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Original research paper

EFFECTIVENESS OF TEACHING PHYSICAL AND HEALTH EDUCATION IN THE FOURTH GRADE OF PRIMARY SCHOOL IN RELATION TO TEACHER'S PROFESSIONAL COMPETENCE

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ABSTRACT

The aim of the research was to determine the effectiveness of teaching physical and health education in the fourth grade of primary school in relation to the teachers' professional competence. The sample of 242 subjects, aged 10, consisted of male and female students of the fourth grade of elementary schools in Nis, Serbia. The sample included two subsamples, one consisting of 124 respondents who attended classes under the guidance of physical and health education teacher (experimental group) and the other of 118 respondents who attended classes under the guidance of generalist teacher (control group). The teaching content, intended for both groups of students, was taught during one semester based on the physical and health education curriculum for the fourth grade of elementary school, and the concept of the experiment is that one group was guided by a physical and health education teacher, and the other by a generalist teacher. The sample of variables included six situational-motor and seven motor tests. The abilities monitored in this paper (explosive leg strength, speed, flexibility, balance and situational motor abilities) were tested by initial and final testing. The results showed that there was a statistically significant effectiveness of teaching physical and health education on the development of motor and situational-motor abilities under the guidance of physical and health education teacher in comparison to classes taught by generalist teacher.

Key words:
physical and health education teacher, generalist teacher, motor abilities, situational-motor abilities, students.

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INTRODUCTION

Physical and health education in the junior grades of elementary school, of adequate content, scope and intensity, has a stimulating effect on the development of organic, functional and anthropomotor abilities. This is a very significant period of the child's physical development and the establishment of a healthy lifestyle, and it is very easy in the period of rapid growth for the motor knoledge, skills and habits to be adopted (Gadžić, 2019; Milenković, 2021; Rašidagić, Manić & Mahmutović, 2016). That is the reason why it is of great importance what kind of professional staff conducts the teaching of physical and health education.

Previous researches indicate that generalist teachers are at disadvantage when teaching physical and health education due to a lack of training, experience and self-efficacy in this field, especially when taking into account the responsibility for teaching other subjects of the curriculum intended for children of junior school age. (Truelove, Bruijns, Johnson, Burke & Tucker, 2021). It is considered that the content of physical and health education within the training program for generalist teachers is not sufficient to later enable quality teaching regarding the proper development of children's motor literacy (Yıldızer & Munusturlar, 2022). Curry (2012) believes that generalist teachers very often omit mandatory physical and health education classes because of the obvious pressure that occurs due to obligations in other content of the curriculum for the children of this age. He also indicates that it is necessary to plan 6–10% of the total program time for physical and health education, which is rarely implemented in practice, and therefore he believes that it is necessary to include competent physical and health education teaching staff. A similar attitude is shown by a survey conducted among school principals (Lynch, 2015). After assessing the state to which extent the curriculum of physical and health education has been implemented, the research results indicate the explicit desire of school principals to have competent teaching staff of physical and health education. Lynch & Soukup (2017) believe that the biggest barrier to quality teaching of physical and health education in junior school age is the professional competence and teacher preparation, so it is therefore necessary to provide competent staff. It should also be noted that in junior school age students spend more time in moderate to vigorous physical activity (MVPA) when they are taught by a physical and health education teacher (33.8%) than when taught by a generalist teacher (29.9%) (Truelove, Bruijns, Johnson, Gilliland & Tucker, 2020).

In favour of the insufficient preparation and competence of generalist teachers (Pašalić, 2009), the data speaks for itself that only .5% of teachers successfully solved 70% of the set tasks on the assessment of kinesiology and kinesiology-methodical competence, and that 3.4% of teachers achieved above-half performance. That is why it is considered that the academic competence of generalist teachers in terms of basic knowledge of kinesiology and its applied discipline of kinesiology methodology is at

a very low level. Stamatović & Šekeljić (2011) state that the lessons taught by physical and health education teachers are more effective than those taught by generalist teachers and point to the necessity of introducing the subject teaching of physical and health education in the junior grades of elementary school. Experiences from the Slovenian primary schools also indicate more efficient effects of teaching under the guidance of physical and health education teachers in the field of developing the physical abilities of children of junior school age (Starc & Strel, 2012).

