game activities of senior goalkeepers in 2008 European Championship*

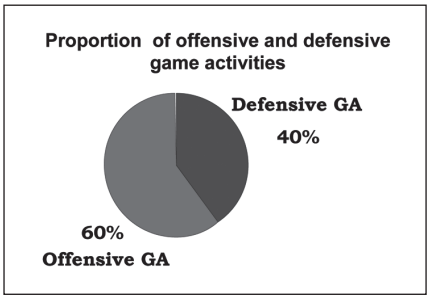


Figure 5. *Proportion of GA of U19 goalkeepers*

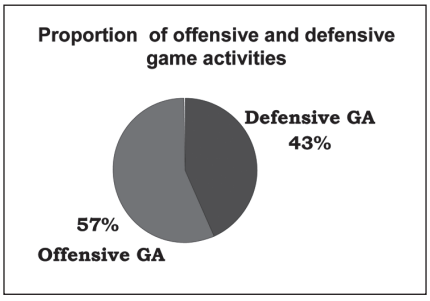


Figure 6. *Proportion of GA of senior goalkeepers*

We recorded almost the same number of game activities in every 15 minutes (Fig. 5, 6). It means that goalkeepers should maintain concentration at the maximum level every minute of the match. The majority of unsuccessful game activities were recorded in the final part of the match in the category up to 19 year (Fig. 7, 8). It has probably much to do with the loss of the above mentioned concentration of young goalkeepers.

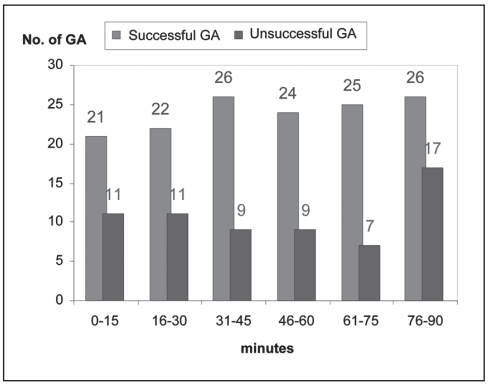


Figure 7. *No. of GA in selected 15minute periods of U19 goalkeepers*

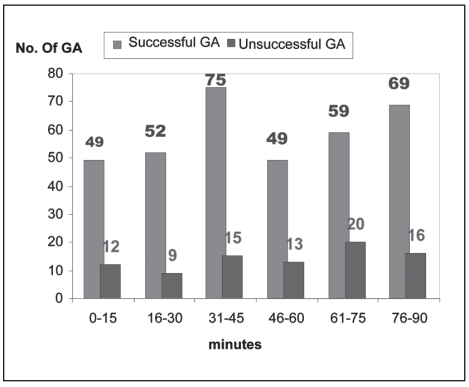


Figure 8. No. of GA in selected 15minute periods of senior goalkeepers

The successfulness of young goalkeepers in the analyzed matches is 69%. Comparing this percentage to game performance of senior goalkeepers, we found out that the younger group reached below-average values. The goalkeepers made mistakes most often in the goal area while solving critical situations and kicking by foot.

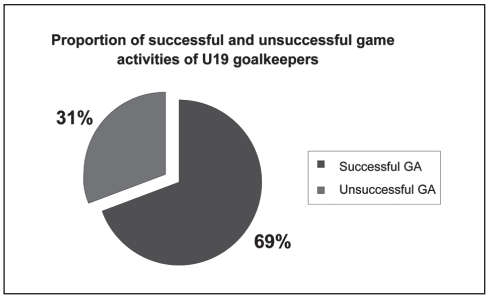


Figure 9. *Successfulness of game activities of U19 goalkeepers in the qualification matches*

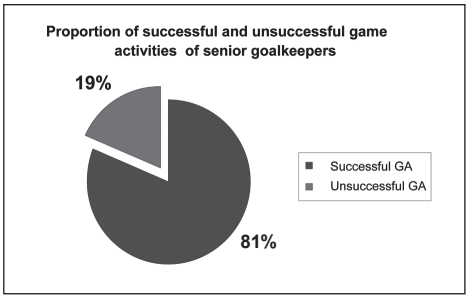


Figure 10. *Successfulness of game activities of senior goalkeepers in European Championship matches*

The proportionality of monitored game activities varied from the successful realization during the match, too. Senior goalkeepers in the European Championships were successful in 81% on average (Fig. 10). Juniors were successful in 69% (Fig. 9), where the most mistakes were made in playing by foot and crossing the ball.

Comparison of chosen aspects of individual game performance of junior and senior goalkeepers

As can be seen in the following Figures, the difference in game performance of junior and senior goalkeepers is mainly in the quality of realised offensive game activities (Fig. 12). The results were the same comparing the categories of goalkeepers in defensive game activities (Fig. 11).

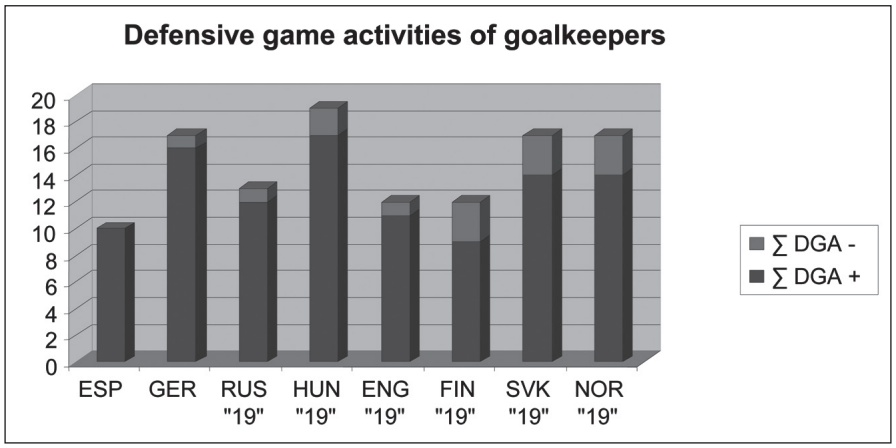


Figure 11. *Comparison of successful and unsuccessful defensive game activities of U19 and senior goalkeepers*

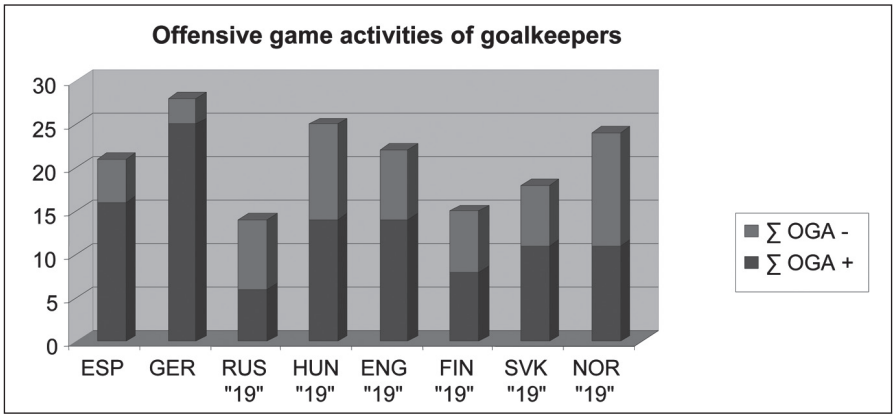


Figure 12. *Comparison of successful and unsuccessful offensive game activities of U19 and senior goalkeepers*

The successfulness of playing by foot as one individual game activity was for both senior goalkeepers higher than for junior goalkeepers, irrespective of the final match result (Fig. 12, 13). We also found similar results in the previous researches and analyses of top level senior goalkeepers (Peráček, Hrnčiarik, Kostolanský, 2008). The results of senior goalkeepers in our research were better, despite exogenous deformational factors affecting the match in the final tournament of the European Championship in 2008.

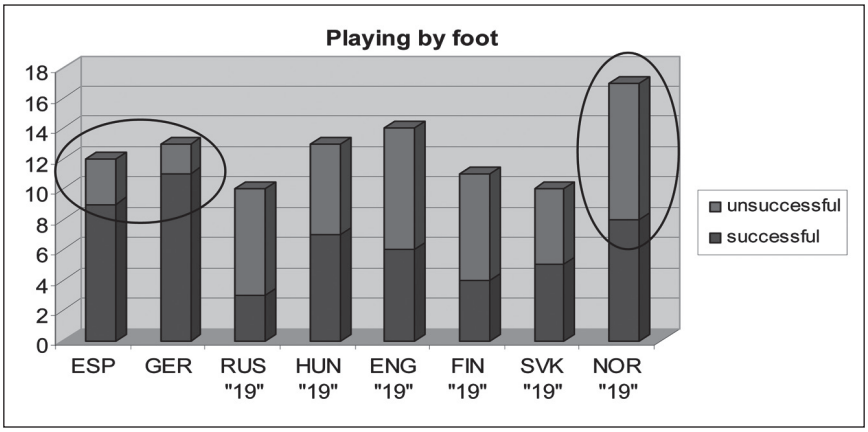


Figure 13. *The successfulness of GA - playing by foot*

Senior goalkeepers playing in the finals of the European Championship in 2008 were recorded as more successful on the monitored parameters than the under 19 goalkeepers in international matches irrespective of the final results. Also, Figure 13 indicates the tendency towards special individual preparation of football goalkeeper.

DISCUSSION

A significant game intensification in football is noticeable nowadays. The intensification is not only related to bio-energy as an external strain but also to game activity which is also an external strain. If goalkeepers want to accelerate the game, they are demanding too much. If the goalkeeper is not experienced enough, he is unsuccessful in the offensive game activities. The proportionality of successful and unsuccessful game activities of goalkeepers is different in senior and in junior category (Peráček, Hrnčiarik, Kostolanský, 2008). The high frequency of changing the intensity in physical activity is typical for game (physical) activities. The intensity changes every 3 – 10 seconds in football (Bangsbo, Lindqvist, 1992).

We specify the requirements for game performance of goalkeepers in a match using detailed duel analysis of the best European junior national teams. We focused on the number of game activities as well as the localization of monitored game activities. Our new view of creating the exercises (methodological and organizational forms) is provided by the frequency of successful or unsuccessful game situation solutions. The exercises are created on the basis of key problems of individual game performance. Such attitude to the development and cultivation of game performance enables us to form the exact requirements for individual game performance and the control of performance. Furthermore, it enables us to influence the unexpected situations due to the pressure of competition and action of team-mates. This is very important, especially for junior goalkeepers who are less successful in offensive game activities. It is probably typical for younger age category, too.

Such attitude enables us to plan the exercise where goalkeepers must make decisions under the time pressure. It is also possible in training process to highlight the deliberate fitness strain (to provide the „environment" for second halftime, the end of the match). High training precision is not enough for assessing the game performance resistance against the disturbances. The crucial criterion will always be a particular performance in an important duel, in an unfamiliar environment, in the condition of noise and exhaustion. This is what changes the understanding of training activity as a proving action without any risk.

CONCLUSION

We found that the number of chosen game activities of goalkeepers in both senior and junior categories, as well as the proportionality of defensive and offensive game activities in both categories is the same. The difference occurred in offensive game activities of senior goalkeepers who were more successful.

The observational analysis method of game activity can be used in following areas of pedagogical (training) practice:

a) In motor analysis required in game performance - technical profile of player - goalkeeper.

b) In managing and planning the training process in training practice. The evaluation of body strain during the particular methodological and organizational forms of training process is a part of designing methods for choosing the challenge in training.

c) In game performance football diagnostics.

d) In game activity analysis of players (not only goalkeepers), the observational analysis can monitor the contribution of a player to the team performance, or intraindividual comparison of game performance.

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ABSTRACT

The authors in their research analyze selected aspects of the individual game performance of the under- U19 national team goalkeepers. They focus on observing the game activity of players in the course of the match with the aim to gather information on typical technical profiles of goalkeepers in these age categories. They found that the frequency of game actions of the junior players – goalkeepers – is approximately equal to that of senior goalkeepers, with a relatively higher rate of success in selected game actions among the senior national-team goalkeepers.

Key words: *football, individual game performance, goalkeeper, game activity, game actions of goalkeepers*

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Izvorni znanstveni rad

OMJER RESPIRACIJSKE IZMJENE KOD DJEVOJČICA: LONGITUDINALNA STUDIJA

UVOD

Omjer respiracijske izmjene (engl. Respiratory Exchange Ratio-RER) omjer je između količine izdanog (izdahnutog) ugljičnog dioksida i primljenog (udahnutog) kisika tijekom obavljanja određenog rada. Ista vrijednost, promatrana na staničnoj razini, naziva se respiracijski kvocijent (engl. Respiratory Quotient-RQ). Utvrđivanjem RER moguće je procijeniti koji se od glavnih energetskih supstrata koristi prilikom obavljanja određenog rada tj. tjelesne aktivnosti. Ovisno o energentu koji se koristi vrijednost RER se mijenja i varira od 0,7 (kada se iskorištavaju isključivo masti) do 1,0 (kada se troše samo ugljikohidrati). Za bjelančevine, koje u energetskom metabolizmu igraju vrlo malu ulogu, RER iznosi 0,8. Respiracijski kvocijenti za mast i bjelančevine manji su od respiracijskog kvocijenta za ugljikohidrate zato što se veliki dio kisika koji ulazi u metaboličke procese s mastima i bjelančevinama upotrebljava za spajanje s viškom vodikovih atoma koji postoje u molekulama tih tvari. Tako se u odnosu na utrošeni kisik stvara manje ugljičnog dioksida. Kod osoba s uravnoteženom prehranom prosječan RER je 0,825 (Guyton 2004).

Vrlo su rijetki do sada objavljeni radovi u kojima se utvrđuju promjene RER kod djece i adolescenata tijekom dulje fizičke aktivnosti. Rezultati dobiveni u većini istraživanja provedenih na osobama mlađe životne dobi, sugeriraju značajnije iskorištavanje masti u odnosu na odrasle osobe.

Cilj je ovog istraživanja utvrditi kretanje omjera respiracijske izmjene tijekom progresivnog opterećenja na pokretnom sagu kod djevojčica u dobi od devet do osamnaest godina.

METODE ISTRAŽIVANJA

Eksperimentalni rad proveden je na uzorku izabranom iz populacije školske djece grada Zagreba. Istraživanje je provedeno longitudinalno, odnosno iste ispitanice praćene su od početka do kraja istraživanja. Skupina od 50 djevojčica prvi puta je

testirana kada su imale 9 godina i praćene su do svoje navršene 18. godine. Sva mjerenja izvršena su u laboratorijima Kineziološkog fakulteta Sveučilišta u Zagrebu.

Sve ispitanice podvrgnute su progresivnom maksimalnom testu opterećenja na pokretnom sagu. Pomoću aparature Ergopneumotest kontinuirano je određivan primitak kisika te oslobađanje ugljičnog dioksida. Na osnovi tih varijabli određena je i vrijednost RER.

Dobiveni rezultati obrađeni su standardnim statističkim postupcima kako bi se utvrdile njihove osnovne karakteristike: aritmetička sredina, standardna devijacija te raspon najmanje i najveće vrijednosti. Razlike između dobivenih vrijednosti RER u odnosu na kronološku dob analizirane su metodom jednosmjerne analize varijance za ponovljena mjerenja (zavisne podatke).

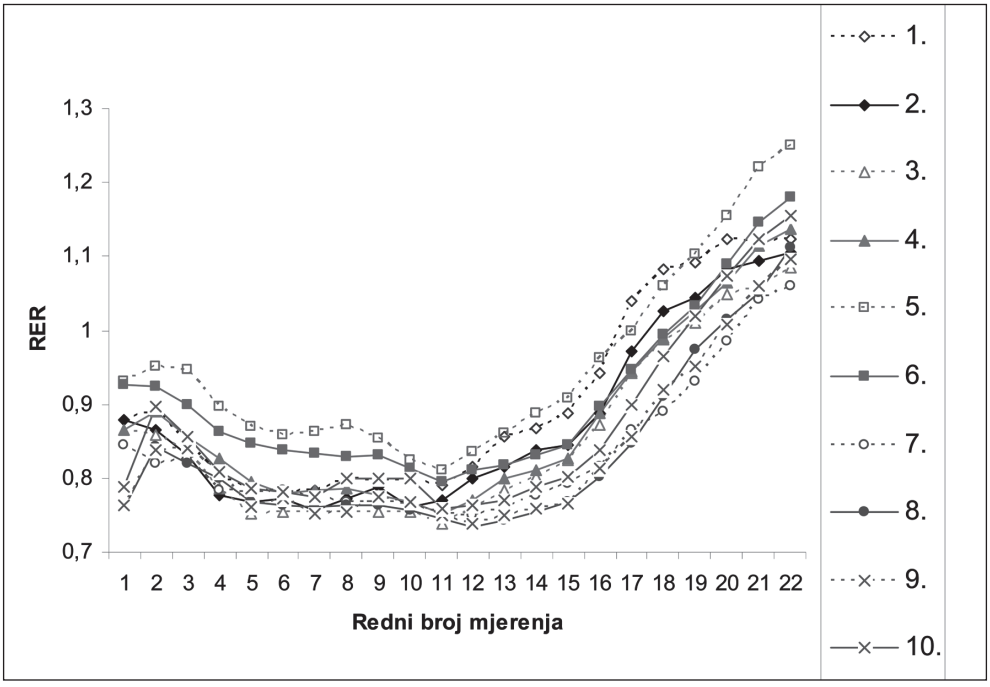
REZULTATI I RASPRAVA

Dobiveni rezultati prezentirani su grafički (slika 1). Tijekom svakog godišnjeg mjerenja, koje je trajalo 11 minuta, pod uvjetom da je ispitanica izdržala sve faze mjerenja, u intervalima od 30 sekundi registrirane su vrijednosti praćenih varijabli: primljeni tj. udahnuti kisik (VO_2), oslobođeni tj. izdahnuti ugljični dioksid (VCO_2) i omjer respiracijske izmjene (RER). Na taj način, tijekom svakog godišnjeg mjerenja, za svaku od ispitanica dobili bismo po 22 vrijednosti za gore navedene varijable.

Tako dobiveni rezultati za svaku pojedinu ispitanicu su obrađeni te su izračunate prosječne vrijednosti svih ispitanica za svaku od praćenih varijabli u određenoj godini. U završnoj fazi, uspoređivane su tako dobivene prosječne vrijednosti za svaku od deset godina koliko je provođeno istraživanje.

Iz slike 1. može se zaključiti da vrijednost omjera respiracijske izmjene raste s povećanjem stupnja opterećenja kojem su podvrgnute ispitanice, ali porast vrijednosti ne ovisi o kronološkoj dobi ispitanica.

Najviše vrijednosti RER zabilježene su kod tjelesnog opterećenja najvišeg stupnja, što je bio i očekivani ishod. Trend porasta RER tijekom testa nije konstantan. U ranijim fazama svakog mjerenja, tj. kod tjelesnog opterećenja nižeg stupnja, bilježi se najprije pad vrijednosti RER, što se objašnjava prilagodbom ispitanica na uvjete u kojima se vršilo mjerenje (ispitanice su na usta i nos dobile masku preko koje su mjerene vrijednosti utrošenog O_2 i oslobođenog CO_2). Opisani blagi pad vrijednosti RER bilježi se tijekom prvih 5,5 minuta mjerenja, što odgovara drugom stupnju opterećenja u kojem ispitanice trče brzinom 9,6 km/h uz nagib od 14%. Nakon toga, vrijednosti RER počinju rasti proporcionalno porastu stupnja tjelesnog opterećenja, da bi na kraju, u točki najvećeg opterećenja te vrijednost prešle vrijedost 1 za svaku kronološku dob. Navedeno se događa zbog laktatnog puferiranja te zbog prebacivanja



Slika 1. *Promjena RER u odnosu na stupanj opterećenja (redni broj mjerenja 1-22) i kronološku dob ispitanice (krivulje označene 1-10). Krivulja 1 označava najnižu kronološku dob (9 godina), krivulja 10 označava najvišu kronološku dob (18 godina).*

organizma na anaerobni metabolizam, kada dolazi do dodatnog stvaranja ugljičnog dioksida kao bioproizvoda bikarbonatnog sustava.

Iz nižih vrijednosti RER dobivenih početkom svakog mjerenja može se zaključiti da se u početnoj fazi, na nižem stupnju tjelesnog opterećenja, kao glavni energetski supstrat iskorištavaju masti. S povećanjem opterećenja dolazi i do porasta vrijednosti RER pa se kao izvor energije u većoj mjeri iskorištavaju ugljikohidrati.

Opisane promjene prosječnih vrijednosti RER događaju se za svaku pojedinu kronološku dob, a vrijednosti RER ne rastu u ovisnosti o dobi, tj. najviša vrijednost RER ne odgovara najstarijoj kronološkoj dobi. Metodom jednosmjerne analize varijance za ponovljena mjerenja, utvrđeno je da postoji značajna statistička razlika među svim fazama pojedinog mjerenja, bez obzira na kronološku dob. Ta razlika također raste sa stupnjem tjelesnog opterećenja. Najviša vrijednost RER zabilježena je u petoj godini praćenja, što bi odgovaralo kronološkoj dobi od 13 godina, odnosno godini nastupa menarhe kod ispitanica (prosječno 12,95 godina).

Uvidom u literaturu te usporedbom s rezultatima istraživanja drugih autora, može se zaključiti da je do maksimalne prosječne vrijednosti RER došlo nakon što su vrijednosti estrogena dostigle određenu razinu. Ta granična vrijednost serumskog estrogena individualno je različita a prema Jenneru (1972) njena prosječna vrijednost iznosi 220 pmol/L. Spolnim sazrijevanjem pod utjecajem gonadotropina koji se početkom puberteta počinju pojačano izlučivati, dolazi do povećanja koncentracije estrogena u plazmi. U jednoj fazi spolnog sazrijevanja, postiže se koncentracija estrogena koja je dovoljna da dovede do maksimalnih vrijednosti RER-a, a posljedično i do povećanog anaerobnog kapaciteta ispitanice, tj. do povećane sposobnosti podnošenja tjelesnog opterećenja. Spomenuta granična koncentracija serumskog estrogena individualno je različita, a postiže se upravo u vrijeme nastupa menarhe.

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RESPIRATORY EXCHANGE RATIO FOR GIRLS: A LONGITUDINAL STUDY

ABSTRACT

The aim of this research was to determine the changes in the respiratory exchange ratio during the progressive load on a treadmill for girls aged 9 to 18. The research was conducted on a sample selected from a population of schoolchildren in Zagreb, and was longitudinal- a group of 50 girls aged 9 was observed until they were 18. All female respondents were exposed to progressive maximal load test on a treadmill. Oxygen uptake and release of carbon dioxide were continuously measured by using Ergopneumotest apparatus. The value of RER based on these variables was determined. The obtained results were analyzed using standard statistical procedures so that their main characteristics could be determined. In the early stages of each measurement, i.e. with the lower level of physical load, lower level of RER values was recorded, while the highest values were observed in body load of the highest level exceeding the value 1 for each chronological age at the point of the highest load. The highest level of RER was observed in the fifth year of monitoring thus corresponding to the chronological age of 13, or in other words, at the age when girls get their period for the first time.

Key words: *RER, metabolism, girls*

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TENIS KAO ŠKOLSKI SPORT

UVOD

Sadržaji izborne nastave tjelesne i zdravstvene kulture nude povećanje tjednog fonda sati tjelesnog vježbanja za učenike. Učenici osnovnih i srednjih škola trebali bi imati mogućnost izabrati tjelesnu i zdravstvenu kulturu kao izborni predmet. Da bi se izborna nastava mogla provesti moraju biti zadovoljeni sljedeći uvjeti: prijedlog plana i programa predmetnog profesora, odobrenje nastavničkog vijeća te dovoljan broj prijavljenih učenika (minimalno 15 učenika). Izborna nastava tjelesne i zdravstvene kulture provodi se jednom tjedno kao blok sat unutar tjednog rasporeda učenika. Struktura sata tjelesne i zdravstvene kulture primjenjuje se i u izbornoj nastavi, a blok sat omogućava duže trajanje pojedinih dijelova sata (Neljak, B., 2009.). Izbor metodičkih organizacijskih oblika rada te kombinacija metodičkih organizacijskih oblika rada na pojedinim satovima neke su od prednosti provođenja izborne nastave u blok satu (Neljak, B., 2009.).

Smatra se da bi se tenis trebao uvrstiti u izborne sadržaje tjelesne i zdravstvene kulture kao jednogodišnji program. Tenis je aciklički polistrukturalni sport. Struktura teniske igre je kompleksna i dinamična te ne možemo unaprijed predvidjeti sve uvjete natjecanja i igre.

Tenis kao takav iznimno doprinosi boljitku učenika na više razina: poboljšanje zdravlja, a ujedno time i povećanje kvalitete života. Mnoge su studije do sada pokazale kako dva sata tjelesne i zdravstvene kulture koja su propisana od strane Ministarstva znanosti obrazovanja i športa nisu dovoljna za upotpunjenje učenikovih potreba za kretanjem i igrom (Prskalo, I., 2010.).

Cilj je rada ukazati na tenis kao sadržaj izborne nastave tjelesne i zdravstvene kulture te prikazati neke primjere sata kao i povećanje tjednog fonda sati vježbanja kod učenika kroz izbornu nastavu tjelesne i zdravstvene kulture. Sportska igra tenis savršeno se uklapa u taj projekt zbog svoje složene i dinamične strukture koja utječe na razvoj svih motoričkih sposobnosti, a najviše na snagu, brzinu koordinaciju, izdržljivost i fleksibilnost (Milanović, D., 2009.).

