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Original research article

THE ORGANIZATION AND DIFFERENT OUTCOMES OF THE PHYSICAL EDUCATION CLASSES IN PRIMARY SCHOOL

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Abstract. *The aim of this study has been to determine to what extent an alternative program of physical education for junior primary schoolchildren, with curricular programs of dance and gymnastics, for a duration of six months, can replace the existing curriculum and contribute to achieving the required objectives and tasks of teaching physical education at this age. The program included 214 third grade primary school children divided into an experimental group of 105 schoolchildren (body height 141.09 ± 6.40 cm and body weight 34.64 ± 7.60 kg), that took part in the alternative program and a control group of 109 schoolchildren (body height 141.91 ± 6.35 cm and body weight 34.24 ± 6.43 kg), that participated in the regular program of physical education. The motor skills variables were assessed by means of the following instruments: balance; segmentary speed; flexibility; explosive power; static strength of the arms; repetitive power; static force of arms and shoulders - muscular endurance; sprint speed and agility. The results of the ANCOVA method in balance, segmentary speed, flexibility, explosive power, static strength, repetitive power and sprint speed between the experimental and control groups at the final measure, with the neutralization and fragmentation in results in the initial measurement showed that there were no statistically significant differences between the groups in the final measurement. Despite the positive effects, the overall results of the research, as well as very positive reactions and impressions of the schoolchildren, we consider that there is a possibility of its application in practice.*

Key words: *PE class teaching, organization and outcomes of PE class teaching, alternative program, regular program, effects*

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INTRODUCTION

Physical education as a subject has an important role and special responsibility reflected in the fact that the course programs cover many contemporary issues within the educational process, with features that none of the other teaching and educational curriculum offers (Hardman, 2009). This responsibility is summarized in the Decision on the role of sport in education, enacted by the European Parliament in November 2007. In the preamble to the Decision special attention is drawn to the fact that physical education is the only school subject within which prepares children for a healthy life, focuses on their overall physical and mental development, transmits important social values such as fairness, self-discipline, solidarity, tolerance, team spirit and fair play, and together with sport is considered one of the most important tools of social integration (Hardman, 2009).

The balanced, focused, continuous and encouraged physical activity contributes to the development of the body and represents a natural basis for the intellectual and overall development of children. Therefore, it is very important to regularly organize the teaching process of physical education and provide schoolchildren the opportunity to practice well.

However, the lack of adequate material and technical conditions for teaching physical education among younger primary school children brings into question the implementation of the curriculum as well as the realization of the objectives and tasks of physical education, related primarily to the versatile development of a child. According to the research of Šekeljić & Stamatović (2007), pursuant to the regulations of the Ministry of Education of the Republic of Serbia in 1995, none of the schools in Užice exceed 30% of the legally stipulated facilities for teaching physical education. Particularly alarming is the fact that the majority, and very often all available capacities of school sports facilities, are used by schoolchildren of the fifth to eighth grade. This, in fact, confirms what resources are available to the schools in teaching physical education among junior primary school children and points to the conclusion that tens of thousands of children at this age have no adequate and very often none physical education teaching. This problem is particularly acute in winter, and respectively from November to May. The practice shows that teachers who work in such inadequate conditions have no clear guidelines and instructions on how to adjust their curriculum to the technical and material conditions at their disposal and to fulfill the scheduled objectives and tasks of physical education teaching at the same time.

Therefore, the organization of the alternative physical education programs, created based on the experience and scientific research in the preceding period can contribute in increasing the quality of physical education teaching.

The research results of Oreb (1984), Jocić, Uzunović, & Kostić (2008) indicate that the activities of dance and dance games, as well as gymnastics, primarily developing gymnastics, can be a good substitute for educational programs of the regular curriculum.