The professional public deals with an idea on possibility of cooperation of the staff competent in physical and health education with generalist teachers. According to the authors (Morgan, Bryant, Edwards & Mitchell-Williams, 2019), the greatest contribution of this kind of research and the idea itself is the very possibility of cooperation of competent physical and health education teachers and their help to generalist teachers in a practical sense, in the form of improving their professional qualifications. The low level of competence and self-confidence of generalist teachers can only be solved by effective and continuous professional development in that field (Morgan & Bourke, 2008) along with significant support and guidance and greater partnership and cooperation (Rainer & Jarvis, 2021). Anyway, it is another confirmation that teaching is not adequate without the participation of physical and health education experts. On the other hand, generalist teachers also hope for greater cooperation with competent professional staff in the field of physical and health education (Stanec & Murray-Orr, 2011).

In view of all that has been stated, this research was carried out to check on whether a doubt in professional circles both in the country and the world, that generalist teachers are underqualified in physical and health education is reasonable (Faulkner *et al.,* 2008; Prokopov, Legurska & Mircheva, 2021), as well as whether with all other obligations they have in other school subjects, they are objectively unable to fulfill all the requirements of a very complex physical and health education curriculum (Truelove *et al.*, 2021), regardless of their desire and an undoubtedly conscientious approach to work. It should be said once more that this is a very important period in the child's development and that is why one should rely on the most professional staff possible. Therefore, the aim of this research is to determine the effectiveness of teaching physical and health education in the fourth grade of elementary school in relation to the professional competence of teachers.

METHODOLOGY

Participants

The research was conducted as a pedagogical experiment with parallel groups. A sample of 242 subjects (four elementary schools in the area of the city of Niš, Serbia) for the purposes of this research was selected among the fourth-grade elementary school students, aged 1. The sample was divided into two groups, experimental group of 124 subjects who attended classes under the guidance of physical and health education teachers and control group of 118 subjects who attended classes under the guidance of generalist teachers.

All those included in the research were healthy and voluntarily gave their consent for testing and participation in the experimental program. It should be pointed out that none of the students of both groups was injured while attending classes and studying program contents. Besides, both groups of the subjects accomplished a high percentage of class attendance of more than 95% (experimental group 97.89%; control group 96.72%). The abilities monitored in this paper were tested before the experimental treatment was carried out by the initial test and after its completion by the final test. The test results for both boys and girls were processed and presented separately.

Variables and organization of testing

For the assessment of motor abilities seven motor tests (TopendSports http://www.topendsports.com) which assess several motor abilities (explosive leg strength, speed, flexibility and balance) were used. The selection of motor abilities that were assessed with appropriate tests was made on the basis of the teaching contents that were intended for implementation, that is, the potential effect of those contents on the tested motor abilities depending on the efficiency of the professional staff who perform the teaching process. When it comes to the program of the sports game, basketball, apart from testing motor abilities, the evaluation of the success of the professional staff was additionally carried out with specialized situational-motor tests.

Squat Jump – SJ. The subject is in a starting position with his knees being bent at 90 degrees, hands are placed on the hips, the trunk is positioned as vertically as possible, feet are at hip width. From the starting position, the subject performs an explosive high jump, keeping the hands on the hips and extending the hips and knees. This test is proven to be reliable and valid for assessing explosive leg strength

(Marković, Dizdar, Jukić & Cardinale, 2004), and is also used in junior school age children (Acero, Fernández-del Olmo, Sánchez, Otero, Aguado & Rodríguez, 2011).

Countermovement Jump – CMJ. The subject is in an upright standing position, hands are placed on the hips, feet are at hip width. From the starting position, the subject squats down to 90 degree leg bent position and then performs an explosive high jump, keeping the hands on the hips and extending the hips and knees. The Countermovement Jump is used as a reliable and valid assessment of explosive leg strength (Marković *et al.*, 2004), as well as in junior school age children (Acero *et al.*, 2011).

Drop Jump – DJ. The subject is in a standing position on the edge of a 20 cm high box. The knees are slightly bent, and the arms are relaxed at the sides. Then he jumps from the box to the ground to a 90º knee angle position, and then an explosive jump up with an upward swing of the arms follows. The test can be successfully used to assess explosive leg strength (Kam-Ming, 2015) and also in children of junior school age (Keiner, Sander, Wirth & Schmidtbleicher, 2013).

