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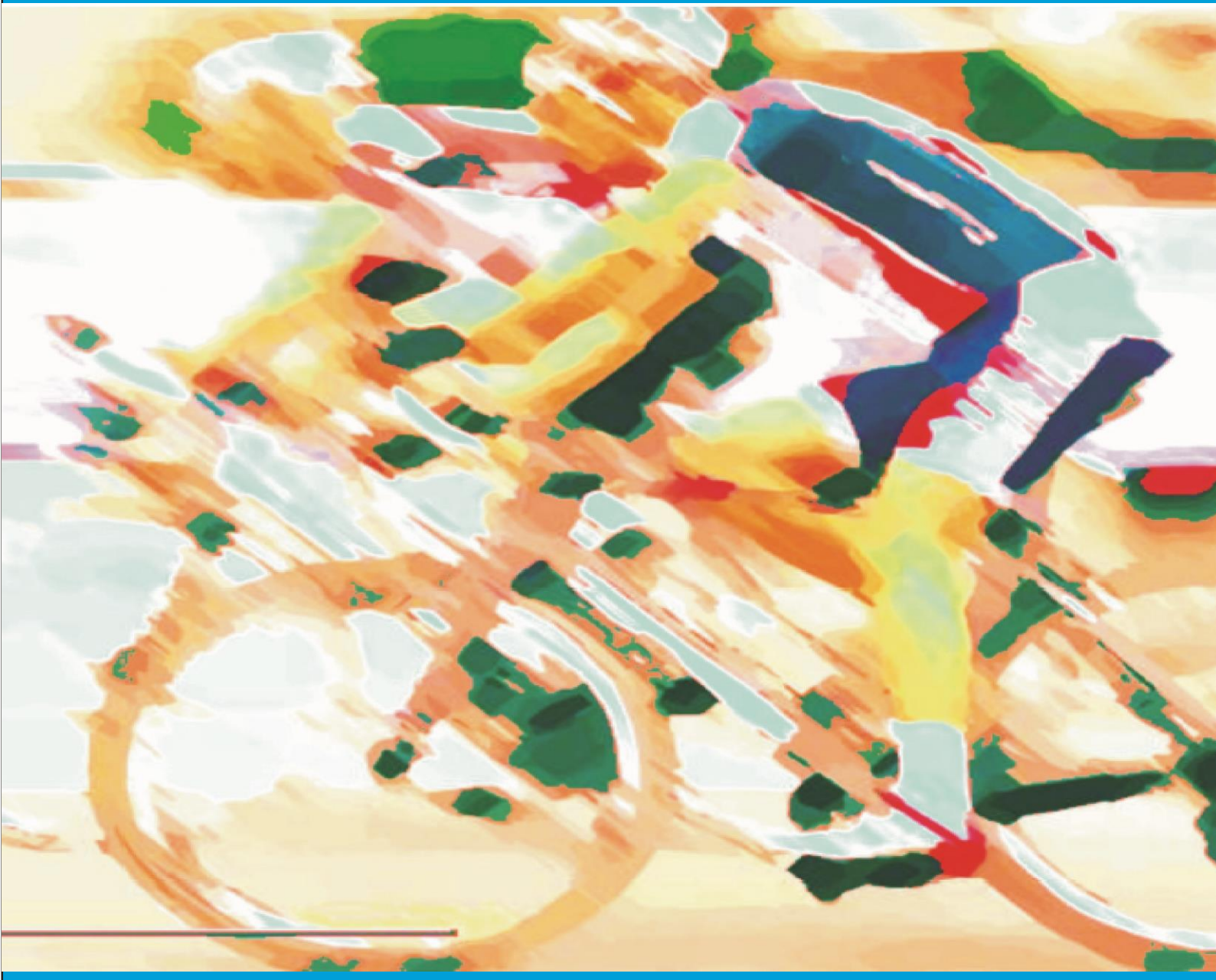

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CONTENTS

THE EFFECT OF BASKETBALL, VOLLEYBALL AND HANDBALL PROGRAM ON THE CHANGES OF BASIC-MOTOR SKILLS OF FIFTH GRADE ELEMENTARY SCHOOL FEMALE STUDENTS

Elvira Nikšić, Edin Beganović

Original scientific work

Abstract:
At the core of every physical activity are basic-motor skills that can be changed in a positive or negative way under the influence of different factors. Body and health culture in school has a positive impact on all basic and motor skills as one of the main goals. The aim of the research was to determine the partial changes (differences) of basic-motor abilities that were created under the influence of a four-month program of basketball, volleyball and handball in the pupils of the fifth grade of elementary school. The study included N = 106 pupils of the V class, aged 10 to 11 years, clinically and mentally healthy, and with no pronounced morphological and locomotor impairments. The sample of respondents was divided into two subgroups, an experimental group (53 students), who conducted physical and health education classes according to the modified plan and program of sports games (basketball, volleyball and handball) for a half-year and control group (53 pupils) who attended regular classes from physical and health culture according to the current curriculum. 15 motor variables were used to assess basic-motor abilities. Descriptive statistics and discriminatory analysis were used to determine changes (differences) in basic-motor abilities. The results of the study at the descriptive level showed certain differences between the groups in the final versus the initial measurements. Based on the results of the discriminatory analysis, it can be concluded that the highest relative contribution has the variables MTAPN and MFRSKL, and the smallest MFESUM and MPD. Other variables give relatively moderate contributions to the accomplished discriminatory function. The advancement of basic and motor skills depends on good organization and realization of physical and health education.

Key words: experimental program, sports games, motor, pupils**.**

INTRODUCTION

Motor skills are defined as latent motor structures that are responsible for the infinite number of manifest motor responses and can be measured and described. Motor skills are not only important for themselves but also for the development of other qualities and abilities. If motor abilities do not develop to a level that is objectively possible with regard to genetic limitation, it is likely that such an individual will not be able to perform effectively and easily with various daily tasks, nor will the development of other traits and abilities with which the motorized capabilities are related. In addition, all motor skills do not have the same coefficient of inadequacy, which is why some during life are less, and some are more influenced by the exercise process. There is much more innate speed, coordination and explosive power than repetitive and static power, and flexibility (Findak, 2003). In order to influence the abilities with a higher level of innation, it is necessary to begin with the transformation process as soon as possible, respecting the sensitive periods for the development of individual traits and abilities (Prskalo, 2004). At the heart of every physical activity are basic motor skills that can be changed in a positive or negative way under the influence of different factors. Physical education at school has one of the main goals of having a positive impact on all basic motor skills. Additional physical activity in the form of systemic training, according to most of the previous studies, increases the positive effects of physical education (Ivković, 2007). The kinesiologically determined initial state and the intended endpoint of the students would enable teachers to determine precisely, quantitatively determining the transition states of the students during the year, from the initial to the final state, and ultimately the final analysis and assessment of the effectiveness of the applied model of exercise (Mraković, 1992). Pejčić, (2001) researched 655 pupils from the 1st to the 4th grade. Students were examined in 4 morphological variables and 6 motorcycles (long jump, 20 m sprint, high hanging, hull lift and polygon backlash). The conclusion is that the teaching of TZK can influence changes in morphological characteristics and motor abilities. Katić and Pažanin (2002) carried out research on 249 boys at the age of 7 years in 10 motor variables (polygon backlash, balance, footsteps, foot legs, hand tapping, hanging hook, hull lifting, 20 m sprint, jump far from the place and throwing the ball). One of the conclusions is that a programmed transformation process of less than a year and a half can not cause changes in general coordination and energy integration. On a sample of 22 students of elementary school students in Zagreb, students were trained for two years using 4 anthropometry tests, 6 tests for motor skills (polygon backlash, long-range jump, hanging in the fold, hand tapping, multiplying and hulling) and one test for functional abilities. It was confirmed that students, who did not participate in sports activities in the course of TZK, twice a 45 min. they could not significantly develop anthropological characteristics in the long run (Sertic et al., 2008). During the research on a sample of 400 pupils of the early school age anthropometric measurements were carried out with three standard instruments, motorized with six

instruments (hand-operated, long-range jogging, polygon backlash, hull lift, multi-row overhang and high-joint support), functional with one test, and motor achievements were assessed using six instruments. An analysis of the state of motor skills and achievements indicates progress in a large part of the motor space (Cetinić and Petrić, 2010).
In their research "Discrimination analysis of some basic motor skills of students of sports gymnasium and students of mixed secondary schools", they came to the knowledge that students of sports gymnasium have much better results in tests of motor skills than students of mixed high school. The reason is why it came to this, and that is that students of the sports gymnasium have a higher amount of hours of physical activity compared to students of mixed secondary schools. What is another indication that a fund of two hours of physical education is limited to optimal development of abilities (Tabaković et al., 2003).

Physical education of two hours a week can hardly fully satisfy the need for movement. In some instances, there is a lack of motivation for physical exercise in children, and they try to avoid active participation in classes in all possible ways. In the physical education classes, students have four sports games: handball, basketball, football and volleyball. Sports games are characterized by varied natural movements. All these movements are applied in the conditions of cooperation between the teammates. The effectiveness of the game in a great deal depends on the speed of movement, perception of space and players in it, from the adoption of the technique of movement, and the level of motor and general abilities. The place of sports games in the teaching of physical education is not accidental. Participation in sports games is characterized by intense muscular, psychological and functional activity, which results in a positive impact on the biopsychosocial development of the child (Nikšić et al., 2015).

METHODS

Sample of examinees

The study was conducted on a sample of N = 106 pupils in the fifth grade, female, aged 10 to 11 years, clinically and mentally healthy, and with no pronounced morphological and locomotor impairments. The sample of respondents was divided into two subgroups, an experimental (53 pupils) and a control group (53 students). The experimental group conducted classes according to the changed curriculum. The program included sports games from handball, basketball and volleyball. The control group carried out the teaching according to the current curriculum.

Variable sample

The variables used in this study consisted of 15 motor variables:

- Variables for estimating the frequency of the movement (Taping by hand - MTAP; Taping the leg - MTAPN; Taping the feet against the wall - MTAPNZ).
- Variables for flexibility assessment (Stick turn - MFLISK; Reach in the seat - MBFDS; Preclination right - MPD).
- Variables for estimating explosive power (Long Distance Jump - MFESDM; High Jump from the Site - MFESUM; High Speed Sprint 20m - MFE2OV).
- Variables for estimating repetitive power (Lay-sit test - MRCLDM; Test squad for 40 seconds - MFRDC; Sketches - MFRSKL).
- Variables for assessing coordination (Steps aside - MAGKUS; Magnetic Test - MAGTUP; Polygon Background - MRGEPOL).

Methods of data processing

A descriptive statistical procedure was applied in the data processing process.
The following descriptive parameters are calculated:
- Arithmetic mean (Mean);
- Standard deviation (Std. Deviation).

Changes were calculated at the multivariate level:

- A discriminatory analysis was used to determine the changes and differences between the experimental and control group under the influence of the experimental program in the tests of basic-motor abilities.

Work program

During the first semester, three teaching units were processed as part of regular classes: athletics, basketball and volleyball. A total of 35 teaching hours of regular physical and health education were held, of which 12 hours of athletics, 12 hours of basketball, 11 hours of volleyball. The program of additional classes through the basketball, volleyball and handball sports games consisted of a modified curriculum from basketball: adding and catching balls from basketball, running a ball with a stop, a basketball technique, a low-lead technique, a kick-off practice with zipper positions, zigzag guiding, one - handed addition, moving the ball with arms in motion, running the ball with stop in the position of the shot, ball manipulation, pivoting technique with the ball, straight line guidance from high to low, and vice versa. From the volleyball sports, some teaching units were done, for example: hammer hit, passing with fingers over the net, training a school service, mini volleyball, hammering overhead, refusing to throw a ball out of the wall, adding alternate fingers - a hammer, school service with six and nine meters, jumping with both legs from dockyards on the net, shooting a basket with a hammer. From the handball, the teaching units were done as follows: foreclosure, lateral addition, jumping, kicking on the goal, slalom, handball, straight tracking, mini handball, goal kicking - seven, manipulation with a handball, Shade Adding,

Adding To The Triples Game 1: 1 Shooting on the goal. Only girls were involved in this program and for this reason football was not taken as a sports game.

RESULTS

The display of the obtained data by the given markings.

Table 1. Values of arithmetic meanings and standard deviations of basic motor initial measurement

Variables	GROUP	N	Mean	Std. Dev.	Std. Error
MTAP	1	53.00	27.30	2.74	.38
	3	53.00	28.09	4.01	.55
MTAPN	1	53.00	24.57	2.79	.38
	3	53.00	22.66	2.71	.37
MTPNZ	1	53.00	18.74	2.25	.31
	3	53.00	19.36	3.26	.45
MFLISK	1	53.00	71.89	15.91	2.19
	3	53.00	74.57	18.63	2.56
MBFDS	1	53.00	21.30	7.83	1.08
	3	53.00	19.38	7.06	.97
MPD	1	53.00	42.17	11.35	1.56
	3	53.00	42.36	9.91	1.36
MFESDM	1	53.00	147.17	24.91	3.42
	3	53.00	148.68	25.06	3.44
MFESUM	1	53.00	26.72	5.22	.72
	3	53.00	26.49	5.57	.77
MFE20V	1	53.00	4.31	.41	.06
	3	53.00	4.41	.55	.08
MRCLDM	1	53.00	20.60	4.03	.55
	3	53.00	21.42	4.77	.66
MFRDC	1	53.00	31.25	5.57	.77
	3	53.00	29.72	7.60	1.04
MFRSKL	1	53.00	8.21	8.78	1.21
	3	53.00	11.04	9.86	1.35
MAGKUS	1	53.00	12.87	1.17	.16
	3	53.00	13.04	1.61	.22
MAGTUP	1	53.00	31.18	2.73	.37
	3	53.00	32.17	4.02	.55
MRGEPOL	1	53.00	22.82	6.52	.90
	3	53.00	22.08	6.57	.90

In the table above are presented the representations of the average values and measures of deviation of basic motor results of the examinees from the control group and experimental group in the initial measurement, based on which the differences in all variables between groups are noticeable.

Table 2. Values of arithmetic meanings and standard deviations of basic motors final measurements

Variables	GROUP	N	Mean	Std. Dev.	Std. Error Mean
MTAP	2	53.00	29.85	2.82	0.39
	4	53.00	30.21	3.50	0.48
MTAPN	2	53.00	26.70	2.84	0.39
	4	53.00	26.68	3.22	0.44
MTPNZ	2	53.00	21.26	2.53	0.35
	4	53.00	21.53	3.10	0.43
MFLISK	2	53.00	62.96	14.92	2.05
	4	53.00	63.40	17.72	2.43
MBFDS	2	53.00	23.28	7.75	1.06
	4	53.00	21.30	6.64	0.91
MPD	2	53.00	46.98	10.61	1.46
	4	53.00	45.96	10.06	1.38
MFESDM	2	53.00	157.26	24.49	3.36
	4	53.00	159.15	22.91	3.15
MFESUM	2	53.00	29.53	5.44	0.75
	4	53.00	29.72	5.38	0.74
MFE20V	2	53.00	4.10	0.36	0.05
	4	53.00	4.08	0.47	0.06
MRCLDM	2	53.00	23.45	4.01	0.55
	4	53.00	24.49	4.25	0.58
MFRDC	2	53.00	35.43	5.42	0.74
	4	53.00	35.04	6.59	0.91
MFRSKL	2	53.00	12.00	10.48	1.44
	4	53.00	15.81	11.99	1.65
MAGKUS	2	53.00	12.01	1.18	0.16
	4	53.00	11.97	1.38	0.19
MAGTUP	2	53.00	29.44	2.50	0.34
	4	53.00	29.93	3.30	0.45
MRGEPOL	2	53.00	17.78	5.22	0.72
	4	53.00	18.47	5.44	0.75

The table above gives an overview of the average values (mean columns) and deviation measures (st. deviation columns) on the individual variants of basic motor in the control and experimental group in the final measurement. As shown in the table, there are some differences in the descriptive level. In the following section, a discriminatory analysis was carried out to determine the intergroup differences in individual components of basic motor in initial and final measurements.

Table 3. Box's M test initial measuring

Box's M		157.51
F	Approx.	1.11
	df1	120.00
	df2	33533.50
	Sig.	0.19

As can be seen from the above table, the Box test is not statistically significant at any level indicating that the elements of the variance-covariance matrix variables of basic motorism are uniformed.

Table 4. Significance of isolated discriminant functions initial measurement

Function		Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
dimension0	1	.17[a]	100.00	100.00	.38

A discriminating function with a canonical correlation value of 0.38 was determined, and according to the value of this coefficient it can be concluded that this is a mild connection between factors that represent the latent structure of the variation of the isolated discriminant function.

Table 5. Wilks' Lambda initial measuring

Test of Function(s)		Wilks' Lambda	Chi-square	df	Sig.
dimension0	1	0.86	14.88	15.00	0.46

The Willks lambda expression and the correlation coefficient are not statistically significant, and it can be said that in the initial measurement no significant models of differentiation between the control and the experimental group regarding the value of the variations of individual components of basic motor are determined. In the initial measurement, there are no noticeable significant differences between the control and the experimental group in terms of differential weighted combinations of basic motoring elements.

Table 6. The structure of the discriminatory function of the initial measurement

Variables	Function
	1
MFRSKL	0.42
MBFDS	-0.34
MRCLDM	0.31
MAGTUP	0.21
MRGEPOL	0.16
MTAP	0.14
MPD	-0.12
MTPNZ	0.12
MFESDM	0.10
MFRDC	-0.08
MFE20V	-0.05
MFESUM	0.04
MAGKUS	-0.04
MFLISK	0.03
MTAPN	-0.01

Table 7. Centroids group initial measurment

GROUP	Function
	1
1	-0.40
3	0.40

The greatest contribution to the discriminatory function, according to the values of the above-mentioned coefficients, have variables MFRSKL – Push-ups and MBFDS - Reach in the seat, and at least MFLISK – Stick turn and MTAPN - Taping a foot. However, all these coefficients are low and the discriminatory function itself is not statistically significant.

In a discriminatory analysis of the basic motor components in the control and experimental group in the final measurement, a significant discriminatory function was discovered. The canonical correlation coefficient indicates a moderate correlation between variants of latent factors that are in the basic motor structure of both groups in the final measurement.

Table 8. Box's M test final measurement

Box's M		186.38
F	Approx.	1.32
	df1	120.00
	df2	33533.50
	Sig.	0.01

Box's test is statistically significant at the level equal to 1%, indicating a significant unevenness of the elements of the variance-covariance matrix variables of the basic motor of the control and experimental group in the final measurement.

Table 9. Significance of isolated discriminatory functions Final Measurement

Function		Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
dimension0	1	.49[a]	100.00	100.00	.57

From the table above, it can be seen that the value of the characteristic root is 0.49, which means that the function is isolated based on the value of cross-saturation can explain, on average, 49% of the variability of the manifest variables of basic motoring.

Table 10. Wilks' Lambda final measurement

Test of Function(s)		Wilks' Lambda	Chi-square	df	Sig.
dimension0	1	0.67	38.20	15.00	0.00

The Willks-Lamda expression and the Hi-square are statistically significant at a level far below 1% indicating that the model of the function significantly makes distinctions between the groups in the final measurement and based on the values of the basic motor variables. This significance of the distinction has arisen under the effect of a work program that is proven in this way.

Table 11. The structure of the discriminating function of the final measurement

Variables	Function
MTAPN	-0.50
MFRSKL	0.22
MAGTUP	0.21
MBFDS	-0.19
MTAP	0.17
MFRDC	-0.17
MTPNZ	0.16
MFE20V	0.15
MRCLDM	0.13
MFLISK	0.11
MAGKUS	0.09
MRGEPOL	-0.08
MFESDM	0.04
MFESUM	-0.03
MPD	0.01

Table 12. Centroids group final measurement

GROUP	Function
	1
1	-0.69
3	0.69

The table above shows the coefficients on the basis of which the relative contribution of each of the mentioned variants of basic motorism to the discriminatory function itself can be concluded. In addition, it can be noticed that MTAPN - Taping foot and MFRSKL – Push-ups have the highest relative contribution, while the smallest MFESUM – High jump and MPD - Turn right. Other variables give relatively moderate contributions to the accomplished discriminatory function. Centroid values are higher than in the base motor situation in the initial measurement, which is also expected from the canonical correlation coefficient (which is higher in the final measurement). Also, the differentiation models were statistically significant in the final versus the initial measurement where they were not statistically significant (see Willks Lamda and Hi-square for initial measurement). According to these results, it can be concluded that there has been divergence in the latent structure of the discriminatory function in both groups, which can most likely be a consequence or effect of the program itself. For this reason, it can be concluded that there are more and more significant possibilities for distinguishing groups in the final measurement.

DISCUSSION

In his doctoral dissertation: "Transformational processes of motor skills and morphological characteristics under the influence of a seven-month program for pupils of the third and fourth grade of primary school", on a sample of 206, divided into two subsamples (experimental and control), a standard and experimental treatment that lasted for 7 month was applied. The results showed that three-hour experimental treatment performed by professors of physical education showed better results than the standard physical education program conducted by class teachers (Skender, 2004). In his research: "The influence of programmed physical education on changes in motor skills in eleven years old students", the results of 70 hours of physical and health education in one year led to changes in all tested motor skills. Variables were the capabilities included in the tests of the eurofit battery test (Stankovic and Hadzikadunic, 2005). An interesting study in which (Delija et al., 2005), analyzes the difference between groups of subjects aged 10 to 11 involved in different kinesiological activities. Subsample consists of three groups: athletes, students working in team sports and students engaged in other sports. Three anthropometric variables, 6 motor variables and one functional were measured. The MANOVA method (analysis of quantitative differences) concluded that different kinesiological treatments created quite large differences among the groups of subjects.

On a sample of 110 pupils (boys and girls) 11 - 13 years, statistically significant changes were found in the structural process of motor dimensions of initial and final measurement, under the influence of the curriculum. A discriminatory analysis was done with the aim of defining quantitative changes that took place at two time points. Indicates that variables for balance estimation (flamingo), long jump (explosive power), lying sit (repetitive hull power), then variable 10x5 statistically significantly changed. The author also concludes that both boys and girls have the capacity to balance at both ages (Kuchuk, 2006). On a sample of 255 boys 11-14 years, significant transformations of motor abilities and degree of adaptation of movable structures were influenced by the programmed work. The highest degree of transformation in the area of basic motor abilities occurred in the long-range jump and hand tapping variability, and it can be concluded that the greatest increase in the value of motor abilities occurred in those motor skills whose development is mainly influenced by endogenous factors (Jašarević i Jašarević, 2006).

In his master's thesis on the sample of 82 handball players, 11-14 years, he tried to determine the qualitative and quantitative changes in the basic situational motor skills created under the influence of the three-month program of handball. The handball program of the 52 training units produced statistically significant changes in the treated areas (Lakota, 2006).

In his work: "Qualitative changes in motor status after a special kinesiology program for children aged 9-10 years", they found that the programmed three-hour training for seven and seven months caused positive effects on improving motor skills, which were included in the testing (Skender et al., 2007). On a sample of 146 male students, transformation processes were established under the influence of programmed physical and health education classes of 69 classes per elementary motor, situational and motor skills and functional abilities of students of the eighth grade. A system of variables of 8 tests for basic motor abilities and 9 tests for the assessment of specific motor abilities was used, and one test for the evaluation of functional abilities. It was found that programmed teaching has a positive influence on improving basic motor, situational and functional abilities between two measurements (Hadžikadunić, 2007). In his work: "A discriminatory analysis of the motor and functional abilities of sports-active and inactive students", on a sample of 64 students, divided into two sub-assemblies (sportively active and inactive students), the author established the existence of a difference between two sub-classes. The results of the study show that sports active students are better in tests for estimating explosive power, segmental velocity, vital lung capacity, and systolic and diastolic blood pressure (Batričević, 2008). In his paper: "The Impact of Experimental Treatment on Some Motor Performance of Fourth-Grader Students", on a sample of 104 students, the treatment applied changes in motor skills in tests for estimating the segmental velocity of the limbs, explosive forces.