SADAŠNJE STANJE

Poražavajuće je mala brojka učenika koji su u toku srednjeg školovanja uključeni u sportske klubove i sustavan trening. Dodatna nastava tjelesne i zdravstvene kulture, u ovom slučaju izborna, s jednim će dodatnim satom (blok sat) kroz godinu uvelike doprinijeti rješavanju gore navedenog problema, a ujedno će učenici kroz ovu nastavu usvojiti nova znanja i vještine, konkretno iz područja teniske igre koja je u današnje vrijeme sve popularnija.

Program koji bi se provodio u školi sustavno bi uključivao cjelokupnu školu tenisa koju prolaze početnici (rekreativci) u teniskim klubovima u trajanju jedne školske godine. U sklopu programa učenici bi prošli osnove tehnike teniske igre, vježbe kretanja na terenu te naprednije programe i vježbe za razvoj pojedinih motoričkih sposobnosti što ujedno uključuje programe koji bi pomogli pri redukciji potkožnog masnog tkiva učenika te poboljšanje funkcionalnih sposobnosti učenika.

STRUKTURA SATA TJELESNE I ZDRAVSTVENE KULTURE

Struktura sata tjelesne i zdravstvene kulture u redovnoj i izbornoj nastavi je ista, dok se trajanje pojedinih dijelova sata razlikuje zbog činjenice da izborna nastava traje 90 minuta odnosno 45 minuta duže od redovne nastave. Sukladno tome uvodni dio sata traje 6 do 8 minuta ili 10% ukupnog trajanja sata, pripremni dio sata 12 do 14 minuta ili 20% ukupnog trajanja sata, glavni A dio sata 40 do 45 minuta ili 40% ukupnog trajanja sata, glavni B dio sata 20 do 25 minuta ili 20% ukupnog trajanja sata i završni dio sata 6 do 8 minuta ili 10% ukupnog trajanja sata.

Uvodni i pripremni dio sata realizraju se ovisno o cilju sata te o odabranim sadržajima za uvodni i pripremni dio sata. U uvodnom dijelu sata mogu se koristiti razne vježbe za adaptaciju na reket i lopticu s ciljem popravljanja i uspostavljanja kontrole nad lopticom. U pripremnom dijelu sata izvode se pripremne vježbe s reketom i teniskom lopticom. Naglasak je također na uspostavi odnosno unaprijeđivanju kontrole lopte s reketom.

U prvom dijelu glavnog A dijela sata ponavljaju se i usavršavaju sadržaji s prethodnih satova, a provode se u paru, trojkama ili četvorkama (ovisno o broju učenika). U drugom dijelu glavnog A dijela sata uče se novi tehnički elementi, također u paru, trojkama ili četvorkama. U glavnom B dijelu sata provodi se sportska igra (mini tenis) u kojoj su učenici podijeljeni u skupine od 2 do 6 učenika ovisno o broju učenika i planiranom zadatku. U završnom dijelu sata koriste se vježbe za snižavanje inteziteta aktivnosti te najčešće koristimo igre koje se provode u mjestu bez trčanja.

ORGANIZACIJA PROVEDBE TENISA KAO IZBORNOG SADRŽAJA NASTAVE TJELESNE I ZDRAVSTVENE KULTURE

Za provedbu izbornog predmeta tjelesne i zdravstvene kulture odnosno tenisa u školama potrebna je uz nastavnika tjelesne i zdravstvene kulture i osoba licencirana od strane Hrvatskog teniskog saveza odnosno trener tenisa. Iznimno je bitno da s učenicima rade educirane osobe koje su detaljno upoznate s metodikom teniskih elemenata uz pomoć redovitih nastavnika TZK-a. Što se tiče nastavnih pomagala poželjno je da svaki učenik ima „svoj" reket. Za učinkovitu provedbu nastave potrebno je i 100 do 150 loptica odnosno dvije košare, ali i spužvaste lopte koje se koriste u počecima usvajanja teniske tehnike. Da bi se nastava uopće mogla provesti potrebne su i mreže za mini tenis (2 do 4).

Vježbalište se organizira na takav način da se školska dvorana podijeli u 2, 3 ili 4 mini tenis terena (ovisno o veličini dvorane) i na takvim terenima vježbaju 2 do 6 učenika. Program koji se provodi započinje s početnom teniskom školom, koristimo različita pomagala i oblik rada s ciljem usvajanja različitih oblika kretanja te se prenose opće teniske informacije. Učenici u školama najviše dolaze do osnovne teniske škole odnosno do usvajanja osnovnih elemenata u gruboj formi, gdje se evidentiraju i uklanjaju pogreške koje narušavaju kontinuitet igre. Učenike koje procijenimo talentiranima usmjeravamo prema teniskim klubovima i daljnjem bavljenju i usavršavanju teniske tehnika na višoj razini.

PRIMJER SATA IZBORNE NASTAVE TZK-A U TRAJANJU OD 90 MINUTA

PRIPREMA ZA SAT TJELESNE I ZDRAVSTVENE KULTURE

Škola	Osnovna škola „Lauder - Hugo Kon"						
Nastavnik							
Razredni odjel		Broj učenika	24	M	14	Ž	10
Datum							

Cilj/evi sata	Usvajanje pravilne tehnike i kontrole udarca (forhand)

STRUKTURA SATA	NASTAVNI SADRŽAJI	TRAJANJE
Uvodni dio	Trčanje u vrstama po širini dvorane (3 vrste po 8 učenika) vođenjem/odbijanjem loptice reketom o tlo i u zrak na različite načine i različitim kombinacijama - o tlo, o tlo pa u zrak, u zrak...	8

Pripremni dio	Pripremne vježbe s reketom i teniskim lopticama 1. Pretklon-zaklon držeći reket i lopticu u uzručenju 2. Prebacivanje loptice iz ruke u ruku bacanjem preko glave 3. Prebacivanje loptice iz ruke u ruku kruženjem oko trupa 4. Prebacivanje loptice iz ruke u ruku osmicom kroz noge 5. Odbijanje loptice dlanom o tlo iz visokog, srednjeg i niskog (čučanj) položaja 6. Čučanj s izbacivanjem lotice iznad glave objema rukama 7. Sunožno preskakivanje loptice koja se nalazi na tlu (naprijed-natrag, lijevo-desno)	14
Glavni A dio	– izmjenični organizacijski oblik rada 1. Odbijanje loptice iz bočne pozicije forehand tehnikom preko mreže (u paru) 2. Guranje loptice po tlu forehandom, zaustavljanje loptice reketom (u paru) 3. Učitelj baca lopticu,a učenici izvode forehand udarac otvaranjem iz osnovnog stava 4. Loptica se nalazi na tlu. Izmahom reketa lopticu prebaciti preko mreže (u paru)	40
Glavni B dio	Igra mini tenis preko mreže (4 protiv 4) s tim da svatko iz ekipe ima pravo na jedan udarac dok se svi iz njegove ekipe ne izredaju. Dopušteno je igrati samo forehand udarac.	20
Završni dio	Odbijanje loptice u zrak reketom zatvorenih očiju u mjestu. Iz igre ispada onaj kojemu lotice padne na tlo. Igra traje do proglašenja pobjednika – zadnji kojemu loptica nije pala na tlo.	8

Tip sata	usvajanje					
Nastavna sredstva i pomagala	loptice za tenis (100), reketi za tenis (24), mreže za mini tenis (4)					
Organizacijski način vježbanja	izmjenični organizacijski način vježbanja					
Prostor za vježbanje	Dvorana	X	Igralište		Ostali prostori	

ZAKLJUČAK

Sadržaji izborne nastave tjelesne i zdravstvene kulture nude povećanje tjednog fonda sati tjelesnog vježbanja za učenike. Evidentno je kako dva sata tjelesne i zdravstvene kulture koji su propisani od strane Ministarstva znanosti obrazovanja i športa nisu dovoljna za upotpunjenje učenikovih potreba za kretanjem i igrom. Uvođenjem dodatnog blok sata u školski program uvelike bi se unaprijedila kvaliteta

života i zdravlja učenika, a ujedno time i zadovoljile učenikove potrebe kao čovjeka koji u današnje vrijeme sve više postaje „homo sedens" (čovjek koji sjedi).

Tenis kao izbor dodatne nastave TZK-a iznimno bi doprinio rješavanju gore navedenih problema. Tenis kao polistrukturalni aciklički sport za svoj uspjeh traži puno, ali daje puno. Program u školama bi se prilagodio učenicima da od njih ne iziskuje velike tjelesne napore nego bi se kroz igru i zanimljive sadržaje iskoristile sve blagodati strukture igre i doprinosa razvoju učenikovih motoričkih i funkcionalnih sposobnosti, ali i bogatstvo usvajanja motoričkih znanja teniske igre i osposobljenja za igranje mečeva u bližoj ili daljoj budućnosti.

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TENNIS AS SCHOOL SPORT

ABSTRACT

Physical education content offers weekly increased sports activities for students. It is important that all students have elective subjects which include some form of physical education. Tennis should be one of the elective sports as one-year education programme because it increases life quality in many ways. Many studies have shown that two hours of physical activity per week are not enough to fulfil students' needs for play and movement. The purpose of this paper is to show that tennis is a perfect activity/game that will develop students' motor abilities. Furthermore, it is matched perfectly to the project: „Tennis in schools".

Key words: *tennis, physical education, school, activity*

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Izvorni znanstveni rad

KOMPARACIJA NEKIH POKAZATELJA OPĆE I SPECIFIČNE KOORDINACIJE MLADIH RUKOMETAŠICA I RUKOMETAŠA U ŠKOLSKOM SPORTU

UVOD

Koordinacija se obično definira kao sposobnost izvođenja složenih kretnji tijela u prostoru i vremenu pri čemu se autori uglavnom slažu da je riječ o vrlo kompleksnoj motoričkoj sposobnosti upravljanja pokretima jednog dijela tijela ili tijela u cjelini (Tomljanović i Malić, 1982), (Malacko, 1991), (Arslanagić, 1997), (Bompa, 2006), (Cvenić, 2007), (Sekulić i Metikoš, 2007), (Foretić; Rogulj; Čavala, 2010). Koordinacija sportaša usko je povezana s tehnikom sporta kojim se sportaš bavi (Milanović, 1997). Koordinacija je u sportu iznimno važan faktor usvajanja i nadgradnje tehnike i taktike igre zbog svoje uske veze s brzinom, jakošću, izdržljivošću i fleksibilnošću (Bompa, 2006). Kako su svi ovi elementi važni za uspjeh i u rukometnoj igri, može se reći da stupanj koordinacije na određeni način determinira uspjeh pojedinaca i ekipe u rukometu.

U rukometu se značenje koordinacije očituje u sposobnostima rukometaša da brzo rješavaju neočekivane zadatke, u sposobnostima brzog izvođenja različitih kretnji u cilju brzog premještanja tijela, u sposobnostima svladavanja različitih prepreka u složenim situacijama te u sposobnosti dobrog manipuliranja loptom (Arslanagić, 1997), (Rogulj i Foretić, 2007). Kod mladih rukometašica i rukometaša u ovom periodu odrastanja (11–12 godina) dva faktora se mogu javiti kao elementi ometanja razvoja koordinacijskih sposobnosti. Jedan je element neujednačenost u rastu, (posebno kod djevojčica) zbog koje može doći do oscilacija koordinacijskih sposobnosti, a drugi element može biti niska razina motoričkog iskustva. Vrlo je vjerojatno da će akumulacija motoričkog iskustva kroz kontinuirani trening i natjecanja pridonijeti poboljšanju koordinacijskih sposobnosti, odnosno pridonijeti boljoj ekonomičnosti pokreta mladih sportašica i sportaša u rukometnoj igri. U ovom radu bit će razmatrana četiri pokazatelja koordinacijskih sposobnosti od kojih dva pripadaju općoj koordinaciji, a dva specifičnoj koordinaciji. Kao pokazatelji opće koordinacije uzet je test poligon natraške i standardni poligon prepreka sastavljen od niza različitih zadataka (redoslijed, broj prepreka i način izvođenja unaprijed

određen). Dva pokazatelja specifične koordinacije činili su vođenje lopte boljom rukom oko stalka te bacanje lopte u zid i hvatanje lopte odbijene od zida. Kako se sposobnost koordinacije manifestira kroz različite situacije i kretne momente, cilj ovog rada bio je komparirati neke elemente koordinacijskih pokazatelja i utvrditi eventualno postojanje značajnih razlika između mladih rukometašica i rukometaša u školskom sportu.

METODE RADA

Uzorak ispitanika

Uzorak ispitanika činilo je 46 mladih rukometašica i 37 mladih rukometaša školskih ekipa u dobi od 11 – 12 godina (5. i 6. razredi). Svi mladi sportaši u rukometnim ekipama su redovito trenirali u ŠŠK-u i nastupali na školskim natjecanjima.

Uzorak varijabli

Uzorak su činile dvije varijable opće koordinacije: poligon natraške (MPN) i standardni poligon prepreka (POL) i dvije varijable specifične koordinacije: vođenje lopte rukom (VOĐL) i bacanje lopte u zid i hvatanje lopte odbijene od zida (BACL).

METODE OBRADE PODATAKA

Deskriptivnom statistikom analizirane su varijable za obje skupine ispitanika, a Studentovim t - testom za nezavisne uzorke analizirana je statistička značajnost razlika aritmetičkih sredina postignutih rezultata mladih rukometašica i rukometaša.

REZULTATI I DISKUSIJA

Tablica 1. *Deskriptivna statistika varijabli*

Varij.	N	AS	Min	Max	Ras	SD
MPN (Ž)	46	14,13	8,80	29,00	20,20	3,94
MPN (M)	37	11,78	6,07	16,80	10,73	2,00
POL (Ž)	46	25,25	20,70	33,00	12,30	2,52
POL (M)	37	24,40	20,20	34,00	13,80	3,23
VOĐL (Ž)	46	5,79	5,20	7,00	1,80	0,33
VOĐL (M)	37	5,58	4,90	6,40	1,50	0,31
BACL (Ž)	46	14,52	12,00	17,00	5,00	1,14
BACL (M)	37	14,94	13,00	16,00	3,00	0,84

Rezultati aritmetičkih sredina mladih rukometašica i rukometaša pokazuju približne vrijednosti u testovima specifične koordinacije te u rezultatu standardnog poligona prepreka. Najveća razlika u prosječnim vrijednostima uočena je u testu poligon natraške. U svim koordinacijskim varijablama dječaci rukometaši su postigli bolje rezultate od mladih rukometašica. Pretpostavlja se da u testovima koji imaju približne vrijednosti rezultata neće biti statistički značajnih razlika između rukometašica i rukometaša što će biti provjereno t-testom. Najveći raspon rezultata vidljiv je u varijablama opće koordinacije – poligonu natraške (rukometašice) i standardnom poligonu prepreka u obje kategorije. Veća homogenost kod mladih rukometašica i rukometaša vidljiva je u testovima specifične koordinacije u odnosu na pokazatelje opće koordinacije.

Tablica 2. *Rezultati t- testa: poligon natraške(MPN), standardni poligon prepreka (POL), vođenje lopte (VOĐL), bacanje i hvatanje lopte (BACL)*

Var.	**AS (Ž)**	**AS (M)**	**t**	**df**	**p**
MPN	14,13	11,78	3,28	81	**0,00**
POL	25,25	24,40	1,34	81	0,18
VOĐL	5,79	5,58	2,88	81	**0,00**
BACL	14,52	14,91	-1,87	81	0,06

Studentovim t - testom potvrđene su statistički značajne razlike između mladih rukometašica i rukometaša u testu opće koordinacije poligon natraške (MPN) i u testu vođenje lopte rukom (VOĐL) kao pokazatelju specifične koordinacije. S obzirom na period intenzivnog rasta koji ranije nastupa kod djevojčica (Mišigoj-Duraković, 2008), a koji može uvjetovati oscilacije u sposobnosti koordinacije, vrlo je vjerojatno da je na postizanje slabijeg rezultata kod rukometašica utjecaj ovog faktora bio presudan. Koordinacija koja pokazuje spretnost ruku tijekom vođenja lopte, a čije izvođenje zahtjeva dobru ritmičku izmjenu rada ruke i odbijanja lopte od podloge, pokazao se težim zadatkom za mlade rukometašice od testa bacanja i hvatanja lopte u kojem nije bilo značajnih razlika (približno 15 bacanja). Moguće je da su mladi rukometaši imali više motoričkog iskustva u manipulaciji loptom u kretanju (koje ne mora biti samo rukometno iskustvo) što je moglo pridonijeti boljoj izvedbi ovoga testa.

ZAKLJUČAK

Iz rezultata deskriptivne statistike varijabli koordinacijskih pokazatelja vidljivo je da su mladi rukometaši u svim varijablama polučili bolje rezultate u odnosu na mlade rukometašice. Rezultati t - testa pokazali su da se mlade rukometašice od mladih rukometaša značajno razlikuju u testu poligon natraške (MPN) kao pokazatelja opće koordinacije i testu vođenja lopte (VOĐL) kao pokazatelja specifične koordinacije. Za pretpostaviti je da su intenzivan rast koji može uvjetovati oscilacije u koordinaciji i nešto slabije motoričko iskustvo u manipulaciji loptom u kretanju kod mladih rukometašica pridonijeli slabijim rezultatima u ovim koordinacijskim faktorima kod ove dvije skupine rukometaša.

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COMPARISON OF SOME INDICATORS OF GENERAL AND SPECIFIC COORDINATION OF YOUNG FEMALE AND YOUNG MALE HANDBALL PLAYERS IN SCHOOL SPORTS

ABSTRACT

On a sample of 46 young female handball players and 37 young male handball players in school sports, four indicators of coordination abilities were measured. Polygon backwards (MPN) and standard polygon obstacle (POL) indicate general coordination. Leading the ball by hand, throwing the ball at the wall and catching it were the indicators of specific coordination. Young male handball players have achieved better results compared to young female handball players in all the variables. Statistically significant differences in favour of young male handball players were confirmed by t – test in the test polygon backwards and leading the ball by hand.

Key words: *coordination, young female handball players, young male handball players, school sports*

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Izvorni znanstveni rad

KONZUMACIJA ALKOHOLA KOD SPORTSKIH TRENERA

Nikotin, alkohol i prekomjerna tjelesna masa prepoznati su od strane Svjetske zdravstvene organizacije (WHO) kao rizični faktori odgovorni za znatan udio od vodećih uzroka bolesti i smrti (2002.). Pravilnim prepoznavanjem i intervencijom te usvajanjem akcija na globalnoj razini može se puno učiniti na smanjenju udjela ovih zdravstvenih rizika u sveukupnom morbiditetu i mortalitetu.

Konzumacija alkohola stoljećima je prisutna u svjetskoj populaciji, ali različiti pozitivni kao i negativni učinci konzumacije su zamijećeni tek nedavno (Rehm i sur, 2001.). U zadnjih je desetak godina uočen porast konzumacije alkohola, pogotovo u zemljama u razvoju, uzrokujući brojne zdravstvene, ali i socijalne probleme. U svjetskim razmjerima, alkohol je odgovoran za smrt 1,8 milijuna ljudi, direktno je povezan s problemima intoksikacije i ovisnosti, a smatra se da uzrokuje i 20-30% karcinoma jednjaka, ciroza jetre, karcinoma jetre, samoubojstava, epilesija i prometnih nesreća (WHO, 2002.).

Cilj ovog istraživanja bio je utvrđivanje navika vezanih uz konzumaciju alkohola kod hrvatskih sportskih trenera.

METODE ISTRAŽIVANJA

Istraživanje je provedeno na uzorku 209 sportskih trenera različitih sportskih disciplina. Ispitanici su anonimno ispunili anketu vezanu uz konzumaciju alkohola. Primijenjen je upitnik AUDIT koji se koristi za utvrđivanje ovisnosti o alkoholu. Neposredno prije ispunjavanja upitnika ispitanicima je objašnjen cilj rada, način ispunjavanja upitnika te na koji se način štite njihovi podaci. U istraživanju su sudjelovali samo treneri koji su svojevoljno prihvatili testiranje. Podaci prikupljeni anketom analizirani su statističkim programskim paketom STATISTICA te su

utvrđene frekvencije pojedinih odgovora te aritmetička sredina i standardna devijacija procjene ovisnosti.

REZULTATI I RASPRAVA

U tablici 1. prikazani su osnovni deskriptivni parametri (aritmetička sredina i standardna devijacija) uzorka te ovisnosti procijenjene AUDIT upitnikom.

U ukupnom uzorku anketiranih trenera bilo je 56 žena i 147 muškarca. Žene su u prosjeku bile u dobi od 24,3 godine, a muškarci nešto stariji, prosječno 27,1 godina. Ispitani treneri oba spola najviše konzumiraju vino i pivo, s time da kod žena dominira vino, a kod muškaraca pivo. Slatka alkoholna pića (likeri) nisu uobičajena, a žestoka pića konzumira manji broj trenera.

Tablica 1. *Osnovni deskriptivni parametri (AS±SD) dobi i AUDIT vrijednosti*

	Žene	Muškarci
Dob (godine)	24,27 ± 4,19	27,12 ± 6,99
AUDIT	4,55 ± 0,48	5,76 ± 0,33

AUDIT upitnik široko je rasprostranjen i koristi se u ispitavanjima široke populacije za utvrđivanje navike konzumiranja alkohola i ocjenu ovisnosti s jednakom uspješnošću kod žena i muškaraca (Aalto i sur., 2009.). Na osnovi 10 pitanja s odgovorima koji se različito boduju (od 0 do 4) u konačnici se izračunava indeks čija vrijednost otkriva postojanje eventualne ovisnosti o alkoholu ili rizika. Zbroj 8 ili više ukazuje na postojanje štetne i opasne navike konzumiranja alkohola. Analiza pojedinačnih odgovora naravno daje još pouzdanije i podrobnije podatke o navikama testirane osobe.

Prosječne vrijednosti ukupnog AUDIT-zbroja ispitanih trenera značajno su ispod granice od osam bodova što jasno pokazuje da većina trenera nema problema s alkoholom. Međutim, raspon u kojem se kreće AUDIT pokazuje da ima i trenera kojima alkohol predstavlja problem. Kod žena samo su četiri ispitanice iznad granične vrijednosti (AUDIT 11, 14 i 23), dok je kod muškaraca čak 21% ispitanika iznad granice 8 (AUDIT od 9 do 26). Kada se podrobnije pogledaju frekvencije pojedinih odgovora može se zaključiti da je većina trenera koji se nalaze iznad granične vrijednosti 8 bodove dobila u okviru prvih pitanja AUDIT upitnika (Koliko često konzumirate alkoholna pića? Koliko pića uobičajeno popijete pijete alkohol? i Koliko često popijete 6 ili više pića jednom prilikom?) što upućuje na rizično ponašanje vezano uz alkohol, ali je manji broj onih koji su veći broj bodova skupili na pitanjima koja upućuju na

postojanje ili početnu ovisnost o alkoholu ili na pitanja koja upućuju da je šteta od alkohola već iskušana (primjerice pitanje Koliko Vam se često desilo tijekom prošle godine da se niste mogli sjetiti što se dešavalo noć prije zbog previše pića? ili Jeste li Vi ili netko drugi bili ozlijeđeni kao rezultat toga što ste previše popili?).

Vrlo dobro je poznato da veće količine alkohola imaju izuzetno štetan utjecaj na većinu organa u čovjekovi tijelu (Kasper, 2004.). Brojna su znanstvena istraživanja utvrdila postojanje odnosa u obliku slova J *(J-shaped relationship* – Gunzerath, 2004.) između konzumacije alkohola i zdravlja s najnižim mortalitetom i morbiditetom kod osoba koje piju malo ili umjereno. Umjereno pijenje podrazumijeva konzumaciju ne više od dva pića dnevno za zdravu osobu (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2000). Manji ukupni mortalitet kod osoba koje konzumiraju umjerenu količinu alkohola u vezi je uglavnom s manjim rizikom od koronarnih bolesti što istraživači povezuju s antioksidansima i antitrombotičnim tvarima prisutnim u vinu, prvenstveno crnim vinima, koje imaju potencijalni korisni učinak protiv aterotrombotičnih oboljenja ili karcinoma. Prema Klatsky i sur. (2003.) na osnovi velike studije provedene u Kaliforniji na uzorku preko 12.000 osoba utvrđeno je da je umjerena konzumacija vina povezana s najmanjim rizikom od koronarnih bolesti, ali i mortalitetom od svih uzroka. Također su utvrdili da osobe koje umjereno piju pivo ili žestoka pića također imaju manji mortalitet u odnosu na osobe koje nikad ne piju.

ZAKLJUČAK

Sportski treneri svakako su populacija sa svojim specifičnostima i zbog njihove povezanosti s igračima, posebno mladim, njihov način života i navike zaslužuje pažnju. Sport ima vrlo važnu ulogu u velikom broju zemalja širom svijeta, i iako sportaši uglavnom plijene pažnju i nose zasluge treneri su također važna karika u tom lancu i njihova edukacija na svim poljima, pa tako i vezana uz konzumaciju alkohola zasigurno će pomoći u ostvarivanju boljih rezultata.