When testing the jumps, the Chronojump system (chronopic v3.0, contact platform, chronojump software .9.3) was used, and for the purposes of this research, data indicating the flight time was used in the statistical processing. These jumps can be used with children of the junior grades of primary school, which has already been mentioned in the previous research, because the jump technique in all three tests is performed in the position of knees bent up to 90º. Full or depth squat is not recommended for children of this age (knees bending more than 90º-100º), because during a large bending the possibility of injuries to soft tissue structures in the knee is increased (Kellis, Arambatzi & Papadopoulos, 2005), which is additionally dangerous for still underdeveloped musculature and resistance to high loads at this age.

20m run – 20RUN. At the signal of the starter's hand, the subjest starts from a low start and quickly runs (sprints) across the 20m track in the shortest possible time. Tests with sprint running like the mentioned 20m variant are a valid indicator of the speed of the subject (Burgess, Holt, Munro & Swinton, 2016). They are also successfully used for children of junior elementary school age (Bogdanis, Donti, Papia, Donti, Apostolidis & Sands, 2019).

Shoulder Circumduction Test – SCT. The subject is in a standing position with his feet apart shoulder width and holds a 150cm long and 3cm thick cord in front of the body that has a fixed handle on one end and a sliding handle next to it. Then, holding the two handles of the cord, the subject passes it, from in front of the body, over the head and back. One hand holds the fixed handle all the time, and the other holding the sliding handle slides along the cord. The subject tries to perform the circumduction with the shortest possible distance between the hands. The result of the test is measured by the distance of the hands after the completed circumduction. The test is proven to be valid for assessing shoulder flexibility (Lemmink, Kemper, de Greef, Rispens & Stevens, 2003). It is also used in children of pre-puberty age (Malacko, Pejčić & Trajkovski, 2011).

Balance Board Test – BBT. The subject stands with his foot on the length of the board (width 2cm, height 4cm, length 60cm, fixed on a thicker board measuring 60x30cm in the middle), with his hands on his thighs. The other foot is on the ground. Time measurement starts when the subject lifts the leg that is on the ground, and stops when he lowers his leg, falls off the board or moves his arms. The test is used as a valid balance indicator (Lemmink, Kemper, de Greef, Rispens & Stevens, 2001). The test is also used with junior school age children (Mladenović, 2014).

Balance Stand Test with Eyes Closed – BST. The subject stands barefoot on an arbitrary leg while the foot of the other leg rests on the knee of the leg which he is standing on. The subject tries to keep the given position for as long as possible, where the hands are placed on the thighs, while the hands must be fixed, and the legs must be in the initial position. The test has been proven valid for assessing the level of balance (Panta, Arulsingh, Raj, Sinha & Rahman, 2015). It is used in different versions with junior school children as well (Condon & Cremin, 2014).

Six tests were used to assess situational-motor abilities. The educational contents related to the sport game of basketball represent, among other things, the basic technical elements of this game, therefore the selected tests can determine the level of mastery of the program (passing, manipulating the ball, moving with the ball), and thus the contribution of the professional staff to the students' knowledge acquisition. Apart from the needs of basketball athletes of different ages, specialized situational-motor basketball tests are also used in research with school children to assess the level of adoption of the intended teaching contents (Chen, Wang & Chen, 2021; Stöckel, Weigelt & Krug, 2011). The applied set of situational-motor tests was taken from the research of Golubović-Jovanović and Jovanović (2003):

Elevational precision of ball passing with two hands – PER2. Four concentric circles are drawn in the central circle of the basketball court. The radius of the smallest circle is 20 cm, the larger circle is 40 cm, the next one is 60 cm and the fourth one is 80 cm. At a distance of 6m from the center of the circle, a 1m long shooting line is drawn. The subject stands in a diagonal position behind the shooting line and shoots the ball into the drawn circles, using the technique of throwing the ball with two hands. A hit with the ball in the smallest circle made with correct technique is valued with 8 points, while other hits in each of the following circles are valued with two points less (6, 4, 2).

Horizontal precision of ball passing with two hands – PHOR. Concentric circles of magnitude of 20, 40, 60 and 80 cm are drawn on a hard, vertically placed basis. At a distance of 6m from the board/wall, a shooting line is drawn on the basis, parallel to the board a 1m long. The height of the center of the circle from the basis is 160 cm. The subject is standing in a parallel basketball stance behind the shooting line and shoots the drawn circles with the ball using the technique of passing the ball with two hands from the chest. A hit with the ball in the smallest circle made with correct

technique is valued with 8 points, while other hits in each of the following circles are valued with two points less (6, 4, 2).