The aim of this study was to determine to what extent an alternative program of physical education among junior primary school children, with curricular programs of dance and gymnastics, for a duration of six months, can replace the existing curriculum and contribute in achieving the required objectives and tasks of teaching physical education at this age. In this way the alternative program could offer a solution to the problem of inadequate space and lack of devices and equipment in realization of regular physical education teaching among junior primary school children.

METHODS

An alternative physical education program for the junior grades of primary school was implemented in five schools in the city of Užice in the period from November 1st to May 1st during the 2012/2013 school year. The experiment lasted six months, during the winter, when the weather conditions render impossible the realization of physical education classes outdoors (in the backyard or on the playground) in schools that do not have adequate material-technical and spatial conditions for the regular physical education curriculum realization. The program included 214 the third grade primary school children and was carried out with parallel groups, an experimental and control group. In the experimental group, there were 105 schoolchildren (body height 141.09 ± 6.40 cm and body weight 34.64 ± 7.60 kg), and the teaching was realized following an alternative physical education program for junior primary school grades. The population of the control group consisted of 109 schoolchildren (body height 141.91 ± 6.35 cm and body weight 34.24 ± 6.43 kg), who participated in their regular physical education program. The difference in the implementation of the curricula was reflected in revising 44 or 43% of total 102 teaching units which are annually planned as part of the regular program of physical education classes, that were supposed not to be implemented during the school year through the regular physical education program, when there are no spatial, material and technical conditions: sports games and gymnastic elements (horizontal bar, loom, circles, skips ...). Instead of these, teaching programs of dance, folk dances and gymnastics with adequate and optimal conditions for their realization were planned. They required a minimum space of $40m^2$, at least two mats, rods, beams, ropes, a music player ... The proposed teaching units were adapted to the abilities of the third grade schoolchildren and the ratio of classes to training, practicing and testing were adequate. Assessing the variables of motor skills was performed by the instruments that were described in the monograph of Kurelić et al. (1975) and the Tests of Yugoslav Institute of Physical Culture and Sports Medicine were used to evaluate the physical abilities (Ivanić, 1988): balance (flamingo balance test, in seconds); segmentary speed (hand tapping, 25 repetitions in seconds); flexibility (bend in sitting in cm); explosive power (long jump from the site in cm); static strength of the arms (handgrip in kp); repetitive power (lying-sitting, 30 repetitions in seconds); static force of arms and shoulders - muscular endurance (endurance in folding, in tenths of a second); sprint speed and agility (skittle running 10x5 m, 5 repetitions in tenths of seconds).

The basic parameters of descriptive statistics were calculated for each applied variable. Intergroup differences in the univariate level with the neutralization of the initial measurement were determined by a univariate analysis of covariance (ANCOVA method) through the adjusted mean values (Adj. Means). Testing the differences was performed by the F-test, and the level of significance is expressed as p.

The statistical package for data processing Statistica 6.0 was used for the data processing and analysis.

RESULTS

Table 1 Basic descriptive parameters of motor abilities of the participants in the experimental group (n=105) and control group (n=109) at the initial measuring

Initial / Final	Mean	Min	Max	Range	Std.Dev.	Skew	Kurt
Flamingo balance test	11,13/	1,50/	37,40/	35,90/	7,88/	1,15/	1,10/
(s)	11,21	1,00	38,10	37,10	7,35	1,22	1,75
Hand tapping	17,25/	12,08/	29,00/	16,92/	2,79/	,82/	2,02/
(25 rep./seconds)	17,05	10,36	37,44	27,08	3,38	2,17	7,13
Bend in sitting	17,86/	5,00/	38,00/	33,00/	5,43/	,29/	1,40/
(cm)	17,45	,00	33,00	33,00	6,38	–0,17	,60
Long jump from the site	128,57/	85,00/	172,00/	87,00/	20,29/	,17/	,84/
(cm)	135,08	80,00	178,00	98,00	18,75	–,58	,27
Handgrip	22,52/	5,00/	62,00/	57,00/	10,84/	,66/	1,02/
(kp)	22,75	4,00	55,00	51,00	11,61	,57	–,10
Lying-sitting	15,78/	4,00/	29,00/	25,00/	5,47/	,09/	,25/
(30 rep./seconds)	17,09	6,00	26,00	20,00	4,69	,02	–,70
Endurance in folding	16,58/	,00/	61,50/	61,50/	13,05/	1,19/	1,46/
(tenths of a second)	17,79	,00	61,00	61,00	13,33	1,00	1,05
Skittle running 10x5m	23,22/	17,03/	31,22/	14,19/	3,24/	,16/	,47/
(5 rep./tenths of second)	23,08	17,30	33,55	16,25	3,03	,60	1,22