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ALCOHOL CONSUMPTION AMONG SPORTS COACHES

ABSTRACT

Sports coaches are certainly a population with specific characteristics and because of their association with the players, especially young people, their lifestyle and habits deserve attention. The aim of this study was to establish habits associated with alcohol consumption among Croatian sports coaches. The study was conducted on a sample of 209 coaches from various sports disciplines. Respondents completed an anonymous questionnaire (AUDIT questionnaire) associated with alcohol consumption. In the sample of surveyed coaches, there were 56 women and 147 men. Women's average age was 24.3 and men's average age was 27.1. The respondents of both genders consume mostly wine and beer. Average value of the total sum of AUDIT-tested coaches is significantly below the limit of eight points, which clearly shows that most coaches have no problems with alcohol. However, the range of the obtained AUDIT values shows that there are some coaches for whom alcohol is a problem.

Key words: *sports coaches, alcohol, AUDIT*

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ANALIZA SPORTSKIH POSTIGNUĆA VISOKOŠKOLSKIH EKIPA STUDENTICA NA NATJECANJIMA SVEUČILIŠNOG PRVENSTVA U ZAGREBU

UVOD

U zagrebačkom visokoškolskom području sportu se poklanja velika pažnja. To je objavljeno u velikom broju strateških dokumenata koji govore o jednakoj važnosti formiranja fakultetskih sportskih društava i provedbi kvalitetnog sustava natjecanja u što većem broju sportova. Danas postoje značajna ograničenja jer još uvijek nisu izgrađeni zatvoreni, a ni otvoreni sportski objekti u kojima bi se provodila sportska aktivnost. Samo velikom motivacijom nastavnika tjelesne i zdravstvene kulture, uz pomoć Zagrebačkog sveučilišta i Zajednice visokih škola i veleučilišta, kao i samih visokoškolskih institucija, sportska natjecanja se uspješno provode već dugi niz godina. Važno je naglasiti da se u posljednjih nekoliko godina javlja sve veći broj ženskih ekipa što ukazuje na pojačani interes studentica za bavljenje sportom i sudjelovanjem na studentskim sportskim natjecanjima. U budućnosti treba ovom problemu pokloniti veću pažnju. Ovdje će se analizirati sportska postignuća visokoškolskih ekipa studentica na natjecanjima u okviru Sveučilišnog prvenstva grada Zagreba.

METODE RADA

Za potrebe ovog stručnog rada prikupljeni su rezultati svih ekipa studentica koje su nastupile na Sveučilišnom prvenstvu grada Zagreba. Analizirane su četiri posljednje akademske godine od ak. 2006/2007. do 2009/2010. god. Važna je činjenica da su u velikom broju sportova nastupile i ekipe visokih škola i veleučilišta što je sportskom natjecanju dalo posebnu draž. U mnogim sportovima ekipe visokih škola i veleučilišta postigle su zapažene rezultate. Prikupljeni rezultati koje su ostvarile sportske ekipe ili pojedinke neke visokoškolske institucije omogućile su više tablica iz kojih je moguće sagledati sportsku aktivnost svakog fakulteta, visoke škole ili veleučilišta. U ovome su radu obrađeni podaci koje su tijekom navedenog razdoblja ostvarile ženske natjecateljice. Analiza postignutih rezultata podijeljena je u tri

faze. U prvoj će se analizirati ukupan broj bodova u svim sportskim disciplinama koje su ostvarile studentice pojedinih sportskih ekipa te utvrditi ukupan broj ostvarenih bodova i odrediti konačan redoslijed ekipa. U drugoj fazi analizirat će se broj sportskih grana i natjecateljskih disciplina u kojima su sudjelovale studentice pojedinih fakulteta, visokih škola ili veleučilišta. U trećoj fazi analizirat će se broj fakulteta, visokih škola i veleučilišta čije su studentice sudjelovale u natjecanjima u okviru pojedinih sportskih grana.

REZULTATI I RASPRAVA

U prvoj tablici analizirani su uspjesi svih visokoškolskih institucija na temelju ukupno prikupljenih bodova tijekom svake akademske godine.

Tablica 1. *Ukupni broj bodova u svim natjecateljskim disciplinama prikazano za svaku akademsku godinu zasebno*

Red. br.	FAKULTET	2006./2007.	2007./2008.	2008./2009.	2009./2010.	UKUPNO
1.	Kineziološki fakultet (KF)	82	98	99	107	386
2.	Ekonomski fakultet (EF)	87	73	96	99	355
3.	Filozofski fakultet (FF)	89	89	78	62	318
4.	Prirodoslovno-matematički fakultet (PMF)	52	77	93	83	305
5.	Pravni fakultet (PF)	24	29	40	55	148
6.	Fakultet elektrotehnike i računarstva (FER)	31	32	45	32	140
7.	Prehrambeno-biotehnološki fakultet (PBF)	11	20	43	33	107
8.	Medicinski fakultet (MF)	3	20	29	53	105
9.	Građevinski fakultet (GF)	5	22	39	36	102
10.	Agronomski fakultet (AGF)	18	17	26	19	80
11.	Fakultet političkih znanosti (FPZ)	17	1	23	26	67
12.	Stomatološki fakultet (SF)	11	11	11	26	59
13.	Fakultet kemijskog inženjerstva i tehnologije (FKIT)	6	8	24	16	54
14.	Farmaceutsko-biokemijski fakultet (FBF)	1	14	16	22	53
15.	Tehničko veleučilište u zagrebu (TVZ)	2	9	16	26	53
16.	Veleučilište VERN	0	0	20	26	46
17.	Fakultet strojarstva i brodogradnje (FSB)	4	8	8	12	32

18.	Grafički fakultet (GRAF)	2	11	5	11	29
19.	Katoličko bogoslovni fakultet (KBF)	2	0	14	10	26
20.	Edukacijsko-rehabilitacijski fakultet (ERF)	2	0	10	10	22
21.	Fakultet prometnih znanosti (FPRZ)	3	1	15	2	21
22.	Arhitektonski fakultet (AF)	2	3	4	11	20
23.	Šumarski fakultet (ŠUF)	0	0	7	9	16
24.	Hrvatski studiji (HS)	1	0	5	9	15
25.	Zagrebačka škola ekonomije i managementa (ZŠEM)	4	4	6	0	14
26.	Veterinarski fakultet (VF)	0	0	7	2	9
27.	Tekstilno-tehnološki fakultet (TTF)	1	2	3	1	7
28.	Visoka poslovna škola Libertas (LIB)	0	0	3	3	6
29.	Zdravstveno veleučilište (ZV)	1	0	0	4	5
30.	Zagrebačka škola za menagament (ZŠM)	3	0	0	0	3
31.	Učiteljski fakultet (UF)	0	0	0	2	2
32.	Geodetski fakultet (GEF)	0	1	0	0	1
33.	Rudarsko-geološko-naftni fakultet (RGNF)	0	0	0	0	0
34.	Visoka škola za primijenjeno računarstvo (VŠPR)	0	0	0	0	0
35.	Visoka policijska škola (VPŠ)	1	0	0	0	1
36.	Metalurški fakultet Sisak (MFS)	0	1	0	0	1
37.	Visoka škola tržišnih komunikacija (AGORA)	1	0	0	0	1
38.	Akademija dramskih umjetnosti (ADU)	0	0	0	0	0
39.	Akademija likovnih umjetnosti (ALU)	0	0	0	0	0
40.	Filozofski fakultet Družbe Isusove (FFDI)	0	0	0	0	0
41.	Geotehnički fakultet Varaždin (GFV)	0	0	0	0	0
42.	Muzička akademija (MA)	0	0	0	0	0
43.	Fakultet organizacije i Informatike Varaždin (FOIV)	0	0	0	0	0

Prema ukupnom broju bodova koje su studentice osvojile tijekom svake pojedinačne natjecateljske sezone, kao ukupnoj sumi bodova kroz četiri akademske godine, jasno se izdvajaju 4 fakulteta i to KF, EF, FF i PMF. Kako ukupni broj bodova zavisi od ostvarenih sportskih rezultata natjecateljica, ali i od broja sportskih disciplina u kojima su se studentice natjecale jasno je da su se na spomenutim institucijama natjecale studentice visoke sportske kvalitete i to u većem broju natjecateljskih disciplina.

Iza navedene grupe fakulteta slijedi skup od 5 institucija (PF, FER, PBF, MF i GF) kod kojih se jasno uočava trend porasta ukupnog broja bodova što znači da se u tim institucijama ostvaruju sve bolji uvjeti za sudjelovanje sve većeg broja vrsnih natjecateljki u studentskim sportskim nadmetanjima. U preostalom dijelu tablice mogu se uočiti još neke grupacije institucija koje imaju slična obilježja. Tako na primjer studentice sa AGF, FPZ, SF, FKIT, FBF, TVZ, FSB, GRAF, FPRZ, AF i TTF sustavno sudjeluju u natjecanjima svake akademske godine iako se njihovi sportski rezultati međusobno dosta razlikuju. Trendovi napretka uočavaju se kod FPZ, SF, FBF i TVZ-a pa je očekivano da će se u narednim sezonama studentice tih institucija svojim rezultatima značajnije primaknuti prema višim rezultatima na ovoj tablici.

Studentice sa još 12 institucija (VERN, KBF, ERF, ŠUF, HS, ZŠEM, VF, LIB, ZV, GEF, ZŠM i UF) osvajale su natjecateljske bodove, ali ne u svim akademskim godinama. Tako su sportašice sa ZŠM i UF osvojile nekoliko bodova u samo jednoj sezoni, a natjecateljice VERN-a, ŠUF-a i LIB-a u zadnje dvije sezone dok su se studentice sa ostalih institucija iz ove grupacije natjecale i osvajale bodove u tri sezone natjecanja. U ovoj grupaciji posebno se ističu studentice VERN-a koje su se natjecale u zadnje dvije akademske godine i ostvarile najveći broj natjecateljskih bodova od svih natjecateljica i s spomenute skupine institucija. Studentice s preostalih 12 visokoškolskih institucija nisu osvojile ni jedan bod tijekom zadnje četiri sezone natjecanja i to vjerojatno zato jer nisu imale priliku da se natječu.

U tablici 2 prikazan je broj natjecateljskih aktivnosti u kojima su se studentice natjecale na sveučilišnom prvenstvu.

Tablica 2. *Broj natjecateljskih disciplina u kojima su se natjecale studentice pojedinih sveučilišnih i veleučilišnih institucija*

Red. br.	FAKULTET	2006./2007.	2007./2008.	2008./2009.	2009./2010.	UKUPNO
1.	Filozofski fakultet (FF)	18	16	10	11	55
2.	Ekonomski fakultet (EF)	14	14	12	13	53
3.	Kineziološki fakultet (KF)	13	12	10	11	46
4.	Prirodoslovno-matematički fakultet (PMF)	12	12	12	13	37
5.	Pravni fakultet (PF)	7	6	6	7	26
6.	Agronomski fakultet (AGF)	8	6	6	5	25
7.	Fakultet elektronike i računarstva (FER)	6	6	5	6	23
7.	Medicinski fakultet (MF)	5	6	3	9	23
8.	Prehrambeno-biotehnološki fakultet (PBF)	4	4	7	6	21
9.	Građevinski fakultet (GF)	6	4	5	4	19
10.	Stomatološki fakultet (SF)	3	5	4	5	17
11.	Fakultet političkih znanosti (FPZ)	4	5	3	3	15
12.	Tehničko veleučilište u zagrebu (TVZ)	1	3	3	5	12
12.	Fakultet prometnih znanosti (FPRZ)	4	4	3	1	12
12.	Farmaceutsko-biokemijski fakultet (FBF)	3	3	1	5	12
13.	Fakultet kemijskog inženjerstva i tehnologije (FKIT)	0	3	4	3	10
14.	Veleučilište VERN	0	2	2	5	9
14.	Arhitektonski fakultet (AF)	3	1	2	3	9
14.	Grafički fakultet (GRAF)	1	2	4	2	9
15.	Fakultet strojarstva i brodogradnje (FSB)	2	2	2	2	8
15.	Tekstilno-tehnološki fakultet (TTF)	4	2	1	1	8
16.	Zagrebačka škola ekonomije i managementa (ZŠEM)	3	2	1	0	6
17.	Hrvatski studiji (HS)	1	0	2	1	4
17.	Veterinarski fakultet (VF)	1	1	1	1	4
17.	Zdravstveno veleučilište (ZV)	3	0	0	1	4
17.	Edukacijsko-rehabilitacijski fakultet (ERF)	1	1	1	1	4
18.	Šumarski fakultet (ŠUF)	0	0	2	1	3
18.	Katolički bogoslovni fakultet (KBF)	1	0	1	1	3
18.	Učiteljski fakultet (UF)	0	0	1	2	3
19.	Visoka poslovna škola Libertas (LIB)	0	0	1	1	2
20.	Geodetski fakultet (GEF)	0	1	0	0	1

Od ukupno 44 visokoškolske institucije, koliko ih je navedeno na popisu Zagrebačkog sveučilišnog športskog saveza, studentice sa 32 institucije ili 72,7 % stalno ili povremeno sudjeluju u studentskim sportskim natjecanjima dok se studentice sa 12 institucija, odnosno, 27,3 % (RGNF, ZŠM, VŠPR,AGORA, VPŠ, MFS, ADU, ALU, FFDI, GFV, MA, UA i FOIV) nisu natjecale ni u jednom sportu u posljednje četiri akademske godine. Od svih institucija čije se studentice natječu samo se studentice sa 20 visokoškolske institucije natječu sustavno tj. svake sezone, a to znači da manje od polovice akademskih institucija, točnije njih 45,5 % osigurava uvjete za sudjelovanje studentica u studentskim sportskim natjecanjima. Četiri se institucije (FF, EF, KF i PMF) ističu po broju natjecateljskih disciplina u kojima se natječu njihove studentice, a u spomenutim institucijama u svakoj natjecateljskoj sezoni studentice sustavno nastupaju u 10–15 sportskih disciplina.

Studentice sa PF, AGF i FER-a također sustavno sudjeluju u natjecanjima, ali u manjem broju natjecateljskih aktivnosti čiji broj se u različitim akademskim godinama kreće od 5 do 8 sportskih disciplina. U manje od 5 sportskih disciplina natječu se studentice sa 13 akademskih institucija dok se povremeno i u vrlo malo sportskih aktivnosti natječu studentice sa još 10 institucija.

Na kraju analize ove tablice može se reći da je sportska aktivnost studentica izražena preko sudjelovanja u studentskim sportskim natjecanjima zadovoljavajuća u relativno malom broju akademskih institucija.

U tablici 3. su prezentiran podaci o popularnosti pojedinih natjecateljskih sportskih aktivnosti u kojima se natječu studentice sveučilišnih i veleučilišnih institucija grada Zagreba.

Tablica 3. *Broj sveučilišnih i veleučilišnih institucija čije su se studentice natjecale u pojedinim sportskim granama*

		2006./2007.	2007./2008.	2008./2009.	2009./2010.	UKUPNO
1.	ODBOJKA	20	19	25	22	86
2.	KROS	9	12	17	9	47
3.	KOŠARKA	12	11	9	10	42
4.	PLIVANJE	7	11	12	10	40
5.	TENIS	15	10	4	9	38
6.	RUKOMET	11	9	7	8	35
7.	BADMINTON	6	4	4	8	22
8.	RUKOMET NA PIJESKU	8	6	4	3	21
9.	ODBOJKA NA PIJESKU	5	6	5	4	20
10.	STRELJAŠTVO	9	4	4	3	20

11.	STOLNI TENIS	6	5	5	3	19
12.	ATLETIKA	3	5	3	6	17
13.	ŠAH	2	4	5	4	15
14.	KARATE	3	4	3	4	14
15.	JUDO	4	3	2	2	11
16.	SQUASH	4	3		3	10
17.	AEROBIKA	3	4			7
18.	MAČEVANJE	4	2			6
19.	VESLANJE			5	10	15
20.	ROLANJE			2	4	6
21.	MALI NOGOMET				5	5
22.	SKIJANJE				2	2

Od ukupno 22 sportske discipline u kojima su se provodila natjecanja od 2006. do 2010. g. studentice su se svake akademske godine sustavno natjecale u 15 disciplina, u jednoj disciplini je natjecanje bilo izostavljeno u sezoni 2008/2009., u dvije discipline se natjecanja više ne provode, ali su zato u posljednje dvije sezone u sustav natjecanja uvedene i četiri nove sportske discipline.

Najpopularnija sportska aktivnost kroz sve četiri akademske godine sveučilišnog natjecanja studentica je odbojka u kojoj svake godine sudjeluju 20–25 visokoškolskih institucija. Iza odbojke nalazi se grupa od 5 sportskih aktivnosti u kojima se u pravilu natječe od 8–15 institucija, a to su kros, košarka, plivanje, tenis i rukomet. Košarka je ujedno i najstabilnija sportska aktivnost obzirom da u njoj svake akademske godine sudjeluje između 10–12 visokoškolskih institucija. Slijedi je plivanje, osim u sezoni 2006/2007., nakon njega se pozicionirao rukomet te tenis i kros dok je prisustvovanje visokoškolskih institucija u ostalim natjecateljskim aktivnostima dosta nesustavno.

Natjecanja se sustavno održavaju i u sljedećih 9 sportskih aktivnosti (badminton, rukomet i odbojka na pijesku, streljaštvo, stolni tenis, atletika, šah, karate i judo), ali se broj visokoškolskih institucija čije studentice nastupaju u navedenoj grupi sportova kreće od 2 do 8 i naglašeno oscilira od jedne do druge akademske godine.

Na samom dnu prve tabele nalaze se aerobika i mačevanje, odnosno, natjecateljske discipline koje se zbog manjka interesa ili zahtjevnih organizacijskih uvjeta više ne provode posljednje dvije godine dok se veslanje i rolanje pojavljuju upravo u tom razdoblju kao i mali nogomet i skijanje čija su natjecanja po prvi puta održana prethodne, 2009/2010. Upravo natjecateljske discipline koje se pojavljuju u predzadnjoj i zadnjoj akademskoj sezoni upućuju na tendenciju povećanja broja sportski sadržaja i kod studentica u okviru studentskih športskih natjecanja.

ZAKLJUČAK

Tijekom akademskih godina 2006/2007. do 2009/2010. studentice zagrebačkih zajednica sveučilišnih i veleučilišnih institucija imale su mogućnost sudjelovanja u sportskim natjecanjima studenata. Nakon analize podataka o sudjelovanju studentica sa različitih institucija u natjecanjima i ostvarenim rezultatima izraženim u bodovima moguće je iznijeti nekoliko zaključaka:

1. U studentskim natjecanjima sustavno sudjeluju i ostvaruju natjecateljske bodove, tijekom zadnje četiri sezone, studentice sa 20 visokoškolskih institucija, a to znači tek 45,5%. Studentice sa 12 institucija (tj. 27,3%) povremeno sudjeluju u natjecanjima, a jednako toliko institucija uopće ne sudjeluje u sveučilišnim športskim natjecanjima grada Zagreba za studentice. Sve navedeno upućuje na činjenicu da premali broj visokoškolskih institucija osigurava uvjete za sudjelovanje svojih studentica na sveučilišnim sportskim natjecanjima.
2. Najbolje rezultate u ukupnom broju natjecateljskih bodova kroz sve četiri natjecateljske sezone ostvarile su studentice sa KF, EF, FF i PMF-a koje osim što su ostvarile visoke sportske rezultate sustavno su se natjecale i u velikom broju sportskih disciplina.
3. Od ukupno 22 sportske discipline u kojima su se provodila natjecanja od 2006. do 2010. g. studentice su se svake sezone sustavno natjecale u 15 disciplina. U posljednje dvije sezone više se ne provode natjecanja iz aerobike i mačevanja, ali su zato u sustav natjecanja uvedene i četiri nove sportske discipline i to veslanje, rolanje, mali nogomet i skijanje.
4. Najpopularnija sportska aktivnost sveučilišnog natjecanja za studentice je odbojka u kojoj svake godine sudjeluju 20–25 visokoškolskih institucija. Iza odbojke nalazi se grupa od 5 sportskih aktivnosti (kros, košarka, plivanje, tenis i rukomet) u kojima se u pravilu natječe od 8 do 15 institucija. U okviru ove grupacije košarka je najstabilnija sportska aktivnost obzirom da u njoj svake akademske godine sudjeluje između 10–12 visokoškolskih institucija.

Prema svemu navedenom možemo zaključiti da je najveći prostor za poboljšanje masovnosti i kvalitete športskih natjecanja studentica u osiguravanju uvjeta za uključivanje studentica sa svih visokoškolskih institucija u sustav natjecanja kao i u dodatnom proširivanju ponude natjecateljskih disciplina. U tu svrhu bilo bi poželjno planirati daljnja istraživanja s ciljem utvrđivanja čimbenika o kojima ovisi uključivanje studentica svih institucija Zagrebačke zajednice sveučilišnih i veleučilišnih institucija u sustav studentskih športskih natjecanja.

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ANALYSIS OF SPORTS ACHIVEMENTS OF UNIVERSITY TEAMS OF FEMALE STUDENTS AT UNIVERSITY CHAMPIONSHIPS IN ZAGREB

ABSTRACT

In this paper are analyzed sports achievements of all university female students' teams who took part at the competitions in the frames of Zagreb University Championship during last four academic years, since 2006/2007 till 2009/2010. From total of 44 university institutions, listed at the Zagreb University Sports Association, female students from 32 institutions or 72,7% frequently or occasionally took part at student sports competitions. Also, from total of 22 sports disciplines in which the competitions were performed, female students frequently competed in 15 disciplines, and the most popular sports activity of university competition for female students is volleyball. According to be above mentioned it can be conclude that the biggest space for improvement of quality of female students sports competitions is in providing the adequate conditions and in additional offer enlargement of competition disciplines.

Key words: *student sport, sports achievements of female students*

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ELEMENTARY SCHOOL PUPILS' INVOLVEMENT IN SPORTS IN SERBIA

INTRODUCTION

Participating in a sport or any kind of physical exercise contributes to a great extent to a healthier physical and psychological development of children. Benefits of sport and physical exercising as factors of prevention of various negative influences in the period of maturing of the youth, such as delinquency and different kinds of addiction, are treated in a great number of studies (Pate et al., 2000). Sedentary way of life is becoming more and more spread among the youth, therefore there is a great tendency to advocate healthy and active life style for children and youth in the developed European and American countries. The continuous decrease of physical activity and exercising within the family and then in social community, as well as reduced possibilities for everyday physical exercising of children in schools are stated as some of the major reasons for insufficient physical activity of the youth (Hardman, 2003).

Developed countries worldwide dedicate more and more significance to the role of physical education and sport in promotion of healthy life style and healthy food. It is thought that one of the major factors in formation of positive relations of the youth towards physical exercises and sport is PE instruction, i.e. students' positive attitude and relations towards PE classes (Carlson, 1995; Ennis, 1996; Portman, 1995; Robinson, 1990). It is clear that students who express negative attitudes and feelings towards PE instruction, in majority cases do not get involved in physical activities out of school (Carlson, 1995; Ennis, 1996; Portman, 1995; Robinson, 1990). The greatest number of authors dealing with studies of physical activity of children (Strong et al., 2005, Pate et al., 2006) recommend a minimum of 30 up to an optimum of 60 minutes of any physical activity in the course of one day. Since the time predicted for the realization of PE class within the national curriculum, of 3x45 minutes per

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week does not satisfy the recommended optimal time for doing physical exercises, it is very important that PE teachers stimulate and direct pupils to go in for some sports activities or physical exercise in their free time.

Sports activities appear in the syllabuses of PE instruction in Serbia, as one form of extracurricular activity. Schools have opportunities to form school clubs to gather children interested in particular sports branches and events. School clubs should be managed by PE teachers. Previously, this way of organization of extracurricular activities (the so called „sections", clubs) functioned very well, therefore a large number of children was involved in various sports activities. However, after the political transition in Serbia, regardless of the attempts of new democratic Government to reform education in elementary school, the organization of sports activities within schools, as well as participation of PE teachers in them, was greatly reduced. As in other East European countries (Hamar et al., 2006), even in Serbia there are problems related to PE instruction because the majority of elementary schools in the Republic of Serbia lack material preconditions for its realization (Nikolić, 2001). Besides, even the schools that have the conditions for the organization of school sections and clubs, cannot organize them due to the problem of renting school facilities for PE instruction to private entities (Milanović, 2002). Additionally, there are problems regarding insufficient financing of PE teachers, so most of them are not motivated to get involved in additional activities with students. On the other hand, new Law on Sport is still not enacted in Serbia, so all the issues related to legal position and work of organizations in sports fields, as well as the problem of professional work in sport is still not legally regulated. Current legally unsolved position in sports field in Serbia is favourable for many private entities that start different sports schools and sports clubs which often employ inexperienced and insufficiently professionally-educated personnel to work with children. Great problems refer also to the professional qualification of the personnel who should work in sports clubs. Additionally, there is a general opinion among sports experts and professionals that a great number of children are included in some sports, although that is not substantiated by any official data because there are few researches that analyze children's engagement in extracurricular sports activities, as the way of organization of children's sports clubs.

This research was aimed at examining the involvement of senior grade pupils of elementary schools in sport, as well as at comparing the obtained data with the data from other countries.

RESEARCH METHODOLOGY

Sample

The sample of subjects consisted of 417 pupils: 188 girls and 229 boys (average age = 13.65 years; SD = 731). The subjects were 7th and 8th grade pupils of two elementary schools in Belgrade, one of them situated in the city centre and the other in the suburban area. Both schools have optimal conditions for the realization of PE classes.

Instrument

The questionnaire was used in the research to obtain information about gender and age of pupils, as well as the type of sports activities they participate in during their free time.

Statistical data processing

For the obtained data the basic descriptive parameters (mean values, frequencies) were calculated. The data were processed using the statistical program SPSS 10.0 for Windows.