The kinesiological treatment did not cause changes in the flexibility and static strength variables, which are influenced by the longitudinal dimensionality of the skeleton, that is, the static strength test is too heavy for the selected sample (Nikolić et al., 2008). In his paper "Structural changes in sports games in the teaching of physical education" on the sample of 152 pupils conducted the content of sports games in the teaching of physical education for the duration of one school year. By applying the treatment, the level of structural changes in basic and specific motors was attempted.

The results of this program have shown a general and systematic reconstruction of general and specific motor abilities, therefore the transfomation process is responsible, although not in all situations to the same extent. The worst effects were recorded in the case of football (Mladenović, 2008). In the study of changes in pupils aged 11 years under the influence of the experimental program of sports games compared to the standard bodybuilding program, the sample was made up of 252 male students who were divided into a control group and experimental group. A system of 33 variables (12 morphological and 21 for estimation of motor and functional abilities) was used. The experimental program was saturated with the contents of sports games. The results show that the morphological system contributes to the equal differentiation of the group, while the experimental group showed better results in the motor space, of 14 variables that showed a statistically significant difference in 13 variables, the experimental group was better (Malacko and Pejić, 2009). In a study conducted on 153 subjects, 48 respondents participated in regular physical education with 2 hours of instruction, (the first experimental group E1), 56 subjects participated in regular physical education with 2 classes, plus the third extra hour per week second experimental group E2), with which professors of physical and health culture worked, and 49 respondents participated in regular physical education classes with class teachers, 2 lessons per week (control group - K).

There were statistically significant changes in motor abilities in the final relative to the initial measurement in experimental groups relative to the control. On the basis of the obtained results it can be assumed that proper methodological design of teaching work (physical exercise means, load, methods for the development of certain abilities forms and forms of work etc.) have had positive effects on motor skills when it comes to girls of third grade primary school (Džibrić et al., 2011). In the conducted research, anthropometric measures and motor abilities were assessed on a sample of 47 third-grade students who are engaged in additional physical activity or training in basketball in the section of the school sports society and who participate only in the regular teaching of physical and health culture. The results showed that students exercising additional physical exercise have significantly better results in motor skills, as well as a noticeable increase in muscle mass. The results of the t-test in the area of motor abilities show significant differences that occur in variables for estimating explosive (MSD), repetitive (MPT), and static power (MIV) for the benefit of students who exercise physically. Similarly, statistically significant differences were found in the flexibility assessment (MPR) and the simple movement rate (MTR) variable. A statistically significant difference was not found in the co-evaluation assessment variable (MPN), although there is a numerical difference in the results of the polygon backlash test for the benefit of additional physical activity students (Gašparic, 2015). The results of the research (Badrić et al., 2015) show that after the training process lasting 8 weeks, statistically significant changes were made in the motor skills of girls who were engaged in additional extracurricular activity in the school sports society. Similar results in their research were obtained (Zukolo, 2007; Milanović et al., 1994; Blašković et al., 1993). Girls progressed most in tests to assess explosive power and flexibility, but also significantly reduced agility performance. The results of this study show that significant differences appear in these abilities, while the differences in the coordination area are minimal. Additional physical activity in the work of a school sports society significantly influences the increase in motor skills.

Some previous research has found that transformational changes in motor skills in older girls who attend more primary school are emerging, while this research has shown that obvious differences are with nine-year-old girls. The results of the research Nićin (2000) and Petković (2007) show that additional physical activity increases the positive effects of both physical development and basic-motor abilities. From the obtained results, it is concluded that for more substantial transformations in the motor space, additional content is needed outside the teaching, assuming that the transformation of basic motor skills is greater when the higher level of motor knowledge is higher. The results show that additional involvement in kinesiological activity, and in this case it is basketball, with the regular teaching that forms the basis of all organizational forms of work in this area, ensures significant transformational effects. This affirms the value of sports in its best form, which is preparation. Kinesiological contents are also shown here as a powerful generator of human adaptability as a self-improvement system. In this case, this is a school sport, which, considering the trends in the reduction of the standard of citizens, must be counted. School sport is the only choice for a large part of the population, and society should take responsibility for making exercise available to every child regardless of the material status of the parents. The results of the study show that after a training exercise lasting 8 weeks, statistically

significant changes in the motor skills of girls who were involved in additional extracurricular activity in the school sports society were created (Badrić et al., 2015).

On a sample of 106 5th grade female students, aged 10 to 11 years, the respondents tried to determine the effects of regular and modified physical education classes by applying contents from sports games (basketball, volleyball and handball) for one semester to changes in basic motor skills in fifth grade elementary school female students. 15 motor variables were used to assess basic motor skills. Descriptive statistics and a T-test were used to determine changes in basic motor skills. The results of the study at the descriptive level showed noticeable differences between the same groups in the final compared to the initial measurements. Based on the results of the t-test for the control and experimental groups, it can be concluded that there were statistically significant changes in values on all variables of basic motor in the final compared to the initial measurement. The analysis of the results of the T-tests shows that the groups differ from each other in the initial measurement in only one variable of basic motor, MTAPN, and this difference is statistically significant in favor of the control group. In the final measurement, there are no significant differences between the control and experimental groups in the average values of all variables of basic motor skills (Nikšić et al., 2019).

CONCLUSION

This research was conducted with the aim of determining the partial changes (differences) of basic-motor abilities created under the influence of a four-month program of basketball, volleyball and handball in the pupils of the fifth grades of primary school. The sample of respondents included 106 pupils in the class, aged 10 to 11 years, clinically and mentally healthy, and with no pronounced morphological and locomotor impairments. The sample of respondents was divided into two subgroups, an experimental group (53 pupils), who carried out physical education classes according to the modified plan and program of sports games (basketball, volleyball and handball) for a semester and a control group (53 pupils)
who attended regular classes from physical education according to the current curriculum. The variables used in this study consisted of 15 motor variables and variables for estimating the frequency of the movement (Taping Hand - MTAP; Taping Leg - MTAPN; Taping Legs on the Wall - MTAPNZ); variables for assessing flexibility (Stick turn - MFLISK; MFESDM; MFESUM; High Jump 20m - MFE2OV), variables for the estimation of the repetitive power (Test (MBFDS; laying-sit - MRCLDM; 40 seconds squash test - MFRDC; Push-ups - MFRSKL) and variables for assessing coordination (Steps aside - MAGKUS; Magnetic Test - MAGTUP; Polygon Background - MRGEPOL). Descriptive statistics and discriminatory analysis were used to determine changes (differences) in basic-motor abilities. The results of the study at the descriptive level showed certain differences between the groups in the final versus the initial measurements. Based on the results of the discriminatory analysis, it can be concluded that the greatest relative contribution has the variables MTAPN - Taping the leg and MFRSKL – Push-ups, and the smallest MFESUM – High jump and MPD - Turning to the right. Other variables give relatively moderate contributions to the accomplished discriminatory function. Centroid values are higher than in the baseline motor situation in the initial measurement, which is also expected from the canonical correlation coefficient (which is higher in the final measurement). Also, the differentiation models were statistically significant in the final versus the initial measurement where they were not statistically significant, as shown by Willks Lamda results and the Hi-square for initial measurement. According to these results, it can be concluded that there has been divergence in the latent structure of the discriminatory function in both groups, which can most likely be a consequence or effect of the program itself. For this reason, it can be concluded that there are more and more significant possibilities for distinguishing groups in the final measurement. Applied programs, i.e. a regular program of physical and health education, as well as an amended program of sports games (basketball, volleyball and handball) for a period of one semester, have influenced the transformation of basic and motor skills. This confirms that regular teaching of physical and health culture can lead to positive transformations, which points to the need to innovate curricula and adapt to the same needs of the population concerned, in order to achieve even greater changes in basic-motor skills, as well as the overall anthropological student status.

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A COMPARATIVE ANALYSIS OF COVERED DISTANCE IN TOP FOOTBALLERS IN FINAL MATCHES ON LAST THREE WORLD CUPS

Adnan Ademović

Original scientific work

Abstract:
This research is a transversal study with the goal of determining the covered distances in top footballers in final matches of the last three world cups. The research was conducted with 50 top footballers, aged 19 to 35, who played all ninety minutes of final matches. The respondents are divided into three groups. The first group consists of players of national teams of Spain and the Netherlands, finalists of the 2010 World Cup played in South Africa (n=18). The second group consists of players of national teams of Germany and Argentina, finalists of the 2014 World Cup in Brazil (n=17). The third group consists of players of national teams of Croatia and France, finalists of the 2018 World Cup in Russia (n=15). The acquired results show that the highest total average covered distance and highest covered distance in the first and the second halftime was realized in the final match of the 2014 World Cup. The results of the univariant analysis of the ANOVA variant showed that significant statistical distinction was achieved (on the level of P=0.001) in the variable of covered distance in the first halftime (SEPRDPP), whereas other variables did not show significant statistical differences.

Keywords: football, covered distances, World Cup

INTRODUCTION

During the last two decades there has been a significant increase in the analysis of football matches. The practical outcomes of the analyses are best reflected in the fact that selected indicators from the analyses can significantly help coaches to identify good and bad performances of individual players or the entire team. Moreover, analyses of football matches help in identifying the psychological requirements of the football and in examining how individual players "overcome" certain psychological aspects of the sport. In order to devise an adequate training, it is of significant importance to take into account the psychological load that professional players are burdened with depending on their position in the team (activity, covered distance, intensity, energy, muscle activity). Hence, analyses of matches are of particular importance because they enable professionals to devise trainings that stimulate both the psychological and other factors that players face. Football is the most popular sports in the world with higher and more demanding motor abilities and abilities of energy efficiency of players, as well as the use of faster and more effective techniques and tactics (Sporiš et al., 2012). Top players grow in the amount and intensity of movement during the years, which requires experts to determine what it is that makes players who play on the top level (Čolakhodžić et al., 2017). Taking into account the total number of players in a match as well as the dimensions of the pitch, it does not come as a surprise that the activities of players without the ball comprise over 95% of the effective playing time. Even though the total amount of physical activities of a footballer consists of a number of different activities, a majority of the activities consists of walking and running with different speed and directions. Therefore, the covered distance during a match is used as a global indicator of the physical demands of the football game. Contemporary top footballers cover on average between 10 and 13 kilometers during a match, with a note that midfielders cover most distances whereas goalkeepers cover only 4 km (Moher et al., 2003; Krusturp et al., 2005; Lago et al., 2010; Andrzejewski et al., 2012). Given that footballers constantly change speed during the match, it is crucial to categorize the total distance covered based on the speed (intensity) of movement (Di Salvo et al., 2006; Barros et al., 2007; Lago et al., 2010). Numerous researchers have so far successfully categorized the total distance covered. However, the categories defined differ from author to author which makes it difficult to compare the respective approaches. It is interesting to note that from the total distances covered only about 50% represent straight movement, whereas the rest represents backwards movement, side movement and zigzag movement, moving in circles etc (Marković and Bradić, 2008).

METHODS

This research attempted to determine the differences in distances covered in top footballers in three final World Cups.

Subjects

The research was conducted on the sample of 50 top footballers, aged 19 to 35, who played all ninety minutes of final matches in the last three World Cups. Goalkeepers were not considered for analysis due to their position in the team. Respondents were grouped into three groups of which the first group consisted of national teams of Spain and the Netherlands, finalists of the 2010 World Cup played in South Africa (n=18). The second group consists of players of national teams of Germany and Argentina, finalists of the 2014 World Cup in Brazil (n=17). The third group consists of players of national teams of Croatia and France, finalists of the 2018 World Cup in Russia (n=15).

Variable sample

The data for the research was retrieved from the official webpage of World Cup Federation (www.fifa.com) which shows all parameters of team success along with situational efficacy of footballers in final matches of final three World Cups. The basic variables that are used are:

- AGE
- AVIS – height (cm)
- SEPRD – distance covered (m)
- SEPRDPP – distance covered in first halftime (m)
- SEPRDDP – distance covered in the second halftime (m)

Methods of data processing

For all variables, the following parameters were calculated: arithmetic mean, standard deviation, minimal and maximal result. The goal of the approach was to determine basic indicators of normal result distribution. In order to determine the differences between three independent samples, a univariant variance analysis (ANOVA) was used.

RESULTS AND DISCUSSION

Table 1 shows the results of central and dispersion parameters for 50 top footballers who played all ninety minutes of final matches of last three World Cups. For the final match on the 2010 World Cup, eighteen (n=18) players were taken for analysis. Their average age is 27.38 ± 3.92, average height 179.83 cm ± 6.41. Footballers covered 9543.94 m ±788.44 on average – in the first halftime 4774.50 m ± 413.17, and 4769.44 m ± 450.65 in the second halftime. For the final match of the 2014 World Cup, seventeen (n=17) footballers were taken into consideration. Their average age was 28 ± 3.04, average height 181.11 cm ± 7.38. The footballers' average covered distance was 10087.17 m ± 788.44 – in the first halftime 5088.05 ± 423.02, and 4999.11 m ± 575.36 in the second halftime. The average age of footballers (n=15) in the 2018 World Cup was 26.60 ± 3.85 and the average height was 183. 46 cm ± 5.69. Footballers in the final match successfully covered a distance of 9437.73 ± 940.21 – in the first halftime 4470.53 m ± 424.64, and 4967.20 m ± 539.68 in the second halftime. Table 1 shows that footballers in the final match of the 2014 World Cup had the highest average distance covered. The highest average distance covered in the first and in the second halftime were accomplished in the final match of the 2014 World Cup, whereas somewhat lower average values were achieved in final matches of 2010 and 2014 World Cups. Table 2 (ANOVE) indicates that only one variable (SEPRDPP) of five variables utilized in the research showed statistical difference, on the level of p=0.001. The variable with the least difference is AGE, with a difference of p=0.55. A view on the differences between groups, it can be observed that the variable that was isolated as the only one with a statistical significance shows notable difference from p=0.00 to p=0.04. It is interesting to observe that the variable (SEPRD) shows significant differences between World Cups of 2014 and 2018. If we compare the results of this study with previous studies, it can be observed that top footballers on average cover a distance of nine to 12 km during a match. Distance in the first halftime was bigger (P<0.05) than in the second halftime for top players (5.51 + 0.10 vs 5.35 + 0.09 km) (Mohra et al., 2003). Hennig and Briehle (2000) indicate in their research that footballers on average covered a distance of 10600 m, with four per cent longer distance in the first halftime as compared to the second halftime. South American footballers (8638 ± 1031 m) on average covered significantly shorter distances (p<0.05) than English Premier League players (10104 m) (Rienzi et al., 2000). The average distance covered was 10.80 km – in the first halftime 5.52 km and 5.250 km in the second halftime. Midfielders covered 10% more (p<0.05) i.e. 11.4 km as compared to defenders and strikers, without a difference in high intensity runs (Bangsbo, 1991). Female professional footballers on average cover a distance of 10300 m (Krustrup et al., 2005). Di Salvo et al. (2006) indicate that footballers on average covered a distance of 11393 m (5709 m in the first halftime and 5684 m in the second halftime. Barros et al. (2007) indicate that the average distance was 10.012 m, the average distance covered in the first halftime was 5.173 m, significantly higher (p<0.001) than the average value of 4.808 m in the second halftime. Ademović et al. (2012), during a study of the model for top footballers, determined that midfielders cover the longest distances (10952 m), defenders less (10273 m), and strikers the least with 9093 meters. Jozak et al. (2011) determined in a comparison of specific types of players that defense midfielders cover longest distances (10.50 km) and offense midfielders (10.39 km). Čolakhodžić et al. (2017) determined that there is no significant difference between the 2010 and 2014 World Cups in relation to the amount of covered distance. Indicators of situational efficacy on the 2014 Word Cup in Brazil show that footballers on average cover a distance of 9396 m (in the first halftime 4746 m and 4505 m in the second halftime) (Čolakhodžić, 2019).

CONCLUSION

This paper presents result of distance covered in 50 top players who played all ninety minutes of final matches on the last three World Cups. The results of the statistical analysis show that the highest average distance covered along with the highest distance covered both in the first and in the second halftime was accomplished in the final match of the 2014 World Cup. The results acquired show that there have not been statistically significant differences in the total distance covered. Only the distance covered in the first halftime show significant statistical differences. Data on the total distance covered in footballers during matches are key in designing football trainings. Such data needs to be taken into account in the process of planning specific training units, as well as during yearly periodization. An analysis of footballers' physical load during matches is very useful for devising individualized trainings.

Table 1. Descriptive indicators of variables for assessing distance covered in final matches on three World Cups

Variable	W.C. 2010					W.C. 2014					W.C. 2018				
	N	Min.	Max.	A.S	S.D	N	Min	Max.	A.S	S.D	N	Min	Max.	A.S	S.D
Age	18	21	35	27,38	3,92	17	24	34	28	3,04	15	19	33	26,60	3,85
Avis	18	170	192	179,83	6,41	17	169	192	181,11	7,38	15	172	191	183,46	5,69
SEPRD	18	8312	11196	9543,94	788,44	17	8181	11424	10087,17	939,37	15	8368	11645	9437,73	940,21
SEPRDPP	18	4217	5594	4774,50	413,17	17	4111	5677	5088,05	423,02	15	3946	5569	4470,53	424,64
SEPRDDP	18	3864	5602	4769,44	450,65	17	4046	5756	4999,11	575,36	15	4317	6076	4967,20	539,68

Table 2. Univariant analysis variance (ANOVA) – determining the differences in distance covered in final matches on three football World Cups.

		Sum of Squares	df	Mean Square	F	Sig.
Age	Between Groups	15,642	2	7,821	,595	,556
	Within Groups	617,878	47	13,146		
	Total	633,520	49			
Avis	Between Groups	109,522	2	54,761	1,269	,291
	Within Groups	2027,998	47	43,149		
	Total	2137,520	49			
SEPRD	Between Groups	4017994,232	2	2008997,116	2,548	,089
	Within Groups	3,706E7	47	788572,773		
	Total	4,108E7	49			
SEPRDPP	Between Groups	3045472,505	2	1522736,253	8,633	,001
	Within Groups	8289881,175	47	176380,451		
	Total	1,134E7	49			
SEPRDDP	Between Groups	539203,411	2	269601,705	,988	,380
	Within Groups	1,283E7	47	272915,077		
	Total	1,337E7	49			

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DEPENDENCY ON CELL PHONE (INTERNET) AND ITS IMPACT TO THE LEARNING PROCESS AND TO THE PHYSICAL ACTIVITY AMONG SPORTS STUDENTS IN AAB COLLEGE

Blerta Abazi, Besim Gashi, Fatmir Pireva, Vjosa Maqedonci

Abstract: The purpose of this study with questionnaires was to ascertain how dependent are students, namely students of Physical Education and Sports, on cell phone and internet, what is the negative effect of the excessive use of the cell phone in their learning process and how much do they practice sports out of the curriculum programme in the current context of an educational institution.
Methods: The study involved 100 students of the Physical Education and Sports branch in AAB College, male and female, with different ages. Spending too much time with electroinic devices, for over 4 hours or more, is an indicator that students are heavily dependent on cell phone and internet, and hence they pay little or no importance to learning. 21% of them say, I do not feel like learning as soon as I get connected to phone over internet. And how much students are committed to sports - is shown by the results that students are very committed to sports even out of the curriculum programme with 35.39% of responses

Keywords: Cell phone, Internet, Sports

INTRODUCTION

Advancements in the technology of communication have increased consequences in the social life, cultural,economic and political one, defining thus the ways in which information is refined, transfered and expresed creativity. Eventhough
technology has hadtransformative impact at the opening of society, todays interests in information technology , its creation and its advancement, in its development and theory, they seem as unimagined interests before (Barr, 2000:21)
The use of technology has become a global neccessity due tu its contributions towards human existence and has expanded socio-economic relations at a global level. Wireless comunication hasappearedas one of the quickest media of expansion in planet, thusstirring a "youth culture" (Castells,Fernandez-Ardevol, Qiu and Sey, 2007)

Thus, the growth of the cell popularity and smart telephones lately has also attracted reseachers attention. Cell telephones are seen as good connection. Teenssay that telephones make their lives more secure and more practical. Eventhough they also cite new tenions linked to the use of cell phones (Pew Research Centre, 2010).
The main aim of this paper work is to verify, how much are dependant students towards telephone and internet and how much has its negative impact when using to much the telephone in their learning process and sport performance of the students, namely the students of Physical Culture and Sports, in actual context of an education institution, where the possibilities of the use of telephone and access to internet, are quite advanced, as at home, Universities, malls, entertainmentcentres".

METHODOLOGY

Kampioni and data source

In this research one hundred students are included at the Faculty of Physical Culture, the chosen sample was of the momentat the private AAB College. The methodoly used in this research will be at funcion of realisation of this aim.Primary research will cover the analysis of collected data through questionaires given to students of new generation at AAB College. The work has its aim to test connectionts between variables of conceptual

Model taken in a study and to give answers to the research questions below:

- How much are interdependent students towards telephone and internet ?
- Does it have a negative impact the overuse of telephone in their eductaion process?
- How much does the overuse of telephone have a negative impcat in passivity at sports out of education programme?

Study tools

One of thestrategies of the research for realizing of studies is that was supported by observationwith questionaries which is one of the techniques of collecting data. The use of the observation startegy enables collection and qualitative analysis of the data while using descriptive statistics and that analitical one. Also the collected data through this strategy could be used to suggest possible reasoning for specific connections between variables and to create models of these connections.

Questionaire has three parts. The first part, contains information about their connection to internet, for the time that students spent in telephone and internet. The second part, gives information for

negative impact that has the overuse of telephone in their learning processmësimorë , and the thirdpart informs us about the engagemnet of students in physical activities out of learning programme. (Albano Zhapaj) 2014

Methods statistics
The processing and the analysis of the collected data are realized through computer programmes of SPSS 22.0 .

Knowing that each of the questions presents a variable that can get an answer, it is thought that with closed questions having alternatives of more real answers in order to get the needed information.

The analysis of data is done through descpriptive analysis, percentages for each variable. The only statistical summary for these kinds of data are frequences and percentages.

DATA ANALYSIS

The analysis of the observation findings

The first part of the group questions:

Table.1 Dependency from the telephone and its connecetion with internet with the Sports students in AAB College

Variables	Nr. Of respondents 100**%**				
	Very rarely	Rare-ly	Often	Very often	Always
How much do use the telephone and internet?	3.45%	10.34%	54.02%	32.18%	0
Did you try to limit your time in internet?	15.91%	30.68%	34.09%	9.09%	10.23%
Do the others complain, that you spend to much time on telephone and internet?	20.45%	17.05%	30.68%	15.91%	15.91%
Does it happen that beacsue of telephone you go late to bed?	10.23%	29.55%	23.86%	19.32%	17.05%
How much time do you usualy spent on the phone during a day?	Less than 30 min	1 hour	2 hours	More than 4 hours	
	0.00%	13.64%	34.09%		45.45%
What do you do in general when you enter the telephone and internet?	Electron-ic post	Chat	Facebook	Studies	Free navigati-ons
	4.55%	38.64%	35.55%	9.09	11.36%

The sceond part of the group questions:

Negative impact of the telephone use inlearining process

Diagram 1.