Legend: Mean – average value, Min – minimum value, Max – maximum value, Range – range, Std.Dev. – standard deviation, Skew – skewness, Kurt – kurtosis

Table 2 Basic descriptive parameters of motor abilities of the participants in the experimental group (n=105) and control group (n=109) at the final measuring

Initial / Final	Mean	Min	Max	Range	Std.Dev.	Skew	Kurt
Flamingo balance test	11,28/	1,00/	38,20/	37,20/	7,97/	1,24/	1,43/
(s)	11,80	1,00	40,30	39,3	7,46	0,88	,97
Hand tapping	16,11/	11,70/	21,20/	9,50/	2,37/	,22/	–,72/
(25 rep./seconds)	16,33	10,98	44,47	33,49	3,85	3,85	5,77
Bend in sitting	19,35/	,50/	38,00/	37,50/	6,44/	–,62/	1,76/
(cm)	17,18	,40	34,00	33,60	6,77	–,22	0,02
Long jump from the site	135,31/	95,00/	180,00/	85,00/	20,16/	–,14/	–,77/
(cm)	141,14	90,00	194,00	104,00	20,46	–,41	–,12
Handgrip	24,16/	,00/	55,00/	55,00/	11,46/	,07/	–,33/
(kp)	24,94	,50	50,00	49,50	12,44	,12	–,72
Lying-sitting	17,73/	5,00/	29,00/	24,00/	5,27/	–,22/	–,20/
(30 rep./seconds)	17,81	3,00	28,00	25,00	4,98	–,23	,05
Endurance in folding	19,11/	2,00/	65,00/	63,00/	13,38/	1,25/	1,49/
(tenths of a second)	18,66	1,00	62,50	61,50	13,81	,93	,62
Skittle running 10x5m	21,90/	16,19/	31,12/	14,93/	3,02/	,54/	–,16/
(5 rep./tenths of second)	21,94	17,20	30,38	13,18	2,75	,84	,62

Legend: Mean – average value, Min – minimum value, Max – maximum value, Range – range, Std.Dev. – standard deviation, Skew – skewness, Kurt – kurtosis

The results of the univariate analysis of covariance in balance, segmentary speed, flexibility, explosive power, static strength, repetitive power and sprint speed among the participants in the experimental group and control group at the final measuring with neutralization and fragmentation of the results at the initial measurement showed that there were no statistically significant differences between the groups at the final measuring.

Table 3 Univariate analysis of covariance (ANCOVA) between the experimental group and control group at the final measuring for motor skills and sports-technical education

	Adj Means		F	p–level
	Control	Experimental		
Body height (cm)	144.59	145.28	5.91	.016*
Body mass (kg)	35.95	36.37	2.30	.131
Flamingo balance test (s)	12.43	11.75	1.00	.317
Hand tapping (25 rep./seconds)	16.13	16.07	0.04	.834
Bend in sitting (cm)	18.35	18.63	0.18	.668
Long jump from the site (cm)	141.70	139.39	1.62	.204
Handgrip (kp)	24.93	25.56	0.29	.589
Lying-sitting (30 rep./seconds)	17.81	17.71	0.04	.840
Endurance in folding (tenths of a second)	20.18	20.43	0.07	.783
Skittle running 10x5m (5 rep./tenths of second)	21.67	21.54	0.24	.623