RESULTS AND DISCUSSION

After the statistical data processing, the obtained results were analyzed. All the pupils have three 45-minute classes of PE weekly and 231 pupils (55%) additionally practice some sports in their free time. From the total number of girls, 54% are involved in some sports activity, while the percentage of boys involved in various sports activities (57%) is slightly higher. Some more recent studies in our country (Milanović, Radisavljević, 2007) indicate a slightly higher percentage of students who participate in a sports activity in their free time (58%), but the sample of subjects in that study included junior school pupils, who evidently join more additional sports activities than senior pupils, which was also confirmed in other researches (Pate et al., 2000).

According to those researches, a great number of children stops active involvement in some sport or some kind of physical exercising in puberty. From the aspect of elite sport and achievement of certain sports results, that also has no great significance, but if observed from the health-related aspect, it is very important that children and the youth are still motivated in order to continue their sports activities. This must be approached in an organized way, primarily through cooperation of parents and PE teachers, as well as with unavoidable support of the entire society.

Taking into account the percentage of all students who are involved in extracurricular sports activities, it can be noticed that in Serbia the percentage is lower than in some other countries (Pate et al., 2000, Klomsten et al., 2005). So for example, according to the data from Norway, where around 77% of state elementary school pupils are involved in some sports activity (Klomsten et al., 2005) in their free time, it can be concluded that the percentage of pupils involved in some sports activities in Serbia is considerably lower than in Norway. This fact indicates that there is a great number of children in our country, who are not involved in sports activity in an organized way in their free time. Reasons for this may be very different, but it can be supposed that transitional changes in Serbia are one of the leading reasons, because they prevented a great number of parents to support financially additional sports activities of their children, and school, as we have mentioned previously, had lost its function of the promoter and founder of sports clubs in local communities. In the developed countries, the organization of children's sports activities is mostly arranged through schools and PE teachers in collaboration with local sports clubs. This kind of cooperation also exists in the USA where the greatest number of children is involved in sports activities through school clubs or some clubs organized by schools and some local clubs, while much lower number of children (11%) are in clubs which are not in school organization (Pate et al, 2006). According to the obtained data from our research, a very small percentage of pupils (6%) is engaged in sports activities in school clubs or sections.

Pupils participate in great number of various sports in our country, but differences can be noticed in the interests of boys and girls, and there is no even distribution when it comes to selection of sports. Table 1 displays representations of sports in the entire sample. Team sports are the most frequent, first basketball (25.2%) and volleyball (21.2%), then football (12.9%). It is interesting that there is no great interest of students in handball, although it was a very popular sport in our country until recently. It can be presumed that the decrease of students' interest was caused by weaker results of our national handball teams at European and World competitions. Unlike similar researches abroad (Klomsten et al., 2005) our research shows that a very small percentage of students is involved in basic sports such as track and field athletics, swimming and gymnastics. Regardless of the fact that the involvement in this sport has a very positive influence on the regular growth and development of children, a very small number of children is engaged in these sports, mostly due to insufficient material investments in organization and promotion of these sports.

Table 1. *Distribution of sports according to gender*

Sport	Boys	Girls	Overall	%
Football	29	1	30	12.9
Water polo	11	0	11	4.7
Basketball	50	8	58	25.2
Dance	2	25	27	11.7
Volleyball	8	41	49	21.2
Tennis	3	7	10	4.3
Swimming	7	1	8	3.5
Handball	7	4	11	4.8
Martial Arts	10	9	19	8.2
Other sports	3	5	8	3.5
Overall	130	101	231	100

The results obtained in this research are similar to the results of some studies abroad according to some parameters (Klomsten et al., 2005), therefore it can be concluded that, for example, in our country as well as in other countries, girls mostly opt for various sports activities when compared to the boys, and that usually slightly lower percentage of girls is involved in sports activities than boys. Regardless of cultural differences in almost all countries all around the world it can be noticed that there are gender differences in the selection of sports, so in most cases boys opt more for sports such as boxing, martial arts, football, handball, ice hockey, while girls prefer participating in sports such as ballet, dance, ice skating and aerobic (Fasting, 2003, Klomsten et al., 2005). Girls opt more for those sports in which aesthetic component is stressed, while boys opt for those sports characterized by power, competing, challenge, velocity and team spirit (Koivula, 2001). In our sample of subjects, the most popular sports for girls are volleyball and dance, while the majority of boys involved in sport, opts for team sports with basketball and football in the first place. The interests of our students in particular sports greatly coincide with the interests of boys and girls in other countries, except that it must be noted that, when it comes to the selection of sports, good results achieved by our national teams play an important role in the children's opting for these sports. So for example, good results of the female volleyball national team attracted attention of great number of girls who, for this very reason, have chosen to train this sport.

CONCLUSION

Participating in a sport or any kind of physical exercise contributes to a great extent to a healthier physical and psychological development of children. The greatest number of authors dealing with studies of physical activity of children (Strong et al, 2005, Pate et al, 2005) recommend a minimum of 30 up to an optimum of 60 minutes of any physical activity in the course of one day. Since the time, predicted for the realization of PE class within the national curriculum, of 3 x 45 minutes per week does not satisfy the recommended optimal time for doing physical exercises, it is very important that PE teachers stimulate and direct pupils to go in for some sports activities or physical exercise in their free time. However, despite the attempts of new democratic Government to reform elementary school education, the organization of sports activities within schools, as well as participation of PE teachers in them was greatly reduced after the political transition in Serbia. Current legally unsolved position in sports field in Serbia is favourable for many private entities who open different sports schools and sports clubs which often employ inexperienced and insufficiently professionally-educated personnel to work with children. Additionally, there is a general opinion among sports experts and professionals that a great number of children participate in some sport, although that is not substantiated by any official data, because there are few researches that analyze children's engagement in extra sports activities, as well as data on the way of organizing sports clubs for children.

This research was aimed at examining the involvement of senior grade elementary school pupils in sport, as well as at comparing the obtained data with the data from other countries.

All the pupils had three classes of PE weekly and 231 pupils (55 %) additionally participate in some sports in their free time. From the total number of girls, 54 % are involved in some sports activity, and the most popular sports with girls are volleyball and dancing. A slightly higher percentage of boys (57%) compared with the girls, is involved in various sports activities. The greatest number of boys who go in for sports opt for team sports, primarily basketball and football. The results obtained in this research, according to some parameters are similar or alike the results of some researches from abroad (Klomsten et al., 2005), so even here, as in other countries, girls mostly opt for various sports activities when compared with boys, and usually there is a lower percentage of girls who are involved in sports activities than boys. According to some other parameters, such as the percentage of pupils who are involved in extracurricular sports activities, that percentage is lower in Serbia than in some other countries (Pate et al., 2000).

In order to achieve more positive results in the future, it is necessary to promote a healthy life style of the entire society, participation in sports and physical exercising. Only by common action of parents, PE teachers, schools and government institutions,

more visible improvements can be reached towards what is our mutual aim, but obligation as well, that is, to enable children and the youth to have appropriate growth, healthier physical and psychological development and good health thanks to various sports activities and physical exercising.

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ABSTRACT

Participating in a sport or being involved in any kind of physical exercise contributes to a great extent to a healthier physical and psychological development of children. However, organization of sports activities within schools, as well as participation of PE teachers in them was greatly reduced after the political transition in Serbia. Although the general opinion among sports experts and professionals is that a great number of children are included in some sports, there is insufficient new data in the researches indicating the percentage of pupils who are involved in extracurricular sports activities, and there is no data on the way sports clubs for children are organized.

This research was aimed at examining the involvement of senior grade pupils of elementary schools in sport, as well as at comparing the obtained data with the data from other countries. The research sample consisted of 417 pupils: 188 girls and 229 boys (average age = 13.65 years; SD = 731). The questionnaire was used in the research to obtain information about gender and age of pupils, as well as time and length of their sports engagement.

All the pupils had three classes of PE weekly and 231 pupils (55 %) are additionally included in some sports activity in their free time. From the total number of girls, 54 % are involved in some sports activity, and the most popular sports with girls are volleyball and dancing. A slightly higher percentage of boys (57%) compared with the girls, is involved in various sports activities. The greatest number of boys who go in for sports opt for team sports, primarily basketball and football. According to some other parameters, such as the percentage of pupils who are involved in extracurricular sports activities, that percentage is lower in Serbia than in some other countries (Pate et al., 2000).

Key words: *pupils, elementary school, involvement, sport*

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Original scientific paper

RELATIONSHIP BETWEEN RHYTHM AND LEARNING ALPINE SKIING TECHNIQUE

INTRODUCTION

Alpine skiing is quite unique motor activity in a way that skier uses different elements of ski technique during downhill sloping. Sometimes one is able to master the ski terrain by only traversing or straight gliding, but more often configuration of ski terrain dictates the need for use of different types of continuously associated ski turns. During this downhill sloping, skier continuously needs to adjust the rhythm of movement, as well as the direction and speed of motion. This is also affected by current snow conditions, inclination of slope and the level of alpine ski expertise. Hence, the primary aim of every ski beginner or recreational level skier is to be safe, i.e. to have control over speed while continuously coordinating alpine ski turns and to secure a stable balance on skies (Matković et al. 2004). Alpine ski technique includes different elements, among which basic elements such as snowplough, gliding straight, traversing and uphill turn have a special role. In fact, when one masters those basic elements, he or she will more readily enrich the current ski knowledge with elements important for dynamic association of ski turns in corridors of different width. This is especially true for the short turn, which enables movement in narrow corridors, by continuously connecting short, unfinished parallel turns close to slope line, and for which a skier has to have developed rhythm. More importantly, short turn is a type of element that can be used on almost any type of terrain, regardless of crowdedness or quality of snow. To be able not only to correctly perform all phases of one turn, but also successfully connect turns in a whole, among other, a skier has to have a good sense of rhythm, which enables a timely movement. Adjusted contractions and relaxations of different muscle groups are a chief criterion for continuous movement. Rhythmicity not only facilitates and organizes movements (Horvatin-Fučkar, 2002; Persichini and Capranica, 2004) but also contributes to timely performance of particular phases of ski turn (Matković et al., 2004). Effectiveness of alpine ski learning is a net result of instructor's expertise, on-terrain conditions and abilities of individual ski beginner.

Some motor abilities more than others contribute to successful learning. Current investigations have shown connection between balance and acquisition of alpine ski knowledge (Malliou et al., 2004; Ružić et al., 2008). Moreover, ability contributes significantly to success of alpine ski competitors (Bosco et al., 1997; Kostelić, 2005). In the same context the association was proved between explosive strength of legs and achievement in alpine ski competition for both young and senior level skiers (Bocco, 1997; Reid, et al., 1997; Lešnik and Žvan, 1998). On the other hand, literature data on correlation of rhythm with alpine ski learning is scarce. We hypothesized that ski beginners with more pronounced rhythmic coordination would be more successful during process of learning different elements of alpine ski technique, especially short turns.

METHODS

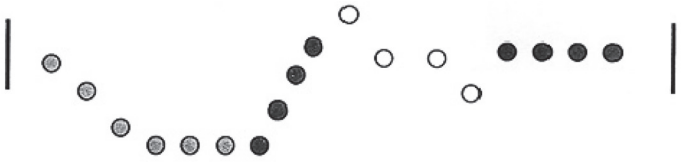
For the purpose of this investigation 108 alpine ski beginners (74 males and 34 females) were tested, all third year students of the Faculty of Kinesiology, University of Zagreb. Mean age of participants was 22.8±1.33 years. Investigation was conducted during academic year 2010/2011 and it included on-field testing in ski resort Sappada in Italy, as well as indoor rhythm testing. We used non-rhythmic drumming (MKRBUB), drumming with hands and feet (MKRBNR) and Oreb's rhythm test (MOREBR) in order to evaluate participants' sense of rhythm. All the mentioned tests were used in previous investigations which confirmed their good metric characteristics (Metikoš et al., 1989; Vlašić, 2006), allowing the conclusion that they all measured participants rhythmic coordination.

Non-rhythmic drumming (MKRBUB) is a test performed from a sitting position, and repeated three times. The examinee sits in the upright position with left hand to the left, and right to the right of the line and has to continuously perform as many uninterrupted movements in 20 seconds as possible. The task consists of the following: hit twice with the left palm to the left side of the panel and leave it there, then with the right palm crossover the left-hand and hit the panel twice, raise the right palm and once touch the forehead, put the right palm down on the right side of the table to the starting position. Test result is a number of correctly repeated tasks during the three 20-seconds repetitive cycles.

In the test *drumming with hands and feet (MKRBNR)* examinee stands in the upright position with face turned to the corner of the wall. While in this position he/she has to perform as many continuous uninterrupted movements in 20 seconds as possible: hit the left side of the wall with dorsal part of the left foot above the horizontal line, then hit the right side of the wall with the right palm, followed by hitting the left side of the wall twice by left palm and then with right foot right side

of the wall just above the horizontal line. The task is performed three times, and the final test result is the number of correctly performed and completed cycles during the 20 seconds.

Oreb's rhythm test (MOREBR) is performed on the hard, flat surface. Between the start and finish line removed 14.5 m from each other there are eighteen circular differently coloured marks 25 cm in diameter (Picture 1). The task consists of running through first eight marked fields, then step and jump on the fields number 9, 10, 11 and 12, after which one has to go through last six fields jumping with joint legs and finish the test by landing past the finish line. The test is repeated three times with a rest following each performance and measured in seconds. All test results are entered.



Picture 1. *Oreb's rhythm test (MOREBR)*

The acquired alpine ski knowledge was assessed after 10 days teaching period by grading four different elements of ski technique: snowplough turn, basic turn, parallel turn and short turn. Participants learned alpine skiing in small groups during four hours daily by previously strictly defined programme and controlled conditions according to altitude, ski terrains, equipment, number of participants per group, and expertise of ski instructors. Two independent judges graded the participants alpine ski knowledge of aforementioned four elements. Prior to grading process, the judges were informed in detail about the grading criteria, and their metric characteristics (objectivity and homogeneity) showed that they were autonomous in assessing alpine ski knowledge. Grades ranged from one to five and were expressed on Likert's scale (Mejovšek, 2003, prema Supek, 1981). Alpine ski knowledge was assessed at the same time and place for all participants.

RESULTS AND DISCUSSION

Table 1 gives basic descriptive statistics parameters for tests: evaluating rhythmic coordination and four elements of alpine ski technique

Table 1. *Descriptive statistics (Min-minimum, Max-maximum, Range, M-arithmetic mean, SD-standard deviation) for rhythmic coordination tests and elements of alpine ski technique*

Variable	Valid N	Min	Max	Range	M	SD
MKRBUB	94	14,00	25,00	11,00	18,73	2,558
MKRBNR	87	9,00	21,00	12,00	14,51	2,865
MOREBR	102	5,42	8,92	3,50	6,57	0,633
Snowplough turn	108	2,00	5,00	3,00	3,53	0,642
Basic turn	108	2,00	5,00	3,00	3,15	0,664
Parallel turn	108	1,00	5,00	4,00	2,98	0,904
Short turn	108	1,00	5,00	4,00	2,75	0,790

MKRBUB-non-rhythmic drumming; MKRBNR-drumming with hands and feet; MOREBR-Oreb's rhythm test

Table 2. shows correlation coefficients between results on three rhythmic coordination tests and grades obtained for demonstration of four ski technique elements

Table 2. *Correlation coefficients between rhythmic coordination and alpine ski knowledge*

	MKRBUB	MKRBNR	OREBMR	Snow-plough turn	Basic turn	Parallel turn	Short turn	Mean KS
MKRBUB	1,00	**0,43***	**-0,31***	**0,27***	0,20	**0,25***	**0,29***	**0,31***
MKRBNR		1,00	0,02	0,07	-0,00	0,04	0,04	0,04
OREBMR			1,00	-0,09	**-0,26***	-0,20	-0,15	-0,22
Snowplough turn				1,00	**0,49***	**0,48***	**0,30***	**0,66***
Basic turn					1,00	**0,77***	**0,58***	**0,87***
Parallel turn						1,00	**0,64***	**0,91***
Short turn							1,00	**0,80***
Mean KS								1,00

* p<0.05,
MKRBUB-non-rhythmic drumming; MKRBNR-drumming with hands and feet; MOREBR-Oreb's rhythm test;
Mean KS-arithmetic mean of alpine ski knowledge

We observed significant correlation between non-rhythmic drumming and acquired knowledge of snowplough ($r=0.27$; $p<0.05$), parallel ($r=0.25$; $p<0.05$) and short turn ($r=0.29$; $p<0.05$). Positive correlation also existed between mentioned test for rhythmic coordination and mean grade of chosen ski elements ($r=0.31$; $p<0.05$). Pearson correlation coefficient also points to the significant correlation between Oreb's rhythm test and success on basic turn ($r=-0.26$; $p<0.05$). Although not very strong, obtained correlations are statistically significant. Results confirm the importance of rhythmic coordination for short turn performance. As expected, growing importance of this ability is noticed during more complex elements of alpine ski technique, which are based on implementation of ski elements in continuous cycles. The true impact of the mentioned is found in everyday practice, where different methodological exercises based on acoustic rhythmic stimuli are used in teaching elements of ski technique (Pišot and Vidamšek, 2004). The exercises are constructed in such a way that instructor suggests correct rhythm in which a ski beginner has to burden or disburden skies by verbal signals „hop-hop" or „up-down". Obtained results for this study were interesting from the aspect of positive correlation between non-rhythmic drumming (performed only by hands) and parallel and short turns, while one would perhaps expect correlation between tests requiring engagement of the whole body, such as drumming with hands and feet, because performance of parallel and short turn requires coordination of the whole body movements. Our results primarily suggest importance of coordinated hand movements during ski rod use for the proper performance of particular elements of alpine ski technique. Current investigations in the field of recreational alpine skiing are primarily oriented towards injury prevention (Hunter, 1999; Koehle et al., 2002; Horterer, 2005; Steinar et al., 2007), while the process of alpine ski knowledge transmission is not so well covered. So, investigations aiming to determine correlation and contribution of different abilities for the success of alpine ski learning are scarce. The sense of rhythm and rhythmic coordination were much more investigated in physical activities such as dance, rhythmic gymnastics or synchronized swimming, which are performed with musical background (Horvatin-Fučkar, 2002; Kostić, 1996; Pollatou et al. 2005). However, investigations such as this one suggest importance of rhythm even in physical activities not requiring musical background, especially during learning phases. Although the presented results do not establish cause-effectiveness but rather correlation, one can assume connection between the tests of rhythmic coordination and acquisition of alpine ski knowledge. This is especially important for dynamic and coordinated use of acquired knowledge, so we speculate that rhythmic coordination has an important place during continuous connecting of all types of ski movements and therefore needs to be imported in the learning phases of alpine skiing. In order to be more successful in teaching alpine ski techniques, ski instructors should implement broader spectrum of upper-body coordination exercises with marked rhythmicity.

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ABSTRACT

Although many ski instructors logically assume continuous integration of individual ski turns during skiing to be conditioned by a rhythmical movement, there is not much published research investigating the influence of rhythm on ski knowledge acquisition. In order to assess the influence of rhythm and success of alpine ski learning we included 108 ski naive participants (74 male, 34 female; age 22.8±1.33) and tested them on three different indoor tests: non-rhythmic drumming, drumming with hands and feet and Oreb's rhythm test. Acquired alpine ski knowledge was assessed through grades obtained for demonstration of four elements of alpine ski technique: snowplough turn, basic turn, parallel turn and short turn. Statistically significant correlation was detected between results on non-rhythmic drumming and degree of acquired knowledge on elements snowplough turn, parallel turn and short turn ($r=0.27$, $r=0.25$, $r=0.29$; $p<0.05$ respectively), as well as with mean grade obtained for the mentioned elements ($r=0.31$; $p<0.05$). Moreover, statistically significant correlation was observed between success on Oreb's test and knowledge of basic turn ($r=-0.26$; $p<0.05$). According to results, rhythmic coordination plays an important role in successful alpine ski learning. As expected, the importance of this ability grows during more demanding learning phases, which require enforcement of alpine ski in alternating cycles. In order to be more successful in teaching alpine ski beginners how to ski, it is desirable to use rhythmical coordination exercises.

Key words: *rhythm, coordination, learning process, ski beginners*

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Izvorni znanstveni rad

UTJECAJ ODREĐENIH ANTROPOMETRIJSKIH VARIJABLI NA REZULTAT U BACANJU KUGLE KOD UČENIKA NA UZRASTU OD 13 DO 14 GODINA

UVOD

Analiza prirode pojava u sportu ukazuje na njihovu višekratnu i raznovidnu međusobnu povezanost, a proučavanje međusobnih veza pridonosi otkrivanju suštine i zakonitosti njihovih relacija. Saznanja o tome koje antropometrijske karakteristike utječu na uspjeh u nekoj sportskoj disciplini od posebnog su značenja i kontinuirano su aktualna u procesu pravilne selekcije mladih atletičara jer samo pravovremena i kvalitetna selekcija donosi vrhunske rezultate. Imajući ovakve potrebe u vidu koncipiran je i cilj ovog istraživanja, a on je usmjeren k utvrđivanju utjecaja primijenjenih antropometrijskih mjera na rezultat u atletskoj disciplini bacanje kugle.

METODE

Istraživanje je realizirano na uzorku od 164 učenika muškog spola starosti 13-14 godina koji su redovno posjećivali nastavu tjelesnog i zdravstvenog obrazovanja. Za procjenu antropometrijskih karakteristika učenika upotrijebljene su 32 antropometrijske varijable koje su pokrivale cijeli hipotetski model antropometrijskog prostora i to: za procjenu longitudinalne dimenzionalnosti skeleta: visina tijela (ATV), sedalna visina (ASV), dužina ruke (ADR), dužina noge (ADN), dužina stopala (ADS) i dužina šake (ADŠ); za procjenu transverzalne dimenzionalnosti skeleta: širina šake (AŠŠ), širina stopala (AŠS), biakromialna širina (ABŠ), širina karlice (AŠK), dijametar ručnog zgloba (ADRZ), dijametar lakta (ADL), dijametar koljena (ADK) i dijametar skočnog zgloba (ADSZ); za procjenu mase i voluminoznosti tijela: obim podlaktice opušteno (AOPL), obim nadlaktice opušteno (AONL), obim podlaktice mišićna kontrakcija (AOPLMK), obim nadlaktice mišićna kontrakcija (AONLMK), obim potkoljenice (AOPK), obim natkoljenice (AONK), obim ramena (AOR), obim struka (AOS), obim glutealno (AOG) i tjelesna masa (ATT); za procjenu potkožnog masnog tkiva: kožni nabor nadlaktice na bicepsu (AKNNLB), kožni nabor nadlaktice na tricepsu (AKNNLT), kožni nabor podlaktice (AKNPL), kožni nabor natkoljenice (AKNNK), kožni nabor potkoljenice (AKNPK), kožni nabor trbuha (AKNM), kožni nabor leđa (AKNG) i kožni nabor koljenove jame (AKNKJ). Sve navedene

antropometrijske mjere izmjerene su tri puta prema standardnoj antropometrijskoj tehnici. Tehnika mjerenja provedena je po standardima Internacionalnog biološkog programa. Za cjelovitu realizaciju cilja i zadataka našeg istraživanja za sve primijenjene varijable izračunati su osnovni deskriptivni statistički parametri. Normalitet distribucije utvrđen je Kolmogorov-Smirnovljev testom (K-S test). Regresijskom analizom utvrđeni su utjecaji odabranih antropometrijskih karakteristika, na rezultat u atletskoj disciplini bacanje kugle (racionalna tehnika).

REZULTATI

U tablici 1 prikazani su rezultati regresijske analize sistema antropometrijske mjere na atletskoj disciplini bacanje kugle. Dobivene su informacije za značajnosti multiple korelacije povezanosti između sistema prediktorske varijable i kriterija. Na osnovi koeficijenta determinacije (R Square koji iznosi 0,62) može se primijetiti da je prediktorski sistem varijable objašnjen sa 62% zajedničkog varijabiliteta s kriterijem, a preostali je dio od 38% pod utjecajem nekih drugih faktora koji nisu bili obuhvaćeni ovim istraživanjem. S obzirom da je dobivena vrijednost koeficijenta višestruke determinacije statistički značajna može se zaključiti da postoji statistički značajan utjecaj prediktora na kriterij.

Iz analize parcijalnih vrijednosti koeficijenata regresije može se primijetiti da pojedinačan značajan utjecaj prediktorske antropometrijske varijable na kriterijsku varijablu bacanje kugle (MFK) imaju varijable: visina tijela (ATV) i dužina ruke (ADR) - mjere za procjenu longitudinalne dimenzionalnosti skeleta, širina stopala (AŠS) - mjera za procjenu transverzalne dimenzionalnosti skeleta, obim potkoljenice (AOPK), obim natkoljenice (AONK), obim ramena (AOR) i tjelesna masa (ATT) - mjere za procjenu volumena tijela i tjelesne mase, kao i varijabla kožni nabor podlaktice (AKNPL) - mjera za procjenu potkožnog masnog tkiva. Ostale varijable nisu pokazale statistički značajan utjecaj na kriterijsku varijablu. Značajna i laka predikcija koeficijenta regresija kod varijable visina tijela (ATV) ukazuje na inverzno slaganje s kriterijem: s rastom jedne opada vrijednost druge promenjive. Uspješnost izvedbe elemenata atletske discipline bit će otežana kod onih ispitanika koji imaju veću tjelesnu visinu jer noge i trup trebaju preći veći put izvedbe. Kod ispitanika koji ne raspolažu potrebnim motoričkim sposobnostima, a i ne posjeduju zadovoljavajuću tehniku vjerojatno će postići slabije rezultate. Povećane vrijednosti longitudinalnih mjera imaju pozitivan utjecaj u uvjetima kada ispitanici raspolažu razvijenim motoričkim sposobnostima i imaju zadovoljavajući nivo usvojene tehnike. Početna brzina izbacivanja kugle zavisi od dužine ruke (ADR) jer su brzina i ubrzanje kinematički odnosno prostorno i vremenski izvedene veličine u kojima su dužina ili prijeđeni put i vrijeme osnova za njihovo definiranje.