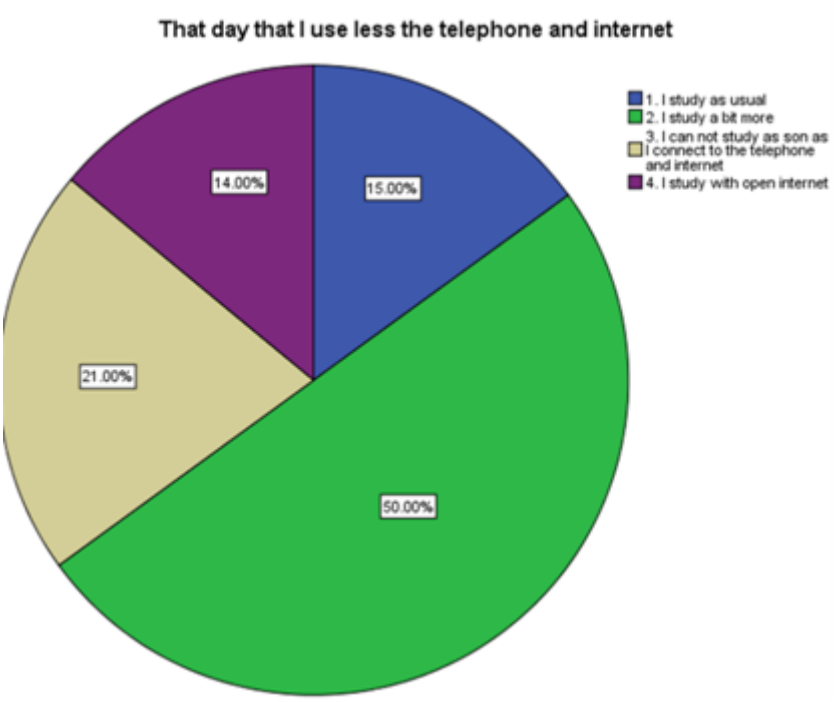

Table. 2 . Negative impact of the telephone use in learning process

Variables	Nr. Of respondents : 100%			
The moment that you use the telephone and internet, the results in learning process	They fall a lot	They fall a little bit	Do not fall	improved
	34.00%	32.00%	20.00%	15.00%
Accoridng to your opinion, if you were less on the telephone and internet, your results in learning process	Will increase	Will decrease	Will not change	Do not know
	72.00%	1.00%	15.00%	12.00%
How many hours per day do you learn-read	Less than 30 min	One hour	2 hours	Over 4 hours
	39.00%	33.00%	21.00%	7.00%

The third part of the question grup

Table. 3. The impact of the use of telephone-internet in physical activity our of learning process

	Nr. Of respondents : 100				
Variables	**%**				
How much do you do sports out of learning process	**Very rarely**	**Rarely**	**Often**	**Very often**	
	3.41%	14.77%	35.23%	46.59%	
How many time per week do you do sports out of learning process	**1-2 days**		**3 -4 days**	**5 days**	
	28.41%		44.32%	27.27%	
How many hours per day do you do sports outside of the learning process	**1 hour**	**2-3 hours**	**3 hours and more**	**I traing without plan**	
	37.50%	38.64%	5.68	18.18%	
Where do you do sports	**Nature**			**Indoors**	
	42.05%			57.95%	
Which sports activity do you do more	**Football**	**Voleyball**	**Basketball**	**Athletics**	**Fitness**
	25%	0	16.67%	8.33%	50%

DATA DISCUSSION

Besides the purpose of the research and research questions we have presented the results of the data and we have given answers to this research.Data results we have presented in three groups:
First group : Students dependency towards the phone and internet. In table number 1 are presented results, in which it is verified how much are students dependened on the telephone. The data have confirmed that students are very much dependent on the phone and internet, (54%) from which they use the telephone very often and (45.45%) use telephone over 4 hours and more, mainly for Chat communication and Facebook.
This shows that the use of internet by the students is now at high levels. Such similar results have given also scholars such as: Trudy L. Hanson , Kristina Drumheller , Jessica Mallard , Connie McKee & Paula Schlegel. The study was about the use of time and entertainment choicesof the College students, they used a three corner appraoch to find out how do college students use and manage their time. From the data that were collected through time diaries, students showed that the largest sum of personal time was Similar studies have given also scholars as Jeffrey H. Kuznekoff andScott Titsworth, who in their studies have reviewed the impact of the use of the cell phone, during lectures in the class, and in learning by students. Participants were in three different groups of studies (control, low level and high level) beside a video lecture, they took notes in that lecture and took two learning evaluations after spent in a form of communication (talking in front of each other, while reading, while talking on the phone and while using pages of social network.), students reported that they spent 14.35 hours for every week in reading and 6.49 hours speaking on the phone.
While results of data for the second group of the variables verify that: The impact of telephone in their learning process? According to presented results it is confirmed that telephone and internet have negative impact in their passivity of the students learning process. Students have used internet (over 4 hours and more) were passive in learning process, which means they have learned less than 30 minutes.
According to diagram nr.1the question: How many hours do students study ? Results show that students are less devoted to studies, since the highest percentage belongs to those who learns less than an hour with (40.91%), while 30.68%, (2 hours). While the time when students do not use telephone, they use it more to study. (Tab.2.) This is being shown by the percentage of answers with 50% (take advantage of the opportunity to learn more) , 21 % (can not learns as soon a sthey are connected to internet on the telephone).

the saw the lecture. The students who didn't use their cell phone wrote 62% more information in their notes, took more detailed notes they were capable to remember detailed information from the lecture, they had a half mark higher in a test with many solutions than the students who were active in using their telephones.

The third group of variables linked to the reasearch question :How much does negative impact have in the overuse of telephone in sports passivity out of learning process?
Data from tab.2show that the students are very much active in sports also out of their learning process with 46.59%.Very often students apply it 35.23%, while a small part use it rarely and very rarely. While students who showed great interst to exercise also outside of the learning process(3-4 days in a week) they achieve the highest percentage with 44.32% , while (5 days in a week) 27.27% .
This shows us that students of Physical Education apart from learning process are active also out of their learing process in different sports.

CONCLUSION

We have come to these main conclusions after the main findings done by this study while observing:

- Telephone and internet today are a necessity tool for all, as well as for students, but as much as it has a positive stance, its overuse has its negative sides too, if students used internet more for studies and less for other social networks, then telephone and internet would have served positively, but grounded on the analysis of data, students with a very small percentage with only 9.09 %, use internet for studies, and they use it more for social networks: FaceBook, Chat ect.
- Spending to much time in using it, over four hours and more,shows that students are dependent from telephone and internet and a litlle time or not at all they dedicate to learning.

When students do not use telephone and internet, they use their time to learn more. This is shown by the percentage of answerrs with 50% (benefit to learn more) , 21 % do not learn as soon as they are on their phones.

- While the question if there is a negative impact the telephone in sports passivity out of learning process ? Data tells us that students of Physical Education are very much active also out of the learning process, relying on given data intab.3, students show great interest to exercise also out of their learining process. Three-four days achieve the highest percentage with 44.32%, that means: the over use of the telephone doesn't play role in sports passivity out of learining process.

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IMPACT OF PLAN AND PROGRAM ON MOTOR ABILITIES ON WATER POLO PLAYERS AND SWIMMERS

Džan Lemeš, Edin Mirvić, Kenan Ademović, Alma Dizdar

Abstract:
In order to determine the level of influence of the plan and program on the motor skills of water polo players and swimmers aged 12 to 14 years. Twelve tests were applied in the field of motor skills, which represent the basis of motor skills in water polo and swimming. The tests are taken from the Eurofit battery of tests, which are standardized and used in the daily work of professors and sports coaches and can be said to represent a representative sample of variables, which by their characteristics correspond to the set goals and objectives of this research work. Mechanism for structuring movement (Agility, Taping by hand, Taping by foot), Mechanism of synergistic and tone control (Deep bow on bench, Reach in sitting, Crossing on low beam), Mechanism of regulation of excitation intensity (Running 20m from high start, Tripping from place, Long jump from place), Mechanism for regulating the duration of excitation (Hang in the joint, Lifting torso in 30 seconds, Triceps dips). As a method to determine the impact of the plan and program on the motor skills of the water polo players, a T test for dependent samples was used. It can be concluded that there was an influence of the program on motor skills on swimmers and water polo players, which is expected, since the influence of aquatic activities on the human body is well known.

Keywords: water polo, T - test, motor skills

INTRODUCTION

Water polo is a sport in which two teams of seven players compete on marked terrain, which is prescribed in advance by rules (30m x 25m). Within a certain amount of time, which is also determined by the rules of the game (4 x 8min, with breaks between quarters), the goal of the team is to score a goal, and to prevent the opposing team from doing the same. (Garbolewski and Starosta, 2013) The duration of one attack in a water polo game is approximately 17.4 + 1.2 s, analyzing through the play of the men's team what is the proof of very fast transfer of the ball from their part of the court to the opponent's part. It is only possible to distinguish players in water by the equipment they wear, ie. by the caps that are on the player's head a can be blue or white depending on whether the team is host or away at the game. The main feature of this sport is that it is played in water, and therefore it is classified into water sports along with swimming, artistic swimming, water jumps and so on. When we compare water polo with some of the "land" sports, we could say that it is most similar to today's handball. In water polo, all motor skills develop harmoniously, but above all strength and endurance. The influence and importance of motoric ability - coordination in water polo is still quite unexplored, but it is quite clear that coordination is essential for the best performance of all technical and tactical elements of the game (Modrić et al., 2011). Similar research on this topic has been done by the authors: Dopsaj et al. 2007, Kondric et al., 2012, Stirn 2010, Donev et al., 2009, Bampouras and Marrin 2009. (Mirvic, E., Dizdar, A., Bajric, S., Bajric, O. 2018). A study was conducted to determine the significance and magnitude of the influence of basic motor skills on swimming speed of the water polo crawl technique at the 75 meter section. They came to the conclusion that in order to achieve swimming results in water polo crawl technique at 75 meters, it is necessary to have a high level of strength in all its manifestations (explosive, static and repetitive), coordination skills and flexibility. The main objective of this research is to determine the level of influence of the plan and program on the motor abilities of water polo players and swimmers from 12 to 14 years.

METHODS

Subjects

The sample of subjects included water polo players and swimmers from Bosnia and Herzegovina, aged 12 - 14, male, a total of 35 from P.V.K. "Dabar" Sarajevo. The study included only those subjects who were completely healthy (all who were ill during the measurement and testing period, and who came to the training in addition, were excluded from the sample).
The research was conducted on a regular basis with the appropriate conditions required for testing in this research.

Procedures

The sample of variables consists of 12 tests to assess motor skills in a water polo game.
A sample of variables for assessing motor skills

The determination of the level of basic motor skills was performed using measuring instruments recommended by Kurelić et al. (1975) and Eurofit battery tests.

a) Movement Structuring Mechanism:
1. Agility in the air
2. Taping by hand
3. Taping by foot
b) Mechanism of synergistic and tone regulation:
1. A deep bow on the bench
2. Retrieve in a sitting
3. Crossing on a low beam
c) Mechanism of regulation of excitation intensity:
1. Run 20m from a high start
2. Tripping out of place
3. Long jump from place

d) Mechanism of regulation of the duration of excitation:
1. Hang in the joint
2. Torso lift in 30 seconds
3. Triceps dips

Description of the research
To ensure the regularity of this research process, approvals from relevant institutions and individuals were used in planning:

- Certificate of swimming water polo club Dabar Sarajevo for testing;
- all subjects were tested under the same conditions (air temperature ranged from 26 to 30 ° C, water temperature ranged from 24 to 26 degrees Celsius and the entire survey was conducted in the comlex of Olimpic pool Otoka Sarajevo);
- the research was conducted in such a way that motor skills were measured in the subjects;
- about all subjects prior to the measurement and testing process, explained in an acceptable way what was expected of them during the research period and what was required of them in this research, and the main motive was, curiosity and understanding of testing as an opportunity to test their own knowledge and knowledge about their motor skills;
- implemented a 3-month program (same program for swimmers and water polo players);
- the training process is based on raising the swimming ability and is identical for swimmers and water polo players;
- performed the same measurement again;
- measurements were made in groups of 10 subjects each due to the limited space and time required for successful testing;
- one meter and one recorder worked on each measurement;
- during the measurement the subjects wore the proper testing equipment;
- after the test data were collected, the measurement lists were completed and the
- data were processed by appropriate methods for this research work.

Methods for data processing
The data obtained was processed at the univariate level. As a method to determine the impact of the plan and program on the motor skills of the water polo player, a T test for dependent samples was used.

RESULTS
Analysis of the results of the T-test of the initial and final state of motor skills
By analyzing the T-test in table no. 1 for dependent specimens, the motor skills influenced by the water polo player's plan and program were evaluated. The results indicate positive and statistically significant differences in the transformation of functional abilities.

Significant changes were observed between the initial and final states in the tests Agility in air Initially – Agility in air Final t (34) = 3.260, p =, 003. The average decrease in value in this test was, 68657, while the 95% confidence interval ranges from, 25863 to 1.11451, the ETA coefficient shows the value is .23.

Significant changes were also observed between the initial and final testing in the Taping by Hand Initial - Taping by Hand final t (34) = -2.989, p =, 005. The average decrease in value in this test was -3.77143, while the 95% confidence interval extends from -6.33539 to -1.20746, the ETA coefficient shows the value is .20.

Significant differences between the initial and final testing are also found in the Taping by Foot tests initially – Taping by Foot Finals t (34) = -2.169, p =, 037. The average increase in value in this test was -1.57143, while the 95% confidence interval extends from -3.04372 to -, 09914, the ETA coefficient shows the value is .12

Table 1. Results of T-test of initial and final state of motor abilities

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Agility in air Initial – Agility in air Final	.686	1.245	.210	.258	1.114	3.260	34	.003
Pair 2	Taping by Hand Initial - Taping by Hand final	-3.771	7.463	1.261	-6.335	-1.207	-2.989	34	.005
Pair 3	Taping by Foot tests initial – Taping by Foot Final	-1.571	4.285	.724	-3.043	-.099	-2.169	34	.037

Pair 4	tests Deep bow on the bench initial - Deep bow on the bench final	2.595	6.361	1.075	.410	4.781	2.414	34	.021
Pair 5	Retrieval in Sitting Initial - Retrieval in Sitting Final	-4.353	11.615	1.963	-8.343	-.363	-2.217	34	.033
Pair 6	Low beam cross-beam tests initial - Low beam cross - beam tests final	-4.211	4.340	.733	-5.702	-2.720	-5.740	34	.000
Pair 7	Run 20m from high start initially - Run 20m from high start final	.181	.469	.079	.019	.342	2.284	34	.029
Pair 8	Triple jump from place initial - Triple jump from place final	51.714	110.458	18.670	13.770	89.658	2.770	34	.009
Pair 9	Long jump from place initial - Long jump from place final	-13.771	32.687	5.525	-24.999	-2.543	-2.493	34	.018
Pair 10	in Hang in joint tests initial – Hang in joint joint final	-9.459	21.682	3.664	-16.907	-2.011	-2.581	34	.014
Pair 11	Torso lifting in 30 seconds initial - Torso lifting in 30 seconds final	-1.685	3.990	.674	-3.056	-.314	-2.499	34	.017
Pair 12	Triceps dips initial – Triceps dips final	-3.342	4.702	.794	-4.958	-1.727	-4.205	34	.000

Also, significant differences between initial and final testing in the tests Deep bow on the bench initially - Deep bow on the bench final t (34) = 2,414, p =, 021. The average decrease in value in this test was 2.59571, while the 95% confidence interval extends from, 41035 to 4.78107, the ETA coefficient shows a value of .14.

Significant changes between initial and final testing and in tests Retrieval in Sitting Initially - Retrieval in Sitting Final t (34) = -2,217, p =, 033. The average decrease in value in this test was -4.35314, while the 95% confidence interval extends from -8.34313 to -, 36316, the ETA coefficient shows the value is .12.

Differences between initial and final testing are also statistically significant in the low beam cross-beam tests initially - the low beam cross - beam tests final (34) = -5.740, p =, 000. The average decrease in the value in this test was -4.21143, while the 95% confidence interval ranges from -5.70252 to -2,72033, the ETA coefficient shows the value is .49.

Differences between initial and final testing are also statistically significant in the tests Run 20m from high start initially - Run 20m from high start final t (34) = 2.284, p =, 029. The average decrease in value in this test was, 18114, while the 95% confidence interval extends from, 01993 to, 34235, the ETA coefficient shows the value is .13.

Differences between initial and final testing are also statistically significant in the Triple jump from place initial - Triple jump from place final t (34) = 2.770, p =, 009. The average decrease in value in this test was 51.71429, while the 95% confidence interval ranges from 13.77044 to 89.65813, the ETA coefficient shows the value is .18.

Differences between initial and final testing are also statistically significant in tests Long jump from place initially - Long jump from place final t (34) = -2,493, p =, 018. The average decrease in value in this test was -13.77143, while the 95% confidence interval extends from -24.99984 to -2.54302 ETA coefficient shows the value is .15.

Differences between initial and final testing are also statistically significant in Hang in joint tests initially – Hang in joint joint final t (34) = -2.581, p =, 014. The average decrease in value in this test was -9.45914, while the 95% confidence interval extended from -16.90729 to -2.01100 ETA coefficient showing the value is .16.

Differences between initial and final testing are also statistically significant in tests Torso lifting in 30 seconds initially - Torso lifting in 30 seconds final t (34) = -2,499, p =, 017. The average value decrease in this test was -1.68571, while the 95% confidence interval extended from -3.05666 to -, the 31477 ETA coefficient shows the value is .15.

Differences between initial and final testing are also statistically significant in the tests Triceps dips initially – Triceps dips final t (34) = -4,205, p =, 000. The average value decrease in this test was -3.34286, while the 95% confidence interval extends from -4.95825 to -1.72746 ETA coefficient shows the value is .34.

DISCUSSION

Based on the results above, we can see that there was an impact of the program on motor skills in swimmers and water polo players, which is expected, since the influence of aquatic activities on the human body is known. The body is in a horizontal position when swimming, which is a facilitating moment for the cardiovascular system. The heart pumps blood easier to all parts of the body, so that carbon dioxide and oxygen are exchanged easier (Ribeiro, J P. et al. 1990). The biggest influence was the variable transverse standing on a low beam, in which motoric abillity coordination is most important. This result could be expected because in the match water polo player has to make quick and effective decisions as to why the intellectual abilities are needed, and it is known that we develop the intelligence with the

coordination. Proper swimming skills can decide who is the winner of the race, and this requires good coordination. In our research we have proven that this program has a positive effect on the motor skills of young water polo players and swimmers. The largest statistical difference between the initial and final measurements was obtained for the low beam transverse position and the triceps dips, the mean difference for the variables agility in the air, arm-tapping and trip-off, other variables were low, but there was a significant difference. (Dizdar, A. and E. Mirvic 2014) concluded in their research that the higher the level of readiness in the motor level, the faster the swimming speed at 25 meters is, and the work should be done to improve mechanisms for structuring movement (agility in the air, taping by hand, taping your foot). The same authors recommended that young cadets should include the basic motor skills that are done on land, in the halls when planning and programming the training process. It should be emphasized that in water polo there are constant changes of movement in water and in order to be more efficient it is necessary to have developed coordination, ie. body agility in water as can be seen from the results obtained (Dizdar, A. and E. Mirvic 2014). However, water polo crawl is swimming without the ball and is therefore much easier than swimming with the ball, which is Hayley B. et al. (2010) in his research emphasized that swimming with the ball reduces the speed of swimming in men's water polo and we need as much motor readiness as possible. According to Dizdar, A. and E., Mirvić (2015) it is not possible to perform any technical element in water polo without basic physical training. Because of this, new research and experiments should be done to arrive at the best plans and programs, and therefore more efficient water polo players.

CONCLUSION

In order to determine the level of influence of the plan and program on the motor skills of water polo players and swimmers from 12 to 14 years. Twelve tests were applied in the area of motor skills, which represent the basis of motor skills in water polo and swimming. The tests are taken from the Eurofit battery of tests, which are standardized and used in the daily work of professors and sports coaches and can be said to represent a representative sample of variables, which by their characteristics correspond to the set goals and objectives of this research work. As a method to determine the impact of the plan and program on the motor skills of the water polo player, a T test for dependent samples was used. It can be concluded that there was an influence of the program on motor skills in swimmers and water polo players, which is expected, since the influence of aquatic activities on the human body is known. This paper may recommend that all water polo and swim coaches also include basic motor skills which are done on land in the halls. The introductory part of the training should be planned and not formal, as is the case with most, as in these parts of the training motor performance can be raised to a higher level.

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WHY DO STUDENTS NOT ATTEND LESSONS WITH SPECIAL REMARK TO PHYSICAL EDUCATION LESSONS ABSENCES

Dženana Imamović-Turković, Hana Hadžibulić-Nurković, Faris Rašidagić, Nermin Nurković

Scientific Review Article

ABSTRACTStudents' absences in high school have become everyday issue. Even though regular attendance on lessons is main duty and responsibility of each student, class teachers and students face high number of absences each year, especially non-excused ones. Experiences from school practice show us that this problem is not easily solved due to great number of factors contributing these absences. The number of factors and reasons of students' absences has inspired us to realize this research but also the possibility to look at this problem from several different perspectives, including the pupils. In accordance with the above mentioned facts, aim of this research is to determine the most frequent reasons why students don't attend Physical Education lessons. Given data has been collected by the sample of previously done research and method used was the „target "analysis. After the research is has been confirmed that at least three factors significantly influence the number of absences: Family Related Factors, Student Related Factors and School Related Factors. By improving social conditions in family surroundings, developing student's self-consciousness and improving working conditions in schools, the number of absences could be decreased. It is recommended that similar research should be done in primary schools also even though the number of absences is smaller there. We hope this research could help solve the issue bothering the entire School System in BiH.

Key Words: Absences, Student, School, Physical Education Lessons

INTRODUCTION

Absenteeism, or in other words, students missing from the lessons, is inevitable and very common thing in our schools. It affects entire range of other negative consequences for both students and overall Educational System.

There is no teacher's or class teacher's meeting where the question of absence is not being discussed with the aim to find a way to objectively consider student's reasons, causes and consequences of them being absent from lessons (Bezinović, 2000). Whether this is excused or unexcused, there have to be means to decrease frequent absences. However, there are pedagogical measures written in the School Statute. School Statute is the main document where student's duties and obligations are stated. So, each student is obliged to attend lessons regularly and in case of not being able to come, he/she has to excuse their absence accordingly and on time. Each absence that does not satisfy given criteria, is considered as unexcused and is punished by stated pedagogical measures:

- Unexcused Absences 6 to 10 school hours, student gets Class Teacher's Warning;
- Unexcused Absences 11 to 14 school hours, student gets Discipline Warning;
- Unexcused Absences 15 to 20 school hours, Student gets Expulsion Warning;
- Unexcused Absences with 21 and more school hours, Student is removed from regular lessons

However, disciplinary measures are not always successful and do not influence the number of absences. When it comes to values promoted by Physical Education lessons where the main goal is to improve health and optimal development of characteristics, abilities and motoric knowledge with great number of values amongst which are:

- Biological values by balancing specific organs and organism and balancing organism and environment
- Health values can be seen in possible and necessary influence of physical exercise not only to keep and improve health but also to develop all of its components.
- Economic values are seen in the possibility to influence human abilities which directly contributes to achieving better career results
- Culture values are enabling students to follow and undertake measures to develop and improve their characteristics, abilities, knowledge and achievements. Culture gives chances to acquire theoretical knowledge about nature factors (sun, air, water), keeping the nature clean, usage of everyday physical exercise.
- Pedagogical values of Physical Education can be seen in possible and necessary influence of Physical Education to develop various characteristic such as moral ones and social side of one's character.