Legend: Adj Means – adjusted means, Control – control group, Experimental – experimental group, Raova F – F test, p-level – level of pertinence, statistical pertinence * $p < 0.05$

DISCUSSION

The results of the univariate analysis of the applied variables of the morphological characteristics of body weight and body height at the final measuring showed a statistically significant difference only in body height ($p = .016$) in favor of the control group, which can be attributed to physical growth and development (Đurašković, 2009). The obtained results are consistent with the research of Branković (1998). The participants included in the experimental program, as well as the participants of the control group, are in a phase of intensive growth and development, and along with the positive effects that can be expected through the realization of certain physical education programs among the experimental group, the changes in these variables are likely to arise as the result of growth and development. Klinčarov, Nikovski, & Aceski (2010) in their study showed that, after the implementation of certain physical education programs, there has been no significant impact on morphological characteristics. However, the studies of some authors (Spasov, 1981) showed that it is possible to affect the morphological changes in size after the realization of the experimental program. The consequence of this is probably the intensity of the load, meaning the intensification of the physical education class. The values of the corrected arithmetic means show that the realized alternative program led to the improvement in results in the flamingo balance test, bend in sitting, long jump from the site, handgrip, lying-sitting, endurance in folding and skittle running while the realized regular program led to improving the flamingo balance test, long jump from the site, handgrip, lying-sitting, endurance in folding and skittle running. Even though there were no statistically significant difference in favor of the

experimental group at the final measuring, it is evident that the implemented alternative program positively affected the changes of motor abilities in the participants of the experimental group, but at the same time it does not provide significantly lower results than the regular program. The obtained results are consistent with the studies of other authors (Jovanović, 1999; Stamatović & Šekeljić, 2006; Milanović, 2007; Marković & Visnjić, 2009). As for balance, the obtained results are consistent with the results obtained by Milanović (2007). In his research he pointed out that the specifically programmed physical education teaching had a positive impact on motor abilities of schoolchildren in the experimental groups. In the studies of Marković & Kopas-Vukašinović (2012); Stamatović & Šekeljić (2006); Babin, Katić, & Vlahović (1999) the positive impact of specially designed physical education teaching on the frequency of movement, that is segment speed, was determined, which is not consistent with the realized research. The positive effects of the physical education teaching programs on the changes in flexibility in schoolchildren of junior school age were determined in the studies of Milanović (2007); Stamatović & Šekeljić (2006); Babin et al. (1999), which is not consistent with the current research. The positive effects of regular physical education teaching programs on the changes in the explosive force among schoolchildren of a junior school age were identified in the studies of Babin et al.(1999); Klinčarov, Nikovski, & Aceski (2010); Marković & Kopas-Vukašinović (2012); Stamatović & Šekeljić (2006); Rodić (2000), which is not consistent with the results of the current research. Thus, the results obtained are likely the consequence of the load intensity in the implemented programs, respectively intensification of the physical education classes. Višnjić (1979) and Babin et al. (2008) specify that the effects of exercise among children would largely depend on intensity during the exercise, so it is necessary to pay more attention to this segment at the physical education classes. The positive effects of physical education teaching programs on the changes in repetitive power of junior school age schoolchildren are consistent with the studies of Marković & Kopas-Vukašinović (2012); Stamatović & Šekeljić (2006); Babin et al. (1999); Sabo (1992). In order to determine the effectiveness of physical education teaching during one school year Sabo applied two different teaching methodologies among the fifth graders. After the experimental treatment in the area of motor abilities was completed, a difference between the groups was found for the following tests: obstacle course backwards, long jump from the site, running to 50m and torso correcting. Among the schoolgirls, a significant difference was also determined in some tests to evaluate the motor abilities. Sabo stated that the determined differences may arise as a result of successfully organized regular physical education teaching in the previous period of schooling. The obtained results of static strength of arms and static force of arms and shoulders-muscular endurance are consistent with the studies of other authors (Stamatović & Šekeljić, 2006; Marković & Kopas-Vukašinović, 2012; Babin et al. (1999) Jurak, Kovač, & Strel (2006). As regards the sprint speed and agility, lower values represent better results. In the study of Panić (1999) the improvement in speed was not determined after the experimental treatment. The authors note that such results are expected, considering that speed as a motor ability is genetically conditioned to a significant extent. Nonetheless, the time of the experiment performance was too short to expect some significant transformations in the speed of schoolchildren in both groups. However, some studies showed that properly timed programmed physical education classes can have a positive effect on speed. The research results in the study of Milanović (2007) indicate that programmed physical education teaching can affect motor abilities of schoolchildren, and that it can lead to positive changes in the tests for sprint speed evaluation. Other researchers also confirmed the