Circles around the waist – KRTE. The subject is in an upright (basketball) position holding the ball in his hands in front of him. At the given sign, he starts circling with the ball around the body in any direction at the height of the hips. The ball is kept passed from hand to hand. The number of complete laps in 30 seconds is measured.

Figure 8 – KRNO. The subject is in an upright position, his knees about shoulder-width apart and then bends over slightly, holding the ball with both hands. While in this position, he passes the basketball through his legs, from hand to hand so that the path of the ball makes a figure eight. The number of complete laps - figure eights performed by the subject in 30 sec. is measured.

Dribble around a central circle of the basketball court – SVKR. The subject holding the ball stands with both feet on the line that cuts the central circle, just outside it. At the starter's signal, he starts from the basketball position to dribble the ball with his outer hand around the entire circle, until both feet and the ball touch the surface over the line. Afterwards, he makes 180° turn, dribbles the ball full circle backwards, in the opposite direction with his outer hand, until his both feet and the ball touch the surface behind the middle line, i.e. his starting point. The time is measured while the subject drives the ball for two full laps with a turn.

Dribble two "small eights" around two adjacent circles of basketball court – SVMO. The subject holdina a ball stands with his both feet behind the center line of the field next to the central circle. At the starter's signal, he starts from the basketball stance to dribble the ball with his superior hand, moving forward as fast as he can, until he goes around from the opposite side the first circle around the free throw line, then from the opposite side and around the center circle. The task is completed when the subject crosses the starting point with both feet and the ball in the shortest time, without touching the surface behind the center line.

The testing was carried out by trained investigators, teachers of physical and health education in schools that have optimal conditions for the realization of physical and health education classes so that the set goal could be successfully implemented. In elementary schools, permission to conduct the research was provided by the competent authorities, who were informed in a timely manner about the course and nature of the research. Testing was conducted in school gyms and in the schoolyards when allowed by weather conditions (initial testing). The subjects had adequate sports equipment.

Experimental program

The experimental group of the subjects attended physical and health education classes, three times a week for one semester and was taught by a physical and health education teacher. A part of the annual fourth grade teaching and learning curriculum of basic education and upbringing – the subject of physical and health education – was taught. The educational content included programs in athletics, basketball and ground and apparatus exercises (gymnastics).

During the same period, the control group having three lessons a week, implemented the same content that was provided for the experimental group with the generalist teacher.

The experiment was reflected in the fact that one group was taught by a physical and health education teacher, and the other by a generalist teacher.

Structure of an individual physical and health education class (example for the experimental group):

1. *Introductory part of the class* (3–5 min) – exercise activities such as walking, running, jumping in order to warm up the student's organism and prepare him for the realization of the tasks in the main part of the class.
2. *Preparation part of the class* (8–10 min) – a complex of basic gymnastics exercises in order to prepare the complete muscular system, tendons and ligaments, for the realization of the tasks in the main part of the lesson.
3. *The main part of the class* (25 min.)
   Part A of the main part of the class (15 min) – acquisition of new motor knowledge and skills issued by the curriculum of physical and health education and their systematization.
   Part B of the main part of the class (10 min) – free movement improvisations related to the part A of the class content or elementary games chosen by the students.
4. *Final part of the class* (3–5 min.) – calming down all the functions of the body by means of physical exercises of lower intensity (loosening and stretching).

Curriculum for the experimental treatment:

No. of school class	Teaching units (54 school classes)	Type of school class		
		T	P	Tg
1–2	Pretest			2
3	Introductory class - getting to know the teaching contents	1		
4–22	ATHLETICS – running technique (low and high start) – speedy running, running through acceleration – relay (pairs race, running backwards) – high jump – overstepping technique – long jump – shrivel technique – long jump – curl up technique – preparation exercises – small ball and medicine ball throwing with the stronger and weaker hand, throwing a vortex. – triathlon – small ball throwing, 60m run and high jump	9	10	
23–33	BASKETBALL – basic basketball position and ball holding, defensive position; catching and passing in place and moving with one and both hands from the chest, from the side, bouncing the ball from the ground. – dribble in place and moving, pivoting. – basketball shoting, basketball two-step. – the play, basic tactical formations in defense and forward (zone positioning and movement), pair work. – the play using learned elements	5	6	
34–52	EXERCISES ON THE GROUND AND APPARATUS ground exercises – forward and backward roll (standing flying roll) – cartwheel – preparation exercises – handstand, scale, bridge from the lying position – floor composition routine (combining of learned elements) apparatus exercises – preparation exercises for vault (vault with expanded legs – gymnastic horse 110cm high) – reaching rings – inverted pike – hang, support, swing, pullover (horizontal bar, uneven and parallel bar on adjusted height). – balance exercises on low balance beam (low bench, Swedish box), walk, jump and landing, turns.	9	10	
53–54	Posttest			2
T – teaching; P – practice; Tg – testing				