Naturally, Physical Education Teacher's role has the appropriate influence to the abovementioned things. Based on available literature (Neichsteter, 1997; Findak, 1999) it can be concluded that teachers should behave naturally, be helpful, kind, available to students, support team work and success, believe in student's success, hold positive energy. One of the ways to successfully maintain teaching process is mutual cooperation between lesson subjects that is, teacher and student which means both subjects should listen to counterpart's suggestions (Rašidagić, Manić, Mahmutović, 2016). Shulman's Research done in 1987 claims that

teacher's academic knowledge mustn't be questioned in any form and should include at least: lesson knowledge, general knowledge about strategies and lesson planning, knowledge to teach specific themes, student knowledge, pedagogical values knowledge. In certain segments, teacher has an educational role which means such teacher respects oneself and others, is functional and disciplined to complete all duties, has reasonable requirements, has good communication with students, clear with firm attitude. School Abseentism is one of the biggest problem schools are facing nowadays. Problem is seen on a global level, in almost all countries of the world. Yahaya (2010) states that absences are one of the ten biggest problems in American School System which was one of the reasons to do this research. After determined reasons for absences, this research shall offer possible measures to prevent them.

SUMMARY OF PRESENT FACTS

Theoretical basis of this research are previous researches themed "Student Absences from Physical Education Lessons". Besides available literature and research information, internet explorers such as Scribd and Google Scholar were also used. 123 similar or same researches were identified at first, but further considerations excluded more than half of them since their content and results were not appropriate (most of them were incomplete or inadequate for this research). When it comes to work methodology, they were analyzed by publication dates: from oldest to most recent ones).

Tolić (1980) in his research about high school students' absences from Physical Education Lessons proves there is no difference between boys' and girls' number of absences.

Stevenson & Baker (1987) as well as Shaw and co. (1996) claim that better relation between the school and parents positively influence to decrease the number of absences.

Sallis& McKenzie (1991) have done a research to determine what would make students not leave Physical Education Lessons. The results showed that "realizing the benefits of lessons" is one of the important reasons that would keep the students in school. Speaking in that context, students should be thought that role of modern Physical Education lessons is gradual preparation to start healthy and active way of life.

Chris (1991) claims that teachers with their interaction and return information can contribute to stronger motivation of students and make them want better results and be more engaged in the lessons, also confirmed by Koka and Hein (2003).

Number of absences is increased in higher grades of high school is confirmed by Nazor (1993) with the aim to get better marks which is the most important goal when it comes to most of parents and students. Such results were confirmed by other authors such as Marušić (2009).

Rayan, Corville-Smith, Addams, Delicandro (1998) claim in their research there are three main groups of factors that influence absences: Factors related to Students' Characteristics, Family Related Factors and School Related Factors. Each of them could be separately analyzed. For example, factors related to students' characteristics show that these influence absences: gender, type of personality and success in school. Also, it is stated that research results regarding gender are inconsistent so authors could not find statistically significant differences between boys and girls. In the same research, there are connections between absences and self-knowledge, self-respect, anxiety and neuroticism.

Smyt (1999) has also done research about gender influencing absences and got the results within high school students where boys make more absences than girls.

Author Sabljić (2000) realized in her research, significant negative connection between average grades at the end of school year and total number of unexcused absences. One can state that students with higher marks (more successful students) have less absences. Author Bilić (2001) has determined that male and female students do not differ when it comes to number of excused and unexcused absences.

Bilmler's Research in 2001, tried to determine whether there is a connection between family relations and absences from school. Results have shown that students coming from families with unresolved internal issues, have more absences than those coming from coherent families. Same results were stated by Livazović (2011).

The most frequent variables related to family and connected to student's school success are family income, parents' occupation, number of children in family, parents' education.

One of the authors who analyzed influence of spatial working conditions (Jensen, 2003), specifically sports hall to number of absences, has determined that can cause "passive participation in lessons" which means students are present on the lesson but don't have complete equipment and suggested that appointed institutions should be involved in solving this problem.

Rečić (2003) and Mlinarević (2006) have proven connection of socio-economic status of family and school success. Results determined statistically significant relation of the two segments since children from wealthy families have more responsibilities in life and work organization outside of school.

Many authors in different periods when they did their research (Ujević, 2004) connect the age of student. It is stated that (Croatian and foreign authors have similar results) absences problems are increased with grade and age.

Type of high school is also significant for absences issue, state Bilankov and Hitrec (2004). Researchers conclude that Gymnasium students have less absences than students going to technical schools.

- Reasons were stated as follows:
- -50.5% of students – there is no particular reason to be absent;

- -68.6% of students - feeling too much pressure because of lesson plans;
- -54.9 % of students – bad interpretation, bad lesson planning, bored during the lesson.

Also, great number of students make absences to express negative attitude towards school, lessons and studying. Exhaustion, monotony that are results of non-interactive lessons, demotivated teacher, unconditioned working spaces for Physical Education just increase number of absences.

Noack (2004) determined that parents' educational level could influence their children not to be absent from lessons (cognitive competence, assuring better possibilities for education, discussing personal opinions about the importance of education).

When it comes to partial or full leave of absence from Physical Education lessons, Kosinac and Banović (2005) have determined there is no statistically significant difference of taking leave of absence between genders. However, Gontarev and Kalac (2017) claim that male students statistically make more absences from Physical Education lessons than girls. 42,3% of girls are absent from these lessons because they don't realize its importance. It is also stated that absences ae encouraged by poor organization of the lesson.

According to author Zrilić (2007), absences from lessons have become a pattern when it comes to student behavior. At the same time, those absences are defined and interpreted as possible risk factors for more serious behavior problems. Researches have shown that both boys and girls are absent from lessons but boys are more prone to have unexcused absences.

Type of school is also a factor in absences during school year, claims Zrilić (2007). There is a statistically significant difference between excused and unexcused absences according to the abovementioned, that is, type of school students go to.

Author Zrilić in 2008 determined in one of her researches that students who are more absent from lessons are more keen to use unhealthy substances.

Livazović and Ručević (2012) in their research make a connection between overall abseentism and poor (sufficient and insufficient) school success.

Topoljak (2012) also deals with the question on which level students are absent from Physical Education lessons. Problem is specifically analyzed by examining how much excuses doctors give to students. Out of 261 researched students, 90% of boys and girls were not in any way excused from doing exercises on the lesson. Out of 10% of students who were „excused ", 2% of boys were temporarily excused and 6% of girls likewise. 2% of students had permanent excuse. From the presented data it can be seen that girls dominate in mentioned categories temporarily as well as permanently.

Škrbo (2014) in his Master Thesis explains that primary school female students have more absences than boys. Taking into account gender and level of education there is no significant difference when it comes to partial or full excuses from PE lessons. The research was done in the area of Canton Sarajevo (BiH).

ANALYSIS OF GIVEN DATA AND DISCUSSION

Looking for the answers to a question: „What are the most frequent reasons why students don't attend lessons with special remark on PE lessons ", completed research on this subject was examined. One of the disturbing factors was the fact there is a small number of such researches done in Bosnia and Herzegovina. The other part of relevant research with adequate data was found in the area of Croatia and final third part of this research consists of data collected from European areas.

First thing to be noticed no matter of the area was inconsistency of results in existing researches. Same factors that impact student absences were determined but often in different mutual relations, sometimes with and sometimes without statistically significant differences. One can also state that, regardless of time period when the research was done, there is no evident change or different data collection that influence student absences. The results confirm that problem of school absences should be treated as complex matter to be dealt with in interdisciplinary way. To be more concrete, things that cause more absences even though different, could be gathered through same research to be more effective in finding a way to solve them.

Teacher/professor could be one of significant reasons to increase absences. One can conclude that students make more absences on lessons where teacher behaves in autocratic way compared to teachers who have more democratic way of teaching. Difference between autocratic and democratic way of teaching: teachers sometimes use command or autocratic lesson methods and can make students feel tired, be monotonous since they can start feeling they don't have enough freedom to express themselves.

Also, students claim they want to be more motivated to work and be more attracted to lessons by using different content during lesson process. Students believe that bad lesson planning can stimulate them to be absent from certain lessons. This can start a question of full democratic way of teaching since command styles hardly have bad organization of lessons (bad time planning, material and technical conditions, human resources). If the students are not able to see benefits of the lesson and importance to study for future life challenges, they will be absent from lessons. Given variable can be surpassed by explaining the influence of certain PE activities to health and organism or explain simple appliance of knowledge to students. School that students attend is also one of the factors that increases absences from PE lessons. Researches have shown that poor material conditions in school, lack of tools and devices as well as their malfunctioning can cause demotivation and lack of interest to be present at PE lessons.

Good or poor state of sports hall influences greater number of absences or causes „passive participation on lessons ". Second cause of absences which can be connected to school conditions is too much students in one class, that is, the size of sports hall not being sufficient. When there are too many students from different classes using the same hall, number of absences increases. One part of the responsibility is to be found in students.

Gender of students, according to some researches, is one of the reasons of increased absences. However, continuity of such results does not exist given the fact that sometimes there is no statistically significant difference by which one could say that male students are more absent than female students. Besides gender, increased absence is influenced by achievements in school. Children who have low achievements, that is, have lower average of marks at the end of school year (sufficient or insufficient) are absent more often from the lessons. Characteristic that should be defined more clearly is also age of the students. Students of older age categories are more absent than the younger ones. Nevertheless, there is no clear statistical evidence of when exactly are boys more absent than the girls. In certain cases, when medical facilities give written excuses for students' absences, there is greater number of lessons missed. These lessons are part of passive motoric presence at PE lessons. Family surrounding from which the student comes also influences absences. The most frequent variables related to family and absences as well as student's achievements are: family income, parents' profession, number of children in the family and parents' education. Higher socio-economic status of the family influences less absences from school. Parents with high level of education and „attractive professions "are a positive influence to kids and if there are less children in the family, parents can spend more time with them and effects of family care can be seen through less absences. If number of absences is to be decreased, and all of the abovementioned factors removed, it is necessary to directly or indirectly participate in educational process to minimize students' absences. After analysis of given data in research papers with this subject, conclusions about PE lessons absences were made.

CONCLUSION

Results of the study which examined reasons for absences show there should be further analysis on this matter. Therefore, after having analyzed gathered data, one can say that students make absences because of the teachers and rigid styles of teaching during the lesson process. Further on, students are absent because of poor material and technical conditions in schools. Part of the reasons is the student him/herself, their growth, development and level of maturity. In the end, it can be concluded that family factors where students with more significant parent support have less absences from school. By analyzing these basic reasons, it seems there is possibility for things to get better and decrease number of absences. Teachers should try and change their teaching methods, make sports more appealing and attractive to students. Also, they should try to interest students to healthy lifestyle with more clear examples of PE lessons importance. School abseentism should be prevented by solving the problem of material and technical conditions in schools and engage wider social community. When it comes to student's reasons for being absent, the problem should be seen from wider perspective and focus on personal characteristics of students. Socio-economic state of one family cannot be solved but this research has concluded that parents must be educated about ways and time spent with their own children which can serve positively to decrease absences from school, whether excused or unexcused.

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THE IMPACT OF BASKETBALL, VOLLEYBALL AND HANDBALL PROGRAM ON THE CHANGES OF SITUATIONAL-MOTOR SKILLS OF FIFTH GRADE ELEMENTARY SCHOOL FEMALE STUDENTS

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Original scientific work

Abstract: Determining the state of the student and his situational-motor skills, and their comparison, enables the teacher to control his work in an immediate manner, and he programmates and implements well planned and additional contents in order to realize the set goals. In order to achieve these functions, it is necessary to determine the current state of the students, as well as the state after the implemented specific contents and programs. The aim of the research was to determine the partial changes (differences) of situational-motor abilities that were created under the influence of a four-month program of basketball, volleyball and handball in the pupils of the fifth grades of elementary school. The study included N = 106 class V students, aged 10 to 11 years. The sample of respondents was divided into two subgroups, an experimental group (53 students), who conducted physical and health education classes according to the modified plan and program of sports games (basketball, volleyball and handball) for a half-year and control group (53 pupils) who attended regular classes from physical and health culture according to the current curriculum. 9 variables were used to assess situational-motor abilities. Descriptive statistics and discriminatory analysis were used to determine the changes (differences) in situational-motor skills. The results of the research at the descriptive level showed certain differences between the groups in the final versus the initial measurements on the individual variables of situational motors. Based on the results of the discriminatory analysis, the relative contribution of each of the variables of the situational motor in the final measurement is seen. The SMKVLS and SMRBLZ variables are the biggest contributors, and the smallest SMOGCPM and SMOSD. Physical and health culture in schools has the primary task of influencing positive transformation processes in all dimensions of students by applying appropriate content.

Key words: experimental program, sports games, situational-motor skills, pupils**.**

INTRODUCTION

Previous research on the student population shows that properly programmed teaching or training processes contribute and help to the overall correct growth and development of children (Skender, 2003; Tabaković et al., 2006; Hodžić, Mekić, 2008; Ćeleš, 2009). For this reason, it is very important to monitor the effects of teaching or training processes in each phase by appropriate instruments. All of this presupposes relevant information on the basis of which it would be more precisely determined, first of all, the initial state, and in the further process and adequate monitoring of the effects of the programmed activities applied, and afterwards, the final state.

Determining the condition of the students, but also of the group as a whole, allows the teacher to control their work, as well as the planned contents that are implemented to achieve the set goals. In order to achieve the expected results, it is necessary to determine the initial state of the students, at the beginning of the year for programming work, and finally for analyzing the performance of work. Thus, the determined initial state and the predicted desired final state of the students would enable the teachers to determine the state of the students during the year, from the initial to the final state, and in the end to the final analysis and assessment of the effectiveness of the applied model of training, i.e. basketball, volleyball and handball content . (Nikšić et al., 2015).

Kvesić (2002) in his master's thesis on the sample of 50 boys 12-14 years old who are involved in the training process and 50 examinees of the same age who are not involved in the football training process determines the level of differences in basic and situational motor skills. The greatest quantitative differences in space with situational motor skills have been achieved by the following variables: the speed of running the ball at 20 m with start from the place, the speed of running the slalom, running speed with right angle direction and the ball speed per semicircle for the benefit of children who deal with systematic sports, in this case football.

Ražanica (2004), on a sample of 127 high school students, aged 15 to 17 years, determines the relations and magnitudes of the influence of some motor skills on the success of performing situational motor tests in sports games. In the area of motor skills, eight tests were carried out according to eurofit, which evaluated five latent hypothetically defined motor dimensions. The results of the regression analysis suggest that the success in sports games is guaranteed by those students whose ability lies in the effectiveness of the regulation system for movement.

Lakota (2006) in his master's thesis on the sample of 82 handball players 11-14 years of age tried to determine qualitative and quantitative changes in basic situational motor skills created under the influence of the three-month program of handball. A 52-course handball program produced statistically significant changes in the treated areas.

Hadžikadunić (2007), on a sample of 146 male students, identified transformation processes under the influence of programmed physical and health

education for 69 hours of instruction in basic motor, situational and motor skills and functional abilities of students of the eighth grade. A system of variables of 8 tests for basic motor abilities and 9 tests for the assessment of specific motor abilities was used, and one test for the evaluation of functional abilities. It was found that programmed teaching has a positive effect on improving basic motor, situational and functional abilities between two measurements.

Bajramović (2008) on a sample of 103 footballers aged 12-14 years tried to determine the levels of transformation of motor skills and the success of footballers under the influence of six-month programmed work. Using the t-test for dependent samples at the univariate level, it was noted that the football program caused a number of significant changes after the final measurement. Using factor or discriminatory analysis at the multivariate level, the author concludes that significant global quantitative changes have occurred in the space of situational motor skills and success in the game, while weak changes were observed in the area of basic motor skills.

Lakota et al. (2008) determined the qualitative level of transformation of situational motor skills in handball players aged 11-14 years in duration of three months. The sample consisted of 82 male entities. Factor analysis isolated 73% of the total variability. The results indicate that qualitative changes have been shown when hitting the goal with the ball, as well as the speed of movements related to ball control.

Mladenović (2008), in his paper "Structural changes in sports games in the teaching of physical education" on the sample of 152 students, implemented the contents of sports games in the teaching of physical education for the duration of one school year. By applying the treatment, the level of structural changes in basic and specific motors was attempted. The results of this program have shown a general, systematic, continuous reconstruction of general and specific motor abilities, therefore the transfomation process is responsible, although not in all situations to the same extent. The worst effects are recorded in the case of football.

Malacko & Pejić (2009) have studied the changes of biomotor pupils aged 11 years under the influence of experimental program of sports games in relation to the standard bodybuilding program. The sample was made up of 252 male students, who were divided into a contral and experimental group. A system of 33 variables (12 morphological and 21 for estimation of motor and functional abilities) was used. The experimental program was saturated with the contents of sports games. The results indicate that the morphological system contributes to the same differentiation of the group, while the experimental group showed better results in the motor space, of which 14 variables showed a statistically significant difference in 13 variables, the experimental group was better.

Džumhur (2009) investigated changes in motor skills and performance in a small soccer game using the situational method of work. On a sample of 81 subjects, aged 12-14 years. He established that the program with the application of the situational method of work revealed changes in the coordination segment, the speed of movement and the segment of equilibrium. It has positively influenced the improvement of situational performance in the soccer game.

The aim of the research was to determine the partial changes (differences) of situational-motor abilities that were created under the influence of a four-month program of basketball, volleyball and handball in the pupils of the five grades of elementary school.

METHODS

Sample of examinees

The study was conducted on a sample of N = 106 pupils in the fifth grade, female, aged 10 to 11 years, clinically and mentally healthy, and with no pronounced morphological and locomotor impairments. The sample of respondents was divided into two subgroups, an experimental (53 pupils) and a control group (53 students). The experimental group conducted classes according to the changed curriculum. The program included sports games from handball, basketball and volleyball. The control group carried out the teaching according to the current curriculum.

Variable sample

The variables used in this study consisted of 9 situational-motor variables: basketball 3 variables, volleyball 3 variables and handball 3 variables.
BASKETBALL (Throwing the ball with both hands against the wall and catching it for 30 seconds - SMKBLRZ; Running the ball with your hand in the slalom - SMKVLS; Throwing the ball into the basket for 30 seconds - SMKBLK).

VOLLEYBALL (Lower frontal serve - SMOSD; Aiming the goal over the net from the basic stand - SMOGCPM; Forearm pass in circle for 30 seconds - SMOOLPK).

HANDBALL (Throwing the ball against the wall for 30 seconds - SMRBLZ; Running the ball in the slalom - SMRVLS; Performing sevens - SMRIS).

Methods of data processing

A descriptive statistical procedure was applied in the data processing process.

The following descriptive parameters are calculated:

- Arithmetic mean (Mean);

- Standard deviation (Std. Deviation).

At the multivariate level, changes were made:

- A discriminatory analysis was used to determine the changes and differences between the experimental and control group under the influence of the experimental program in the situational-motor tests.

Work program

During the first semester, three teaching units were processed as part of regular classes: athletics, basketball and volleyball. A total of 35 teaching hours of regular physical and health education were held, of which 12 hours of athletics, 12 hours of basketball, 11 hours of volleyball. The program of additional classes through the basketball, volleyball and handball sports games consisted of a modified curriculum from basketball: adding and catching balls from basketball, running a ball with a stop, a basketball technique, a low-lead technique, a kick-off practice with zipper positions, zigzag guiding, one - handed addition, moving the ball with arms in motion, running the ball with stop in the position of the shot, ball manipulation, pivoting technique with the ball, straight line guidance from high to low, and vice versa. From the volleyball sports, some teaching units worked, for example: hammer hit, passing with fingers over the net, training a school service, mini volleyball, hammering overhead, refusing to throw a ball out of the wall, adding alternate fingers - a hammer, school service with six and nine meters, jumping with both legs from dockyards on the net, shooting a basket with a hammer. From the handball, the teaching units worked as follows: foreclosure, lateral addition, jumping, kicking on the goal, slalom, handball, straight tracking, mini handball, goal kicking - seven, manipulation with a handball, Shade Adding, Adding To The Triples Game 1: 1 Shot on goal. Only girls were involved in this program and for this reason football was not taken as a spot game.

RESULTS

Display of the collected data by the given characteristics.

Table 1. Values of arithmetic meanings and standard deviations of situational-motors initial measurement

Variables	GROUP	N	Mean	Std. Deviation	Std. Error Mean
SMKBLRZ	1	53.00	23.38	5.20	0.71
	3	53.00	22.19	5.89	0.81
SMKVLS	1	53.00	10.32	1.39	0.19
	3	53.00	11.41	2.64	0.36
SMKBLK	1	53.00	4.17	2.52	0.35
	3	53.00	3.83	2.42	0.33
SMOSD	1	53.00	6.72	3.07	0.42
	3	53.00	6.83	3.34	0.46
SMOGCPM	1	53.00	4.34	2.36	0.32
	3	53.00	4.98	2.23	0.31
SMOOLPK	1	53.00	18.34	4.93	0.68
	3	53.00	20.13	6.65	0.91
SMRBLZ	1	53.00	21.42	3.86	0.53
	3	53.00	23.32	4.55	0.63
SMRVLS	1	53.00	11.05	1.73	0.24
	3	53.00	11.90	2.33	0.32
SMRIS	1	53.00	3.36	1.67	0.23
	3	53.00	3.92	2.06	0.28

The table above presents the average values and measurements of the deviation of the results of the control and experimental group on the variables of the situational motors in the initial measurement. At the descriptive level, there are noticeable differences between groups.

Table 2. Values of arithmetic meanings and standard deviations of basic situational-motors final measurements

Variables	GROUP	N	Mean	Std. Deviation	Std. Error Mean
SMKBLRZ	2	53.00	26.66	4.02	0.55
	4	53.00	24.89	5.59	0.77
SMKVLS	2	53.00	9.24	1.00	0.14
	4	53.00	10.21	1.97	0.27
SMKBLK	2	53.00	6.58	2.56	0.35
	4	53.00	5.51	2.85	0.39

SMOSD	2	53.00	8.89	2.49	0.34
	4	53.00	9.06	2.94	0.40
SMOGCPM	2	53.00	6.30	2.05	0.28
	4	53.00	6.68	2.06	0.28
SMOOLPK	2	53.00	21.83	5.36	0.74
	4	53.00	24.83	7.22	0.99
SMRBLZ	2	53.00	23.45	3.94	0.54
	4	53.00	25.81	4.21	0.58
SMRVLS	2	53.00	10.15	1.43	0.20
	4	53.00	10.57	1.80	0.25
SMRIS	2	53.00	5.09	1.89	0.26
	4	53.00	6.06	2.32	0.32

The table above gives an overview of the average values of the control and experimental group on the individual variables of the situational motor in the final measurement. In this case, the differences between the groups are noticeable at the descriptive level.

Based on the results of the discriminatory analysis, one significant discriminatory function was identified, the coefficient of the canonical coalition being 0.60. It can be said that this is a significant and moderate correlation of the structural latent component variants of situational motions in the initial measurement.

In the following section, a discriminatory analysis was made to determine the intergroup differences in the individual components of situational motors in the initial and final measurement.

Table 3. Box's M test initial measurement

Box's M			90.56
F	Approx.		1.83
	df1		45.00
	df2		35532.53
	Sig.		0.00

According to the value and significance level of the Box test, it can be concluded that there are significant uneven elements matrices of variance-covariance of manifest variables of situational motors in the control and experimental group.

Table 4. Significance of isolated discriminant functions initial measurement

Function		Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
dimension0	1	.57[a]	100.00	100.00	.60

In the described analysis, one discriminatory function was isolated with a canonical correlation value of 0.60 and the value of the characteristic root of 0.57. On average, the factors of the latent canonical variation, ie, functions can explain 57% of the variability in the individual situation motors variables.

Table 5. Wilks' Lambda initial measurement

Test of Function(s)		Wilks' Lambda	Chi-square	df	Sig.
dimension0	1	0.64	44.96	9.00	0.00

According to the Willks lambda indicator and the level of significance of the Hi-squared (which is less than 1%), it can be concluded that the isolated-discriminating function is statistically significant and that selected manifestation variables of situational motors in the initial measurement significantly contribute to the

discriminatory function of the classification prediction of the control group and the experimental group in the initial measurement.