positive effects of physical education classes to the sprint speed (Stamatović & Šekeljić, 2006, Babin et al., 1999). As in most of the above-mentioned studies the experimental programs lasted longer period of time, the obtained results are likely the consequences thereof or biological growth and development (Đurašković, 2009).

CONCLUSION

The applied alternative program of physical education teaching among the third grade primary school children in relation to the regular program did not provide lower results in the transformation of motor abilities and physical development. The alternative program is suitable for schoolchildren, easily applicable and well accepted both by children and by primary school teachers who have implemented it. Considering the positive effects, the overall results of the research, as well as the very positive reactions and impressions of the schoolchildren, we consider it necessary to inform the relevant institutions, primarily the Ministry of Education, Science and Technological Development about the contents of an alternative physical education teaching program for junior primary school children so that the possibility of its application in practice in the future could be considered.

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ORGANIZACIJA I RAZLIČITI ISHODI NASTAVE FIZIČKOG VASPITANJA U OSNOVNOJ ŠKOLI

Cilj istraživanja bio je da se odgovori na pitanje u kojoj meri alternativni program nastave fizičkog vaspitanja u mlađem školskom uzrastu, sa nastavnim sadržajima iz plesa i gimnastike, u periodu od šest meseci, može da zameni postojeći nastavni program i doprinese ostvarivanju potrebnog cilja i zadataka nastave fizičkog vaspitanja na ovom uzrastu. Program je obuhvatio 214 učenika trećeg razreda osnovnih škola podeljenih u eksperimentalnu grupu od 105 učenika (telesne visine 141,09±6,40 cm i telesne mase 34,64±7,60 kg), sa kojom je sprovođen alternativni program i kontrolnu grupu od 109 učenika (telesne visine 141,91±6,35 cm i telesne mase 34,24±6,43 kg), sa kojim je sprovođen redovni program nastave fizičkog vaspitanja. Procena varijabli motoričkih sposobnosti vršena je sledećim instrumentima: ravnoteža; segmentarna brzina; fleksibilnost; eksplozivna snaga; statička snaga ruku; repetitivna snaga; statička sila ruku i ramenog pojasa-mišićna izdržljivost; sprinterska brzina i agilnost. Rezultati metode ANCOVE u ravnoteži, segmentarnoj brzini, fleksibilnosti, eksplozivnoj snazi, statičkoj sili, repetitivnoj snazi i sprinterskoj brzini između ispitanika eksperimentalne i kontrolne grupe na finalnom merenju, sa neutralizacijom i parcijalizacijom rezultata na inicijalnom merenju pokazali su da nisu utvrđene statistički značajne razlike između grupa na finalnom merenju. Imajući u vidu pozitivne efekte, ukupne rezultate istraživanja, kao i veoma pozitivne reakcije i utiske učenika, smatramo da postoji mogućnost njegove primene u praksi.

Klučne reči: *nastava fizičkog vaspitanja, organizacija i ishodi nastave, alternativni program, redovni program, uticaji*