

## THE IMPACT OF PHYSICAL EDUCATIONAL PROGRAM CONTENT ON ELEMENTARY SCHOOL STUDENTS AND THEIR MOTOR ABILITY CHANGES

(Research note)

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### Abstract

*On sample of 65 elementary school subjects in Pale, all male gender students, chronological age of 14 ( $\pm 6$  months), longitudinal study was performed, which main goal was to determine in which extent does physical educational program content in schools influences on the development of better improved motor abilities of students. For that purpose 9 motor tests were implied which they were considered to be the best indicators to define motor abilities for the studied population. The following measuring instruments were implied: hand tapping (MTAP), foot tapping (MTAN), and tapping a foot against a wall (MTAZ); explosive strength: the standing depth jump (MSDM), the standing high jump (MSVIS) and throwing a medicine ball from a seated position (MBMS); flexibility: hyper extensions (MDPK), the splits (MŠPA) and side-stepping with a baton (MISP). In order to determine whether there were any changes at the level of the students' motor skills, we used the student t-test for small dependent samples and a canonical discriminatory analysis. After data processing, we determined a statistically significant increase in the level of motor skills among the elementary school students as a result of their physical education classes.*

**Keywords:** elementary school, motor tests, segmental speed, explosive strength flexibility, initial measuring, final measuring, canonical discriminatory analysis, physical education classes.

### INTRODUCTION

Physical education as a conscious and meaningful educational activity has tendency of increasing scientific growth which reflects in much improved functional physical and technical-tactical preparedness of humans in general. The working conditions are rapidly changing and constantly improving, also methods and means of work for educational process are more efficient now. Also, there is a huge devotion to improve control for achieved effects of educational work (Višnjić, D., Jovanović, & Miletić, 2004).

Understanding motor abilities for children and youth, understanding their growing and developing process plays significant role in physical, biological and anthropological development of humans in general. Motor abilities as particular segment of overall anthropological human being are subordinated to physical exercise

which can be transformed in positive matter. Our current scientific knowledge about influential possibilities of exercise on transformational anthropological human status indicate that there is a possibility that during the human life period with timely, carefully dosed and professionally guided activities, functional abilities would be significantly increased.

Physical education is an inseparable part of the cultural development of a nation and as such is an integral part of their tradition of physical development. As a part of one's general education, physical education must be a planned and systematic activity which offers physical exercise as a form of the specific need which is necessary for the development of human personality. As a part of man's everyday activity, physical exercise is a reflection of his inner being and as such cannot be separated from man and his movement in general (Živanović, 2000).

The Professor of Physical education has the most important role in realization physical education teaching and he must be professionally capable of modern way planning and class realization, also his creativity needs to put in service better quality and more organized work in physical education classes. The teacher should be able to rely on his own example in order to influence the students to develop a sense of responsibility, by actively involving them in the process of planning, programming and controlling work. By means of such an approach, the students will play the part of active subjects in the realization of physical education classes, since they will be working for their own good. As a result, every student will be able to realize his maximum potential, depending on his abilities, which in turn will be a strong incentive for the teacher and the students to make greater efforts.

In this paper we focused on the development of motor skills, as part of physical education classes, among older elementary school students. The subject matter of our research was to determine whether there were any changes in the level of motor skills which could, to any extent, be the result of physical education classes.

## METHODS

Our sample consisted of 65 subjects all extracted from a population of elementary school students in Pale, age 14 ( $\pm 6$  months), male gender students, all of whom regularly participated in their physical education classes. The aim of the research was to determine whether or not program content had any influence on student motor abilities. An Experimental program lasted 4 months from the beginning of school year until the end of the first semester of the 2012/13 school year. Nine tests of motor skills were used in the research, defined as segmental speed: hand tapping (MTAP), foot tapping (MTAN), and tapping a foot against a wall (MTAZ); explosive strength: the standing depth jump (MSDM), the stand-

ing high jump (MSVIS) and throwing a medicine ball from a seated position (MBMS); flexibility: hyper extensions (MDPK), the splits (MŠPA) and side-stepping with a baton (MISP). The measuring instruments used to evaluate motor skills were taken from the research of Kurelić et al., (1975).

For the purpose of determining the changes in the level of the motor skills of the students, we relied on the student t-test for small dependent samples and a canonical discriminatory analysis, both calculated with the help of the Statistica 7.0 statistics program.

## RESULTS AND DISCUSSION

The results of the t-tests for motor skills from the initial and final measuring of the subjects are shown in Table 1. Following their analysis, we concluded that a statistically significant difference can be found for the following tests: hand tapping (MTAP .006), foot tapping (MTAN .024), tapping a foot against a wall (MTAZ .000), the standing depth jump (MSDM .007) throwing a medicine ball from a seated position (MBMS .010).