Table 6. The structure of the discriminatory function of the initial measurement

Variables	Function
	1
SMKVLS	0.35
SMRBLZ	0.30
SMRVLS	0.28
SMOOLPK	0.20
SMRIS	0.20
SMOGCPM	0.19
SMKBLRZ	-0.14
SMKBLK	-0.09
SMOSD	0.02

Table 7. Centroids group initial measurement

GROUP	Function
	1
1	-0.75
3	0.75

From the table above, it can be seen that some situational-motors variables in initial measurement in different ways contribute to an isolated discriminative function, and according to individual values of the coefficients. In doing so, the greatest contribution to the maximum intergroup distinction is given by the variables SMKVLS - Handling the ball by hand in the slalom and SMRBLZ - Throwing the ball on the wall for 30 seconds, while the smallest relative contribution has the variables SMKBLK Throwing the ball into the basket for 30 seconds and SMOSD - Service bottom . When it comes to centroid groups, they represent standardized near-zero variants in the structure of which are differentiated weighted combinations of situational motions variables. Given the centroid value, it can be seen that the cross-sectional criterion is important in the middle between the centroid values and that the centroids are fairly uniform. This means that there is no difference in the correct classifications and distinctions between the control and the experimental group, as in both groups the percentages of the correct classification are uniform.

In this discriminative analysis, one discriminatory function is also isolated, as can be seen from the following tabular displays.

Table 8. Box's M test final measurement

Box's M		66.51
F	Approx.	1.34
	df1	45.00
	df2	35532.53
	Sig.	0.06

The Box's test is not statistically significant, and it can be said that in the final measurement, the elements of the variance-covariance matrix of the components of the situational motor are mutually uniform, while in the previous, initial measurements they are not. This indicates a higher homogeneity of the groups in the situation after the work program in relation to the measurement before the work program.

Table 9. Significance of isolated discriminatory functions Final Measurement

Function	Eigenvalue		% of Variance	Cumulative %	Canonical Correlation
dimension0	1	1.01[a]	100.00	100.00	.71

An isolated discriminating function has a characteristic root value greater than 1 which indicates that the factors of the latent structure of a discriminant function can explain, on average, the overall variability of one manifest variable of situational motoring. A canonical correlation of 0.71 indicates a high connection between the variants of latent factors. This correlation is higher than in the initial measurement, which indicates a greater possibility for the model to achieve better distinctions between groups.

Table 10. Wilks' Lambda final measurement

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
dimension0 1	0.50	69.59	9.00	0.00

A model with one discriminative function is statistically significant, which is confirmed by the statistically significant Willks Lmbda expression and Hi-square

Table 11. The structure of the discriminating function of the final measurement

Variables	Function
	1
SMKVLS	0.31
SMRBLZ	0.29
SMOOLPK	0.24
SMRIS	0.23
SMKBLK	-0.20
SMKBLRZ	-0.18
SMRVLS	0.13
SMOGCPM	0.09
SMOSD	0.03

Tabela 12. Centroids Group Final Measurement

GROUP	Function
	1
1	-0.99
3	0.99

From the table above, and according to the values of the coefficients, we see the relative contribution of each of the variables of the situational motor in the final measurement to the discriminatory function itself. The biggest contribution is given to the variables SMKVLS - Handling the ball in slalom and SMRBLZ - Throwing the ball on the wall for 30 seconds, and the smallest SMOGCPM - Targeting the target over the net from the base bet and SMOSD - Service bottom corner. These coefficients indicate the relative contribution of these variables of the model's ability to distinguish between members of one or the other group. As you can see further, centroid values are higher than in initial measurements, which means that the model has better distinctions than in the initial measurement. Because of this, it can be said that there are indications that the effect of the work program has led to changes in the latent structures of the groups, which lie at the basis of the values of the manifest variables of situational motions.

DISCUSSION

Previous research on the student population shows that properly programmed teaching or training processes contribute and help to the overall correct growth and development of children (Skender, 2003; Tabaković et al., 2006; Ćeleš, 2009). Therefore, it is very important to monitor the effects of teaching or training processes with appropriate instruments. Hadžikadunić (2007), on a sample of 146 male students, identified transformation processes under the influence of programmed physical and health education for 69 hours of instruction in basic motor, situational and motor skills and functional abilities of students of the eighth grade. A system of variables of 8 tests for basic motor abilities and 9 tests for the assessment of specific motor abilities was used, and one test for the evaluation of functional abilities. It was found that programmed teaching has a positive impact on improving basic motor, situational and functional abilities between two measurements (initially and final).

Lakota and associates (2008) determined the qualitative level of transformation of situational motor skills in handball players aged 11-14 years in duration of three months. The sample consisted of 82 male subjects. Factor analysis isolated 73% of the common variability.

The results indicate that qualitative changes have been shown when hitting the goal with the ball, as well as the speed of movements related to ball control.

Mladenović (2008), in his paper "Structural changes in sports games in the teaching of physical education" on the sample of 152 students, implemented the contents of sports games in the teaching of physical education for the duration of one school year. By applying the treatment, the level of structural changes in basic and specific motors was attempted. The results of this program have shown a general, systematic, continuous reconstruction of general and specific motor abilities, therefore the transfomation process is responsible, although not in all situations to the same extent. The worst effects are recorded in the case of football.

Malacko and Pejić (2009) investigated the changes of pupils aged 11 years under the influence of the experimental program of sports games in relation to the standard program of physical education. The sample was made up of 252 male students, who were divided into a contral and experimental group. A system of 33 variables (12 morphological and 21 for estimation of motor and functional abilities) was used.

The experimental program was saturated with the contents of sports games. The results indicate that the morphological system contributes to the equal differentiation of the group, while the experimental group showed better results in the motor space, of 14 variables, which showed a statistically significant difference in 13 variables, was an experimental group.

Based on the results of the arithmetic meanings in the tests for the assessment of situational-motor abilities, at the beginning and at the end of the programmed exercise from volleyball, and on the basis of the significance of the changes tested with the T-test for the dependent samples, it is clearly visible that the programmed exercise from volleyball produced significant partial effects. In tests for assessment of situational-motor abilities, presented in this research by the variables SMJAPT - Japanese test, SMTESJ - seating test, SMPRSE - precision of serving, SOPKNZ - rejection of the ball in a circle on the wall and SOPPOZ - rejection of the ball with forearms on the wall, there is a statistically significant positive shift in the value of the arithmetic mean in all tested variables at the final measurement at the statistically most significant level (Šmigalović et al., 2012).

Analyzing the results of the final with respect to the initial situation of situational - motor abilities, there has been a rewriting of the variables and an increase in the number of factors, which shows that there have been qualitative changes in the structure, as well as the transformation of some numerical indicators of situational - motor abilities of the respondents. Looking at the whole, the program of regular and additional teaching with its contents and training exercises and loads had a significant influence on the qualitative changes in situational and motor skills (Talović et al., 2015)

CONCLUSION

This research was conducted with the aim of determining the partial change (difference) of situational-motor skills created by the influence of a four-month program of basketball, volleyball and handball in the pupils of the five grades of elementary school. The sample of respondents included 106 pupils in the fifth grade, aged 10 to 11 years, clinically and mentally healthy, and with no pronounced morphological and locomotor impairments. The sample of respondents was divided into two subgroups, an experimental group (53 pupils), who carried out physical education classes according to the modified plan and program of sports games (basketball, volleyball and handball) for a semester and a control group (53 pupils) who attended regular classes from physical education according to the current curriculum. The variables applied in this study consisted of 9 variables for assessing situational motor performance in sports games and variables for assessing situational motor performance from basketball (Throwing a hand with a hand on the wall and capturing for 30 seconds - SMKBLRZ; Handling the ball by hand in the slalom - SMKVLS; Throwing the ball into the basket for 30 seconds - SMKBLK), variables for assessing situational motor performance from volleyball (Service bottom chess - SMOSD; Targeting the target through the net from the base bet - SMOGCPM; SMOOLPK), variables for assessing situational motor performance from the handball (Throwing the ball on the wall for 30 seconds - SMRBLZ; Running the slalom ball - SMRVLS; Performing the seven-meter - SMRIS). Descriptive statistics and discriminatory analysis were used to determine the changes in the situational-motor abilities. The results of the research at the descriptive level showed certain differences between the groups in the final versus the initial measurements on the individual variables of situational motors. Based on the results of the discriminatory analysis, the relative contribution of each of the variables of the situational motor in the final measurement is seen. The SMKVLS and SMRBLZ variables have the greatest contribution, and the smallest SMOGCPM and SMOSD. These coefficients indicate the relative contribution of these variables of the model's ability to distinguish between members of one or the other group.

Centroid values are higher than in initial measurements, which means that the model has better distinctions than in the initial measurement. Because of this, it can be said that there are indications that the effect of the work program has led to changes in the latent structures of the

groups, which lie at the basis of the values of the manifest variables of situational motions. The results obtained can be of benefit to teachers, as well as professors of physical and health culture in conceiving similar programs and their implementation in everyday teaching practice.

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THE EFFECTS OF ALPINE SKIING TRAINING ON THE ADOPTION OF SKIING ELEMENTS IN GIRLS

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original scientific paper

ABSTRACT: Alpine skiing is a motoric and energy complexed and demanding sport activity. Alpine skiing requires a long systematic preparation, but there are still dilemmas in choosing the most optimal ski learning model. The aim of this research is to determine the effects of successful performance implementation of basic and advanced elements of alpine skiing, conditioned by the attained five-day ski education for school-age boys. It is assumed that the treated program will produce statistically significant differences in favor of the final measurement. METHODS: The study was conducted on a sample of 33 girls aged 7-10 years residing in Sarajevo Canton. Seven variables were used to evaluate the performance of the basic ski elements: STARN- straight run, TRSNG – traversing, UPTRN – uphill turn, SNPGH – the snowplough, SNPGT- snowplough turns, SNPGC – snowplough curve, SLSID – sliding sideways. Two variables were used to evaluate the advanced ski elements: STTUR – stem turns and SHPLT – short parallel turns. The overall performance of the Alpine ski elements was evaluated by a panel of judges (three judges). The research hypothesis was measured using the t-test for dependent samples. RESULTS: The results showed significant statistical differences in all nine treated variables. The five-day ski training program has produced a positive transfer to the adoption of basic and advanced ski elements CONCLUSION: The five-day ski training program, with its contents, workloads, organization and methodical procedures, significantly influenced the adoption of basic and advanced ski elements. The five-day training showed positive effects on the adoption of skiing elements in elementary school.

Keywords*:* Measurement, biomechanics, turns, beginners, , judges, mistakes.

INTRODUCTION

Skiing as a physical activity originated primarily as a means of survival. Speed and mobility were of special importance for the members of the first communities. According to an old Norwegian legend, the roots of skiing go as far back as 8000 years before Christ.Alpine skiing is a motorically and energetically complex and demanding sports activity. By analyzing alpine skiing through the criteria of structural complexity, it falls in the group of monostructural sports in which there is one or more closed movement structures of an acyclic character which are successively repeated. (Milanović, 1997). Alpine skiing is a complex sport that demands good physical and mental preparation from an athlete in its structure and realization. Skiing is a sport that is performed with specific equipment and as such it started developing on steep slopes of the Alps, and that period is marked as the beginning of the development of the alpine skiing technique. Alpine skiing requires a long and systematic preparation, however, there are still dilemmas when it comes to choosing the most optimal model to learn how to ski. All motoric knowledge is prone to certain changes. MalackoiRađo (2004) emphasize that the changes in the subject's state primarily depend on the process of receiving, flow, and retention of information transfer. Learning how to ski represents a challenge for children. Learning how to ski starts with games in the snow, and then by setting simple movement tasks on skis, and later by upgrading through basic skiing elements with a tendency of adopting advanced skiing techniques. Properly selected tasks, exercises, knowing the basic natural tendencies of a child's development, and the basic rules of learning how to ski prevent improper adoption of movement stereotypes (Jelka, 2009). Skiing as a sports activity requires and puts great emphasis on proper posture and as such requires special motoric capabilities. The motoric capabilities the level of which significantly affects the level of technical proficiency in any sport, skiing included, are often neglected or less developed in children. This is why there is more and more emphasis on the need of society for caring about physical activity in youth through which the development of motoric capabilities will be impacted (Cleland et. al., 2008). When we talk about motoric or movement development, alpine skiing as a sports activity has a huge significant effect on the improvement of all motoric capabilities. Motoric or movement development has several characteristics which define it, so many authors characterize it according to three characteristics:„Skender et. al. (2010) 1) that it is a continuous process of changes in a functional capacity. Just like all living organisms, humans are constantly developing but the scope of the changes can vary in different life stages; 2) that it is connected with age, but not dependent on it. Individuals don't necessarily have to make the same amount of progress in chronological and physiological development; 3) that the development is a sequential occurrence. One step leads to another and that is an irreversible occurrence. The aim of this research is to determine the effects of successfulness of performing basic and advanced elements of alpine skiing, conditioned by a realized five-day skiing education for school-age boys. It is assumed that the treated program will produce

statistically significant differences in favor of the final measurement.

METHODS

Sample of subjects

This research was carried out in the Sarajevo Canton on the sample of 33 elementary school-aged female subjects who are beginner skiers. The subjects are clinically healthy without notable morphological and locomotive defects.

Sample of variables

The choice of variables for this research was performed on the basis of appropriateness and adaptability to the age of the subjects.

Variables for estimating the success level at performing basic skiing elements

The variables for estimating the success level at performing basic skiing elements in this research were defined by the curriculum of the basic school of alpine skiing. The practical part of the skiing school's program consists of training basic skiing elements. The variables for estimating the success level at performing basic skiing elements in this research are made up of nine basic skiing elements. In order to simplify the processing of results, the variables for estimating the success level at performing basic skiing elements are coded so that five letters denote one element of alpine skiing. The variables for estimating the success level at performing basic skiing elements in this research are as

follows: Test – STARN, straight run; Test – TRSNG, traversing; Test – UPTRN, uphill turn; Test – SNPGH, the snowplough; Test – SNPG, snowplough turns; Test – SNPGC, snowplough curve; Test – SLSID, sliding sideways; Test – STTUR, stem turns; Test – SHPLT, short parallel turns.

The program and procedure of grading the success at performing basic skiing elements

Realized program

The complete examination was performed between 8 AM and 12 PM. The location of the test (Bjelašnica) was equipped with all the necessary testing equipment. The training was realized in the winter season period and it lasted for 6 hours a day for 5 working days, for a total of 30 hours of training. The training was performed by a licensed skiing instructor. Determining the success levels of individuals at performing certain sports activities is impossible to do with objective measuring instruments, so determining the success levels of performing certain sports activities must necessarily be performed with a subjective estimate of competent judges.

Statistical processing of results

A database has been formed by statistically processing the results, and then the data was put in order, grouped, and put in tables. Its mathematical processing was realized with the use of Microsoft Excel and a statistical application software SPSS 10. Grading the success at performing basic skiing elements was performed by five judges, all of which had to fulfill the following criteria:

- *that they have graduated from the Faculty of sport and physical education*
- *that they possess the theoretical and practical knowledge of alpine skiing*
- *that they possess a skiing instructor license*

The knowledge of the subjects at performing basic skiing elements was defined with a scale of five grades. The grading was performed exclusively with full grades ranging from 1 to 5. Each element was performed two times (one after another because of a possible mistake during the first attempt), and the judges took the better attempt into consideration. Each judge wrote down grades ranging from 1 to 5. After the judges announced their grades, a secretary wrote the said grades in each subject's file.

The received grade is a result of technical performance of a certain element i.e. a grade of the biomechanical correctness of the element, awarded on the basis of subjective estimate by the judges. Potential technical mistakes during performing the basic skiing elements are manifested through deviations in the position of the body or the parts of the body during the performance. The judges have synchronized their criteria and paid special attention to: the starting position, the position of the body, the position of the legs, the position of the arms, aesthetic performance of the exercise, coordination of the exercise, technical performance of the exercise, the amplitude of movements, the speed and the rhythm, and the final position.

Tabela 1. Evaluation criterion (Kazazović, 2003)

EVALUATION CRITERION	
Rating 5 (Five)	The element was optimally designed so that there were no errors in the starting position, body position, foot position, arm position, aesthetic performance of the exercise, technical performance, amplitude of movement, speed and rhythm, and end position.
Rating 4 (Four)	The element is optimally designed with slight errors in the specific technical requirements of starting position, body position, leg position, arm position, aesthetic performance of exercise, amplitude of movement, speed and rhythm and end position. Maximum number of minor errors 1-3.
Rating 3 (three)	The element is still well executed with a small number of errors for some of the technical requirements of starting position, body position, leg position, arm position, aesthetic execution of exercise, coordination of movement, amplitude of movement, speed and rhythm and end position, but overall the structure of movement is not disturbed . Maximum number of minor errors 2-4.

Rating 2 (Two)	Element runtime violated. There are errors with almost all of the above technical requirements. The structure of the movement was also disturbed.
Rating 1 (One)	The element is poorly executed with many errors. There are major drawbacks to all of the above technical requirements. The movement structure is significantly impaired.

Table 2. The differences between the initial and the final testing evaluation of skiing knowledge

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	STARN1 - STARN2	-1.738	.912	.141	-2.022	-1.454	-12.348	41	**.000**
Pair 2	TRSNG1 - TRSNG2	-1.762	.906	.140	-2.044	-1.480	-12.610	41	**.000**
Pair 3	UPTRN1 - UPTRN2	-1.571	.859	.133	-1.839	-1.304	-11.849	41	**.000**
Pair 4	SNPGH1 - SNPGH2	-1.905	.790	.122	-2.151	-1.658	-15.616	41	**.000**
Pair 5	SNPGT1 - SNPGT2	-1.881	.803	.124	-2.131	-1.631	-15.190	41	**.000**
Pair 6	SNPGC1 - SNPGC2	-1.762	.958	.148	-2.060	-1.463	-11.921	41	**.000**
Pair 7	SLSID1 - SLSID2	-1.071	.745	.115	-1.304	-.839	-9.314	41	**.000**
Pair 8	STTUR1 - STTUR2	-1.190	.804	.124	-1.441	-.940	-9.601	41	**.000**
Pair 9	SHPLT1 - SHPLT2	-1.214	.842	.130	-1.477	-.952	-9.346	41	**.000**
Pair 10	TOGR1 - TOGR2	-14.167	6.544	1.010	-16.206	-12.127	-14.030	41	**.000**

THE RESULTS

Based on the results presented in table 2, it is visible that there are statistically significant differences in all nine treated variables for the evaluation of basic and advanced skiing elements (Sig.=.000). The treated five-day program of skiing training with all of its contents, loads, and methodical procedures has produced a positive transfer on the adoption of basic and advanced skiing elements. The basic skiing techniques STARN, TRSNG, UPTRN, and SLSID represent the base elements with the skis arranged parallel to each other, while the SNPGH, SNPGT, and SNPGC elements are performed with the skis arranged in a wedge.

DISCUSSION

Cigrovski (2007) emphasizes that the most efficient way to teach basic alpine skiing techniques is the one which makes use of the elements of the snowplough alpine skiing technique in the program. With a properly learned straightforward snowplough, the dynamic balance with equal thrust on both skis is ensured as it is a beneficial body and ski position which forms the base of progression toward adopting more advanced skiing techniques. In order to properly master the snowplough turn, it is necessary to achieve a safe and somewhat automated performance of the straightforward snowplough and its variations (**Jurković, N., i D., 2003).** Potential technical mistakes during the performance of such alpine skiing elements are manifested through deviations in the position of the body and parts of the body during the performance. In order to efficiently master the snowplough turn element it is necessary to learn to transfer the weight of the body to the ski. Matkovićet. al. (2004) emphasize that chaining together several snowplough turns enables the skier to overcome the slope safely and in a controlled manner with a change in the direction of the movement. The stem turn, the parallel turn, and short parallel turns are skiing technique elements in which the skier continuously chains together multiple turns, so the leg muscles are significantly more engaged when

performing those elements in comparison to the straight run and the uphill turn, which are performed only to the left or the right side (**Cigrovski et. al. 2012**). This skiing element is also the most advanced technique which the subjects have presented during testing. **Murovec (2006)** emphasizes that the process of teaching beginners requires changing the length of the skis every couple of days. In the beginning, it is the most optimal to use shorter skis. The value of the sum of grades from the initial and the final test are evidently different, thereby confirming the existence of a statistically significant positive difference between the values of the total grades in favor of the final testing ($p<.01$). It should be noted that the subjects were absolute beginners, so progress was expected.

CONCLUSION

The aim of this research was to determine the effects of successfulness in performing basic and advanced alpine skiing elements, conditioned by a realized five-day skiing training for elementary school-aged girls. Student's t-test for dependent samples was applied for checking the effects of the tested skiing program, on the basis of which we tried to determine statistically significant differences after the realization of the skiing program. It is possible to realize positive effects on the adoption of basic and advanced skiing elements in girls aged 7-10 with a five-day skiing education ($p<.01$). We can conclude that the treated skiing program with its contents, loads, organization, and methodical procedures has produced a positive transfer on the adoption of basic and advanced skiing elements. The tested variables STTUR and SHPLT represent results of the advanced alpine skiing techniques which, for the first variable (STTUR), encompass parallel and snowhplough skiing with a rhythmic up-down movement and a synchronized change in ski position geometry during the given element. The second variable (SHPLT) represents basic short parallel turns in alpine skiing which is performed on skis arranged in a parallel fashion with pronounced vertical and rhythmic movement. This skiing element is also the most advanced technique which the subjects have presented during testing.

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EVALUATION OF THE "HEALTH RELATED CONSTRUCT" MODEL OF MONITORING PHYSICAL DEVELOPMENT AND DEVELOPMENT OF MOTORABILITIESOF STUDENTS

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Abstract
The aim of this research is to evaluate and assess physical development and development of motor abilitieson a sample of school childrenaged from 11 (sixth-graders) to 15 (ninth-graders)in the Una Sana canton (Bosnia and Herzegovina) using the „health related construct" model for monitoring physical development and development of motor abilities, which linksphysical fitness and health of children andyoung people. This concept tries to connect the test results exclusively with good health condition of the child, which gives a completely new dimension to "physical fitness" tests among children.The concept of „physical fitness"is moving away from general ability to perform certain exercise or physical activity towards the so called „health-related fitness ", which connects „physical fitness"and emphasizes components such as cardiorespiratory endurance, body composition, muscular flexibility and strength,which are crucial factors in determining goodhealth status of an individual. In accordance with the current trends, the proposed model in this research of monitoring physical development and development of motor abilities of studentsfollows the so called „health-related physical fitness" model. Bearing in mind the changes in monitoring physical development and development of motor abilities of students in Physical Education classes throughout the world, and similarities in economic and social parameters in the Republic of Serbia and Bosnia and Herzegovina , the authors of this paper have chosen to evaluate the model of monitoring physical development and development of motor abilities from the Republic of Serbia (as the model which follows the new „health related " concept in monitoring physical development and motor abilities development.