Statistical data processing

Arithmetic mean and standard deviation were used from the area of descriptive statistics, and from the comparative one, Student's T-test for dependent samples and analysis of covariance.

RESULTS

The following chapter presents the results of the research, as well as their interpretation. Descriptive parameters and T-test are presented both for motor and situational-motor abilities of both groups of students as a whole and separately for students according to their gender (Tables 1–4). Besides, for the purpose of presenting and proving the effect of the research, covariance analysis was used (Tables 5 and 6).

Table 1: Descriptive parameters and T-test of boys' motor abilities

	pretest		posttest		p-level (eg)	p-level (cg)
	eg	cg	eg	cg		
SJ	.39 ± .06	.39 ± .06	.41 ± .08	.41 ± .07	.074	.234
CMJ	.4 ± .08	.43 ± .07	.42 ± .11	.39 ± .09	.119	.016*
DJ	.44 ± .09	.45 ± .08	.47 ± .09	.45 ± .06	.105	.935
20RUN	4.19 ± .37	4.15 ± .37	4.19 ± .32	4.2 ± .31	.810	.002*
SCT	7.79 ± 12.02	69.77 ± 11.86	66.64 ± 1.16	68.68 ± 9.79	.000*	.037*
BBT	5.44 ± 3.7	4.61 ± 3.06	9.22 ± 4.03	5.32 ± 2.93	.000*	.002*
BST	24.41 ± 1.35	25.31 ± 7.94	29.63 ± 1.67	25.52 ± 7.45	.000*	.553

Mean ± SD; *Significance level p < .05;
eg – experimental group; cg – control group

Table 1 shows the descriptive parameters and results of the T-test of motor abilities of both groups of boys. In the experimental group, a statistically significant positive change can be established in the result of the Shoulder Circumduction test, which assesses the flexibility of the shoulder girdle (SCT p = .000) and with the tests Balance board test (BBT p = .000) and Balance stand test with eyes closed (BST p = .000) with which balance is assessed. In the tests of explosive leg strength: Squat jump (SJ p = .074), Countermovement jump (CMJ p = .119) and Drop jump (DJ p = .105), as well as in speed test, 20m run (20RUN p = .810) no statistically significant positive

change was recorded in the experimental group. In the control group, a statistically significant positive change was recorded in the Shoulder circumduction test (SCT p = .037) and Balance board test (BBT p = .002). Other tests with statistical significance indicate a negative change in student results: Countermovement jump (CMJ p = .016) and 20m run (20RUN p = .002).

Table 2: Descriptive parameters and T-test of girls' motor abilities

	pretest		posttest		p-level (eg)	p-level (cg)
	eg	cg	eg	cg		
SJ	.4 ± .08	.4 ± .05	.4 ± .07	.41 ± .07	.977	.627
CMJ	.4 ± .08	.42 ± .07	.38 ± .1	.39 ± .1	.353	.079
DJ	.43 ± .06	.44 ± .08	.46 ± .09	.44 ± .07	.044*	.774
20RUN	4.48 ± .36	4.46 ± .36	4.47 ± .3	4.45 ± .3	.651	.420
SCT	73.5 ± 13.58	72.95 ± 1.94	68.43 ± 1.94	71.55 ± 8.95	.000*	.030*
BBT	5.73 ± 3.43	4.87 ± 2.71	1.07 ± 3.5	5.44 ± 2.71	.000*	.035*
BST	26.31 ± 11.44	24.72 ± 7.7	31.07 ± 1.33	24.74 ± 7.5	.000*	.962

Mean ± SD; *Significance level p < .05;
eg – experimental group; cg – control group

When it comes to the motor abilities of girls (table 2), the results are very similar to those of boys, with a partially statistically significant positive change in explosive strength in Drop jump (DJ p = .044). In the control group of girls, there is also a statistically significant positive change in the results of certain tests, but this change is of a lower level than the one in the experimental group.