Tablica 1. *Regresivna analiza antropometrijskih varijabli na rezultat bacanje kugle (MFĐ) kod učenika*

R.b.	Varijable	r	Part-r	BETA	t	Q
1	ATV	-0.18	-0.11	-0.32	-2.07	0.04
2	ASV	-0.08	-0.05	-0.08	-0.88	0.38
3	ADR	0.31	0.20	0.39	3.77	0.00
4	ADN	-0.02	-0.01	-0.02	-0.23	0.82
5	ADS	0.02	0.01	0.02	0.24	0.81
6	ADŠ	0.11	0.07	0.15	1.27	0.21
7	AŠŠ	-0.16	-0.10	-0.18	-1.88	0.06
8	AŠS	0.18	0.11	0.19	2.11	0.04
9	ABŠ	-0.04	-0.02	-0.04	-0.40	0.69
10	AŠK	0.09	0.05	0.08	1.00	0.32
11	ADRZ	-0.01	-0.01	-0.01	-0.16	0.87
12	ADL	0.02	0.01	0.02	0.23	0.82
13	ADK	-0.06	-0.03	-0.04	-0.64	0.52
14	ADSZ	0.07	0.04	0.06	0.84	0.40
15	AOPL	0.15	0.09	0.21	1.69	0.09
16	AONL	-0.02	-0.01	-0.03	-0.18	0.86
17	AOPLMK	-0.06	-0.04	-0.09	-0.71	0.48
18	AONLMK	-0.02	-0.01	-0.04	-0.27	0.79
19	AOPK	-0.26	-0.16	-0.25	-3.03	0.00
20	AONK	0.19	0.12	0.21	2.21	0.03
21	AOR	0.17	0.10	0.31	1.92	0.05
22	AOS	-0.04	-0.02	-0.07	-0.46	0.65
23	AOG	-0.12	-0.07	-0.22	-1.39	0.17
24	ATT	0.18	0.11	0.54	2.08	0.04
25	AKNNLB	-0.10	-0.06	-0.13	-1.19	0.23
26	AKNNLT	-0.15	-0.09	-0.25	-1.76	0.08
27	AKNPL	-0.18	-0.11	-0.27	-2.08	0.04
28	AKNNK	0.09	0.05	0.10	0.99	0.33
29	AKNPK	0.08	0.05	0.09	0.95	0.34
30	AKNM	-0.07	-0.05	-0.11	-0.85	0.40
31	AKNG	0.08	0.05	0.12	0.87	0.38
32	AKNKJ	0.00	0.00	0.00	0.02	0.98
		R	R Square		F	Q
		0.79	0.62		6.77	0.00

Učenici s većim vrijednostima širine stopala (AŠS) imaju veću potpornu površinu što omogućuje i veću stabilnost učenika i doprinosi većem odskočnom implusu prilikom izvođenja tehnike bacanje kugle. Veće vrijednosti antropometrijskih varijabli: obim natkoljenice (AONK), obim ramena (AOR) i tjelesne mase (ATT) omogućuju veću manifestaciju snage koja direktno utječe na uspješnost rezultata u atletskoj disciplini bacanje kugli gdje se masa tijela koristi kao oslonac za manifestaciju eksplozivne snage pri izbačaju kugle. Prethodno navedene mjere pokazuju da maksimalna manifestacija snage u velikoj mjeri zavisi od mase učenika. Varijabla obim potkoljenice (AOPK) s negativnim je predznakom i pokazuje inverzno povezivanje. Povećana vrijednost kožnih nabora u organizmu i oko mišića koji obavljaju određena kretanja kod tehničkoj izvedbi elemenata bacanje kugle otežavaju rad mišića. Potkožno masno tkivo, kao balastna masa, smanjuje relativnu snagu i negativno utječe na rezultate u atletskim disciplinama.

ZAKLJUČAK

Polazeći od prikazanih rezultata i njihove osnovne interpretacije, može se zaključiti da mjere za procjenu longitudinalne dimenzionalnosti skeleta, transverzalne i volumen tijela i tjelesne mase determiniraju visoke rezultate u bacanju kugle dok povećane vrijednosti potkožnog masnog tkiva negativno utječu na rezultat.

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THE INFLUENCE OF CERTAIN ANTHROPOMETRIC VARIABLES ON THE RESULT IN THE SHOT PUT AMONG STUDENTS OF 13-14 YEARS OF AGE

ABSTRACT

The awareness of which anthropometric characteristics have an impact on the success in a certain athletic discipline is particularly important, and continuously current in the process of the proper selection of young athletes. In order to determine the relations between the applied anthropometric measurements and the result in the athletic discipline shot put, a research was made on a sample of 164 examinees (male) at the age of 13 and 14. In order to estimate the anthropometric space, 34 anthropometric measurements were applied. For all the results obtained from the tests, basic statistical parameters were calculated. The normality of the distribution of the results was checked with the use of Kolmogorov-Smirnov procedure. In order to determine the influence of the anthropometric measurements as predicators in a manifested space on the success in the athletic discipline shot put, a regressive analysis was set as a criterion. The research results showed that the impact of the system of anthropometric measurements on the criterion is statistically important.

Key words: *anthropometrical measurements, shot put, manifested variables, regression analysis*

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Izvorni znanstveni rad

STRUKTURA ANTROPOMETRIJSKIH MJERA KOD UČENIKA NA UZRASTU OD 13 DO 14 GODINA

UVOD

Poznavanje antropometrijskih karakteristika pojedinih dobnih i spolnih skupina učenika preduvjet je kvalitetnog planiranja i programiranje rada u kineziološkoj edukaciji i sportu. Varijabilnost antropometrijskog statusa posebno je izražena tijekom adolescentnog razdoblja što diktira posebnosti u planiranju i provođenju nastave i ocjenjivanja. Zbog toga praćenje antropometrijskih mjera kod učenika ima veliko značenje u pravilnom postavljanju cilja i kontrole učinka kineziološkiх programa. Cilj ovog istraživanja je odrediti strukturu antropometrijskih karakteristika učenika starih 13-14 godina.

METODE

Istraživanje je provedeno na uzorku od 164 učenika uzrasta 13-14 godina. Za procjenu antropometrijskih karakteristika učenika upotrijebljene su 32 antropometrijske varijable koje su pokrivale cijeli hipotetski model antropometrijskog prostora i to: za procjenu longitudinalne dimenzionalnosti skeleta: visina tijela (ATV), sedalna visina (ASV), dužina ruke (ADR), dužina noge (ADN), dužina stopala (ADS) i dužina šake (ADŠ); za procjenu transverzalne dimenzionalnosti skeleta: širina šake (AŠŠ), širina stopala (AŠS), biakromialna širina (ABŠ), širina karlice (AŠK), dijametar ručnog zgloba (ADRZ), dijametar lakta (ADL), dijametar koljena (ADK), dijametar skočnog zgloba (ADSZ); za procjenu mase i voluminoznosti tijela: obim podlaktice opušteno (AOPL), obim nadlaktice opušteno (AONL), obim flektirane podlaktice (AOPLMK), obim flektirane nadlaktice (AONLMK), obim potkoljenice (AOPK), obim natkoljenice (AONK), obim ramena (AOR), obim struka (AOS), obim glutealno (AOG) i tjelesna masa (ATT); za procjenu potkožnog masnog tkiva: kožni nabor nadlaktice na bicepsu (AKNNLB), kožni nabor nadlaktice na tricepsu (AKNNLT), kožni nabor podlaktice (AKNPL), kožni nabor natkoljenice (AKNNK), kožni nabor potkoljenice (AKNPK), kožni nabor trbuha (AKNM), kožni nabor leđa (AKNG) i kožni nabor koljenove jame (AKNKJ).

Sve navedene antropometrijske mjere izmerene su tri puta, prema standardnoj antropometrijskoj tehnici. Tehnika mjerenja provedena je po standardima Internacionalnog biološkog programa. Za realizaciju cilja i zadataka našeg istraživanja izračunati su osnovni deskriptivni parametri, a utvrđivanje latentne strukture primijenjenih manifestnih varijabli Hotellingovom metodom glavnih komponenata faktorske analize s primjenom Varimax i Direct oblimin rotacije.

REZULTATI

U svrhu utvrđivanja prikladnosti podataka za provođenje faktorske analize dobiveni podaci obrađani su centralnim i disperzionim parametrima, mjere distribucije i Kaiser Meyer Olkinovom mjerom. Kako bi se definirala latentna struktura morfološkog prostora kod ispitanika, provedena je faktorska analiza po metodu glavnih komponenti. Izračunavanjem karakterističnih korjena i procenta objašnjive varijance izoliranih antropometrijskih faktora izolirane su tri značajne glavne komponente koje su objasnile 68.60% zajedničkog varijabiliteta istraživanog sistema antropomjetrijskih mjera, a transformacijom glavnih komponenata u varimaks i direkt oblimin poziciji dobivena je jednostavnija, a samim tim i jasnija struktura izoliranih latentnih dimenzija. U tabeli 1 i 2 prikazani su finalni rezultati obje faktorske solucije. Prema varimaks rotaciji (Tabela 1) značajne projekcije k prvoj antropometrijskoj latentnoj dimenziji zadržale su varijable za procjenu potkožnog masnog tkiva i dio varijabli za procjenu volumena tijela i tjelesne mase s relativno visokim i pozitivnim vrijednostima, definirana sljedećim mjerama: kožni nabor nadlaktice na tricepsu (AKNNLT), kožni nabor trbuha (AKNM), kožni nabor leđa (AKNG), kožni nabor podlaktice (AKNPL), kožni nabor nadlaktice na bicepsu (AKNNLB), kožni nabor natkoljenice (AKNNK), kožni nabor koljenove jame (AKNKJ), obim struka (AOS), obim glutealno (AOG), obim nadlaktice opušteno (AONL), kožni nabor potkoljenice (AKNPK), tjelesna masa (ATT), obim kontrahirane nadlaktice (AONLMK), obim ramena (AOR), obim natkoljenice (AONK) i obim potkoljenice (AOPK). Imajući predvid visinu i broj značajnih proekcija prethodnih mjera, prvi izdvojeni antropometrijski latentni faktor mogli bi da ga imenujemo kao faktor potkožnog masnog tkiva s volumenom tijela i tjelesne mase. Opisani faktor odgovoran je za rast mekih tkiva. Spajanje mjera volumena i mase tijela s mjerama potkožnog masnog tkiva potvrđuje postojanje nediferencirane morfološke strukture kod djece u razdoblju intenzivnog rasta i razvoja. Visoke projekcije longitudinalnih mjera: visina tijela (ATV), dužina ruke (ADR), dužina noge (ADN), dužina šake (ADŠ), dužina stopala (ADS), sedalna visina (ASV), biakromialna širina (ABŠ), kao i transverzalnih mjera: širina šake (AŠŠ), širina karlice (AŠK), širina stopala (AŠS), omogućuje da se druga izolirana latentna antropometrijska dimenzija imenuje kao faktor skeletne dimenzionalnosti. Značajne projekcije na treću latentnu

antropometrijsku dimenziju imaju četiri dijametra: ručnog zgloba (ADRZ), koljena (ADK), lakta (ADL) i skočnog zgloba (ADSZ), kao i dva obima: flektirana podlaktica (AOPLMK) i relaksirane podlaktice (AOPL), što omogućuje da ovu latentnu dimenziju imenujemo kao faktor transverzalne dimenzionalnosti.

Pored ortogonalne rotacije u ovom istraživanju primijenjena je i transformacija koja daje kose faktorske solucije - direkt oblimin kriterijum (Tabela 2). S ovom faktorskom solucijom dobiveni su skoro identični rezultati s određenim malim razlikama koje se odnose na visinu projekcije antropometrijske mjere na soodvetnoj latentnoj dimenziji.

Tablica 1. *Faktorska analiza antropometrijskih mjera Analiza glavnih komponenti - varimaks rotacija*

Varijabli	Rotated Component Matrix Component		
	1	2	3
ATV	0.01	0.90	0.21
ASV	0.08	0.68	0.26
ADR	-0.05	0.86	0.07
ADN	0.05	0.84	0.09
ADS	0.06	0.78	0.26
ADŠ	-0.02	0.81	0.29
AŠŠ	-0.05	0.62	0.53
AŠS	0.20	0.50	0.50
ABŠ	0.20	0.62	0.47
AŠK	0.46	0.50	0.08
ADRZ	-0.07	0.44	0.71
ADL	0.19	0.27	0.65
ADK	0.13	0.04	0.66
ADSZ	-0.09	0.18	0.59
AOPL	0.50	0.36	0.63
AONL	0.72	0.25	0.47
AOPLMK	0.47	0.29	0.67
AONLMK	0.65	0.29	0.53
AOPK	0.57	0.24	0.21
AONK	0.64	0.32	0.26
AOR	0.64	0.43	0.45
AOS	0.79	0.30	0.32

AOG	0.75	0.45	0.31
ATT	0.67	0.56	0.40
AKNNLB	0.83	-0.15	-0.05
AKNNLT	0.91	-0.10	0.00
AKNPL	0.89	-0.12	-0.01
AKNNK	0.82	-0.06	-0.06
AKNPK	0.69	0.05	0.14
AKNM	0.89	-0.02	0.05
AKNG	0.89	-0.05	0.03
AKNKJ	0.79	0.06	0.07
Rotation Method: Varimax with Kaiser Normalization.			

Tablica 2. *Faktorska analiza antropometrijskih mjera Analiza glavnih komponenti - direkt oblimin rotacija*

Varijabli	Pattern Matrix(a)			Structure Matrix		
	Component			Component		
	1	2	3	1	2	3
ATV	-0.06	0.93	-0.01	0.10	0.93	-0.47
ASV	0.02	0.66	-0.11	0.16	0.72	-0.45
ADR	-0.10	0.93	0.13	0.02	0.85	-0.32
ADN	0.00	0.90	0.12	0.13	0.84	-0.34
ADS	-0.01	0.78	-0.09	0.14	0.82	-0.48
ADŠ	-0.10	0.80	-0.12	0.07	0.85	-0.51
AŠŠ	-0.15	0.51	-0.45	0.06	0.72	-0.68
AŠS	0.12	0.38	-0.42	0.29	0.62	-0.65
ABŠ	0.12	0.52	-0.36	0.30	0.73	-0.65
AŠK	0.43	0.51	0.09	0.50	0.54	-0.28
ADRZ	-0.18	0.25	-0.71	0.05	0.58	-0.79
ADL	0.10	0.08	-0.65	0.29	0.43	-0.72
ADK	0.06	-0.18	-0.73	0.21	0.20	-0.65
ADSZ	-0.17	0.01	-0.64	-0.01	0.31	-0.60
AOPL	0.42	0.17	-0.57	0.59	0.53	-0.76
AONL	0.67	0.09	-0.39	0.79	0.40	-0.61
AOPLMK	0.39	0.07	-0.64	0.56	0.46	-0.78
AONLMK	0.59	0.12	-0.45	0.72	0.45	-0.67

AOPK	0.55	0.17	-0.11	0.61	0.32	-0.34
AONK	0.62	0.24	-0.14	0.69	0.42	-0.42
AOR	0.58	0.30	-0.33	0.72	0.57	-0.64
AOS	0.76	0.19	-0.19	0.84	0.42	-0.49
AOG	0.71	0.37	-0.15	0.81	0.57	-0.52
ATT	0.62	0.46	-0.23	0.76	0.69	-0.63
AKNNLB	0.87	-0.19	0.12	0.80	-0.10	-0.01
AKNNLT	0.94	-0.15	0.08	0.90	-0.02	-0.09
AKNPL	0.92	-0.17	0.08	0.87	-0.06	-0.07
AKNNK	0.85	-0.08	0.15	0.80	-0.01	-0.03
AKNPK	0.69	-0.02	-0.06	0.71	0.13	-0.23
AKNM	0.91	-0.08	0.04	0.89	0.06	-0.16
AKNG	0.92	-0.10	0.06	0.88	0.03	-0.12
AKNKJ	0.80	0.01	0.03	0.80	0.13	-0.19
Rotation Method: Oblimin with Kaiser Normalization.						

ZAKLJUČAK

Analiza strukture antropometrijskih mjera u ovom istraživanju ukazala je na postojanje tri latentne dimenzije definirane kao: faktor potkožnog masnog tkiva s volumenom tijela i tjelesne mase, faktor skeletne dimenzionalnosti i faktor transverzalne dimenzionalnosti skeleta. Dobijeni rezultati se ne podudaraju s hipotetskim modelom koji je pretpostavio izdvajanje četiri latentne antropometrijske dimenzije. Činjenica zbog koje se nisu izdiferencirali posebice faktor volumena i mase tijela i faktor potkožnog masnog tkiva predpostavljamo da je zbog nedovoljne diferencijacije mišićnog od masnog tkiva odnosno ispitanici su u fazi intenzivnog rasta i razvoja pa je nemoguće govoriti o definitivno formiranoj i diferenciranoj morfološkoj strukturi.

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THE STRUCTURE OF ANTHROPOMETRIC MEASURES OF MALE STUDENTS AGED 13-14

ABSTRACT

On a sample of 164 male students grade 7-8, aged 13-14 (+ – 6 months) and 32 anthropometric variables, a survey was conducted in order to determine the latent structure of the anthropometric measures of our examinees. In the statistic data processing basic descriptive parameters were applied. In order to determine the latent structure, the varimax and direct oblimin rotation were applied. Three anthropometric dimensions identified as a factor of subcutaneous fat tissue with a body volume and weight, a factor of skeleton dimension and a factor of transversal skeleton dimension were isolated.

Key words: *anthropometric measures, latent, dimensions, structure, male students*

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Abstract

THE BASICS OF THE EDUCATIONAL SYSTEM IN FINLAND

ABSTRACT

The basics of educational system in Finland are the underlying values of basic human rights, equality, democracy, biodiversity and environmental conservation as well as the viability of multiculturalism and its approval. Education promotes community spirit, responsibil-ity and individual rights and freedoms. Teaching is based on the Finnish culture that has evolved interacting original

Nordic and European culture. The education takes into account diversification of Fin-nish culture affected by the different cultures of immigrants. Teaching should support pupil's own cultural identity, its construction as well as his/her involvement in the Finnish society and the glob-alized world. It is also used to promote tolerance and intercultural understanding. Basic educa-tion should increase regional and individual equality. Teaching should take into account different kinds of learners, promote gender equality by providing girls and boys with the capacity to act with equal rights and obligations in the society and reconciling work and family life.

Education is part of the basic security training. It is both an educational and a teach-ing task. Its role is to provide individuals with the opportunity to acquire general knowledge and to perform. Education enables the society to develop cultural capital and to increase the sense of community and equality. Education gives the opportunity for diversified growth, learning and the development of healthy self-esteem, so that students can acquire necessary knowledge and skills to gain the skills for further learning and to develop as active citizens of the democratic society. Basic education is also supported by each student's linguistic and cultural identity and native lan-guage development. The aim is to arouse the desire for lifelong learning. Society, in order to ensure continuity and to build a basic task for the future, needs to move the cultural heritage from genera-tion to generation, to accumulate the necessary knowledge, skills and raise awareness of the society, the underlying values and practice. It will also develop the ability to critically evaluate issues, to create a new culture and renew its thinking and practice.

The core curriculum is based on the concept of learning where learning is the result of the student's active and goal-oriented activity in which he/she interacts with other students, teachers, and with the environment, and on the basis of their previous knowledge of structures and processes interprets the received information.

Teaching should take into account that, although the general principles of learning are all the same, what is learned depends on the individual's prior knowledge and strategies he/she uses.

Learning is linked to the action, situation and culture in which it occurs.

Information or skill learned in one situation does not automatically transfer to be used in different situations. Students have an active knowledge construction process, highlighting only the theories of learning, the school is to create such learning environments where students can set their own goals, and learn to work independently and collaboratively in different groups and networks.

They should be given opportunities to try and find their own learning style, suitable for the work they will do. They should be aware of their control, evaluate and, where appropriate, correct the way they work. Education must also take into account that students' ability to study in-dependently varies and that they need a teacher studies instructor. Due to students' individuality, there should be a diversity of teaching and learning approaches. Students will be provided with tools for data acquisition, production of knowledge and reliability evaluation. Skills sector is characterized by knowledge and skill acquisition and productivity. Students are guided to use Informa-tion and communication technologies and services offered by libraries. Learning situations should be designed so that students can apply what they have learned outside the learning situations. Some of the studies can be arranged via distance learning, independent learning and foreign language.

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Izvorni znanstveni rad

POSTIGNUĆE U SPORTU I BAVLJENJE SPORTOVIMA ZAGREBAČKIH MATURANATA I MATURANTICA

UVOD

Sustav školstva i sustav sporta faktori su koji istodobno sinergijski i komplementarno djeluju na stvaranje navika redovite tjelovježbe i bavljenja sportskim aktivnostima. Njihova je koegzistencija i djelovanje u Zagrebu i Hrvatskoj prisutna već više od stotinu godina (Janković 1954; Gredelj, Hošek, Momirović, Petrović i D. Tarbuk 1973; Hofman i Jajčević 1994; ; Bosnar i Prot 1999; Prot, i Bosnar 1999, 1999; Šafarić, Bosnar i Prot 1999). U zagrebačkom miljeu prisutna je infrastruktura sporta koju čine objekti i sportske organizacije koje na njima djeluju. Sportski sadržaji i sportska postignuća tematski su redovito pristuna u medijima. Kroz djetinjstovo i mladalaštvo moguće se uključti i dujelovati u preko šezdesetak sportova ili tjelovježbenih aktivnosti. Sustav školstva i sustav sporta promiču redovitu tjelovažbu i sport kao sastavnice pozitivnih i poželjnih stilova života. Stoga će se u ovom radu na razini manifestacija analizirati bavljenje sportom zagrebačkih srednjoškolaca polaznika završnih, maturalnih, razreda.

METODE

Reprezentativnom uzroku efektiva 6433 zagrebačkih maturanata (3327) i maturantica (3106) sudjelovalo je u šire koncipiranom istraživanju koje se odnosilo na sudjelovanje u sportu i sportskim interesima. Podaci su prikupljani nekoliko puta tokom jednog olimpijskog ciklusa. Uzorak je balansiran s obzirom na tip škole, maturanti: gimnazija, četvorogodišnjih i trogodišnjih srednjih škola sa završnim zanimanjem. Pri odabiru ispitanika vodilo se računa da budu zastupljene i škole s „tipičnim muškim" i škole s „tipičnim ženskim" zanimanjima.

Između ostalog zabilježen je sport kojim su se dominantno bavili ili se sada bave za 2530 ispitanika i 1901 ispitanica te je zabilježena i razina dotadašnjeg uspjeha, odnosno postignuća u sportu, za 3307 ispitanika i 3083 ispitanica.

Razinu dotadašnjeg uspjeh (postignuća) u sportu maturanti i maturantice ocijenili su na šestostupanjskoj skali: (1) Nisam se bavio sportom; (2) Bavio sam se povremeno; (3) Školski sport; (4) Razina općine ili regije; (5) Državna razina; i (6) Međunarodni rang).

Od svih ispitanih 2530 maturanta i 1901 maturantica navelo je sport kojim su se bavili ili se trenutno bave. Pod bavljenjem sportom naznačeno je redovito

treniranje i uključenost u natjecanja. Očekivalo se da se maturantice bave nekim od slijedeća 62 sporta: klizanje, plivanje, skijanje, koturaljkanje, odbojka, hokej na ledu, planinarenje,, košarka, sportska gimnastika, akrobatika, atletika, nogomet, estetska gimnastika (ritmika), plesovi, judo, stolni tennis, veslanje, boks, ronjenje, alpinizam, podvodni ribolov, taekwondo, mačevanje, biciklizam, boćanje, dizanje utega, rukomet, badminton, tenis, streljaštvo, hrvanje, skijanje na void, sanjkanje, vaterpolo. konjički sport, streličarstvo, karate, baseball, jedrenje na dasci, skokovi u vodu, kajakaštvo i kanuistika, orjentacijski sport, moto sport, padobranstvo, rugby, sinhrono plivanje, body building, aerobika, hokej na travi, sportski ribolov, kuglanje, trčanje, nanbudo, savate, kickboksing, akrobatskirnr, brakedance, biljar, softball, jazzdance, budokai i jedrenje. Sve druge navedene tjelovježbene aktivnosti i sportovi kojima se maturanti i maturantice bave označene su s „neki drugi sport" i „neki drugi borilački sport".

U odnosu na rodne kategorije analizirano je postignuće u sportu. U odvojenim tablicama za matruante i maturantice prikazana je učestalost bavljenja pojedinim od sportova, temeljem koje su sportovi rangirani. Spearmenovom rho korelacijom ocijenjena sukladnost dobivenih rangova.

REZULTATI

Rezultati su prezentirani u tri tablice: Tablica 1. Postignuće usportu u odnosu na Spol; Tablica 2. Učestalosti i rangovi bavljenja sportom maturantca Zagreba; i Tablica 3. Učestalosti i rangovi bavljenja sportom maturantica Zagreba.