Keywords: morphological characteristics, motor abilities, monitoring and evaluation, students

INTRODUCTION

As part of reforms of the educational system in Bosnia and Herzegovina new syllabuses for Physical Education are being introduced in schools.At the same time, while implementing new syllabuses we are trying to start systematic monitoring of the effects of the syllabuses, in order to get insight into the implementation, and also upgrade and improvethe syllabuses based on the gained experience. The transformation of anthropological status ofstudents is the primary goal of the Physical Education classes, and physical exercise and sport activitiesare the means to achieve this goal. EUROFIT battery of test,which has been suggested by the European Council in 1988, is being used in primary and secondary schools in Bosnia and Herzegovina for the process of monitoring and checking physical development and motor abilities development.The application of this test battery has brought certain innovations in monitoring child's physical development and motor abilities development and also contributed to improvement of the overall quality of Physical Education classes in Bosnia and Herzegovina. However, recent developments in the USA and some European countries give new insightsintothe aim and goal of monitoring physical development and motor abilities developmentin Physical Education classes, based on a number of researches which have pointed out the connection between physical development, motor skills and health of children and young people(Ortega et al., 2008). Most developed countries worldwide emphasize the role that Physical Education classes play in promotion of healthy way of living and developingpositive attitude among young people towards physical exercise and sport. (Carlson, 1995; Ennis, 1996; Portman, 1995; Robinson, 1990). Due to these reasons the authors dealing with this subject think that monitoring of studentss' physical development and motr sabilities development has to be in accordance with the aim and goals of Physical Education classes, such as promotion of healthy lifestyle, creating positive attitude towards physical exercise and sport.According to these authors testing„physical fitness" (a term which defines physical developpment and motor skills in English speaking world) should include , apart from measuring and monitoring certain components of studentss' „physical fitness" , education of studentss about the way and methods of improving each individual fitness component, and at the same time promote positive attitudes towards physical exercise and physical activity in general (Corbin et al., 1995).In the USA and some European countries, we have recently witnessed acompletely new perspective of the aim and goal of monitoring physical development and motor abilitiesdevelopment in Physical Education classes, based on researches which have pointed out the connection between physical development, motor abilities and health, or to quote the English-speakingauthors between physical fitness and health (Ortega et al., 2008). The American authors call the concept of monitoring physical development and development of motor abilities which connects physical fitness and health of children and young people health related construct in „physical fitness" or „health-related fitness". This concept tries to connect the test results exclusively with good health condition of the child, which gives a completely new dimension to "physical fitness" tests among children.Baumgartner

and Jackson, note in 1987, that the concept of „physical fitness "is moving away from general ability to perform certain exercise or physical activity towards the so called „health-related fitness ", which connects „physical fitness "and emphasizes components such as cardiorespiratory endurance, body composition, muscular flexibility and strength, which are crucial factors in determining good health status of an individual (Marsh, 1993). These changes in the concept have caused the changes in the battery of tests, so that the so called „health-related fitness tests" no longer contain balance, agility or strength tests, but include new ones which test cardiorespiratory endurance, body composition(especially fat component), muscular strength, endurance and flexibility .Originally the reasons for the introduction of these functional health related tests were supported mainly by the results of tests conducted on adults (Freedson et al., 2000). However, the data from the recent researches point out the connection between the high level of „cardiorespiratory fitness" (cardiorespiratory endurance) of children and adolescents and healthier „cardiorespiratory profile" not only at this age but also later in life (Twisk et al., 2002). This concept has also introduced some changes with respect to referential standard used in the battery of tests for assessing „physical fitness ".While previous test batteries used the so called normative reference standard where all components of„physical fitness" were defined (according to the age and gender), the new ones useCriterion-Referenced Standards (Harris & Cale, 2006). When using norms, the teacher could theoretically monitor the changes in values of an individual student by comparing his results with the defined norms, but the test results did not provide much information about the student's health.In other words, these tests provided us with data about the current state, but they did not tell us what we should do to prevent possible health risk. The innovation that the so called Criterion-Referenced Standards provides is the fact that it uses the gained results to determine minimal level of fitness, which are vital for the protection of child's health, that is for the reduction of risk of possible health problems later on in adulthood.The results which are above the minimal level of fitness cut off ponts for each fitness component are classified as acceptable, and the results which are under the cut off points are classified as the results that need to be improved. The use of these standards is in accordance with modern understanding of physical growth and motor skills tests, according to which the test results should not be used for comparison or grading of students (Corbin, 2002).

A numer of test batteries following this concept have recently beenconducted in Europe. One of them is the Helena battery which was crated as part of an international project conducted in nine European countries.One of the goals of the Helena study,which used the same methodology to assess physical development, motor abilities, physical activity and diet,was to compare data and determine the similarities and regularities regarding monitoring young people in Europe, in order to offer certain solutions for improvement of general physical and psychological health of young people in Europe (Ruiz et al., 2006). Apart from the Helena battery, ALPHA-FIT test battery was created after several years of research among 10 000 children and young people. Its purpose is to assess health related „physical fitness"of children and young people. The battery consists of valid, reliable, safe cost-effective tests which can be used to monitor public health. It includes the following tests: assessment of cardiorespiratory endurance–*shuttle run /*20m endurance shuttle-run/,assessment of musculosceletal fitness - handgrip/ *and* (standing jump), assesment of body composition –/BMI – body mas index/, hip circumference/triceps and subscapular skin fold/. When teachers or trainers are not restricted by a time limit, it is recommended to use extendedALPHA-FITtest battery which includes agility test and 4x10 shuttle run (Ruiz et al., 2016).A large study aimed at setting a new system of monitoring physical development and motorabilitiesof students in primary schools was conducted in the Republic of Serbia in the period from 2011 to 2014 (Milanović I Radisavljević Janić, 2015). Following modern tendencies, the suggested model for monitoring physical fitness and motor skills of students follows the concept of the so-called „health related physical fitness" model. Basically, the structure of the battery of tests in this model contains tests for monitoring and assessment of cardiorespiratory endurance, body composition, muscle strength, endurance and flexibility. Apart form the basic srtructure of the battery of tests for monitoring physical development and motor skills developement, an additional agility assessment test has been added which provides certain information about a part of motor area not directly connected to health, but certainly important for overal mechanism for regulation of movement (Kureliću i sar., 1975). In this way this batery of tests has, according to the authors, included all necessary components in monitoring physical development and development of motor abilities of students, while such extended concept of health related physical fitness model is in line with the goal and tasks of Physical Education classes in the Republic of Serbia and would help effectivness of teaching (Milanović i Radisavljević Janić, 2014). Taking into account the conditions in which Physical Education classes are held in primary schools in the Republic of Serbia, the following battery of tests has been suggested; for monitoring physical development and body composition minimum quantity of information sufficient for objective analysis can be obtained form the results of the following tests; shuttle run test(for general endurance assesment), sit and reach test (for flexibility assessment), sit ups in 30 s test, standing jump test, fixed arm hang test (for for strength and muscular endurance assessment) and shuttle run 4x10 (for agility assessment). Baring in

mind the changes in monitoring physical fitness and motor abilities of students in Physical Education classes in the world, and taking into account similarities in economic and social parametres of the Republic of Serbia and Bosnia and Herzegovina, the authors of this researchhave decided to to evaluate the model of monitoring physical development and development of motor abilities from the Republic of Serbia (as the model which follows the new „health related " concept in monitoring physical development and motor abilities development.

METHODS AND RESEARCH

The aim of this research is evaluation and assessment of physical development and motor abilities on a sample of school children aged 11 (sixth-graders) to 15 (ninth-graders) in the Una Sana canton (Bosnia and Herzegovina) using the Serbian„health related construct" model for monitoring physical development and motor abilities development, which linksphysical fitness and health of children and young people. The sample in this research consisted of 843 students (boys and girls) enrolled ineight primary schools from Una Sana canton (BIH), aged 11 to 15 (from the sixth to the ninth grade of primary school in the educational system of BiH). During the selection of students for this research the following criteria were applied;students had to be healthy, without injuries on the day of the tests and had to regularly attend their Physical Education classes.

SAMPLE OF VARIABLES

Independent variables, dependant and control variables were used for the purpose of this research.Independant variables were genderand age of the defined sample.Control variables were body height and body mass of the defined sample, while dependant variables were : standing jump test, sit ups in 30 s test, fixed arm hang test,sit and reach test;shuttle run 4x10;20 m shuttle run with progressive speed increase and body mass index(BMI).

MEASURING INSTRUMENTS

Height was measured with a stadiometer (Seca Instruments Ltd., Hamburg, Germany)the Martin type with subjects standing barefoot on a firm surface wearing only PE athletic attire. Weight was measured with aTanita Inner Scan Model BC-587 (Tanita Europe GmbH., Sindelfingen,Germany) to the nearest 0.1 kg. The scale was placed on a firm flat surface.Subjects were barefoot and wore only PE athletic attire. Body mass index was calculated as body weight in kilograms divided by the square of height in meters. Sit and reach test was performed with a wooden box (45 cm x 35 cm x 32 cm) a ruler and glide on the upper surface of the box (60 cm long and 35 cm wide).The subject was barefoot and had to sit with legs extended in front of the body, with the soles of the feet against the front of the box, arms stretched (one hand on top of the other)in fornt of the body. The subject had to reach slowly forward and move the glide without bending knees.For standing jump test subjects(wearing PE attire)stood on a flat (non slip) surface with markedline and take off line, from which measurment was taken in centimeters. For sit ups in 30 s test subjects had to lie on their back on a mat with knees bent at 90-degreeangle and hands placed at the back of the neck, while another person(testing assistant)was holding the subject's feet on the ground. The subject had to lift the upper bodywith elbows touching the knees, the result of the test was the total number of correclty performed sit-up repetitions in 30 seconds. Fixed arm hang test was adminstered on a horizontal bar, and the time was measured by chronometer.In order to assume the starting position the subject used a chair or was lifted by assistants to grab the bar with his hands,shoulders with apartand chin above or at the level of the bar. After assuming this starting position, the chair was removed. Chronometer stopped when the subject lowered his chin under the bar.Shuttle run 4x10 test was administered on a running trackon non-slip surface. The equipment used in the test consisted of chronometer and two sponges. The track was marked with two parallel lines 1,2 m long (markings were made using chalk or adhesive)10 m apart. Two sponges were left behind the second marked line at the end of the track. The subject stood at the start line and after a signal was given he started running as fast as possible along the marked track towards the line at the other end of the track, cross the line with one foot and take the first sponge. Then he turned as fast as possible and ran back along the same track, touched the start line with one foot, left the sponge, turned and ran towards the second line, where he took the second sponge, turned and finished the test by running over the start line (during this time he ran 40 m).

In 20 m shuttle run with progressive speed increase subjects had to run between two lines 20 meters apart keeping pace withaudio signal played on CD player.When hearing a sound the subject had to stand with his both feet on the line. The aim of the test was to run as many sections as possible.

Method of data analysis

The relevant descriptive and comparative statistical analysis was used for data processing. Within the descriptive statistics; the following parameters were determined for all variables of morphological and motoric area of different age groups: arithmetic mean standard deviation, minimum and maximum. Within the comparative statistics , the analysis of variance (ANOVA) and multivariateanalysis of variance (MANOVA). Non parametric test was also performed to check median.As a levelof statistical significanece, $p<0.05$ *was determined*.

Result and discussion

The total number of 6th grade students who were tested was 180, 84 girls and 96 boys. Average height of girls at this age was 150.29 cm (SD=7.45;

Min=133.0; Max=168.0), while average height of boyswas slightly lower, and was 148.79 (SD=7.48; Min=130.0; Max=165.0). The difference in height between boys and girls was not statistically significant (p>0.05). Average values of body mass for girls are almost the same as the average values for body mass for boys. Average value of body massfor girls was 42.3 kg (SD=8.24; Min=30.0, Max=66.0), while boys had average mass of 42.0 kg (SD=9.90; Min=30.0; Max=75.0).There were no statistically significant differences in BMI betweenboys and girls.Girls had slightly lower average BMI, with average BMI of18.59 (SD=2.75; Min=12.66; Max=24.65), while the average value of BMI for boys was 18.78 (SD= 3.20; Min= 13.32; Max= 29.67).

Table 1. Basic descriptive parameters of physical development and motor abilities of students and the results of analysis of variance according to gender in the sixth grade

Variables / Gender		N	Min	Max	M	SD	P	η^2
Body height (cm)	female	84	133.0	168.0	150.29	7.45	0.18	0.01
	male	96	130.0	165.0	148.79	7.48		
Body mass (kg)	female	84	300	66.0	42.3	8.24	0.86	0.00
	male	96	30.0	75.0	42.0	9.90		
Body mass index(kg/m^2)	female	84	12.66	24.65	18.59	2.75	0.67	0.00
	male	96	13.32	29.67	18.78	3.20		
Sit-up (n)	female	84	9.0	30.0	16.9	4.12	**0.00**	0.59
	male	96	8.0	33.0	19.3	4.96		
Standing long jump (cm)	female	84	100.0	195,0	132,9	20.36	**0.00**	0.85
	male	96	110.0	208,0	145,5	20.79		
Sit and reach (cm)	female	84	7.0	31.0	19.4	5.58	**0.00**	0.40
	male	96	5.0	33.0	17.2	5.02		
Fixed arm hang (s)	female	84	0	63.0	12.1	13.08	**0.00**	0.74
	male	96	0	66.0	20.9	17.62		
Shuttle run (s)	female	84	57.0	401.0	166.9	78.64	**0.00**	0.68
	male	96	50.0	425.0	216.1	100.88		
Shuttle run 4x10 m (s)	female	84	11.07	16.75	14.16	1.10	**0.00**	0.13
	male	96	10.78	15.89	13.19	1.30		

Legend: *p<0.05; N- number of subjects, Min-minimum, Max- maximum; M-*arithmetic mean*, SD- standard deviation, η^2-effect size*

Average score on sit ups in 30 s test was 19.26 (SD= 4.96; Min= 8; Max= 33)for boys, and 16.96 (SD= 4.12; Min= 9; Max= 30)for girls. The difference between the two average values was statistically significant p<0.01, which means that boys had significantly better scores on this test. Average score for boys onstanding jump test was 145.5 cm (SD= 20.79; Min= 110.0; Max= 208.0), while girls had significantly lower score, namely 132.9 cm (SD= 20.36; Min= 100.0; Max= 195.0). Boys were better than girls instanding jump test with statistical significance *of* (p<0.05).The results of sit and reach test are also different for the two groups of students according to gender, where girls were better than boys, with average score of 19.41cm (SD= 5.58; Min= 7; Max= 31) for girls, and 17.26 cm (SD= 5.02; Min= 5; Max= 33) for boys. The results of the analysis of variance proved statistically significant differences of average value of scores for boys and girls on sit up test (p<0.01) in favour of girls.Average score for girls in fixed arm hang testwas 12.08 seconds (SD= 13.08, Min= 0, Max= 63). Boys were better in this test, and their average score was 20.90 seconds(SD= 17.62; Min= 0; Max= 66). The difference between girls and boys is statistically significant (p<0.05). Girls had significantly lower scores on shuttle run test in comparison to boys of the same age (p<0.05). Average score for boys on shuttle run test was 216.11 seconds (SD= 100.88; Min= 50; Max= 425),

while average score for girls was significantly lower, namely 166.87 seconds (SD= 78.64; Min= 57; Max= 401). The difference between the results of boys and girls in shuttle run 4x10 is statistically significant ($p<0.05$). Boys had average score of 13.19 second (SD= 1.30; Min= 10.78; Max= 15.89), while girls had higher average score of 14.16 seconds (SD= 1.10; Min= 11.07; Max= 16.75). Table2shows basic descriptive parameters of the results of tests of physical development and motor abilities of seventh grade students of both genders, as well as the results of analysis of variance with statistically significant results of testing physical developments and motor abilities development between boys and girls in the seventh grade.The total number of 7th grade students who were tested was 201, 108 girls and 93 boys. The average height for girls at this age is 157.25 cm (SD= 7.19; Min= 142.0; Max= 175.0), while average height for boysis slightly lower, namely 156.27 cm (SD=7.63; Min=135.0; Max=175.0). The difference in height between boys and girls was not statistically significant ($p>0.05$). The difference in body mass between boys and girls was not statistically significant ($p>0.05$). Average value of body mass for girls is 50.58 kg (SD=11.62; Min=31.0, Max=86.0), while boys have average value of body massof 47.42 kg (SD=12.62; Min=30.0; Max=86.0).

Table 2. Basic descriptive parameters of physical development and motor abilities of students and the results of analysis of variance according to gender in the seventh grade

Variables / Gender		N	Min	Max	M	SD	*P*	η^2
Body height (cm)	female	108	142.0	175.0	157.25	7.19	0.34	0.00
	male	93	135.0	175.0	156.27	7.63		
Body mass (kg)	female	108	31.0	86.0	50.58	11.62	0.06	0.01
	male	93	30.0	86.0	47.42	12.62		
Body mass index(kg/m^2)	female	108	13.96	31.14	20.32	3.84	**0.05**	0.01
	male	93	12.33	31.39	19.24	4.06		
Sit -up (n)	female	108	10	31	19.04	3.95	**0.00**	0.04
	male	93	12	35	20.82	4.64		
Standing long jump (cm)	female	108	100.0	200.0	137.03	19.88	**0.00**	0.11
	male	93	100.0	200.0	152.80	24.85		
Sit and reach (cm)	female	108	5.0	33.0	20.7	6.03	**0.00**	0.06
	male	93	7.0	30.0	17.7	5.10		
Fixed arm hang (s)	female	108	0	50.0	12.3	11.80	**0.00**	0.16
	male	93	0	75.0	27.4	21.85		
Shuttle run (s)	female	108	50.0	344.0	156.5	63.8	**0.00**	0.09
	male	93	50.0	468.0	209.7	98.4		
Shuttle run 4x10 m (s)	female	108	11.07	16.56	13.94	1.20	**0.00**	0.14
	male	93	10.09	15.84	12.92	1.32		

Legend:p<0.05; N-number of subjects, Min-minimum, Max- maximum;M-arithmetic mean, SD- standard deviation, η^2- effect size

Boys and girls differ statistically in Body Mass Index.Average value of body mass index for girls is 20.32 (SD=3.84; Min=13.96; Max=31.14), and for boys 19.24 (SD=4.06; Min=12.33; Max=31.39). Average score for sit up test in 30 seconds for boys was 20.82 (SD=4.64; Min=12; Max=35), while average score for girls was je 19.04 (SD=3.95; Min=10; Max=31). The differences in scores for sit up test between boys and girls are statistically significant ($p<0.01$). Boys did better than girls in long jumpand the differences in scores are statistically significant ($p<0.01$). Average scores for boys in long jump was 152.80 cm (SD=24.85; Min=100.0; Max=200.0), while girls had average score of 137.03 cm (SD=19.88; Min=100.0; Max=200.0). The results of sit and reach test for boys and girls differ significantly. Average score for girls in this test is 20.75 cm (SD=6.03; Min=5; Max=33), while boys average score is 17.69 cm (SD=5.10; Min=7; Max=30).The results of analysis of variance proved statistical significance of average scores in sit and reach testin favour of girls.

Average value for girls in fixed arm hang test is 12.33 seconds (SD=11.80, Min=0, Max=50), while average value for boys is 27.44 (SD=21.85; Min=0; Max=75). The difference between scores for boys and girls is statistically significant ($p<0.05$). The results of shuttle run tests for girls were statistically significantly lower than the results for boys. Average score in shuttle run test for boys is 209.73 seconds (SD=98.38; Min=50.0; Max=468.0), while average score for girls is 156.50 seconds (SD=63.83; Min=50.0; Max=344.0). The difference between scores for girls and boys in shuttle run 4x10 test is also statistically significant. The difference in average scores for boys and average scores for girls is statistically significant ($p<0.01$) in favour of boys. Boys had average score of 12.92 seconds (SD=1.32; Min=10.09; Max=15.84), while girls had average score of 13.94 seconds (SD=1.20; Min=11.07; Max=16.56).Table 3 shows basic descriptive parameters of the results of tests of physical development and motor abilities of eight grade students of both genders, as well as the results of analysis of variance with statistically significant resultsof testing physical developments and motor abilities development between boys and girls in the eighth grade.The total number of 8th grade students who were tested was 259, 106 girls and 153 boys. Average height of girls at this age was 160.19 cm (SD=6.75; Min=142.0; Max=180.0), while average height of boys was slightlyhigher, and was 162.15 cm (SD=8.27; Min=139.5; Max=187.0). The difference in height between boys and girls was statistically significant ($p<0.05$). The difference in body mass between boys and girls was not statistically significant($p>0.05$). Average value of body massfor girls was53.28 kg (SD=11.37; Min=33.0, Max=83.0), while boys' average value body mass 52.23 kg (SD=9.95; Min=30.0; Max=81.0).

Table 3. Basic descriptive parameters of physical development and motor abilities of students and the results of analysis of variance according to gender in the eighth grade

Variables / Gender		N	Min	Max	M	SD	*P*	η^2
Body height (cm)	female	106	142.0	180.0	160.19	6.75		
	male	153	139.5	187.0	162.15	8.27	**0.04**	0.01
Body mass (kg)	female	106	33.0	83.0	53.28	11.37		
	male	153	30.0	81.0	52.23	9.95	0.43	0.00
Body mass index(kg/m^2)	female	106	14.27	30.30	20.67	3.77		
	male	153	12.70	30.86	19.77	2.97	**0.03**	0.01
Sit-up (n)	female	106	8.0	27.0	18.9	3.40		
	male	153	11.0	36.0	23.4	5.41	**0.00**	0.18
Standing long jump (cm)	female	106	100.0	250.0	149.0	23.69		
	male	153	100.0	225.0	168.5	27.00	**0.00**	0.12
Sit and reach (cm)	female	106	10.0	35.0	21.2	5.57		
	male	153	8.0	31.0	20.4	4.71	0.18	0.00
Fixed arm hang (s)	female	106	0	77.0	15.5	13.69		
	male	153	0	89.0	29.7	21.60	**0.00**	0.12
Shuttle run (s)	female	106	51	329	166.3	58.85		
	male	153	69	505	249.9	102.23	**0.00**	0.18
Shuttle run 4x10 m (s)	female	106	10.38	16.73	13.79	1.36		
	male	153	9.47	16.22	12.30	1.38	**0.00**	0.22

Legend: *$p<0.05$; N- nu. of subjects, Min-minimum, Max- maximum; M*-arithmetic mean*, SD- standard deviation, η^2- effect size*

Boys and girls differ significantly statistically in body mass index ($p<0.05$) in favour of girls. Average body mass index for girls is 20.67 (SD=3.77; Min=14.27; Max=30.30), while average body mass index for boys is19.77 (SD=2.97; Min=12.70; Max=30.86). Average value of results on sit up test for boysis 23.4 (SD=5.41; Min=11; Max=36), and for girls 18.9 (SD=3.40; Min=8; Max=27). The difference in scores between boys and girls in this test is statistically significant($p<0.01$) in favour of

girls. Boys did better than girls in long jump and the difference in scores is statistically significant ($p<0.01$). Average value of results for boys on long jump test is168.50 cm (SD=27.0; Min=100.0; Max=225.0), while average score for girls is 149.03 cm (SD=23.69; Min=100.0; Max=250.0). Results of sit up test for boys and girls do not differ significantly. Average score for girls is 21.23 cm (SD=5.57; Min=10.0; Max=35.0), and average score for boys is 20.37 cm (SD=4.71; Min=8.0; Max=31.0). Results of variance analysis showed no statistical significance of average scores in sit up tests ($p>0.05$). Average value for girls in fixed arm hang test is 15.50 seconds (SD=13.69, Min=0, Max=77), while average value for boys is 29.67 seconds (SD=21.60; Min=0; Max=89.0). The difference between scores for boys and girls in this test is statistically significant ($p<0.01$). Boys had significantly better results than girls in shuttle run test ($p<0.01$). Average score for boys on shuttle run test is 249.9 seconds (SD=102.23; Min=69.0; Max=505.0), and average value for girls is 166.3 seconds (SD=58.85; Min=51.0; Max=329.0). The difference in scores for girls and boys in shuttle run *4x10 m*is also statistically significant ($p<0.05$). Boys had average score of 12.30 seconds (SD=1.38; Min=9.47; Max=16.22), while girls had average score of 13.79 seconds(SD=1.36; Min=10.38; Max=16.73).Table 4 shows basic descriptive parameters of the results of tests of physical development and motor abilities of ninth grade students of both genders, as well as the results of analysis of variance with statistically significant results of testing differences in morphologic characteristics and motor abilitiesbetween boys and girls in the ninth grade. The total number of 9th grade students who were tested was 203, 104 girls and 99 boys. Average height of girls at this age was 163.87 cm (SD=5.41; Min=149.0; Max=177.0), while average height of boys was 169.91 cm (SD=8.13; Min=151.0; Max=190.0). The difference in height between boys and girls is statistically significant ($p<0.01$). The difference in body mass between boys and girls is statistically significant ($p<0.05$). Average value of body mass for girls is 55.86 kg (SD=9.77; Min=39.0, Max=84.0), while boys' average body mass was 58.97 kg (SD=12.20; Min=35.0; Max=88.0). Boys and girls did not differ significantly in body mass index ($p>0.01$).