Table 3: Descriptive parameters and T-test of boys' situational-motor abilities

	pretest		posttest		p-level (eg)	p-level (cg)
	eg	cg	eg	cg		
PER2	3.06 ± 2.56	2.37 ± 2.59	5.21 ± 1.82	2.93 ± 2.13	.000*	.091
PHOR	4.15 ± 2.08	3.27 ± 1.95	5.48 ± 1.58	4.07 ± 2.24	.000*	.005*
KRTE	7.7 ± 3.28	6.83 ± 2.95	9.76 ± 3.81	7.23 ± 2.94	.000*	.037*
KRNO	5.17 ± 2.44	4.62 ± 1.94	7.17 ± 3	4.97 ± 2.19	.000*	.021*
SVKR	17.02 ± 2.29	17.68 ± 1.89	14.55 ± 2.18	17.06 ± 1.77	.000*	.000*
SVMO	21.88 ± 3.37	22.38 ± 2.65	18.83 ± 3.47	21.61 ± 2.62	.000*	.000*

Mean ± SD; *Significance level p < .05;
eg – experimental group; cg – control group

In the fiels of situational-motor abilities of boys (Table 3), a statistically significant positive change in the results was established in all tests in the experimental group of students, while in the control group there was a statistically significant positive change to a somewhat lesser extent.

Table 4: Descriptive parameters and T-test of girls' situational-motor abilities

	pretest		posttest		p-level (eg)	p-level (cg)
	eg	cg	eg	cg		
PER2	2.69 ± 2.47	2.62 ± 2.32	4.97 ± 1.96	2.83 ± 1.91	.000*	.465
PHOR	3.55 ± 2.15	3.86 ± 2.05	5.69 ± 1.58	3.62 ± 2.17	.000*	.477
KRTE	7.07 ± 2.36	6.84 ± 2.71	8.57 ± 2.11	7.29 ± 2.41	.000*	.007*
KRNO	4.69 ± 1.52	4.52 ± 1.64	5.9 ± 1.56	4.9 ± 1.69	.000*	.007*
SVKR	18.54 ± 1.98	18.48 ± 1.6	15.7 ± 1.93	17.98 ± 1.63	.000*	.000*
SVMO	24.89 ± 2.7	24.64 ± 2.45	2.82 ± 2.78	23.72 ± 2.37	.000*	.000*

Mean ± SD; *Significance level p < .05;
eg – experimental group; cg – control group

Situational-motor abilities of girls (Table 4) in the experimental group follow the results of boys, because a statistically significant positive change in all tests is established. In the control group of girls, there were no statistically significant

changes only in situational accuracy tests: Elevational precision of ball passing with two hands (PHER2 p = .465) and Horizontal precision of ball passing with two hands (PHOR p = .477).

Table 5: Analysis of covariance of motor abilities

	boys		girls	
	F	p-level	F	p-level
SJ	1.38	.213	1.07	.389
CMJ	.67	.716	.19	.992
DJ	1.07	.391	1.26	.271
20RUN	121.39	.000*	49.39	.000*
SCT	128.66	.000*	86.78	.000*
BBT	48.77	.000*	35.28	.000*
BST	81.2	.000*	11.20	.000*
MANCOVA	boys – F = 2.57; p-level = .000*			
	girls – F = 23.87; p-level = .000*			

The multivariate level of covariance analysis (Table 5) shows the effects of professional work of physical and health education teachers in the implementation of teaching contents on the development of motor abilities in the experimental one in relation to the control group of both boys and girls. The presence of statistical significance (boys - p = .000; girls - p = .000), as well as the value of the F-test (boys - 2.57; girls - 23.87) indicates that the students taught by physical and health education teachers mastered quite good and even better the taught curricula from two programs related to basic sports (athletics and gymnastics) and a program related to sports (basketball) than the control group.

If each test is analyzed individually, statistical significance was found in most motor tests at a 99% confidence level. However, in all tests representing explosive strength, no statistical significance was found in both boys (SJ p = .213; CMJ p = .716; DJ p = .391), and girls. (SJ p = .389; CMJ p = .991; DJ p = .271). In other motor tests, the professional work of physical and health education teachers in the management of teaching contents fully contributed to the improvement of the results.