Tablica 1. *Postignuće usportu u odnosu na Spol*

			Spol		Total
			muški	žene	
Postignuće usportu	Nisam se bavio sportom	čestina	219	449	668
		% unutar Spol	6.6%	14.5%	10.4%
	Bavio sam se povremeno	čestina	1417	1712	3129
		% unutar Spol	42.6%	55.1%	48.6%
	Školski sport	čestina	410	478	888
		% unutar Spol	12.3%	15.4%	13.8%
	Razina općine ili regije	čestina	871	325	1196
		% unutar Spol	26.2%	10.5%	18.6%
	Državana razina	čestina	256	91	347
		% unutar Spol	7.7%	2.9%	5.4%
	Međudržavni rang	čestina	154	51	205
		% unutar Spol	4.6%	1.6%	3.2%
UKUPNO		čestina	3307	3083	6390
		% unutar Spol	100.0%	100.0%	100.0%

Tablica 2. *Učestalosti i rangovi bavljenja sportom maturantica Zagreba*

	S P O R T	**čestina**	**posto**	**rang**
1	Nogomet	885	35.0	1
2	Košarka	386	15.3	2
3	Tenis	113	4.50	3
4	Rukomet	105	4.20	4
5	Plivanje	87	3.40	5
6	Karate	87	3.40	5
7	Atletika	73	2.90	6
8	Taekwondo	70	2.80	7
9	Stolni tenis	63	2.50	8
10	Veslanje	62	2.50	9
11	Odbojka	56	2.20	10
12	Body building	47	1.90	11
13	Vaterpolo	37	1.50	12
14	Streljaštvo	34	1.30	13
15	Biciklizam	32	1.30	14
16	Hrvanje	28	1.10	15
17	Judo	25	1.00	16
18	Boks	23	.90	17
19	Skijanje	22	.90	18
20	Hokej na ledu	21	.80	19
21	Baseball	19	.80	20
22	Rugby	18	.70	21
23	Plesovi	17	.70	22
24	Hokej na travi	15	.60	23
25	Sportski ribolov	14	.60	24
26	Aerobika	12	.50	25
27	Moto sport	10	.40	26
28	Badminton	9	.40	27
29	Trčanje	9	.40	27
30	Sportska gimnastika	8	.30	28
31	Orjentacijski sport	8	.30	28
32	Kuglanje	8	.30	28
33	Planinarenje	7	.30	29
34	Kajakastvo i kanuistika	7	.30	29

Tablica 2. *Učestalosti i rangovi bavljenja sportom maturantica Zagreba (nastavak)*

	S P O R T	čestina	posto	rang
35	Bočanje	6	.20	30
36	Skokovi u vodu	6	.20	30
37	Streličarstvo	5	.20	31
38	Klizanje	4	.20	32
39	Alpinizam	4	.20	32
40	Podvodni ribolov	4	.20	32
41	Jedrenje na dasci	4	.20	32
42	Padobranstvo	3	.10	33
43	Budokai	3	.10	33
44	Koturaljkanje	2	.10	34
45	Ronjenje	2	.10	34
46	Mačevanje	2	.10	34
47	Dizanje utega	2	.10	34
48	Nanbudo	2	.10	34
49	Savate	2	.10	34
50	Kickboksing	2	.10	34
51	Brakedance	2	.10	34
52	Estetska gimnastika (ritmika)	1	.00	35
53	Skijanje na vodi	1	.00	35
54	Sanjkanje	1	.00	35
55	Konjički sport	1	.00	35
56	Sinhrono plivanje	1	.00	35
57	Jedrenje	1	.00	35
58	Akrobatika	0	.00	36
59	Akrobatski RNR	0	.00	36
60	Biljar	0	.00	36
61	Softball	0	.00	36
62	Jazzdance	0	.00	36
	Neki drugi sport	46	1.80	
	Neki drugi BS	6	.20	
	UKUPNO	2530	100.00	

Tablica 3. *Učestalosti i rangovi bavljenja sportom maturantica Zagreba*

	S P O R T	čestina	posto	rang
1	Rukomet	310	16.3	1
2	Odbojka	305	16.0	2
3	Košarka	185	9.70	3
4	Tenis	122	6.40	4
5	Atletika	121	6.40	5
6	Aerobika	119	6.30	6
7	Plesovi	90	4.70	7
8	Plivanje	69	3.60	8
9	Trčanje	66	3.50	9
10	Estetska gimnastika (ritmika)	49	2.60	10
11	Karate	34	1.80	11
12	Sportska gimnastika	34	1.80	11
13	Taekwondo	28	1.50	12
14	Stolni tenis	28	1.50	12
15	Sinhrono plivanje	26	1.40	13
16	Streljaštvo	24	1.30	14
17	Biciklizam	23	1.20	15
18	Skijanje	20	1.10	16
19	Konjički sport	17	.90	17
20	Nogomet	16	.80	18
21	Planinarenje	16	.80	18
22	Koturaljkanje	16	.80	18
23	Klizanje	15	.80	19
24	Skokovi u vodu	10	.50	20
25	Hokej na travi	9	.50	21
26	Veslanje	8	.40	22
27	Judo	7	.40	23
28	Akrobatski RNR	7	.40	23
29	Body building	6	.30	24
30	Badminton	6	.30	24
31	Orjentacijski sport	6	.30	24
32	Mačevanje	5	.30	25
33	Kuglanje	4	.20	26
34	Softball	4	.20	26

Tablica 3. *Učestalosti i rangovi bavljenja sportom maturantica Zagreba (nastavak)*

	S P O R T	**čestina**	**posto**	**rang**
35	Kajakastvo i kanuistika	3	.20	27
36	Alpinizam	3	.20	27
37	Nanbudo	3	.20	27
38	Akrobatika	3	.20	27
39	Jazzdance	3	.20	27
40	Padobranstvo	2	.10	28
41	Vaterpolo	1	.10	29
42	Boks	1	.10	29
43	Hokej na ledu	1	.10	29
44	Rugby	1	.10	29
45	Sportski ribolov	1	.10	29
46	Streličarstvo	1	.10	29
47	Podvodni ribolov	1	.10	29
48	Jedrenje na dasci	1	.10	29
49	Budokai	1	.10	29
50	Ronjenje	1	.10	29
51	Brakedance	1	.10	29
52	Biljar	1	.10	29
53	Rvanje	0	.00	30
54	Baseball	0	.00	30
55	Moto sport	0	.00	30
56	Bočanje	0	.00	30
57	Dizanje utega	0	.00	30
58	Savate	0	.00	30
59	Kickboksing	0	.00	30
60	Skijanje na vodi	0	.00	30
61	Sanjkanje	0	.00	30
62	Jedrenje	0	.00	30
	Neki drugi sport	60	3.20	
	Neki drugi BS	7	.40	
	UKUPNO	1901	100.00	

ZAKLJUČAK

Između maturanata i maturantica uočene su i prikazane bitne razlike u razini postignuća u sportu. U kategorijama (1) Nisam se bavio sportom; (2) Bavio sam se povremeno; (3) Školski sport; u znatno većem broju zabilježeno je prisustvo maturantica, dok na (4) Razina općine ili regije; (5) Državnoj razina; i (6) Međunarodnoj razini zabilježen znantno veći omjer u korist maturanata (duplo veći broj). Obzirom da u obje rodne kategorije dominira povremeno bavljenje sportom, a broj onih koji se nikad nisu bavili i ne bave se sportom nije zanemariv postoji potreba za mjerama kojima bi se osigurala redovitost u bavljenju sportom u znatno većem broju slučajeva.

Izbor i učestalost sudjelovanja po pojedinim sportovima, pa prema tome i rangovi pojedinih sporotova, znatno se razlikuju u odnosu na rodnu pripadnost. O tim se razlikama mora voditi računa kada se stvaraju uvjeti i planira provođenje aktivnosti za redovitim bavljenja sportom.

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ACHIEVEMENT AND PARTICIPATION IN SPORTS OF MALE AND FEMALE SECONDARY SCHOOL GRADUATES FROM ZAGREB

ABSTRACT

The representative sample of 6,433 subjects composed of 3,327 male and 3,106 female secondary school graduates was examined for sports participation (only in dominant sport in past, or present) and achievement. The aim of this study is to examine frequencies of participation in 62 sports or regularly exercised activities. Their ranks and level of their achievements compared by gender have been analyzed. Dominantly, secondary school graduates do sports on irregular basis and there are more female students among non-active and in-school sports.

Difference between groups is noted on other levels too, where on town, region, national and international level there are systematically twice as many males than females. One percent or more males are involved in 17 sports, and one percent or more females in18 sports characterize active participation with marked gender differences per sport. Spearmen's rho correlation for male and female participation is 0.47 illustrating gender differences.

Key words: *achievement in sports, participation in sports, secondary schools graduates*

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Izvorni znanstveni rad

RELACIJE IZMEĐU BAZIČNE I SPECIFIČNIH MANIFESTACIJA AGILNOSTI U RUKOMETU

UVOD

Po definiciji brojnih autora (prema Gredelj i sur., 1975. i Jukić i sur., 2003.) sposobnost brze promjene pravca kretanja naziva se agilnost (od grč. riječi agilis – brz, okretan). Agilnost se isto tako definira kao sposobnost usporavanja, ubrzavanja te brze promjene pravca kretanja zadržavajući kontrolu kretanja i ne gubeći brzinu (Brittenham, 1996., prema Jukić i sur. 2003). Prema Jukić i suradnici (2003) agilnost dijelimo po kriteriju osnovnog načina kretanja na frontalnu, lateralnu i horizontalno-vertikalnu, dok prema načinu promjene smjera razlikujemo agilnost s kružnim, kutnim i agilnost s promjenama smjera okretima.

Agilnost kao motorička sposobnost nalazi se na vrhu hipotetske hijerarhijske strukture uspješnosti u rukometu. Moderni rukomet podrazumijeva visoki intenzitet igre, brze i eksplozivne promjene smjera kretanja sa i bez lopte, kratke sprintove, fintiranja igrača, itd. Zastupljenost različitih manifestacija agilnosti tijekom rukometne igre je vrlo visoka. Agilnost kao motorička sposobnost u velikoj je mjeri povezana s koordinacijom pokreta, brzinom i eksplozivnošću. Između ostalog, prema nekim autorima (Gambetta, 2001) smatra se da agilnost uvelike omogućava sprečavanje nastanka sportskih ozljeda jer sportaši s izraženijom agilnosti lakše kontroliraju svoje tijelo u urgentnim trenažnim i natjecateljskim situacijama.

Veliki broj konstruiranih testova s utvrđenim metrijskim svojstvima pokriva prostor za procjenu bazičnih motoričkih sposobnosti. Obzirom na različitosti pojedinih sportova u strukturi, složenosti biomehaničkih parametara, dominaciji energetskih procesa i motoričkih sposobnosti i sl., neophodno je pri procjeni specifičnog motoričkog statusa rukometaša/ica primjenjivati testove koje u svom konstruktu sadrže specifična kretanja iz rukometne igre. Iz navedenih razloga, uz primjenu postojećeg testa za procjenu specifične agilnosti u 'halfovskim' i vratarevim obrambenim kretanjima, za potrebe ovog istraživanja konstruirana su 2 testa za procjenu specifičnih motoričkih sposobnosti (kretanje centarhalfa i kružnog napadača) u rukometu.

CILJ ISTRAŽIVANJA

Cilj je ovog istraživanja utvrditi utjecaj bazične agilnosti na neke specifične manifestacije agilnosti u rukometnoj igri kod rukometaša i rukometašica mlađih dobnih skupina.

METODE ISTRAŽIVANJA

Uzorak ispitanika

Pilot istraživanje provedeno je na uzorku od 14 rukometaša mlađih kadeta RŠK Jastrebarsko, dobi između 13 i 14 godina i 11 rukometašica kadetkinja RŠK Jastebarsko dobi između 16 i 17 godina. Svi ispitanici bili su urednog zdravstvenog stanja, bez morfoloških, patoloških ili drugih oštećenja lokomotornog sustava te su u potpunosti prošli osnovnu izobrazbu u elementima tehnike rukometne igre.

Uzorak varijabli

Bazične motoričke sposobnosti testirane su primjenom baterije mjernih instrumenata prikazanih u tablici 1.

Tablica 1. *Prediktorski skup varijabli za procjenu moričkih sposobnosti*

	VARIJABLA	NAZIV	INTENCIONALNI PREDMET MJERENJA
1	MAGKUS	Koraci u stranu	lateralna agilnost
2	MAGSLA	Trčanje u slalomu 20m	frontalna agilnost
3	20Y	Trčanje 20 yardi	frontalna agilnost s okretima te usporavanjem i ubrzavanjem

Specifične motoričke sposobnosti testirane su primjenom varijabli:

1. *MAGKV4* (prema Vuleta, Gruić, 2009.) – kretanje između vratnica (agilnost u frontalnim i lateralnim gibanjima s promjenama smjera kretanja do 90° - imitacija halfovskog kretanja i kretanja vratara)
2. *CHALF2* – kretanje centarhalfa (imitacija kretanja centarhalfa sa bočnom i dubinskom komponentom)
3. *KN2* – kretanje kružnog napadača (imitacija kretanja i postavljanja kružnog napadača sa blokom na braniču)

Metode obrade podataka

Deskriptivnom statistikom definirani su parametri centralne tendencije i disperzivni parametri prediktorskih varijabli (aritmetičke sredine, minimalne i maksimalne vrijednosti, standardne devijacije te zakrivljenosti distribucije). Regresijskom analizom definirana je povezanost između indikatora bazičnih motoričkih sposobnosti i pojedinačnih manifestacija specifične agilnosti.

REZULTATI I RASPRAVA

Rezultati mjerenja bazičnih i specifičnih motoričkih sposobnosti za testirane rukometaše i rukometašice prikazani su u tablici 2 i 3.

Tablica 2. *Deskriptivna statistika varijabli za procjenu motoričkih sposobnosti kod rukometaša*

	N	AS	Min	Max	Raspon	Std.Dev.	Skewness	Kurtosis
MAGKUS	14	8,72	7,92	9,68	1,76	0,47	0,56	0,20
MAGSLAL	14	7,29	6,87	7,74	0,86	0,30	0,21	-1,25
Y20	14	5,24	4,82	5,95	1,13	0,31	0,80	0,50
MAGKV4	14	15,80	14,54	17,83	3,29	0,94	0,70	0,11
CHALF2	14	8,23	7,80	9,01	1,21	0,36	0,70	-0,13
KN2	14	8,51	7,55	9,76	2,21	0,67	0,19	-0,79

Tablica 3. *Deskriptivna statistika varijabli za procjenu motoričkih sposobnosti kod rukometašica*

	N	AS	Min	Max	Raspon	Std.Dev.	Skewness	Kurtosis
MAGKUS	11	8,83	7,71	9,26	1,55	0,45	-1,77	3,59
MAGSLAL	11	7,49	7,12	8,06	0,94	0,32	0,79	-0,48
Y20	11	5,59	5,10	5,95	0,85	0,25	-0,60	0,24
MAGKV4	11	16,76	15,21	17,62	2,41	0,63	-1,51	3,46
CHALF2	11	7,89	7,17	8,37	1,21	0,33	-0,97	1,24
KN2	11	8,08	7,42	8,94	1,53	0,44	0,49	-0,15

Uvidom u deskriptivne parametre (tablice 2 i 3) vidljivo je da mlađi kadeti RŠK Jastrebarsko postižu prosječno bolje rezultate u svim varijablama osim u 2 varijable za procjenu specifične motoričke sposobnosti, agilnosti. U varijabli imitacije kretanja centarhalfa (CHALF2 – prosječno 0,34 sekunde sporiji) i varijabli imitaciji kretanja

kružnog napadača (KN2 – prosječno 0,43 sekunde sporiji) rukometaši su postigli lošiji rezultat što možemo pripisati starijoj dobi rukometašica, a samim time i dužem stažu treniranja gdje su bolje usvojile strukturu kretanja igrača u obrani i kružnog napadača kao specifičnog motoričkog kretanja, a koje je usko vezano uz lateralnu agilnost koja se najbolje manifestira kroz test koraci u stranu (MAGKUS – prosječno 0,11 sekundi brži) gdje je vidljiv neznačajno bolji rezultat kod rukometaša.

Tablica 4. *Multivarijatni regresijski pokazatelji utjecaja/doprinosa prediktorskog skupa varijabli na kriterije uspješnosti kod rukometaša i rukometašica*

	RUKOMETAŠI			**RUKOMETAŠICE**		
KRITERIJ	**MAGKV4**	**CHALF2**	**KN2**	**MAGKV4**	**CHALF2**	**KN2**
MULTIPLE R	0,91	0,92	0,78	0,78	0,81	0,76
MULTIPLE R^2	0,82	0,85	0,61	0,61	0,66	0,58
F(3,10 M; 3,7 Ž)	15,37	19,11	5,37	3,75	4,44	3,35
P	**<0,00**	**<0,00**	**<0,02**	<0,07	**<0,05**	<0,09
std. err. of estimate	0,45	0,16	0,47	0,46	0,23	0,34

Za mlade rukometaše povezanosti prediktorskog skupa varijabli s kriterijima za procjenu specifične agilnosti u rukometu (*MAGKV4, CHALF2, KN2*) opisane su koeficijentima multiple korelacije (tablica 4) čije su se vrijednosti - 0,91(*MAGKV4*), 0,92 (*CHALF2*) i 0,78 (*KN2*) testiranjem pomoću F-distribucije za stupnjeve slobode df1=3 i df2=10 pokazale statistički značajnima na razinama - p (*MAGKV4*)=0,00; p (*CHALF2*)=0,00 i p (*KN2*)=0,02. Zajednički varijabilitet sustava prediktora i kriterijskih varijabli *MAGKV4* (oko 82%) i *CHALF2* (oko 85%)nešto je viši u odnosu na zajednički varijabilitet sustava prediktora i kriterijske varijable *KN2* (oko 61%). Neobjašnjeni dijelovi varijanci kriterijskih varijabli mogu se pripisati utjecaju čimbenika koji nisu kvantitativno definirani, a koji se odnose na različite doprinose i utjecaje jednofaktorskih i višefaktorskih motoričkih sposobnosti – koordinacije, eksplozivne snage, ravnoteže i dr.

Kod rukometašica utvrđena je povezanost prediktorskog skupa varijabli s varijablom za procjenu specifične agilnosti u kretanju centarhalfa (*CHALF2*) *p=0,04*, *r=0,81*, *a u odnosu na varijable KN2* (*p<0,09*) i *MAGKV4* (*p<0,07*) postoji povezanost koju u interpretaciji u odnosu na statističke konvencije ipak treba uzeti *s rezervom*. Zajednički varijabilitet sustava prediktora i kriterijske varijable *CHALF2* je oko 66% (multiple R^2=0,66). Neobjašnjenih 37% varijabiliteta može se pripisati utjecaju/doprinosu drugih motoričkih sposobnosti.

Tablica 5. *Parcijalni regresijski koeficijenti analize utjecaja/doprinosa prediktorskog skupa varijabli na kriterije uspješnosti kod rukometaša i rukometašica*

	RUKOMETAŠI						RUKOMETAŠICE					
KRITERIJ	MAGKV4		CHALF2		KN2		MAGKV4		CHALF2		KN2	
	BETA	p	BETA	p	BETA	p	BETA	p	BETA	p	BETA	p
Intercpt		0,66		0,14		0,61		0,26		0,22		0,92
MAGKUS	0,10	0,61	0,12	0,53	-0,19	0,52	0,66	0,08	0,92	***0,02**	0,34	0,34
SLAL	0,26	0,27	0,09	0,66	0,42	0,23	0,35	0,24	0,31	0,27	0,10	0,74
Y20	0,60	0,06	0,76	***0,01**	0,53	0,23	-0,09	0,80	-0,43	0,23	0,43	0,27

*statistički značajan doprinos

Rezultati parcijalne regresijske analize (tablica 5) ne pridaju statističku značajnost doprinosa ni jednoj varijabli prediktorskog skupa *za procjenu agilnosti u frontalnim i lateralnim gibanjima s promjenama smjera kretanja do 90°* (*MAGKV4*) te agilnosti u kretanju i postavljanja *kružnog napadača sa blokom na braniču* (*KN2*). Uspješnost u ovim testovima moguće je objasniti ujednačenim doprinosom svih promatranih manifestacija bazične agilnosti.

Statistički značajan doprinos rezultata u testu *20 yardi* (*20Y; p=0,01, BETA=0,76*) kod rukometaša te testa *koraci u stranu* (*MAGKUS; p=0,02, BETA=0,92*) kod rukometašica utvrđen je u odnosu na specifično kretanje definirano *imitacijom kretanja centarhalfa u strukturi kretanja igrača u obrani* (*CHALF2*).

U situacijskim uvjetima kretanja centarhalfa u dubokoj zonskoj formaciji 3:2:1, bazična frontalna agilnost (20 yardi) doprinosi manifestaciji specifične agilnosti u rukometnoj igri kod rukometaša mladih kadeta dok se kod kadetkinja statistički značajan doprinos odnosi na bočnu agilnost (koraci u stranu).

Bilo je očekivano da će rezultati u bazičnoj agilnosti doprinositi jednako specifičnoj agilnosti i kod rukometaša i kod rukometašica. Međutim razlike u doprinosima bazične frontalne i lateralne agilnosti vjerojatno su uvjetovane različitim spolno, dobno i iskustveno (nastavno, natjecateljsko i trenažno iskustvo) uvjetovanim razlikama u percepciji ispravnog 'centarhalfskog' kretanja, percepciji i razumijevanju opisa, upute i zadane izvedbe motoričkog zadatka te koordinacijskim stereotipima.

ZAKLJUČAK

Istraživanja transfera bazičnih sposobnosti u specifične manifestacije istih u različitim situacijskim uvjetima rukometne igre pretpostavka su potpunijem razumijevanju procesa planiranja, programiranja i općeg modeliranja nastavnog, ali i trenažnog i natjecateljskog procesa. Usklađivanje motoričkih sposobnosti sa motoričkim znanjima u smislu optimizacije kretanja u uvjetima suradnje i suprostavljanja pretpostavka su definiranju metodičkih slijedova koji uz najmanji utrošak energije i vremena projicira sposobnosti kroz znanja u natjecateljski rezultat. Obzirom na više-faktorsku strukturu agilnosti, razumijevanje ovog transfera u kontekstu odnosa frontalne i bočne pokretljivosti posebno dolazi do izražaja u radu s mlađim dobnim skupinama pa rezultati ovog istraživanja predstavljaju pretpostavku provođenju detaljnijih analiza koji agilnost postavljaju u kontekst *načina izvedbe* u situacijskim uvjetima, kao i na usmjerenost djelovanja na sam *cilj izvedbe*.

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RELATION BETWEEN BASIC AND SPECIFIC MANIFESTATIONS OF AGILITY IN HANDBALL

ABSTRACT

The aim of this study was to determine the impact of basic agility on some specific manifestations of agility in male and female handball younger age groups. The pilot study was conducted on a sample of 14 handball male younger cadets, aged between 13 and 14 , and 11 female cadets, aged 16 to 17 years, all players of HSC Jastrebarsko. In order to determine the aim of the study, 3 variables of fundamental motor abilities (MAGKUS, MAGSLAL, Y20) and 3 variables of specific motor abilities (MAGKV4, CHALF2, KN2) were used. Correlation was determined among predictor set of variables with the criteria for assessing specific agility in handball among male players, while among female players correlation was determined only for the criterion for assessing specific agility in moving centre half (CHALF2). Statistically significant contribution in the 20 yards test results for male players, and side steps test for female players was determined in relation to a specific movement defined by imitating the movement of centre half in the movement structure of defensive players (CHALF2).

Key words: *handball, agility, younger age groups*

Jaromír Šimonek ***Professional paper***
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FROM PERFORMANCE-ORIENTED TO COMPETENCE-BASED PHYSICAL EDUCATION CURRICULUM IN SLOVAKIA

Preparing young people both to successfully face the challenges of the information society and derive maximum benefit from the opportunities it provides has become an increasingly important objective of education systems in Europe. It has led those in charge of education policy to review curricular content, and teaching and learning methods. This has inevitably led in turn to heightened interest in key competences, namely those competences considered vital for a lifetime of successful participation in society.

It is clear from the definition of „**competence**" that it is a „**general capability**", which is based on knowledge and skills, practical expertise, values and predispositions of an individual. Competence should accordingly be understood as an ability to activate, apply and transfer the system of knowledge, skills, capacities, values and attitudes onto individual situations in life.

„**Key competences**" represent a transferrable and universally employable set of knowledge, skills and attitudes inevitable for everyone´s personal satisfaction and development, for his/her active life in a society and successful employability.

In 2003, the European Commission, in its effort to unify the numerous attitudes to competences, defined **8 areas of key competences** for the elementary stage of education:

1. Communication in mother tongue,
2. Communication in any foreign language,
3. Mathematic literacy and competences in natural sciences and technology,
4. Competences in the area of IKT,
5. Learning to learn (competences for life-long education),
6. Social and civic competences (intra-personal and inter-personal),
7. Entrepreneurial competences (motivating changes, reacting to them and reaching the objectives and take-on the responsibilities for their behaviour),
8. Cultural competences (awareness).