Table 4. Basic descriptive parameters of physical development and motor abilities of students and the results of analysis of variance according to gender in the ninth grade

Variables / gender		N	Min	Max	M	SD	*P*	η^2
Body height (cm)	female	104	149.0	177.0	163.87	5.41		
male		99	151.0	190.0	169.91	8.13	**0.00**	0.16
Body mass (kg)	female	104	39.0	84.0	55.86	9.77		
male		99	35.0	88.0	58.97	12.20	**0.04**	0.02
Body mass index(kg/m²)	female	104	15.43	30.86	20.77	3.27		
male		99	15.18	31.03	20.27	3.10	0.26	0.00
Sit-up (n)	female	104	10	32	18.36	4.36		
male		99	14	36	24.58	4.96	**0.00**	0.31
Standing long jump (cm)	female	104	105.0	197.0	141.76	21.10		
male		99	130.0	250.0	184.50	27.02	**0.00**	0.44
Sit and reach (cm)	female	104	6	31	21.55	5.49		
male		99	7	33	19.63	5.93	**0.02**	0.02
Fixed arm hang (s)	female	104	0	89	20.23	19.37		
male		99	1	86	37.42	23.00	**0.00**	0.14
Shuttle run (s)	female	104	59	558	180.64	87.00		
male		99	108	559	312.49	119.58	**0.00**	0.28
Shuttle run 4x10 m (s)	female	104	9.27	16.55	12.90	1.49		
male		99	9.27	14.87	11.55	1.19	**0.00**	0.20

Legend: *p<0.05; N- number of subjects, Min-minimum, Max- maximum; M*-arithmetic mean*, SD- standard deviation, η^2- effect size*

Girls had slightly higher average value of body mass index than boys. Average value of body mass index for girls was 20.77(SD=3.27; Min=15.43; Max=30.86), and for boys 20.27 (SD=3.10; Min=15.18; Max=31.03). Average score for sit up test for boys is 24.58 (SD=4.96; Min=14; Max=36), while average score for girls was 18.36 (SD=4.36; Min=10; Max=32). The difference in scores in this test is statistically significant ($p<0.01$) in favour of boys. Average scores for boys and girls in long jump statistically differ significantly ($p<0.01$) in favour of boys. Average score value for boys on long jump is 184.50 cm (SD=27.02; Min=130.0; Max=250.0), while average score for girls is 141.76 cm (SD=21.10; Min=105.0; Max=197.0). Girls' score in sit up test is 21.55 (SD=5.93; Min=7.0; Max=33.0) and boys' 19.63 cm (SD=5.49; Min=6.0; Max=31.0). The results of the analysis of variance proved statistically significant differences ($p<0.05$) of average value of scores for boys and girls on sit on test in favour of girls.Average score for girls in fixed arm hang test is 20.23 seconds (SD=19.37, Min=0 , Max=89), while average score for boys is 37.42 seconds (SD=23.00; Min=1; Max=86). The difference in scores between boys and girls is statistically significant ($p<0.01$) Girls had lower scores in shuttle run test than boys. The difference in scores is statistically significant ($p<0.01$). Average value of scores for boys on shuttle run test is 312.49 seconds (SD=119.58; Min=108.0; Max=559.0), while average score for girls is 180.64 seconds (SD=87.0; Min=59.0; Max=558.0). The difference in scores between boys and girls in shuttle run *4x10m*test is statistically significant ($p<0.01$). Boys had average score of 11.55seconds in this test (SD=1.19; Min=9.27; Max=14.87), while girls had average score of 12.90 seconds (SD=1.49; Min=9.27; Max=16.55).

CONCLUSION

When the results of female students were compared with the results of male students (gender) , and the results of different age groups (age),the obtained results point to the existance of age factor effect and gender factor effect for all variables evaluated in this research. In the majority of tests, observed individually, the obtained results point to the existance of observable age factor effect and gender factor effect in all variables that have been assessed in theevaluated model of monitoring physical development and development of motor skills from the Republic of Serbia that has been used inthis research. These result were expected because it had been assumed that tests discriminate subjects according to gender and age. Mutual interactionon of the gender factor and age factor, which points to the differences occuring in motoric abilities tests in different age groups in both genders, was expected in case of motoric abilities. It was expected that the age factor effect would appear in variables that refer to physical deveolpmnet, namely in height, body mass and body mass index, while in case of skin folds it was not possible to correctly predict the effect of age factor. It is evident that child's growth and development leads to increased body mass and height, which is also evident inreferential standards of body mass index for a particular age and gender. There has been improvement in the results of most motor abilitiestests with age (except for flexibility), as expected. When comparing the obtained results by gender,differences go mostly in favour of boys, except for flexibility where girls have better reulsuts, and balance where the differences in results do not consistently go in favour of one gender.According to authors who have investigated structure of motor skills famales and males have the same structure of motor skills,(Kurelić i sar., 1975; Myers, Gebhardt i sar., 1993; Marsh, 1993) so models of monitoring physical development and motor abilities development in children and young people should use the same motor skills tests for females and males, as is the case in this model.One of the important characteristics that a model for monitoring physical development and motor abilities development must possess is the model's adaptability to different age groups. When choosing tests, it is important to keep in mind that the test is adapted and acceptable to all age groups that attend Physical Education classess. Acorrding to previous experience, majority of models predict that baterries of tests can be applied to students aged between 5 and 17, regardless og gender. However, we should bear in mind that children develop basicmotor abilitiesduring early childhood, and reach maturitybetween the age of five and eight, as well as the fact that these skills are necessary for performing any test that is a certain measuring instrument for the assessment of one of fitness components in order to perform the test (Malina et al., 2004). Bearing this in mind, the period betwen the age of five and eight is regarded as some sort of „transitional period "and tests of fitness can be perfmed after this period (Malina et al., 2004). For all these reasons monitoring and testing of physical development and motor abilities of students who have not mastered bascis motor abilities would be useless as the obtained results would not be valid and reliable. In conslusion, monitoring and testing of motor skills can start from the age of nine or ten, while monitoring of physical development variables (height, body massand body mass indexi) can start earlier,as soon as a child enrolls into primary school.

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THE EVALUATION OF COMPETITION PERFORMANCE IN HANDBALL - WORLD CADETS CHAMPIONSHIP SKOPLJE, 2019.

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Abstract

This study deals with the evaluation of the competitive performance of the cadet level handball players. The subject was differences in the realization of competing activities of successful and less successful cadet handball teams in the U19 World Handball Championship,held in North Macedonia, 2019. The main goal of this study is to determine the level of efficiency of competitive activity of young handball players and the differences in the expression of competitive activity that potentially exists between successful (the place from 1st - 4th) and less successful (the place from 5th-8th) handball teams.In the study were used statistical and descriptive research methods. The sample is represented by representative handball teams (8) under 19, who participated in the recently held World Handball Championship. The analysis included36 matches in the group of less successful teams and 36 matches in the group of successful teams in this championship. Itwas presented a description of the technical and tactical elements of the handball game (17 variables), which represents competitive activity in men's handball, and thenwas conducted a comparative analysis of these elements for different levels of success of the cadet handball team on this high-quality, international competition.For a more precise analysis, it is particularly extracted seven (7) variables,which examined the current situation/condition in the world representing handball, in terms of technical and tactical activities in the attack phase. According to the data obtained, it is clear that the coefficient of efficiency of technical and tactical elements, in numerical terms, determines the success of most handball teams at this world championship for young handball players. The results further show that there are differences in the statistical sense, for 2 out of 7 variables,identified as variables from which contributes directly to the success, respectively, with which goals are scored. The general conclusion is that there are significant differences in the realization of some competitive activities in successful and less successful men's cadet handball teams at the World Handball Championship 2019.

Keywords: handball, competition, technical and tactical activities, efficiency, attack.

INTRODUCTION

Sports games are classified into a group of sports branches in which dominate the non-stereotypical movements and situations, and they are characterized by complex presentations of basic motor skills. The intensity of the stress of the match is moving in the range from moderate to maximum, and given frequent, longer or shorter interruptions and periods of continuous play, the character of sports game efforts could be classified as a variable (Đurinović, 2016).

The analysis of competitive activity allows us to distinguish the factors on which the efficiency and the result in the chosen sports activity depend and also to assess quite precisely at what level they are. Also, this analysis can determine the amount of work to be done in the competition and what that work consists of. In that way, it comes to finding out what exactly athletes need to prepare for. (Nešić, 2006). To evaluate the performance of the technical and tactical elements of a handball game, only the performances with the interference of the opponent are counted, because such analysis gives a more realistic picture of the state of technical and tactical preparation of players in competitive situations. Data obtained in this way serve as the basis to evaluate the state of technical and tactical preparation of handball players or as operational indicators for coaches. The collecting a relevant statistics during a sports game has become a lucrative business and every professional team or individual, in almost every sport, has its professional staff to monitor important factors, both from his team and also from opponents. The advantage of this method of monitoring the player's efficiency is that the individual statistics obtained allow an analysis of the characteristics of the applicable game systems. In other words, they can show the state of sports form the team is in. When necessary is, the coach analyzes the parameters When necessary is, the coach analyzes the parameters (for which he estimates that they are needed for his work), to assess the condition level of the overall efficiency of the team at the matches.

METHOD

The study was designed as a qualitative, with retrospective character. The study used a descriptive and comparative research method.For the variables of the technical-tactical dimension of the competitive activity of the cadet handball players, it was used *RukometStat* to keeping statistics of the handball matches, as well as the whole competition.It is used in the Croatian handball leagues, the regional SEHA league, and as a system for statistical data processing and reportsof *International Handball Federation*(IHF).

Sample
The study includes the results of the first eight (8) placed teams at the World Cadet Championships (Egypt, Germany, Denmark, Portugal, Hungary, France, Spain and Iceland).Each teams has played 9 games, so a total of 72 played games makes the observed sample of this research.Therefore, the holders of information in this paper (entities) are handball matches.

Variables semple
The variables monitored in the study are from the area of technical and tactical activities which take place in the handball attack phase, and they were selected based on a unique criterion that characterizes the completion of an offensive action - creating the conditions for a shot on goal in situations where the number of players on the court is equal, respectively, larger or smaller number of players in the attack phase.
Based on this, 17 variables were used in the study, as follows: PGUT - average goals per game, BRŠ - the total number of shots, BRG - the total number of goals, BRŠK - the total number of wing shots, BRGK - the total number of wing goals, BRŠ7M – the total number of 7m shots, BRG7M - the total number of 7m goals, BRŠ9M - the total number of 9m shots, BRG9M - the total number of 9m goals, BRŠ6M - the total number of 6m shots, BRG6M - the total number of 6m goals, BRŠPR - the total number of breakthrough shots, BRGPR – the total number of breakthrough goals, BRŠKN – the total number of fastbreak shots, BRGKN – the total number of fastbreak goals, PRIMG – the total received goals, BRNAP – the total number of attacks.

Statistical procedures
To process the data obtained were used a descriptive statistics procedures which contain methods and procedures for presenting and summarizing data and comparative statistics. It was also used the procedures of graphical and tabular presentation of data, as well as a calculation of measures of central tendency and variability:

1. Mean - aritnetic mean;
2. Std.Dev. - standard deviation;
3. Min. – minimum;
4. Max. – maximum;
5. Coe.var. - coefficient of variation.

For each situational variable from the field of technical and tactical dimensions was calculated the coefficient of efficiency (KE). To calculate it, it is necessary to know the total number of executed game elements, as well as the number of successfully executed game elements. The general formula for calculating KE is (Godik,1976):

$$KE = \frac{\text{the total number of executed game elements}}{\text{the number of successfully executed game elements}}$$

From a field of comparative statistics were used: t-test (test of mean difference for small dependent samples), which determines the significance of the difference in efficiency between more and less successful national teams (technical and tactical dimension) at the 2019 World Cadet Championship with. Statistical data processing was done using application software SPSS 20.0, on the laptop Acer, Aspire E1 – 510.

RESULTS
The sample included a total of 72 matches, which were divided into two groups, 36 matches for less successful national teams (rank from 5th to 8th place) and 36 matches for successful national teams (rank from a 1st-4th place) at the World Cadet Handball Championship, Skopje, 2019.

Table 1. Basic statistical parameters for variables from the TT dimensions field- sample of played matches

Variables	N	Mean	Min.	Max.	Coe. var.	Std.Dev.	K-S
PGUT	72	30.943	26.89	34.22	0.0718	2.224	0.765
BRŠ	72	424	386	458	0.0635	26.944	0.444
BRG	72	266.88	242	308	0.0753	20.110	0.669
BRŠK	72	65.88	49	86	0.2025	13.346	0.313
BRGK	72	42.125	26	59	0.2722	11.470	0.451
BRŠ7M	72	31.5	21	38	0.1819	5.732	0.648
BG7M	72	23.375	16	28	0.1920	4.489	0.758
BRŠ9M	72	165	212	204	0.1960	32.341	0.561
BRG9M	72	80.25	43	113	0.2922	23.456	0.564

BRŠ6M	72	57.625	40	73	0.2409	13.886	0.572
BRG6M	72	42.75	28	57	0.2594	11.093	0.489
BRŠP	72	55.5	40	72	0.2031	11.275	0.380
BRGP	72	41.625	25	54	0.2377	9.898	0.408
BRŠKN	72	39.626	31	50	0.1716	6.802	0.457
BRGKN	72	31.5	26	40	0.1679	5.291	0.669
PRIMG	72	226.5	208	245	0.0665	15.071	0.539
BRNAP	72	465.75	386	567	0.1278	59.545	0.337

*Legend: **PGUT** - average goals per game, **BRŠ** - the total number of shots, **BRG** - the total number of goals, **BRŠK** - the total number of wing shots, **BRGK** - the total number of wing goals, **BRŠ7M** – the total number of 7m shots, **BRG7M** - the total number of 7m goals, **BRŠ9M** - the total number of 9m shots, **BRG9M** - the total number of 9m goals, **BRŠ6M** - the total number of 6m shots, **BRG6M** - the total number of 6m goals, **BRŠPR** - the total number of breakthrough shots, **BRGPR** – the total number of breakthrough goals, **BRŠKN** – the total number of fastbreak shots, **BRGKN** – the total number of fastbreak goals, **PRIMG** – thr total received goals, **BRNAP** – the total number of attacks.*

By reviewing the results and statistical parameters for variables from the TT dimension field, for a sample of played matches (Table 1), it is stated that the handball players gave on average ≈ 31 goals per game, that on average, each team shot the goal in total of 424 times in the nine (9) matches that each team played in the tournament. They achieved 266.88 goals on average, per national team. From the position of the wing players, the average shooting was a little over 65 times, and the goalkeepers net shook 42.12 times. From the 7m line, it was shooting an average of 31.5 times and achieved an average of 23.38 goals. From the 9m field, it was shot an average of 165 times and achieved a little more than 80 goals. From the pivot play position, the ball is shot almost 58 times on average and almost 43 goals were achieved.

There were 41 goals achieved from the breakthrough, and there were almost 40 opportunities to fastbreak with an average of 31.5 goals. The average number of attacks per one handball national team, from the 9 played games, was 465.75.

Considering the values of the coefficients of variation, it is confirmed that the sample is quite uniform even by the criterion of attack. According to the present parameter values, the distribution of the results for the whole sample of variables (N = 72) is in the range of normality which indicates the homogeneity of the sample of variables, which provides the further processing of data. In order to verify the efficiency of national teams, of the 17 observed variables, for further analysis are taken into account only those related to the achievement of goals. For these purposes has been extracted seven (7) variables.

Table 2. Efficiency coefficient (KE) of the eight best-placed teams - TT elements of attack

Mark	**EGY**	**GER**	**DEN**	**PORT**	**HUN**	**FRA**	**ESP**	**ISL**
KE_G	0.672	0.666	0.641	0.617	0.645	0.597	0.626	0.517
KE_GK	0.730	0.636	0.509	0.530	0.675	0.686	0.689	0.600
KE_G7M	0.750	0.892	0.800	0.710	0.714	0.740	0.593	0.761
KE_G9M	0.557	0.519	0.562	0.529	0.462	0.425	0.355	0.430
KE_G6M	0.742	0.739	0.700	0.700	0.777	0.833	0.802	0.630
KE_GPR	0.750	0.740	0.809	0.805	0.781	0.625	0.807	0.655
KE_GKN	0.769	0.794	0.780	0.838	0.864	0.833	0.800	0.697

*Legend:**KE_G** – Shot efficiency coefficient (goal), **KE_GK**- Wing efficiency coefficient, **KE_G7M** - 7mshot efficiency coefficient, **KE_G9M** - 9mshot efficiency coefficient, **KE_G6M** - 6mshot efficiency coefficient, **KE_GPR** - breakthrough shot efficiency coefficient, **KE_GKN**–fastbreak shot efficiency coefficient*

By looking at the results (Table 2.) obtained by calculating the efficiency of a shot as an element of attack, Egypt could be the most effective in scoring goals **(0.672),** and least effective in scoring goals, Iceland national team **(0.517).** The most effective in achieving the goals from the wing position was

Egypt **(0.730)**, and the worst Denmark **(0.509)**. From the 7m position, the most efficient were the Germans **(0.892)** and the worts Spaniards (0.593). From the field of 9m, the best realization of the attacks had the Danes **(0.562)** and the worst Spaniards **(0.335)**. On the 6m position, the French were the most efficient **(0.833)**, and the national team of Iceland **(0.630)** had the lowest score in this segment of the game. The highest coefficient from the breakthrough was achieved by the Danes **(0.809)** and the least by the French **(0.625)**. By the fastbreaks, the most successful were the Hungarians **(0.864)** and the least successful were the Icelanders **(0.697)**.

The key question of the research is: is the numerical difference between less successful (place of 5th-8th) and successful (place od 1st-4th) big enough, to be considered as statistically significant to? To make the necessary conclusion easier, it should be said that the national teams are divided by the criterion of success into two groups (1) and (2). Group 1 consisted of better-placed teams (Egypt, Germany, Denmark, and Portugal), while Group 2 consisted of lower placed teams (Hungary, France, Spain, and Iceland). The results were obtained based on the values of the degree of freedom **df=71** and the limit value of the two-way t-test. For the statistically significant values accepted are those whose (limited) value of t-test is higher than, or equal to **t ≥ 2.000,** at a significance level of **p = 0.05.**

According to the results in Table 3, it is clear that there are also differences between the groups in two (2) variables out of seven (7) marked as a variable from which contributes directly to the success,that is, which achieves goal with.Statistically significant differences are shown in the variables Wing efficiency coefficient**(KE_GK) p= 0.033** and 7m shot efficiency coefficient**(KE_G7M) p = 0.044.**For other variables, there was no statistical significance at this level of inference.

Table 3. The differences between less successful and successful handball teams

Variables	Groups	N	X	SD	Skew.	Kurt.	t	df	p
KE_G	1	36	30.94	19.756	3.210	1.741	2.128	71	0.123
	2	36	28.31	12.685	-2.547	0.377			
KE_GK	1	36	3.88	10.519	-5.290	0.124	-3.742	71	**0.033**
	2	36	5.47	7.804	1.196	0.188			
KE_G7M	1	36	2.97	1.258	2.227	-1.129	3.356	71	**0.044**
	2	36	2.22	3.741	1.500	0.764			
KE_G9M	1	36	10.55	20.704	0.074	-1.048	1.647	71	0.198
	2	36	7.27	16.583	1.934	-0.877			
KE_G6M	1	36	4.50	14.456	-5.905	0.017	0.642	71	0.567
	2	36	5.50	8.041	3.796	1.938			
KE_GPR	1	36	4.97	10.750	-5.614	-0.067	1.022	71	0.383
	2	36	4.27	9.327	2.704	-1.597			
KE_GKN	1	36	3.39	5.916	2.229	1.545	-0.405	71	0.712
	2	36	3.61	5.260	2.235	1.443			

Handball belongs to the group of so-called. high-intensity intermittent sports. The main characteristic of this group of games is multiple short periods of high-intensity explosive movements, separated by periods of short rest. The essence of the handball game is reflected in the efficiency of handball players in all phases of the game. Its recognition and understanding are not possible without researches which is related to determining the relationships of standard indicators of situational efficiency and performance in the game with differently defined criteria of that performance. Many previous studies of situational efficiency in handball are based on this idea and they explored efficiency considering play positions (Guić, Vuleta & Milanović, 2006), Ohnjec, at al., 2008), efficiency

considering the shooting zones (Pokrajac, 2008, Rogulj, 2000), and efficiency considering a different ways of shooting (Delija & Štimec, 1994; Vuleta, Milanović & Sertić, 2003; Ćeleš, at al., 2014). Furthermore, they were also explored the differences between the frequency and the success of the shot with the success of the team (Apitzs & Lui, 1997; Taborsky, 2008), the influence of tactics elements on success, and the influence of the variables in the attack ending on the final result of the match (Srhoj, at al., 2001; Rogulj, Srhoj, V. & Srhoj, Lj., 2004; Rogulj & Srhoj, V. 2009).

Speaking about the frequency of certain technical-tactical activities, a figure of 567 attacks, how many teams from Egypt has made in 9 played matches, clearly indicates that modern handball is played fast and offensively. Teams from Germany (482 attacks), Denmark (497), Portugal (507) who finished the tournament as the four best-placed teams had a no different concept. A number of opportunities for shooting also support the conclusion that the tactics of the game based on the aggressive approach and aim to achieve a goal. With the frequency of technical-tactical elements in handball has been dealing Guić et al. (2006), Bilge (2013) and Vuleta, Sporiš & Milanović, (2015), and also Vuleta, Milanović, & Jerak, (2016) in which they also confirm relatively high percentages of efficiency in the attack.

The coefficient of efficiency (KE) in research provides an opportunity to measure the level of efficiency and the realization of the technical-tactical idea by elements. According to these values, the team of Egypt had 458 attempts to make a shot on goal, France 452, Portugal 444, and Iceland 432 attempts. According to the coefficient of efficiency, the best realization in the tournament, in terms of goals scored, had the team from Egypt (0.672), followed by Germany (0.666), Hungary (0.645) and Denmark (0.641). For comparison, Vuleta and Štimac, (1989) are received a similar data from the World Youth Championship in Rijeka in 1987, according to which the national team of Yugoslavia achieved 35.1 shot per match, with an average shooting efficiency of 61.1%, or Vicha (1981), who recorded an average shot efficiency of 55.24% in 11 matches, at the Olympic Games in Moscow, 1980. The winning teams achieved 60.6% efficiency. Rokavec (2012) analyzed some indicators of the situational efficiency of the Croatian handball team at the European Championship in Serbia, 2012. The Croatian national team had 60% efficiency against the opponent's goal, 38% from the outside positions of attackers, 62.5% from wing positions of attackers and 63% from the pivot position of attackers.