Table 6: Analysis of covariance of situational-motor abilities

	boys		girls	
	F	p-level	F	p-level
PER2	11.44	.000*	1.91	.000*
PHOR	6.31	.000*	7.64	.000*
KRTE	58.77	.000*	3.00	.000*
KRNO	52.35	.000*	25.72	.000*
SVKR	108.69	.000*	83.95	.000*
SVMO	187.54	.000*	67.89	.000*
MANCOVA	boys – F = 39.88; p-level = .000*			
	girls – F = 51.45; p-level = .000*			

More efficient implementation of teaching contents related to basketball under the guidance of physical and health education teachers influenced the improvement of situational-motor abilities of the experimental group in both boys and girls (Table 6). Thanks to the professional work of physical and health education teachers who obviously influenced the higher level of knowledge acquired by students, the statistical significance at the multivariate level of analysis of covariance between the subjects of the experimental and control groups was very high. (boys – p = .000; girls – p = .000). Supportive of this are the values of the F-test, (boys – 39.88; girls – 51.45) which contribute to the previously mentioned significance.

Likewise, the univariate level of covariance analysis between the experimental and control groups also indicate that there is a statistically significant effect in all situational-motor tests at a 99% confidence level in both girls and boys.

DISCUSSION

The research indicated that in a period of one semester, a positive effect of the professional work of physical and health education teachers proved itself in the implementation of the teaching content, which had a positive effect on the development of the monitored motor and situational-motor abilities of the students of the experimental group (subject teaching). Individually observed, the contribution of more effective subject teaching compared to generalist teaching can be seen in the results of most tests.

In the context of the explosive leg strength, which was assessed by standing high jumps, the effectiveness of the professional work of physical and health education teachers was not recorded to the extent that was expected by setting the initial assumption. In some previous studies, the results in tests of explosive leg strength showed minor or major improvements (Stamatović & Šekeljić, 2011; Starc & Strel, 2012; Sheerin, Williams, Hume, Whatman & Gleave, 2012). The fact that no improvement has occurred can partially be explained by the genetic conditioning of explosive strength (Sridhar & Maniazhagu, 2018), but probably also by the insufficient action of teaching content that could have an impact on this dimension (jumps in athletics, vaults in gymnastics). As part of the work on vaulting, preparation exercises for vaulting (repetition of the material taught in the third grade) were performed, followed by preparation for vaulting and its performance, while in athletics the program includes the improvement of the high jump using the overstepping technique. In both cases, in the experimental group at the beginning of the work, a poor knowledge of the material taught in the previous grades was ascertained, which should be the basis for the further teaching process.

In the result of speed (20m run), the effect was statistically presented, but only because of poorer results after the implementation of the training in the control group. There were no positive changes in the experimental group. Speed, as well as explosive strength, is considered a highly genetically determined ability (Bompa & Carrera, 2015) and there are fewer options to influence its development through expert guidance of teaching content than some other motor dimensions. However, it would be wrong to say that it cannot be worked on and that pedagogical work on speed development would be a waste of time (Brown & Ferrigno, 2014; Foran, 2010). In the long term, the teacher can contribute to improving the manifestation of speed by improving the speed running technique, working on the development of endurance and strength, length, frequency and rhythm of the steps, etc. (Bompa & Buzzichelli, 2017). However, in this research regarding speed, the influence of the organized work of physical and health education teachers on the implementation of the teaching content did not really affect the improvement of this ability. Training the technique of speed running through the sprint discipline at 60m and the long jump, as well as work on the development of strength abilities, could show the effects of pedagogical work if it were monitored longer than it is currently practiced. The fact is that the proper organization of training these elements is insufficient for improvement in a short time, especially since the students demonstrated an unenviable running technique at the beginning of the work, although training this teaching content was carried out in the previous grades as well.