From the point of view of health-oriented physical education and sport, t**he European Commission´s proposal does not include any motor competences and the ones for health and life protection**. In order to support our opinion that it is **necessary to add this competence area** into the initially selected 8 ones, we present the model of different types of intelligence by Gardner (1983), which includes also bodily-kinesthetic intelligence.

The Seven Types of Intelligence (Gardner, 1983):

Psychologist Howard Gardner has identified the following distinct types of intelligence in his Multiple Intelligences Theory („MI Theory") in the book „Frames of Mind."

1. Linguistic
2. Logical-Mathematical
3. **Bodily-Kinesthetic**
4. Spatial
5. Musical
6. Interpersonal intelligence.
7. Intrapersonal intelligence.

We think **that the current discussion on key competences is focused mostly and predominantly on job market and forgets the meaning of competences for the personal life of a man**. It is just the complacent personal life, for which the school should prepare a young prospective person. A standard health state gives prerequisites for a successful acquisition of competences. However, health may not be considered an obvious and a definitive status, on which we can build up other competences. Health must be protected and cherished by means of well-planned programmes. **Every individual should acquire knowledge, skills, habits and attitudes, which would form a prerequisite for acquiring new competences for oneself**. Being healthy and knowing how to protect one´s health and life and take care of them, are the key competences of an individual. Moreover, it is a preferred competence for the society from the point of view of the care of a citizen. The quality of individuals characterizes the quality of the whole society.

Life-long acquisition of motor competences and the ones of taking care of one´s health are reached also through education in schools (as well as out of schools), while the subject „Physical Education" is one of the key ones in the whole system.

The new **Act on Education** No. 245/2008 Coll. was adopted in May 2008 and has been implemented in Slovak schools (in 1st grade of elementary = ISCED 1 and secondary schools = ISCED 3, and 5th grade of elementary schools = ISCED 2) for already three years. It replaced the old law from 1996. Nowadays, 3rd year of the

reform is in progress and it is being implemented in 4th grade of ISCED 1, 7th grade of ISCED 2nd and 3rd grade of ISCED 3). The reform will be completed within the next 2 years.

The new **School Act** brings along:

- Free last year in kindergartens
- Reducing the number of pupils in classrooms (1-4 grade max. 25, 5-9 grade max. 28)
- Obligatory first foreign language started from year 3, obligatory second language started from year 6
- State published books only free
- Reducing the number of obligatory classes
- Change of the curricula
- 10-years of compulsory school attendance remains
- Free education at elementary and secondary schools remains.
- Education is provided at 5 levels according to the ISCED classification:

ISCED	Level of Education
ISCED 0	Pre-primary education
ISCED 1	Lower-primary education
ISCED 2	Upper-primary education
ISCED 3	Secondary education
ISCED 4	Post-secondary education
ISCED 5	Higher education

Based on the new act, school subjects were reorganized and grouped into 8 educational areas (Tab. 1).

CHARACTERISTICS OF THE EDUCATIONAL AREA: HEALTH & MOVEMENT

The subject Physical Education & Sport provides basic information on biological, health and social elements of a healthy life style. Pupils develop abilities and acquire knowledge, skills and habits, which are a part of a healthy life style not only during the school attendance, but in adulthood as well. They will acquire skills and habits for effective spending of their leisure time and at the same time knowledge on health effect of the skills and habits adopted.

Table 1. *Educational areas*

Educational area	Subjects
Language and Communication	Slovak language and literature
	First foreign language
	Second foreign language
Maths and Work with Information	Mathematics
	Information Technology
Man and Nature	Physics
	Chemistry
	Biology
Man and Society	History
	Geography
	Civics
Man and Values	Ethics/Religion
Man and the World of Work	World of Work
	Technology
Art and Culture	Music
	Arts
	Art Education
Health and Movement	Physical Education and Sport

CONTENTS OF EDUCATION

Provision of the aforementioned competences is realized through the contents formed by elementary knowledge on the importance of movement activities for health, prevention of diseases, adequate way of living, sport activities and its organizing, motor performance and its assessment and means of movement.

AIMS OF THE SUBJECT PHYSICAL EDUCATION & SPORT

In the subject Physical Education & Sport a pupil obtains competences which should allow him/her to use them in their own life style in everyday life with the aim of health support. They are as follows:

Motor competences

- To be able to perform motor activities, which help to prevent from civilization diseases,

- To develop general motor performance with the focus on maintaining and improving health,
- To acquire adequate number of motor activities in selected kinds of sport, and to be able to apply them in their free time.

Cognitive competences

- To be able to explain reasons for performing motor activities in the life style with the focus on health protection.
- To use terminology of acquired motor activities and knowledge.
- To be able to explain and use warm-up exercises prior to the activity.

Communication competences

- To be able to express oneself clearly and comprehensibly.
- To use correct terminology.

Interpersonal competences

- To show positive attitude to oneself and the others.
- To effectively work in a team.
- To solve conflict situations in a rational way, mainly in sport.

Attitude competences

- To enjoy the activity being performed.
- To be able to win, but also to lose in a match and in life.
- To observe the principles of fair-play.

The curriculum of physical education and sport (Tab. 2 and 3)

The curriculum consists of two parts:

a) state curriculum (state programme) – 2 lessons of PE per week

b) school curriculum (school programme) – schools can choose another one, two or more lessons per week as an addition to the 2 lessons of the state programme. This allows schools to offer students PE lessons every day! However, in practice this is not so simple. The reasons are understandable: lack of money to pay PE teachers in schools, old-fashioned material base, lack of sport facilities, expensive equipment, and last but not least, children are discouraged by the difficulty of the contents of PE lessons given in the past (Chebeň, 2006a, 2006b). Today, teachers prepared at universities are taught in a new way – to offer a wide

variety of physical and sport activities with the focus not on top performance but on mass character of leisure activities to be used in the future life, and also on the social and non-cognitive aspects of the lessons.

Table 2. *No. of lessons per week in the school curricula in Slovakia*

	2nd grade of elementary school – ISCED 2					Secondary school – ISCED 3			
Grade	**5th**	**6th**	**7th**	**8th**	**9th**	**1st**	**2nd**	**3rd**	**4th**
State educational programme (No. of lessons per week)	21	23	24	24	24	24	25	23	22
School programme (lessons per week)	6	6	6	6	6	7	7	8	8
Sum of lessons per week	27	29	30	30	30	31	32	31	30

Table 3. *Educational area: Health and Movement - ISCED 1 (years 1 through 4), ISCED 2 (years 5 through 9)*

Health & Movement	SUBJECT	1st year	2nd	3rd	4th	5th	6th	7th	8th	9th
State Programme	Physical education & Sport	2 hrs.	2	2	2	2	2	2	2	2
School Programme	Eligible subjects	5	5	5	5	6	6	6	6	6

ISCED 3 (years 1 through 4 at secondary school)

Health & Movement	SUBJECT	1st year	2nd	3rd	4th
State Programme	Physical education & Sport	2	2	2	2
School Programme	Eligible subjects	4	4	7	15

Educational standards define the contents of education to be acquired by each pupils in the given subject

Educational standards are divided into:

a/ performance standards

b/ contentual standards

Below are presented examples of educational standards:

SPORT GAMES

COMPETENCE:

Pupil reaches such level of acquisition of game skills, patterns and systems that he/she is able to play a game according to the rules of competition.

PERFORMANCE STANDARD:

- to know how to correctly name, describe, practically show, and apply in a match the technique of basic skills, and to use game patterns and systems in a match,
- to know and describe players´ functions in defence and offense,
- to know how to explain basic rules of competition of selected sport games,
- to know how to set up and do in practice the warm-up prior to a match,
- to know how to act as a referee (ancillary referee), recorder, time-keeper and to run a simple observation sheet on players´ performance in a match,
- to know how to evaluate the real value of one´s individual sport performance and the one of the team.

CONTENTUAL STANDARD:

Knowledge:

- systematics of skills, basic terminology,
- technique of performing the skills,
- game patterns and systems,
- game performance in sport games, assessment of performance,
- players´ functions,
- elementary rules of selected sport games,
- organization of a simple competition (referees, time-keepers, recorders, etc.),
- principles of fair-play.

Based on these and other knowledge, teachers can develop the following abilities and skills in children:

Skills and Abilities:

- conditioning, elementary conditional and coordination abilities,
- describe and practically show correct technique of individual skills:

  basketball – one-hand pass, dribbling, shooting, defending a player with and without ball

  football – passing, ball damping, shooting, dribbling, defending a player with and without a ball

  handball – one-hand pass, dribbling, shooting, jump shooting, defending a player with and without a ball

  volleyball – overhand pass, pass after a movement, underhand serve, passing to a setter under the net.

Using the knowledge, skills and abilities during the lessons facilitates creation of the following attitudes of pupils:

Attitudes:

- to show permanent positive attitude to sport games,
- to show positive attitude to motor activities,
- to have positive relationship with team-mates and opponents as well,
- to stick to the adopted norms and rules,
- to observe the principles of fair-play,
- to manifest the effort of self-improvement, perseverance and bravery,
- to enjoy the performed motor activity,
- to be able to win and also accept a loss in a sport match as well as in life, to acknowledge the opponent´s qualities.

Contents of Education

Provision of the given competences is realized through the contents of education. The contents of education are divided according to the so called topics:

Table 4. *Survey of topics*

a/ Basic topics

General gymnastics
Athletics
Elements of gymnastic sports
Sport games
Swimming
Outdoor activities
Testing motor abilities
TOTAL: 66 hours

b/ Eligible topics

Non-traditional (for Slovakia) motor activites (badminton, table tennis, ringo, squash, etc.)
Ice-skating
Ice-hockey
Snowboarding
Bodybuilding
Aerobics, aqua aerobics
Martial arts and self-defence
In-line hockey
Dances (social dances, disco, folk dances)
Other activities

Initial surveys show (Tab. 5) that the majority of schools have not increased the number of compulsory 2 lessons of Physical Education and Sport (PES) for pupils at schools. This means that in spite of the proclamations of the Slovak Ministry of Education to support movement of pupils, the real situation is opposite. The reasons for not increasing the number of compulsory lessons of PES per week are various: lack of financial means to pay for teachers, lack of expert teachers, poor material provision of the subject, lack of gyms and other facilities, etc.

Table 5. *Statistic data on P.E.S lessons obtained by questionnaires*

				Percent
Total no. of schools	132	No. of schools which **added** at least one lesson of PE in the School programme	37	28%
		No. of schools which **have not added** any lessons of PE in the School programme	95	72%
Headmaster **HAS got education in PE**	Number of schools			
	33	No. of schools which **added** at least one lesson of PE in the School programme	11	31%
		No. of schools which **have not added** any lessons of PE in the School programme	22	69%
Headmaster **HAS NOT got education in PE.**	99	No. of schools which **added** at least one lesson of PE in the School programme	26	11%
		No. of schools which **have not added** any lessons of PE in the School programme	73	89%

CONCLUSION

Prior to the implementation of the new School Act in 2008, children at the second grade of elementary schools had only 2 lessons of Physical Education & Sport per week. After September 2008, only 28% of headmasters added at least one lesson into the School educational programme. This means that the amount of motor activity of pupils in school has not increased. One of the reasons is the lack of financial means to run and renew the equipment and facilities necessary for good quality PES process. Maintenance of objects also requires a certain amount of financial means, so headmasters choose „less expensive" solution – subjects which are not so costly (such as history, maths, etc.). One of the tasks of teachers of PES is to elaborate serious attractive, financially not demanding motor programmes for pupils and ask headmasters to incorporate these lessons into the curricula in the form of at least one lesson of PES for pupils per week. In order for PES teachers to be successful in this process, they have to be well prepared by the universities. Therefore, the urgent task of faculties preparing teachers is to educate flexible, modern teachers prepared to fulfil even the most difficult theoretical and practical tasks.

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ABSTRACT

The paper deals with the curricular reform in Slovakia and its impacts on the extent and contents of Physical education and sport in schools. The author suggests that motor competence is included in the 8 key competences of pupils. Based on the new act, school subjects were reorganized and grouped into 8 educational areas, including Health & Movement. The curriculum consists of two parts: State compulsory programme and School elective programme. This means that students can have not only two obligatory lessons of PE & Sport, but can add at least one lesson to the state compulsory programme. However, very few schools have made use of this opportunity. There are various reasons for that, financial insufficiency, lack of expert teachers, and lack of sport facilities being the most frequent ones.

Key words: *competence, pupils, health & movement, state educational programme, school programme, questionnaire*

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RAZLIKE U ANTROPOLOŠKIM OBILJEŽJIMA UČENIKA PETIH I ŠESTIH RAZREDA U REDOVITOJ NASTAVI I UČENIKA UKLJUČENIH U ŠKOLSKI ŠPORT U GOSPIĆU

UVOD

Antropološka su obilježja organizirani sustav svih osobina, sposobnosti i motoričkih znanja i njihove međusobne relacije. Pod antropološka obilježja ubrajaju se antropometrijske karakteristike, motoričke, funkcionalne i kognitivne sposobnosti, konativne osobine i socijalni status. Poznavanje antropoloških osobitosti pojedinih dobnih i spolnih skupina učenika/sportaša/vježbača rekreativaca i temeljnih pokazatelja njihovog zdravlja preduvjet je sigurnog, kvalitetnog i svrhovitog rada u kineziološkoj edukaciji, sportu i rekreaciji (Mišigoj, Duraković 2009).

Tjelesno vježbanje i šport sastavni su dio odgojno-obrazovnog sustava u Republici Hrvatskoj. Pod pojmovima tjelesno vježbanje i šport u odgojno-obrazovnom sustavu podrazumijeva se obavezna nastava tjelesne i zdravstvene kulture (TZK) i izvannastavne športske aktivnosti. Nastavi tjelesne i zdravstvene kulture pripadaju redovita i izborna nastava. Redovita nastava provodi se prema propisanim nastavnim planovima i programima. U svakodnevnoj se praksi izborna nastava tjelesne i zdravstvene kulture gotovo i ne provodi. Stoga je važno provođenje izvannastavnih športskih aktivnosti učenika iznimno velika. Upravo one imaju cilj smanjiti razlike između znanstveno istraživane i dokazane potrebe djece i mladih za tjelesnom aktivnošću i športom i stvarne količine tjelesne aktivnosti u sustavu odgoja i obrazovanja. Školski je šport glavni sadržaj izvannastavnih športskih aktivnosti djece i mladih (Milanović 2009).

U Ličko-senjskoj županiji 29,76% učenika osnovnih škola uključeno je u rad, treninge i natjecanja školskih športskih društava na osnovu upitnika iz 2007/08 godine. Ako uzmemo u obzir da je efektivno vrijeme rada učenika na satu tjelesne i zdravstvene kulture oko 18 minuta, a učenici (osmih razreda) u igri provedu 34 minute dnevno, suvremeni način života pretvara djecu, učenike i mladež u sjedilačku civilizaciju s mnogim negativnim posljedicama (Neljak, 2001.) od kojih se najčešće

ističu sve veći postotci pretile djece i odraslih, s tendencijom ranijeg registriranja i praćenja broja kroničnih bolesti.

Cilj je ovog istraživanja utvrđivanje kvantitativnih promjena u antropološkim obilježjima učenika petih i šestih razreda u redovitoj nastavi i učenika uključenih u školski šport u Gospiću. S obzirom na cilj rada, mogu se postaviti sljedeće hipoteze: H1: u prostoru antropoloških obilježja učenika petih razreda ne postoji statistički značajna razlika između redovite nastave tjelesne i zdravstvene kulture i sudjelovanja u školskom športu. H2: u prostoru antropoloških obilježja učenika šestih razreda ne postoji statistički značajna razlika između redovite nastave tjelesne i zdravstvene kulture i sudjelovanja u školskom športu. H3: u prostoru antropoloških obilježja učenika petih i šestih razreda ne postoji statistički značajna razlika između učenika koji sudjeluju u školskom športu.

METODE ISTRAŽIVANJA

Uzorak ispitanika sastavljen je od 110 učenika petih i šestih razreda osnovne škole u Gospiću. Učenici su razvrstani u četiri skupine na način da prvu čine učenici petih razreda koji pohađaju redovitu nastavu tjelesne i zdravstvene kulture, drugu skupinu čine učenici petih razreda koji su pored redovite nastave tjelesne i zdravstvene kulture uključeni u školski šport, treću skupinu čine učenici šestih razreda koji pohađaju redovitu nastavu tjelesne i zdravstvene kulture, a četvrtu skupinu čine učenici šestih razreda koji su pored redovite nastave tjelesne i zdravstvene kulture uključeni u školski šport. Ispitanici su izmjereni standardnim mjerama i testovima za procjenu antropoloških obilježja u osnovnoj i srednjoj školi. Mjerenje je obavljeno kao finalno mjerenje učenika na kraju školske godine. Antropometrijska obilježja učenika mjerena su testovima: tjelesna visina (ATV), tjelesna težina (ATT), opseg podlaktice (AOP) i nabor nadlaktice (ANN). Motoričke sposobnosti provjerene su testovima: taping rukom (MTR), skok udalj s mjesta (MSD), podizanje trupa (MPT), pretklon raznožno (MPR), poligon natraške (MPN) i izdržaj u visu zgibom (MIV). Funkcionalne sposobnosti provjerene su testom aerobne izdržljivosti (F800).

Test se izvodi na način da se mjeri vrijeme učenika koje postigne na stazi dugoj 800 metara, a korišten je umjesto standardnog testa aerobne izdržljivosti (F6) iz razloga što se može lakše motivirati učenika za rad.

Obrada podataka provedena je na način da su prvo utvrđeni normaliteti distribucija, nakon čega razlike vrijednosti između grupa utvrđene Studentovim t-testom za nezavisne uzorke.

REZULTATI I RASPRAVA

Uvidom u osnovne statističke parametre ispitanika po razredima može se utvrditi da distribucija vrijednosti rezultata normalna. Navedene tvrdnje temelje se na činjenici da vrijednosti mjera asimetrije (Skewness), ispupčenost krivulje (Kurtosis) i Kolmogorov-Smirnov testa ne variraju značajno od graničnih odstupanja. U tablicama od 1. do 3. prikazani su rezultati nezavisnog t-testa za sve ispitanike po razredima.

Tablica 1. *Rezultati antropoloških obilježja t-testa za nezavisne uzorke učenika petih razreda*

Varijable	Aritmetička sredina 1	Aritmetička sredina 2	t-vrijednost	Stupljevi slobode	p-razina značajnosti
Visina	148,5833	151,0833	-0,49139	46	0,625485
Težina	40,3333	38,8333	0,54531	46	0,588173
Opseg podlaktice	21,5000	20,6667	1,60217	46	0,115963
Kožni nabor nadlaktive	5,0417	7,5083	-1,12345	46	0,267075
Taping rukom	21,8750	24,8750	-3,78242	46	**0,000447**
Skok udalj	143,2500	157,5417	-2,82872	46	**0,006901**
Poligon natraške	17,6000	13,8063	3,36455	46	**0,001554**
Podizanje trupa	28,3333	36,9167	-5,21183	46	**0,000004**
Pretklon raznožno	50,9167	53,5833	-1,23981	46	0,221332
Izdržaj u visu zgibom	16,0000	29,7917	-2,59916	46	**0,012518**
Trčanje 800 m	2,7825	2,4717	3,09319	46	**0,003362**

Već letimičnim uvidom u rezultate analize razlika učenika petih razreda primjetne su statistički značajne razlike u nekim testovnim vrijednostima između učenika koji pohađaju redovitu nastavu tjelesne i zdravstvene kulture i učenika koji su pored redovite nastave tjelesne i zdravstvene kulture uključeni u školski šport. Navedene promjene evidentirane su kod varijabli koje određuju motoričke sposobnosti učenika (MTR, MSD, MPN, MPT, MIV) te kod testa koji određuje aerobni kapacitet učenika (F800). Razlike mjerenja dviju grupa učenika ukazuju da učenici koji su pored redovite nastave tjelesne i zdravstvene kulture uključeni i u školski šport imaju bolje testovne vrijednosti što je izravni utjecaj školskog športa. U varijablama morfoloških karakteristika (ATV, ATT, AOP, ANN) i motoričke varijable (MPR) nije došlo do statistički značajnih razlika između grupa na razini statističke značajnosti p=0,05.

Tablica 2. *Rezultati antropoloških obilježja t-testa za nezavisne uzorke učenika šestih razreda*

Varijable	Aritmetička sredina 1	Aritmetička sredina 2	t-vrijednost	Stupljevi slobode	p-razina značajnosti
Visina	157,8387	156,6129	0,53581	60	0,594073
Težina	52,4194	46,3226	1,90174	60	0,062010
Opseg podlaktice	23,3871	22,0000	2,04384	60	**0,045367**
Kožni nabor nadlaktive	5,3065	4,3500	2,06660	60	**0,043096**
Taping rukom	26,0323	27,4194	-2,20954	60	**0,030965**
Skok udalj	154,7742	168,3226	-2,31599	60	**0,023993**
Poligon natraške	15,9558	13,4355	2,51939	60	**0,014437**
Podizanje trupa	30,5161	36,6774	-2,60901	60	**0,011446**
Pretklon raznožno	53,2581	57,7419	-1,35887	60	0,179274
Izdržaj u visu zgibom	19,4839	27,3548	-1,39218	60	0,169007
Trčanje 800 m	4,1784	3,5200	4,00054	60	**0,000176**

U šestom razredu kod učenika koji pohađaju redovitu nastavu tjelesne i zdravstvene kulture i učenika koji su pored redovite nastave tjelesne i zdravstvene kulture uključeni u školski šport statistički značajne promjene utvrđene su kod dvije morfološke varijable (AOP, ANN), četiri motoričke varijable (MTR, MSD, MPN, MPT) i varijable koja određuje aerobni kapacitet (F800). Razlike mjerenja dviju grupa učenika ukazuju da i kod učenika koji su pored redovite nastave tjelesne i zdravstvene kulture uključeni u školski šport imaju bolje testovne vrijednosti što je izravni utjecaj školskog športa. U varijablama morfoloških karakteristika (ATV, ATT) i motoričke varijable (MPR, MIV) nije došlo do statistički značajnih razlika između grupa na razini statističke značajnosti p=0,05.

Tablica 3. *Rezultati antropoloških obilježja t-testa za nezavisne uzorke učenika petih i šestih razreda koji su pored redovite nastave uključeni u školski šport.*

Varijable	Aritmetička sredina 1	Aritmetička sredina 2	t-vrijednost	Stupljevi slobode	p-razina značajnosti
Visina	151,0833	156,6129	-1,2594	53	0,213406
Težina	38,8333	46,3226	-2,7188	53	**0,008837**
Opseg podlaktice	20,6667	22,0000	-2,3150	53	**0,024518**
Kožni nabor nadlaktive	7,5083	4,3500	2,0217	53	**0,002783**
Taping rukom	24,8750	27,4194	-3,4314	53	**0,001171**
Skok u dalj	157,5417	168,3226	-2,1061	53	**0,039951**
Poligon natraške	13,8063	13,4355	0,4473	53	0,656470
Podizanje trupa	36,9167	36,6774	0,1285	53	0,898267
Pretklon raznožno	53,5833	57,7419	-16181	53	0,111586
Izdržaj u visu zgibom	29,7917	27,3548	0,4067	53	0,685833
Trčanje 800 m	2,4717	3,5200	-10,7521	53	**0,000000**

U učenika petih i šestih razreda koji su pored redovite nastave tjelesne i zdravstvene kulture uključeni u školski šport, statistički značajne razlike su utvrđene kod morfoloških karakteristika u testovima (ATT, AOP, ANN) kod motoričkih varijabli u testovima (MTR, MSD,) i varijable za procjenu aerobnog kapaciteta (F800). Ove razlike između učenika petih i šestih razreda prvenstveno je zbog dobi ispitanika utjecaja rasta i razvoja i ulaska u period puberteta, ali i utjecaju školskog sporta na motoričke testove (MTR i MSD). Kod testa aerobnog kapaciteta učenika došlo je do statistički značajne razlike ali u negativnom smislu što je pod utjecajem motivacije učenika za rad i utjecaja rasta i razvoja u periodu puberteta.

U prostoru cijelog uzorka ispitanika može se tvrditi da kod učenika koji su pored redovite nastave tjelesne i zdravstvene kulture uključeni u školski šport utvrđeno je 13 statistički značajnih promjena i 9 statistički istih stanja. Pritom je veći broj morfoloških mjera ostao nepromijenjen dok je u prostoru motoričkih i funkcionalnih sposobnosti više vrijednosti usmjereno statistički značajnim promjenama.

ZAKLJUČAK

Provedeno je istraživanje na uzorku 110 učenika petih i šestih razreda osnovne škole u Gospiću s ciljem utvrđivanja razlika u antropološkim obilježjima učenika petih i šestih razreda u redovitoj nastavi i učenika uključenih u školski šport. U tu

su svrhu ispitanici izmjereni s 11 standardnih varijabli za procjenu antropoloških obilježja. Temeljem rezultata istraživanja može se zaključiti:

Analizom rezultata razlika u antropološkim obilježjima učenika petih razreda u redovitoj nastavi i učenika uključenih u školski šport evidentirane su promjene kod varijabli koje određuju motoričke sposobnosti učenika (MTR, MSD, MPN, MPT, MIV), te kod testa aerobnog kapaciteta učenika (F800). Time se odbacuje hipoteza H1: koja tvrdi da u prostoru antropoloških obilježja učenika petih razreda ne postoji statistički značajna razlika između redovite nastave tjelesne i zdravstvene kulture i sudjelovanja u školskom športu.