In a further review of this research, the realization from wing positions was best for the Egypt team **(0.730)**, followed by Spain **(0.689),** France **(0.686)** and Hungary **(0.675).** From the 7m line, the most efficient performance hadGermans **(0.892),** Danes **(0.800),** Icelanders **(0.761),** and Egyptians **(0.750)**. From the 9m field, the most efficient was the handball players of Denmark **(0.562)**, followed by Egypt **(0.557)**, then Portugal, **(0.529)** and Germany **(0.519)**. The most effective pivot position players on the 6m line were in the team of France **(0.833)**, then Spain **(0.802)**, Hungary **(0.777)** and Germany **(0.739)**. From the "breakthrough", the most effective in the tournament were Danes **(0.809)**, Spaniards **(0.807)**, Portuguese **(0.805)** and Hungarians **(0.781)**. The counterattacks were best realized by Hungarians **(0.864)**, Portuguese **(0.838)**, then French **(0.833)** and the Spaniards **(0.800)**.

Even after the analysis by the criterion of efficiency coefficient (KE), The winning teams (group 1) are, more or less, retained positions at the top of the table with a tolerance of ± 1. The teams of Egypt and Iceland have confirmed your placement, while the team of Portugal in fact, made the most benefited when it comes to the relationship between wins and losses because, if the efficiency parameter were the realization of technical and tactical elements in the game, the Portugal national team would only take 7th place. A similar check was conducted by Vuleta, et al. (2003) and attempted to determine the relationship between the variables of shooting on goal with the final result of the handball match.

The results showed that of the total number of realization, about 45% done with outside positions. The winning teams have shown significantly greater efficiency from outside positions (43.20%) than losers (32.52%), as well as greater efficiency of7m shooting (76.53%) in relation to the losers (65.76%). The differences between winning and losing teams have also explored Saavedra, J. M. Þorgeirsson S., Kristjánsdóttir, H., Chang, M. & Halldórsson, H. (2017) with the desire to compare handball statistics to the final result of the match. A similar issue was addressed by Ćeleš, at al. (2014) who analyzed the differences in the efficiency of shooting performance between winning and losing teams at the 2012 European Handball Championship and they found statistically significant differences in the four variables (UBG, PROC, ŠUTKRUS, and Š9MNE). As in this study, the results have shown that the difference between the winning and losing team appeared in the number of goals per match, and the authors have also noted the differences in the realization of goals from a 9m field. Babić (2017) was exploring differences between the situational efficiency male handball teams in the first part of the competition of the Croatian Premier League season 2016/2017. and found a statistically significant difference between the placed and unplaced teams in the variables: 6m shot successfully (ŠUT6M-US), 9m shot successfully (ŠUT9M-US), shot from the half-fastbreak unsuccessfully (ŠUTPKT-NE), 6m shot unsuccessfully (ŠUT6M-NE) and technical faults (TEH). So, the results in terms of finding differences between two entities based on standard attack variables are clearly different, which can be

"justified" by many factors such as the level of competition or the quality of teams in a physical, technical, tactical and psychological sense. In our opinion, because of its specificity, these are domains that leave us enough space to explore and find answers to the question of why is one team more successful and the other less successful in a handball game.

CONCLUSION

Based on the results of the research, it came to some conclusions. Specifically, the coefficient of efficiency of the technical-tactical elements, in numerical terms, clearly determines the success of most handball teams in this World Cup U19, 2019.

The idea of this research was to check whether there is a statistically significant difference in the criterion of success of the realization of these parameters. And, in that part of the research the statistical significance was confirmed for the two variables, (KE_GK) p=0.033 and (KE_G7M) p = 0.044, while the differences in arithmetic mean in the other analyzed variables were such values, that they were not statistically significant at this level of inference.

It also imposes the conclusion that the obtained results confirm the fact that all analyzed variables (actions) are not equally represented in the game of observed teams, and that the achieved team rankings are influenced by a number of different factors at the same time.

The general conclusion is that there are significant differences in the realization of competitive activity in successful and less successful men's cadet handball teams at this championship.

With this kind of research, in addition, to create the conditions for improving training technology handball game and to contribute of the development of research which, unfortunately, has been unjustifiably neglected in our country, should affect to all actors, to coaches, players, and referees, to start looking at handball more responsibly and above all, much more detailed, more thorough, professional and scientific. Being aware of the fact that handball is not just a technical and tactical activity in the attack, it leaves space for researchers to focus their "efforts" on other parts of the handball game. In this way, they will make a significant contribution to the healing of a sport where we once were world and European champions and Olympic winners. (Valdevit, 2009).

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THE INFLUENCE OF SITUATION EFFICIENCY OF GOAL SHOOTING ON RESULTS OF HANDBALL MATCHES OF THE FIRST PHASE OF THE WORLD U19 CHAMPIONSHIP 2019

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Abstract
To determine the influence of the situational efficiency of goal shooting on the prediction of the results of the first phase of the competition at the U19 World Handball Championship in 2019 it was analyzed 60 matches, played by national teams that have qualified to this championship. It has been observed 14 variables of situational shooting efficiency with seven positions, from which usually shoots in the attack phase of the handball game. This set of variables was set up so that was analyzed a successful and unsuccessful shot on goal from all positions. The criterion was a binary-defined result of handball. For all analyzed variables were calculated basic descriptive indicators. At this stage of the competition, teams have shot an average of 45.66 times from seven analyzed positions in the game of which was an average 27.53% of successful and 18.14% unsuccessful shots. The percentage of shooting success was 60.09%. The mutual correlation of the predictor variables was calculated with the classical correlation method. The results showed that 7 correlation coefficients are significantly at a more stringent inference level and 4, at a milder inference level. To evaluate the predictive impact of a set of variables which are evaluated situational efficiency within the binary defined result of handball game, the Logistic Regression was used. Its results are shown that the applied set of predictor variables covers between 57.3% and 76.4% of the common variance. The result of the Hosmer & Lemeshow test confirmed the high predictive value of the selected set of variables. The calculated B values and the individual contribution of each of the analyzed predictor variables indicate that the six variables have a statistically significant contribution to the prediction of the results of handball matches of this stage of the World Junior Championships. The highest partial contribution to the prediction of the result of handball matches was shown by the variable for evaluating the successful fast breaks shot. The high individual predictive value was also shown by the variable for evaluating successful shots from the back positions (9m shot - successfully). This phase of the competition was dominated by national teams that play fast handball, with a large number of fast breaks and fast transformations from one phase of handball play to another.

Keywords: handball, situational efficiency, attack, prediction, criterion variable.

INTRODUCTION

The sports games with a large number of players and the relatively small space to play, and continuous simultaneous conflicts in all phases of the game, a real challenge for quality quantification and analysis of collected data.Handball is one of the most complex ball games characterized by a well-defined goal, a wealth of natural forms of movement, variety of movement structures, pronounced situational confrontation of players (contact sport), and the need for creative and organized implementation of technical and tactical elements in situational conditions (Rogulj, 2000).

Today, most researches in handball are based on experimentally based knowledge. It is in human nature to be better, faster, more successful. That is why there is a strong tendency today to be successful in a handball game, so we are witnessing a very fast increase in the qualitative-quantitative of knowledge about handball. With the collection of more predictors and the application of adequate mathematical and statistical algorithms, we are increasingly closer to predicting the success of handball. It is quite common today to use certain methods whose results show the hierarchical influence of certain factors on the result of handball. That is why Milanović (1997) says: "The goals and tasks of training should be operationalized so that the size and structure of anthropological characteristics and motor knowledge are known on which dependssuccess in sport. In his research Vuleta Milanović & Sertić (2004) the first major component in the attack phase, name it as a "factor in the success of the game in the attack phase". With the influence of some parts of the anthropological status of handball players on the explanation of the criteria dealt Horga, 1983; Kuleš, 1983 and Šimenc & Pavlin, 1983. The complexity of the handball game shows that both depend on many factors that are related to each other, and they are manifested in totality.

METHODS

The sample

A statistical data for this research are taken from the official website IHF - and with 60 games of the first round of the competition in four groups of Men's Youth (U19) World Championship North Macedonia, which was held from 6th to 18th August, 2019.

The sample of variables

For this research, a set of 14 manifest variables were selected, which are standard indicators of the

situational efficiency of goal-shooting that are recorded at each match for both teams:

1. 9m shot (ŠDMUS) – SUCCESSFUL,
2. 9m shot (ŠDMNE) – UNSUCCESSFUL,
3. 6m shot (ŠŠMUS) – SUCCESSFUL,
4. 6m shot (ŠŠMNE) – UNSUCCESSFUL,
5. Wing shot (ŠKRUS) – SUCCESSFUL,
6. Wing shot (ŠKRNE) – UNSUCCESSFUL,
7. 7m shot (ŠSMUS) – SUCCESSFUL,
8. 7m shot (ŠSMNE) – UNSUCCESSFUL,
9. Fast break shot (ŠKNUS) – SUCCESSFUL,
10. Fast break shot (ŠKNNE) – UNSUCCESSFUL,
11. Breaktrought shot (ŠPRUS) – SUCCESSFUL,
12. Breaktrought shot (ŠPRNE) – UNSUCCESSFUL,
13. Shot from a long distance (ŠVDUS) – SUCCESSFUL,
14. Shot from a long distance (ŠVDNE) – UNSUCCESSFUL.

The criterion variable is binary defined based on the final results of the matches of wins (1)/defeat (0).

Data methods

The collected data were processed by the statistical package SPSS 15.0 for Windows.

The basic descriptive indicators are calculated for all analyzed variables. Themutual correlation of the predictor variables was calculated using the correlation analysis algorithm. To obtain the information on the regression relation of a set of analyzed predictor variables to a binary defined criterion variable, it was applied a special regression analysis method (logistic regression). In its application, the following parameters were calculated:

- The percentage of cases with no predictor variables in the analysis,
- The values of the hi-squares with the corresponding number of degrees of freedom,
- The Hosmer and Lemesh test values,
- The values of Cox & Snell R Square and Nagelkerke R Square,
- The level of predictive value,
- Individual contribution values of each predictor variable (Wald),
- The significance of the individual influence of predictor variables,
- The values of coefficients B and
- The quotient of probabilities for each independent variable (Exp (B)).

RESULTS AND DISCUSSION

The results of the descriptive statistics are presented in table1. For this purposewas calculated: minimum values (**Min.**), maximum values (**Max.**), arithmetic mean (**Mean**), standard deviation (**Std. Dev**.) and variance (**Variance**).

Table1. The basic descriptive indicators analyzed variables

	N	Min.	Max.	Mean		Std. Dev.	Variance
				Stat.	Std.Er.		
UBRŠUT	120	33.00	64.00	45.6750	.50002	5.47747	30.003
ŠUTUSP	120	13.00	48.00	27.5333	.59995	6.57207	43.192
ŠUTNE	120	7.00	39.00	18.1417	.48727	5.33782	28.492
PROCŠUT	120	7.00	39.00	18.1417	.48727	5.33782	28.492
ŠDMUS	120	2.00	19.00	7.5167	.31511	3.45191	11.916
ŠDMNE	120	1.00	28.00	9.6583	.40263	4.41064	19.454
ŠŠMUS	120	.00	12.00	4.7417	.25007	2.73937	7.504
ŠŠMNE	120	.00	11.00	1.8750	.14081	1.54247	2.379
ŠKRUS	120	.00	14.00	4.5333	.24879	2.72534	7.427
ŠKRNE	120	.00	8.00	2.8583	.17998	1.97163	3.887
ŠSMUS	120	.00	11.00	2.7417	.17211	1.88535	3.555
ŠSMNE	120	.00	5.00	1.0667	.11148	1.22119	1.491
ŠKNUS	120	.00	16.00	3.3167	.30449	3.33553	11.126
ŠKNNE	120	.00	4.00	.8250	.08340	.91360	.835
ŠPRUS	120	.00	11.00	4.2500	.22400	2.45377	6.021
ŠPRNE	120	.00	6.00	1.6333	.13228	1.44904	2.100
ŠVDUS	120	.00	5.00	.4417	.07466	.81782	.669
ŠVDNE	120	.00	2.00	.2333	.04386	.48043	.231

The results of descriptive statistics indicate that the analysis included 120 national teams.

The national teams, participants in this championship at this stage of the competition are, on average, performed 45.66 shots from different positions during this phase of the competition. Successful were on average 27.53% shots and 18.14% shots were unsuccessful. Percentage, the shot efficiency for all national teams in the preliminary round of the competition was 60.09%. Very similar data were obtained by Ćeleš, Vojvodić, and Skender (2014) where they found that the

winning teams had a 61.3% successful shot on goal in the analyzed championship.
The most shots were from outside positions (ŠDMUS 19.00 and ŠUTDMNE 28.00), then from the 6m line (ŠMMUS 12.0 and ŠMMNE 11.0). The most successful shots were from the position of 9m (ŠDMUS 7.52), then from the 6m line (ŠŠMUS 4.74) and shot from the wing positions (ŠKRUS 4.53). Then, followed by breakthrough shots (SPRUS 4.25) and fast break shots (SKNUS 3.32). The values of the correlation analysis of the predictor variable are listed in table 2.

Table 2. Matrix of correlations of predictor variables

	ŠDMUS	ŠDMNE	ŠŠMUS	ŠŠMNE	ŠKRUS	ŠKRNE	ŠSMUS	ŠSMNE	ŠKNUS	ŠKNNE	ŠPRUS	ŠPRNE
ŠDMUS	1											
ŠDMNE	.099	1										
ŠŠMUS	**-.211***	**-.261***	1									
ŠŠMNE	**-.302****	.053	.006	1								
ŠKRUS	-.030	**-.277****	.022	-.170	1							
ŠKRNE	-.109	.005	-.139	-.022	.113	1						
ŠSMUS	-.174	-.170	-.018	-.014	-.163	-.113	1					
ŠSMNE	-.164	-.122	-.178	.174	.009	-.115	.106	1				
ČKNUS	.102	**-.363****	**.213***	-.177	.179	.057	.036	-.92	1			
ŠKNNE	.106	-.071	.136	-.057	.011	.070	-.119	-.57	**.319****	1		
ŠPRUS	**-.218***	**-.293****	-.018	.055	-.089	-.071	.021	.056	-.027	-.100	1	
ŠPRNE	**-.291****	-.104	-.066	.047	.033	-021	-.020	.014	.026	.021	**.255****	1

Legend: ŠDMUS– *9m shot successful;* ***ŠDMNE –*** *9m shot unsuccessful;* ***ŠŠMUS –*** *6m shot successful;* ***ŠŠMNE –*** *6m shot unsuccessful;* ***ŠKRUS –*** *wing shot successful;* ***ŠKRNE –*** *wing shot unsuccessful;* ***ŠSMUS –*** *7m shot successful;* ***ŠSMNE****-7m shot unsuccessful;* ***ŠKNUS –*** *fast break shot successful;* ***ŠKNNE –*** *fast break shot unsuccessful;* ***ŠPRUS –*** *breaktrough shot successful;* ***ŠPRNE –*** *breaktrough shot unsuccessful.*

The correlation between the predictor variables in this study is shown in table 2. On a stricter criterion of conclusion, 7 coefficients are significant or 10.6%, and on a more lenient criterion of conclusion, 4 coefficients are significant or 6.06%. The most significant coefficients have a negative sign (8 coefficients) while 3 coefficients have a positive sign. The highest negative correlation of -.363 is shown by the variables (ŠDMNE) and (ŠKNUS), and the variables (ŠDVUS) and (ŠŠMNE) by -.302. The highest positive correlation in the value of .319 is shown by the variables (ŠKNUS) and (ŠKNNE). The predictor influence of variables that assessed the situational efficiency (effective and ineffective) of a goal shot on the final binary defined result of a handball match was calculated by a logistic regression method. The results of this method are shown in tables 3, 4, 5 and 6.

Table3. Omnibus Tests of Model Coefficients

		Chi- square	**df**	**Sig.**
Step 1	Step	102.207	14	.000
	Block	102.207	14	.000
	Model	102.207	14	.000

The table shows the values of the chi-square test of 102.207 with 14 degrees of freedom and statistical significance.

Table 4. Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Squere
1	64.115(a)	.573	.764

Table 4 shows the pseudo indicators r^2 as in classical multiple regression. Also, from this table, it can be seen that the applied set of predictor variables explains between 57.3% and 76.4% of the common variance. The results are within the expected range because this analysis covers only one phase of the handball game, that is, only the situational efficiency of goal shooting. Probably, the rest of the unexplained variance should be sought in the successful performance of the technical-tactical elements in the defense.
The confirmation that the model predictor variables situational efficiency has a statistically significant effect on the binary defined result handball is presented in table 5.

Table 5.The value Hosmer and Lemeshow test

Step	Chi-square	df	Sig.
1	2.310	8	.970

As the significant values in this test (Sig. .970) are far above the limit values, it can be confirmed that the model of predictive variables is a very good predictor of a criterion variable. Other researchers (Rogulj, 2000;Srhoj, Rogulj, Padovan & Katić, 2001;Vuleta et al. 2004) have found in their researchers that there is a distinct contribution of predictor variables in the prediction of criterion variables.

The single influence of the variables of situational shot efficiency from the seven analyzed positions, differentiated into winning or losing the handball matches of preliminary competition at the World U 19 Men's Championship held in 2019 in North Macedonia,is presented in table 6.

Table 6. Results of logistic regression analysis on the influence of variables of successful and unsuccessful shot on goal and results of handball match

Variables	B	S.E.	Wald	Sig.	Exp (B)
	Lower	Upper	Upper	Lower	Upper
ŠDMUS	.334	.123	7.342	**.007**	1.397
ŠDMNE	-.204	.106	3.726	.054	.815
ŠŠMUS	.337	.178	4.392	**.036**	1.453
ŠŠMNE	-.481	.337	2.036	.154	.618
ŠKRUS	.457	.186	6.060	**.014**	1.580
ŠKRNE	-.222	.196	1.285	.257	.801
ŠSMUS	.401	.255	2.462	.117	1.493
ŠSMNE	-1.001	.364	7.581	**.006**	.367
ŠKNUS	.664	.193	11.849	**.001**	1.943
ŠKNNE	.445	.350	1.619	.203	1.561
ŠPRUS	.557	.206	7.288	**.007**	1,745
ŠPRNE	.070	.267	.069	.793	1.073
ŠVDUS	.552	.417	1.758	.185	1.737
ŠVDNE	.035	.221	.053	.897	1.054
N = 120; Overal Percentage¹ = 50.8; Overal Percentage² = 86.7					

Legend:ŠDMUS – 9m shot successful; **ŠDMNE** – 9m shot unsuccessful; **ŠŠMUS** – 6m shot successful; **ŠŠMNE** – 6m shot unsuccessful; **ŠKRUS** – wing shot successful; **ŠKRNE** – wing shot unsuccessful; **ŠSMUS** – 7m shot successful; **ŠSMNE**-7m shot unsuccessful; **ŠKNUS** – fast break shot successful; **ŠKNNE** – fast break shot unsuccessful; **ŠPRUS** – breaktrough shot successful; **ŠPRNE**– breaktrough shot unsuccessful; **ŠVDUS** – Shot from a long distance successful; **ŠVDNE** –shot from a long distance unsuccessful.

Table 6. also shows the number of analyzed cases that were handled by this analysis. For this part of the competition, this type of regression analysis was processed by a total of 120 national teams in 60 games. The chosen method of regression analysis in the SPSS package predicts that 50.8% of cases will be correctly classified by research. The obtained value was calculated without including predictor variables (Overal Percentage¹). While the other value (Overal Percentage²) is a significant improvement because the values of the predictor variables were taken into the analysis.

Four variables of the study area have negative B coefficients (ŠDMNE, ŠŠMNE, ŠKNNE, and ŠMMNE), while the largest single contribution as a predictor in the prediction of a binary defined criterion variable is the variables: (ŠKNUS 11,85; ŠDMUS 7,34; ŠPRUS 7,29; ŠSMNE 7.58; ŠKRUS 6.06 and ŠŠMUS 4.39) and their impact was statistically significant on the milder statistical criterion of conclusion (p = 0.05).

As you can see, the biggest single positive prediction of the result of a handball match in this competition has the variable SKNUS (11,85). These results give us the right to say that for success in a handball game, in this championship at this stage of the competition, it is necessary to perform as many successful fast breaks. The national teams that performed fast playing on the field and achieve so-called "light goals", are very close to the final

success of that game. In addition to the resultant advantage, national teams with this style of playing also have a psychological and physiological advantage that, in some games, can be a key factor in winning.

The team that achieves goals from fast breaks, becomes more psychologically stable and with more willing moment to play. In addition to that, a good fast break is performed by an inividual or a small group of players, so that the others can save the energy for hard defense work, which is very important in tournament mode. We must also not forget the fact that a good fast break is a product of a well-implemented defense system. A second individual influence on the criterion variable is The third variable that in this study had a statistically significant influence on the prediction of the results of a handball match of this U 19 Men's World Championship is ŠDMUS (7.34). In the descriptive analysis of the data, we have already noticed that from these positions, shots on goals are most often performed and are achieved an average of 7.5 goals.

Very often, players who shot from the back outside positions are morphologically and physically dominant players in their teams, and very often leaders, so the results of such a high partial impact on the result of handball are expected. Babić (2017) obtained similar data when, among other differences between ranked and non-placed teams, he also found statistically significant differences in the variable (ŠUT9M-US). The ŠPRUS variable (7.29) has also a statistically significant partial influence on the criterion variable. Knowing what is going on and in what kind of shooting position is a player who successfully makes a breakthrough into a goal, this kind of impact is expected. Usually, these types of shooting are performed by technically well-trained players and they can create a technical and tactical advantage for their team, which can be a key advantage in some games. The handball game in its structure has many tactical situations when the planned action is the right action for wing players.

The next variable that has a statistically significant contribution to the prediction of the final result of a handball match is ŠKRUS (6.06). That's why, every team who aspires to a high ranking in a competition should have quality players in the wing positions because as we can see, their shooting success has a significant contribution to the success in handball.

The analyzed ŠŠMUS variable (4.39) in this competition showed a statistically significant partial influence on the result of the matches of this competition. The adequate attention in the training process should be given and this technical element of the handball game.

CONCLUSION

A partial analysis of the impact of the situational efficiency of goal shooting on the result of a handball match of the preliminary part of the shown by the ŠSMNE variable (7.58), which has a negative coefficient. Similar results of the negative impact of this variable were obtained (Srhoj et al. 2001 and Vuleta, 1997). The unsuccessful performance of this way of shooting has a negative effect on the positive result in handball. The mistakes that are made should be minimized, because this is one situation from which the lightest goals can be achieved, and with it optimally approach to the goal of a handball game. To perform a 7m shot, the team must have a player with good shot technique, high self-confidence, good precision and, sometimes, positive sports insolence.

Competition of this U19 World Handball Championship confirmed some previously established knowledge about these relations. The model of predictor variables applied has shown a significant influence on the result of the handball match of this championship. Of the 14 analyzed variables for the predictor set 6 variables also showed statistically significant partial influence in the prediction of the final result of a handball match (ŠKNUS, ŠSMNE, ŠDMUS, ŠPRUS, ŠKRUS, and ŠŠMUS). The set of pediatric variables covers between 57.3 and 76.4% of the common variance, which gives the set of predictor variables a much higher predictive value.

The national teams at this level of competition who have high ambitions in competitions should keep their situational efficiency of goal shooting at over 60%. The biggest single contribution to predicting the final result of a handball game is the variable (ŠKNUS), with which we evaluated the efficiency of fast break-successfully. This situation leads us to think that fast, short and effective actions in the attack phase begin to dominate with their significance. Well, for this reason, we can say that this part of the championship was dominated by teams that play fast handball and that have a fast transformation from one stage to another of handball.

The results of this analysis may serve to better understand the relations within the structure of the handball game in terms of identifying those factors that support or interfere with the resultant success of the handball game. Also, this data can be a clear indicator of modeling the training process, especially in work with young handball players.

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