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By means of a canonical discriminatory analysis (Table 2), we obtained a significant discriminatory function of mid intensity (CR=53,5%) which indicates the kind of correlation between the data we used to carry out the discriminatory analysis. The values for the discriminatory force of the motor skills explained by the Wilk's-Lambda test (.721) indicate that the differences between the initial and final measuring in the area of stu-

Table 1. The significance of the differences between the means from the motor tests

Tests	Mean (I)	Mean (F)	T-value	P
MTAP	41.84	45.74	-2.82	.006
MTAN	31.04	33.58	-2.29	.024
MTAZ	19.26	22.82	-4.66	.000
MSDM	164.04	179.78	-2.77	.007
MSVIS	37.62	37.16	0.24	.812
MBMS	436.14	481.46	-2.62	.010
MDPK	43.28	43.88	-0.40	.693
MŠPA	160.58	165.30	-1.36	.176
MISP	75.08	78.46	-1.53	.129

Table 2. The significance of the isolated discriminatory function

Disc Func.	Eigen	CR	Wilk's Lambda	Chi-Sqr .	df	P-Level
1	.396	.535	.721	31.04	11	.000

dent motor skills are significant ( $P=.000$ ), as indicated by the extent of the Chi square test of high value (Chi-Sqr = 31,04)..

*Table 3. The factor structure of the isolated discriminatory function of the motor tests*

Variables	Root 1
MTAZ	.756
MTAP	.458
MSDM	.444
MBMS	.413
MTAN	.371
MISP	.247
MŠPA	.220
MDPK	.063
MSVIS	-.036

The part that the variables of motor skills played in the structure of the discriminatory function is shown in Table 3. The group centroids are the means of the results of the initial and final measuring. The results indicate that the contribution to the discriminatory function for the majority of tests was made by high-value coefficients, which points out the significance of the transformational processes of the motor skills. The greatest contribution to discriminatory function was made by the following tests: tapping a foot against the wall (MTAZ .756), hand tapping (MTAP .458).

*Table 4. Measurement centroids*

Measuring	Root 1
Initial	-.617
Final	.617

The results in Table 4 represent the discriminatory function of the centroids on the basis of all of the motor tests with values of -.617 and .617. The significance of these centroid measuring, which has been tested by means of the significance of the discriminatory function, indicates that their distance (discriminatory nature) is significant.

*Table 5. The classification matrix*

MEASURING	Initial	Final	Overall
Initial	39,4	11,6	51
Final	12,6	36,4	49
Initial	80%	20%	100%
Final	26%	74%	100%

The classification matrix (Table 5), which shows the divergence of the groups in terms of percentages, indicates that the separation of the results from the canonical

coefficient correlation of CR = 53,5% can be explained with 77% accuracy (the means of the very group percentages).

The obtained results for the discriminatory analysis of motor skills at the final in relation to the initial measuring of the subjects indicate that under the influence of physical education classes, significant changes have occurred in the motor skills of these subjects.

Development of motor skills occupies a prominent position in the process involved in physical education and in addition to other things, it includes the level of adaptation between exercise load and the students' abilities, the choice of task type and work contents, as well as achieving a level of motor skills great enough so that they can be included in extracurricular sports activities (Višnjić, 2006). Nevertheless, the same question keeps resurfacing: to what extent is the weekly number of physical education classes sufficient for the optimum development of motor skills. Some research results (Rančić, 2007; Branković, Milenković, Projović, & Jakovljević, 2009) indicate a great difference in the level of motor skills among students whose physical activity has been reduced to only their physical education classes and those who also train elsewhere. In order to reduce these gaps, it is necessary to increase the existing number of weekly classes and thus devote more attention not only to the development of motor skills, but also to the other dimensions of the anthropological status of the students as a whole. Thus, the changes to the skills and characteristics of the students, under the influence of physical education, would be even greater.

## CONCLUSION

During the four-month long realization of this physical education program, we monitored the effects of the program contents of the physical education classes on eighth-grade elementary school students in Pale. At the end of that period (at the final measuring as compared to the initial one), we determined a statistically significant increase in the level of five out of nine tests of motor skills. The entire set of motor variables in latent space underwent a statistically significant change in the period from the initial to the final measuring. We can assume that the proper methodological shaping of the work (the choice of physical exercises, load, the methods used to develop motor skills, the shapes and forms of the work, etc.) contributed to the optimum work regime of individual systems of organs and the body as a whole, which enabled them to rationally and effectively adapt to the applied load.

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