Analizom rezultata razlika u antropološkim obilježjima učenika šestih razreda u redovitoj nastavi i učenika uključenih u školski šport evidentirane su promjene kod dvije morfološke varijable (AOP, ANN), četiri motoričke varijable (MTR, MSD, MPN, MPT) i varijable koja određuje aerobni kapacitet (F800) Time se odbacuje hipoteza H2: koja tvrdi da u prostoru antropoloških obilježja učenika šestih razreda ne postoji statistički značajna razlika između redovite nastave tjelesne i zdravstvene kulture i sudjelovanja u školskom športu.

Analizom rezultata razlika u antropološkim obilježjima učenika petih i šestih razreda u redovitoj nastavi i učenika uključenih u školski šport evidentirane su promjene kod morfloških karakteristika u testovima (ATT, AOP) kod motoričkih varijabli u testovima (MTR, MSD) i varijable za procjenu aerobnog kapaciteta (F800). Time se odbacuje hipoteza H3: koja tvrdi da u prostoru antropoloških obilježja učenika petih i šestih razreda ne postoji statistički značajna razlika između učenika koji sudjeluju u školskom športu.

Analizom rezultata razlika u antropološkim obilježjima učenika petih i učenika šestih razreda može se zaključiti da je do promjena došlo pod utjecajem školskog športa, a razlike između petih i šestih razreda u antropološkim obilježjima su pod utjecajem dobi ispitanika, utjecaja rasta i razvoja i ulaska u period puberteta.

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DIFFERENCES IN THE ANTHROPOLOGICAL FEATURES OF FIFTH AND SIXTH GRADE PUPILS AND PUPILS INCLUDED IN SCHOOL SPORTS ACTIVITIES IN GOSPIĆ

ABSTRACT

A research was conducted in a primary school in Gospić on the sample of 110 fifth and sixth grade pupils with the aim to determine differences in the anthropological features of fifth and sixth grade pupils and pupils included in school sports activities. The pupils were measured with 11 standard variables used for the anthropological features evaluation. By analyzing the results of differences in anthropological features of fifth and sixth grade pupils, it can be concluded that changes are caused by the influence of school sports activities while differences in anthropological features between fifth and sixth graders are influenced by their age, growth, development and the period of puberty.

Key words: *fifth grade, sixth grade, anthropological features, school sports activities, classes, Physical Education classes*

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PRIMJENA RAGBIJA U ŠKOLSKOM SPORTU

UVOD

„...ali trebaš raditi snažno i inteligentno da bi postao dobar igrač".

Clive Woodward (2005)

Sportske su igre društveno duboko u našoj kulturi. Filozofija naše nacije, kao i filozofija većine drugih prepoznala je važnost sportskih igara za razvoj mlade i senzibilne osobe. Naši pedagozi konstantno ukazuju na kognitivnu, društvenu i kulturalnu važnost sportskih igara za razvoj djece. To ukazuje da naš aspekt čovjeka kao igrača nije samo prilika čovjeka da se spontano rekreira, već potreba za izazovom da se pokaže u istoj vrijednosti. Ragbi je igra koja ima idealno okruženje za sposobnost iskazivanja sva tri čovjekova aspekta življenja kao mislioca, radnika i igrača. (J.E. Kane, ravnatelj Instituta za visoku edukaciju, London, 2005).

ZAŠTO RAGBI?

Ragbi je igra trčanja, guranja, dodavnja, obaranja, pucanja u kojoj je uključeno cijelo tijelo, koja utječe na razvoj većine motoričkih i funkcionalnih sposobnosti. Igra u kojoj se individualnost potiče, ali je nemoguća bez timskog rada. Igra s velikom tradicijom sportske kulture, uzajamnog poštivanja svojih i suparničkih igrača te je kao takva prepoznata diljem svijeta kao nezamjenjiv dio razvoja djetetovih antopoloških karakteristika te kognitivnih i konativnih sposobnosti i osobina. Okruženje u ragbiju daje djetetu osjećaj pripadnosti i aktualizacije te unatoč tome što je sport u nekim situacijama grub igrač osjeća poštovanje svojeg suigrača. Ragbi je igra koja se igra u 120 zemalja diljem svijeta, u počecima se igrao isključivo kao akademski sport odakle je i potekao, sa Sveučilišta Rugby u Engleskoj. Iako je zastupljen na svim kontinentima i u svim staležima, ragbi je i dalje ostao primarno akademski sport.

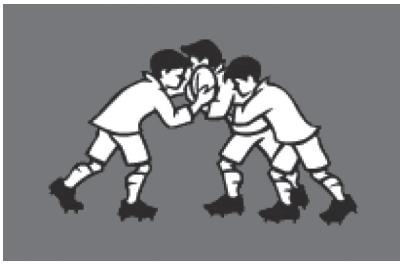
ISKUSTVA IZ FRANCUSKE

Sredinom dvadesetog stoljeća francuski fiziolog Tissie u procesu modernizacije francuskog školskog sportskog sustava je tražio da se uz švedski gimnastički sustav u školama uvedu športske igre. Poseban naglasak je stavljao na ragbi, jer po njegovim

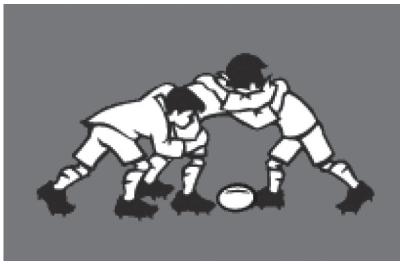
riječim, „Reci mi kako igraš i ja ću ti reći tko si", ragbi je bio idealno okruženje za razvoj mladih. (Terret, 1999)

UVOD U RAGBI IGRU

Ragbi je igra gdje dvije momčadi na igralištu do 100 metara dužine i 70 metara širine različitim tehnikama nošenja, dodavanja, pucanja i polaganja lopte pokušavaju postići što više poena te momčad koja postigne više poena je pobjednik. U seniorskom i juniorskom ragbiju svaka momčad broji 15 igrača te svaki od njih ima svoju poziciju pa tako i zadaću koju mora izvršavati kao igrač. Igrači su raspoređeni u dvije skupine: Skup koji se sastoji od osam igrača te linija u kojoj su ostalih 9 igrača. Ako je igrač oboren, taj igrač mora pustiti loptu iznad koje se formira otvorena formacija na podu pod imenom *rak*, a ako je igrač zaustavljen na nogama formira se otvorena formacija *mul*. Svrha *raka* i *mula* je da igra ima kontinuitet. *Linijski aut* i *donji skup* su dvije zatvorene formacije u ragbiju te su tako dva značajna faktora u ragbi igri. *Donji skup* se formira nakon prekida u igri kao početak novog napada, a *Linijski aut* kao formacija izvođenja auta. Zgoditak se postiže na način da igrač postavi loptu u prostor za zgoditak i donosi 5 bodova te se može pretvoriti sa slobodnim udarcem u rašlje što donosi još 2 boda. Bodovi se još mogu postići slobodnim udarcem koji se daje ako igrač povredi pravila igre te poluvolejem iz igre. Oba vrijede po 3 boda.



Slika 1. *Formacija „Mul"*



Slika 2. *Formacija „Rak"*

Formacija *mul* nastaje kao rezultat zaustavljanja igrača s loptom na nogama.

Formacija *rak* nastaje kao rezultat obaranja igrača a loptom na pod.



Slika 3. *Formacija „Linijski aut”*



Slika 4. *Formacija „Donji skup”*

RAZLIČITI MODALITETI RAGBI IGRE U ŠKOLSKOM SPORTU

Različiti modaliteti ovog sporta siguran su put za razvoj mladih igrača te tako postoji:

U8 ragbi

Verzija za djecu do 8 godina koji na smanjenom terenu (40x30m) igraju s 8 igrača u svakoj momčadi bez formacija *linijskog auta* (slika 3) i *donjeg skupa* (slika 4). Sudac je aktivan sudionik igre ne samo kao kontrolor pravila već kao i odgajatelj i učitelj. Ovom verzijom se postiže sigurnost, ali se pri tome zadovoljava dječja potreba za natjecanjem.

U10 ragbi

Verzija za djecu od 8 do 10 godine koji na smanjenom terenu igraju s 9 igrača u svakoj momčadi bez formacija *linijskog auta* i *donjeg skupa*, jer su djeca i dalje u dobi univezalne sportske škole. Ali sudac više nema ulogu učitelja već samo kontrolora igre.



Slika 5. *Ragbijaši dječje dobi*

U12 ragbi

Verzija za djecu od 10 do 12 godine koji na smanjenom terenu (60x40m) igraju s 10 igrača u svakoj momčadi te se prvi puta uvodi formacija *donjeg skupa*, ali ne formacija *linijskog auta*. Donjeg skupa je formiran od 3 igrača, ali je zabranjeno natjecanje za loptu već služi samo kao početak reseta igre. Ulaskom djece u osnovnu sportsku školu počinje temeljna sportska priprema pa se radi toga počinje sa zatvorenim formacijama *donjeg skupa*.



Slika 6. *Donji skup mladih ragbijaša*

U14 ragbi

Verzija za djecu od 12 do 14 godine koji na smanjenom terenu(70x40m) igraju s 12 igrača u svakoj momčadi te se po prvi puta uvodi formacija *linijskog auta*, a skup je sastavljen od 5 igrača,te počinje faza sportske specijalizacije.

Još postoje dvije verzije ragbija koje su se modificirale nedostatkom uvjeta , a to su „Touch" ragbi i „Tag" ragbi. Obje su bezkontaktne verzije ragbija, ali imaju ista pravila kao i osnovna verzija ragbija. U „Touch" ragbiju igrač umjesto obaranja i zabijanja mora igrača dotaknuti s dvije ruke i reći „Touch" te se igrač mora zaustaviti i dodati loptu, a u „Tag" ragbiju igrači nosu vrpce oko struka te svaki put kad mu protivnički igrač skine vrpcu on mora stati i dodati loptu.

Temeljna pravila i osnove treninga u ragbiju

Trening u ragbiju ovisi o dobi, spolu i razini sposbnosi igrača s kojima se radi. Trening se principom sustavnosti i postupnosti prilagođava i modificira tijekom

sazrijevanja igrača. Igra mora biti primarna metoda učenja u mlađim dobnim skupinama. Za vrijeme osnovne škole ragbijaški treninzi bi se trebali odvijati dva puta tjedno kao dio izvan nastavnih školskih aktivnosti, a u srednjoj školi tri puta tjedno. Zbog jednostavnosti organizacije i kratkog trajanja utakmica u toj dobi turnirski sustav natjecanja je idealan tijekom osnovne škole. Nakon završetka osnovne škole igrači bi se uključivali u sustavni klupski trening.

Temelj treninga ragbija mlađih kategorija metodika treniga se svodi na višestrani razvoj s naglaskom na kordinacijske sposobnosti i osnovna tehničko-taktička znanja u ragbiju te se s vremenom daje naglasak na učenje specifičnih pozicijskih tehničko-taktičkih znanja i razvoj bazičnih i specifičnih motoričkih sposobnosti. Uvodni i pripremni dio treninga se temelji na razvoju osnovnih ragbi kretanja. To su igre trčanja, puzanja, hodanja, guranja, hrvanja...). U glavnom dijelu treninga radi se na razvoju osnovnih tehničko taktičkih znanja i temeljnih kondicijskih sposobnosti.

U mlađoj se sportskoj dobi zbivaju velike promjene tijekom rasta i sazrijevanja djeteta sportaša, osobito tijekom izgrađivanja kondicijskih sposobnosti, sportske tehnike i taktike te, što je posebno važno, formiranja navika i pozitivnih karakteristika ličnosti. (Milanović, 2010)

ZAKLJUČAK

Iako je ragbi u Hrvatskoj više od pedeset godina on nije dobio na značajnosti unatoč svim njegovim pozitivnim karakteristikama. Poučeni iskustvima izvana gdje je ragbi neizostavan dio školskog sporta, pokušali smo predstaviti ragbi kao sport koji potiče zdrav i potpun razvoj djece i madih. Uspješan razvoj djece i mladih mora biti temeljen na širokom spektru različitih sposobnosti, osobina i znanja, a ragbi je idealan sport za to. Na temelju ovog rada može se predložiti da ragbi postane dio Hrvatskog školskog sportskog sustava i da ga se uključi u sustav natjecanja na lokalnoj, regionalnoj i državnoj razini.

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APPLICATION OF RAGBI IN SCHOOL SPORT

ABSTRACT

Ragbi is a sport that falls to a chategory of sport games, and with that is an ideal activity for full psycho-physiological development of kids and adolescents. Proof for that is that depite the fact rugby became a proffesional sport in numeruos countries , in his essence it stayed an academic sport because it is irreplecable part of education from preschool to university level. That is the reason why I suggest that rugby should be part of Croatian school sport and its competitions on all levels.

Key words: *ragbi, psycho-physiological development, school sport*

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Review

ROLE OF SCHOOL SPORT IN THE EDUCATION OF THE YOUTH

School sport as part of school physical education has a vital role in the education of young people. As an indispensable extracurricular activity of the pupils, school sport can inspire the youth to the heights which help one see and understand better the words of Achilles' father: „Strive always to be the best and excellent among others not to shame the line of your fathers, the finest men by far…." (1). These words remind one of something that in these global modern times is a ***forgotten value***. For sport has for a long time forgotten its value attributes such as health, socialization and education, and has turned to some new ones – profit and professionalism.

That is why it is once more important to remind why the all-time terminological fight about the term: **school sport or sport in school** was so important, and that wisdom and foresight have fortunately for the domain of sport won over hedonistic – profit interests. That is why we can still talk about long-abandoned attributes of sport – health, socialization and education that are nowadays value categories of the school sport.

In the syntagma ***school sport***, the attribute school clearly denotes its priority. It determines its value categories and actually guards those values that once were in the core of sport. This means that such an organizational scheme for school sports activities primarily emphasizes education, and everything is subdued to the education of our schoolchildren. Such determination of its objectives, where education has a prime role, sports results being the primal task in sport becomes just an incentive for the school sport and pupils to turn to, of their own will, and to be engaged in school sports groups and school sports competitions. Through the engagement in school sports groups and in their school sport dreams quite unnoticed pupil will build up their social skills, friendliness, respect and love for other fellow beings.

Also through physical exercise and exercising pupils will perfect their body and their health. And all of these are going to be built into their personality – one and only, unique and irreproducible. This very personality will, due to school sports

dreams mature more easily and prepare for the life that will bring them ups and downs, successes and failures. That is the value of school sports which cannot be measured by material means.

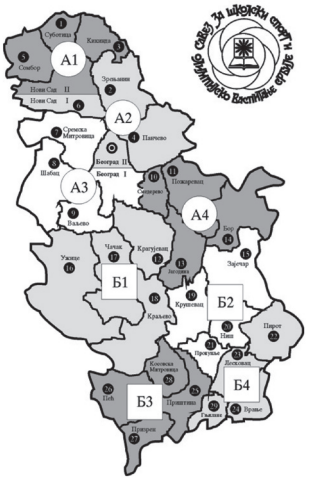
Education is not just: planned and systematic activity ... (2), or, maturing process ... (3), this is also an old Slavonic word for feeding. And this means that physical exercise, which is the basic means of all three realms of physical culture – education, sport and recreation, represents specific food, first of all for the physical part of our being. Therefore, it is important to know how to use this specific food – physical exercise. And as it is always in life, all kinds of over-nurturing in one or other sense is not useful; it is detrimental for health of each individual. Over-emphasized physical activity which is basic for the building of new cults such as: **cult of sports results, cult of the body and cult of the profit** should at no cost be present in the school sport. Quite contrary, underestimating and scorn for physical exercise and physical engagement can frequently be found in everyday life, which is also not acceptable. Due to these controversies that are ultimately cruel, school sport gives a chance to find the right measure in consuming this specific food – physical exercising. This fact contains one of the most essential values of the school sport. By educating i.e. nurturing young school athletes by means of physical exercising, school sport helps in adequate growing up and maturation of young people. This growing up encompasses immeasurable importance of parents and our PE teachers.

School sport as its name denotes clearly is connected to school and is a part of regular teaching process. Within physical education (4), it covers the area of extracurricular activities and is a very important segment. Variability of school sports groups is a treasure of each school because it meets various demands of the pupils. Likewise, this is a chance to get familiar with some sporting activity and to like it and accept it. Such an opportunity is a precious one for the pupils and each of them can find what his or her young personality favours most. And through togetherness and school sports trainings, one learns all that organized and planned physical exercising enables.

Model of organized school sport in Serbia shows that a large number of children are included in different sports activities at different levels (5). In a pyramid-like structure of the organization starting from its basis, competing in school all the way to the top which is a state level competition, a large number of pupils has a chance to compete and show their abilities. Of course as all the systems this one shows its drawbacks. All the drawbacks do not reflect in the lack of will and knowledge to organize and implement school competition and the functioning of the school sports groups. What poses a problem is setting up of the structure of school sport. For the time being, the only values of the results achieved at the communal, regional and republic levels are taken into account. If one adds up the problem relating to the

right of the pupils to take part in these competitions (schoolchildren athletes or those not participating in sports club) it rounds off the problem altogether. The problem is reflected in the drawbacks of the teacher's work in the very base of the pyramid-like structure of the school sport – in the school itself. One does not evaluate the results of the teacher in his or her school nor does one insist on the pyramid basis foundation. Until one applies this principle, one cannot expect to get any improvement in the school sport. Of course, in emphasising the awareness, the most important role belongs to the field expertise organizations of the PE teachers and the Ministry responsible for the school sport.

These are the reasons to start with the school class and school grade as the basic unit when one organizes sports competitions showing the advancement of schoolchildren. This must be the foundation when thinking about school sport and the organized system of working and competing. (6)



Appendix 1

Table 1. *Represented sports in school sports competitions*

Athletics	Handball
Gymnastics	Basketball
Swimming	Volleyball
Shooting	Futsal
Table tennis	

In the systematic organization of school sport, of course it is very important to have a support from the state through their ministries. Basically, one takes into account ministries of education and sport of the youth (6). But this support is important not only because of the financial support, but also because of the possible determination of legislative regulations of the very organization of school sport and school sports competitions, and it has its drawbacks. These drawbacks taken from the state's angle are identification of school sports competitions with competitions in the registered sport. This sense of sameness causes the formation of the opinion, not only of the PE

teachers but children as well, that sports results are valuable in their own right and that to achieve them, all means of obtaining them are allowed.

This is completely wrong and tragic.

School sport is a chance and it has to be a chance to satisfy the need for movement and socializing and to occupy free time of young people. Therefore, one has to pay equal attention to the regional and state competitions as well as the school ones. Because the purpose of the presence of school sport is satisfying the needs of the youth and these are more and more emphasized. New technology and new concepts of the (programmed) development of man and society at large offer quite the opposite – individualization and destructive humanization. In order to defy this trend, the school and school sport can with the help of parents slow down and stop altogether such inclinations of the neo-globalist and neo-liberal ideologies.

- Therefore, our PE teacher ***cannot be a coach but a torch holder*** who will light the theo-humanistic path to his/her pupils.
- Therefore, our PE teacher will know that class and grade competitions in his school are most important; more important than all the regional and state competitions and Olympiads.
- Therefore, our PE teacher will try hard to stir all the pupils in his/her school to exercise and compete having in mind the Latin maxim: ***Urbi et orbi!*** (7) and the best among them will constitute their representative school teams.
- Therefore, our PE teacher will follow the theo-anthropocentric approach in PE field approach (8). He will try to find in each pupil that spark that will trigger him or her and direct them into physical exercising and thus to socializing with their friends.
- Therefore, our PE teacher will know that competitions in school sports meetings are typical life school for the pupils. He or she will teach them not to be lofty in their success or ashamed in their failures. He or she will teach them to gain success by working – exercising.

In a word, our PE teacher will teach the pupils that school sport (and for the chosen ones registered sport) is just a part of their own youth and life joy and their school sports are constituent part of their growing up.

Our PE teacher will be a role model for his or her pupils and thus will testify about the values of the school sport that are not just winnings and awards, achieved points and good sports results but socializing, regular training and school sports dreams that stir and lift. He or she will testify to that in teaching their pupils not to win by fraud and violence but with their own efforts and capabilities.

Participants of the republican school sports competitions

	year	athletics	gymnastics	swimming	shooting	table tennis	handball	basketball	volleyball	futsal	Total
Elementary schools - girls	2003/04	130	105	260	58	48	108	90	90		
Elementary schools - boys	2003/04	130	51	292	63	60	108	90	90	90	
Secondary schools - girls	2003/04	112	27	79	54	57	108	90	90		
Secondary schools - boys	2003/04	125	20	101	58	54	108	90	90	90	
total	2003/04	497	203	732	233	219	432	360	360	180	3216
Elementary schools - girls	2004/05	123	115	212	65	66	108	90	90	90	
Elementary schools - boys	2004/05	106	54	270	69	69	108	90	90	90	
Secondary schools - girls	2004/05	108	36	78	61	60	72	90	90		
Secondary schools - boys	2004/05	115	28	99	68	60	108	90	90	90	
total	2004/05	452	233	659	263	255	396	360	360	270	3248
Elementary schools - girls	2005/06	112	166	223	76	54	108	90	90	90	
Elementary schools - boys	2005/06	114	89	259	71	57	108	90	90	90	
Secondary schools - girls	2005/06	106	35	74	55	51	108	90	90		
Secondary schools - boys	2005/06	113	36	93	68	60	108	90	90	90	
total	2005/06	445	326	649	270	222	432	360	360	270	3334
Elementary schools - girls	2006/07	118	92	268	63	66	108	90	90	90	
Elementary schools - boys	2006/07	109	75	301	67	69	108	90	90	90	
Secondary schools - girls	2006/07	100	30	79	59	63	108	90	90		
Secondary schools - boys	2006/07	110	22	105	68	69	108	90	90	90	
total	2006/07	437	219	753	257	267	432	360	360	270	3355

Contribution 1

They will testify by their own example that they do not care for rewards and prizes and that they do not come before the pupils. Therefore, he or she will decorate their teaching room with the pictures of their pupils and not with their rewards.

They will testify by showing everyone that their class and school competitions are most important and that all their pupils take part in them; that their gym and open door facilities are full of their pupils included into the activities of the sports groups. They will show that for them it is most important that all the pupils do exercises, try to master and perfect themselves and that they fantasize to – ***be the best and try not to bring shame to their school, their parents and their friends***. This is not utopia, this is the task for our good teacher. (9) This task that our teacher has accepted when stepping on the threshold of the school is a lofty task of each and every PE teacher-pedagogue. In their school everybody can exercise and the best will represent the school, class. This is the obligation of the PE teacher.

In the world we live in and which for the sake of hedonistic objectives finds all means allowed for the task accomplishment, we think about the role and the significance of school sport. Besides, neo-Darwinist theory omnipresent and interwoven in all aspects of our lives is consistently destroying this segment of school as well. It uses words: ***tear it up, tear it up*** and tries to incorporate all characteristics of the registered sport and all its negative sides into the school sport. And by forcing only town's and republic competitions and by rewarding teachers only for the results achieved there one tries to blur the role of school sport and follows neo-Darwinist theory of today's world.

Therefore our PE teacher and pedagogue, the torch bearer of our specific domain of knowledge knows well what to do.

And to show that ***one educates with the help of love and being a role model***.

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2. Education is a planned and systematic activity of leading a child and the grown up in physical and spiritual sense. (Zivanovic, N. 2000. Contribution to the epistemology of physical education. Panoptikum: Nis.)
3. Education is a process of forming a personality with the organized actions of the family, school and other factors (Small encyclopedia of education. Vol.1, Belgrade, 1896.)
4. Physical education is a part of general education which means that this is a planned and systematic activity which by means of physical movement-exercise as a specific food develops human personality. (Zivanovic, N. 2000. Contribution to the epistemology of physical education. Panoptikum: Nis.)

5. According to the available data it is estimated that school sport competitions comprise around 500.000 pupils. And in the finals, taking republic level into consideration, there are around 3.200 and 3.400 pupils. (See the contribution 1).
6. Organizational scheme can be seen on a site of the Association of school sport and Olympic education.
7. In Serbia a responsibility for education and sport of young people falls within two separate Ministries: Ministry of Education and Ministry of Sport and Youth
8. To all and each!
9. Approaches to the development of the theories of physical education: ethnocentrism, biocentrism, egocentrism, anthropocentrism, theoanthropocentrism.
10. It may sound like utopia for all the pupils to be included into the functioning of school sports groups. But this is feasible if there is a wish of the teacher to motivate his or her pupils. Organizational problems can be solved. This is verified by some teachers in some schools in Serbia as well as one of the authors of this paper in his early teaching days in one of the schools.

ABSTRACT

School sport as a part of school physical education has a vital role in the education of young people. As an indispensable extracurricular activity of the pupils, school sport can inspire the youth to the heights which help one see and understand better the words of Achilles' father: „Strive always to be the best and excellent among others not to shame the line of your fathers, the finest men by far…." (Homer, Iliad, VII 208-210). School sport differs from the sport in school in that it uses such messages to build most valuable school sport dreams as a part of youth. Also, school sport dreams make a basis for easier maturation and facing the reality where success and failure make up normal course of our lives. Therefore, school sport competitions should be under the patronage of the Ministry of Education and Ministry of Sport and Youth and school as well. Naturally, this cannot take place without parents and pupils. Without their help and enthusiasm it is not possible to organize school sport especially at the level of school. That is why this segment of school sport deserves the greatest attention. Citing the organization of school sport in Serbia, we will point to the bad and good sides of it and give our opinion on how to improve the organization of school sports competition.

Key words: *School sport, education, youth*

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