By training the students the elements of the program as part both of floor and apparatus exercises, the physical and health education teacher influenced the reaching of a statistically significant effect on the flexibility of the shoulder girdle and balance. First of all, it refers to the success in training students with elements in the floor (eg rolls, scale, bridge from the lying position and working on connecting those elements into compositions) and on low balance beam (training movements and turns of 90º and 180º on a narrow surface that helps in the development of balance), with indispensable effective work on raising the level of general strength, which permeates the manifestations of all motor dimensions (Behringer, vom Heede, Matthews & Mester, 2011). At the same time, it was also noticed that the students were not able to cope with the teaching content that they most certainly should not have met for the first time, however, the effect of the work contributed to a significant improvement in the results. Previous research confirms that mastering gymnastics elements has a positive effect on improving the level of motor balance (Akin, 2013; Alpkaya, 2013; Karachle, Dania & Venetsanou, 2017) and flexibility (Niaradi & Batista, 2018; Özer & Soslu, 2019), therefore competent teachers who have theoretical and practical knowledge of sports gymnastics and efficiency in transferring that knowledge to students are of key importance in this case as well. Better results in some of these tests are achieved in the control group, in both boys and girls, but the improvement is of a smaller scalle.

Due to the nature of the tests themselves, the success of the training students in basketball should have been demonstrated in situational-motor abilities. Among other things, along with basics of the basketball game, the elements of dribbling and moving of players having the ball and passing and basketball shooting were covered, as well. The situational-motor basketball tests that were used in this research require a good mastery of the mentioned technical elements (Golubović-Jovanović & Jovanović, 2003). Although less time is spent on basketball than on athletics and gymnastics, the training of the basic elements of this sport was successful. High statistical significance at the individual level of the covariance analysis indicates that the students under the guidance of the physical and health education teacher mastered the basketball curriculum much better than the control group due to the obviously better methodical approach of the teacher in the experimental group. The results in the situational-motor tests are not exclusively the result of successfully organized and implemented teaching content on basketball, but are generally based on the professional work of the teacher during the development of general motor abilities, which situational-motor abilities are closely related with (Nikšić, Beganović & Joksimović, 2020; Milenković & Stanojević, 2014; Rašidagić & Fazlagić, 2010, Zhang, Lee, Burnet & Gu, 2021).

Physical and health education is important because of health and developmental benefits through psychomotor development and enabling a physically active lifestyle (Thomas, Lee & Thomas, 2019). The complexity of teaching physical and health

education represents a whole set of influences on the students' anthropological space. On this occasion, the method of organization of the teaching and the expertise of the teacher in transferring knowledge to the students, contributed a high percentage to the improvement of the level of motor and situational-motor abilities of male and female students of the fourth grade of elementary school. Previous researches on the same topic (Bigović, 2003; Marković, 2002; Radović, 2013; Starc & Strel, 2012) point to the necessity of prioritizing the subject teaching of physical and health education in elementary schools, because they came to the same conclusion: subject teaching of physical and health education is more effective and gives better results in tested physical abilities. It is considered that the greater competence shown by physical and health education teachers comes from, on the one hand, the academic education in the field of sports sciences that they have acquired, as well as from greater experience in practicing and teaching basic and sport-specific skills included in the curriculum of physical and health education (Invernizzi *et al.*, 2020).

CONCLUSION

The experimental program in this research was carried out with the intention of determining the effectiveness of teaching physical and health education in the fourth grade of elementary school in relation to the professional competence of teachers. The initial assumption was that students under the guidance of a physical and health education teacher was going to be more effective in class, i.e. would better master the teaching content and, as a consequence, achieve statistically better results in motor and situational-motor abilities than the students who attend physical and health education classes taught by a generalist teacher. The obtained results showed that the students in the experimental group under the guidance of the physical and health education teacher achieved statistically better results in motor and situational-motor abilities, which indicates the more efficient work of the physical and health education teacher who those classes have taught by.

The level of subject knowledge, in the theoretical and practical sense, in the field of exercise, technical mastery of motor forms and sports, didactics and methodology, psychological knowledge and recognition of psychosocial characteristics of students, was acquired through schooling exclusively for work in a specific field, physical and health education. Such a professional staff profile can theoretically, methodically and organizationally adequately prepare themselves for the class, and after the diagnosis of the student's anthropological status, contribute to the adoption of the content of sports and technical education and the optimal development of those abilities in which students show poorer results. Therefore, the results obtained by this research, indicate the need for returning physical and health education subject classes to the

junior grades of primary school, that is, enabling physical and health education teachers to work with the children of this age. Such a need is also indicated by other numerous researches, some of which have been mentioned in this paper, because the progress of students in subject teaching in the field of developing physical abilities and forming appropriate motor habits by adopting the content of sport-technical education is obvious.

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