

DIFFERENCES IN THE EFFECT OF REGULAR AND SPECIALLY PROGRAMMED PHYSICAL AND HEALTH EDUCATION ON THE MOTOR STATUS OF STUDENTS

RAZLIKE U UTICAJU REDOVNE I POSEBNO PROGRAMIRANE NASTAVE TJELESNOG I ZDRAVSTVENOG ODGOJA NA MOTORIČKI STATUS UČENIKA

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Abstract: The aim of this study was to examine and compare the effects of regular and specially programmed Physical and Health Education on the transformation of basic motor and situational–motor abilities of sixth-grade primary school students. In the motor domain, 15 variables were observed, and in the situational–motor domain 6 representative variables were analyzed. The sample included 106 students divided into the control group (53 students) and the experimental group (53 students). Students were male and female, aged 12 ± 6 months. The control group followed the regular curriculum, while the experimental group participated in an intensive program of sports games—basketball, volleyball, and handball. The program lasted one school semester. Descriptive statistical methods showed a normal distribution of data for both motor and situational–motor variables. An independent-samples *t*-test showed that, initially, the control group had an advantage only in the variable MTAPNO within the motor domain. In the situational–motor domain, the experimental group initially demonstrated better abilities in the variables OKVLS, ORBLZ, and ORVLS. After the implementation of the programs, the final *t*-test in the motor domain did not record statistically significant differences between the groups. In the situational–motor domain at the final measurement, the experimental group showed higher *t*-test values for the variables OKVLS, OLPKS, ORBLZ, and ORISE, while the control group had higher *t*-test values for the variable OKBLK. Conclusion: It cannot be stated with certainty that the specially designed instructional program had a significant effect on improving the motor and/or situational–motor abilities of the students in the experimental group.

Keywords: Physical and Health Education, Control

Sažetak: Cilj ovog istraživanja bio je ispitati i uporediti efekte redovne nastave i posebno programirane nastave tjelesnog i zdravstvenog odgoja na transformaciju bazično- motoričkih i situaciono- motoričkih sposobnosti učenika VI razreda osnovne škole. U motoričkom prostoru posmatrano je 15 varijabli a u situaciono- motoričkom 6 varijabli predstavnika prostora. U uzorku ispitanika bilo je 106 učenika podjeljenih u kontrolnu grupu (53 učenika) i eksperimentalnu grupu (53 učenika). Učenici su bili muškog i ženskog spola, starosti 12 godina +/- 6 mjeseci. Kontrolna grupa realizovala je nastavne sadržaje u skladu sa radovnim nastavnim planom i programom rada, dok je eksperimentalna grupa bila podvrgnuta intenzivnom programu sportskih igara- košarka, odbojka i rukomet. Trajanje programa bilo je jedno školsko polugodište. Deskriptivno- statistički metod pokazao je normalnu distribuciju podataka i za motoričke i za situaciono- motoričke varijable. T- test za nezavisne uzorke pokazao je da je incijalno, u motoričkom prostoru, prednost uočena kod kontrolne grupe samo za varijablu MTAPNO. U situaciono- motoričkom prostoru incijalno je evidentirana bolja sposobnost eksperimentalne grupe za varijable OKVLS, ORBLZ i ORVLS. Nakon provedenih programa rada, finalno primjenjeni T- test u prostoru motorike, nije zabilježilo statistički značajne razlike između grupa. U okviru situaciono- motoričkog prostora, kod finalnog mjerenja, Eksperimentalna grupa ima veće vrijednosti T- testa za varijable: OKVLS, OLPKS, ORBLZ, i ORISE, dok kontrolna grupa ima veću vrijednost T- testa za varijablu OKBLK. Zaključak: Ne može se sa sigurnošću zaključiti da je posebno dizajnirani program nastave značajno uticao na povećanje motoričkih i/ili situaciono- motoričkih sposobnosti učenika i učenica eksperimentalne grupe.

Ključne reči: Nastava tjelesnog i zdravstvenog odgo-

group, Experimental group, Basic motor skills, Situational motor skills, t-test

ja, Kontrolna grupa, Eksperimentalna grupa, Bazična motorika, Situaciona motorika, T – test

INTRODUCTION

The development of motor abilities in school-aged children represents a foundation for healthy physical, psychological, and social growth. Motor abilities are shaped through basic motor components (such as strength, speed, agility, endurance, and coordination), while situational–motor abilities include the application of motor skills in sports games, interactive situations, and changing conditions (Metikoš et al., 1990). Regular Physical and Health Education plays a clear role in promoting physical activity, health, and socio-emotional development; however, the question increasingly arises whether specially programmed instruction (modified or expanded curricula, experimental programs, additional activities) may have a greater impact on the transformation of basic motor and situational–motor abilities, especially in sixth-grade students (Kovač et al., 2007).

Transformational processes depend on several interconnected factors, such as: accurate assessment of the subject's initial status within the observed domain and the formation of relatively homogeneous groups; planning and programming instructional content aligned with students' abilities, interests, and available resources; defining exercise methods for developing anthropological characteristics and learning methods for acquiring technical–tactical skills; determining organizational forms of work (individual, group, or frontal); establishing the final status of anthropological characteristics and technical–tactical knowledge; and adjusting the transformational program based on transitional measurements. It has been confirmed that specific exercise processes significantly influence changes in various human traits, abilities, and skills. However, the key question remains: "How much, what, and how should one exercise for changes to occur, and how can variability in quantitative and qualitative terms be controlled?" (Rađo, 1998). In both European and Balkan contexts, evidence suggests that such modified programs may produce better outcomes. For example, a study by Badrić, Sporiš, and Krističević (2014), involving 434 students from primary schools in Sisak and Petrinja, showed that more physically active students achieved significantly better results in motor tests (strength, agility, coordination) compared to less active peers. Additionally, Jakovljević (2015) found that the intensity of leisure-time physical activity correlates with better motor development in primary school children. In research examining the effects of sports programs on mo-

UVOD

Razvoj motoričkih sposobnosti kod djece školske dobi predstavlja temelj za zdrav fizički, psihički i socijalni rast. Motoričke sposobnosti se uobličavaju kroz bazično- motoričke sposobnosti (kao što su snaga, brzina, agilnost, izdržljivost, koordinacija) a situaciono-motoričke sposobnosti uključuju primjenu situaciono- motoričkih vještina u sportskim igrama, situacijama interakcije i promjenjivih uslova (Metikoš i saradnici, 1990.). Redovna nastava Tjelesnog i zdravstvenog odgoja ima jasnu ulogu u promociji tjelesog vježbanja, zdravlja i socio- emocionalnog razvoja učenika, ali se sve češće postavlja pitanje da li posebno programirana nastava (modifikovani ili prošireni program, eksperimentalni kurikulum, dodatne aktivnosti) može imati veći uticaj na transformaciju bazično- motoričkih i situaciono-motoričkih sposobnosti, naročito kod učenika VI razreda osnovne škole (Kovač i saradnici, 2007.). Transformacijski procesi sistema zavise od nekoliko faktora, koji su međusobno povezani kao npr: tačno utvrđivanje (procjena) stanja subjekta u prostoru koji se istražuje i formiranje relativno homogenih grupa; planiranje i programiranje sadržaja nastavnog procesa, a koji su u skladu sa mogućnostima učenika, interesima učenika i sredstvima kojima se raspolaže; određivanje metoda vježbanja za razvoj antropoloških karakteristika i metoda učenja pri usvajanju i uvježbavanju tehničko- taktičkih znanja; utvrđivanje organizacijskih oblika rada (individualni, grupni i frontalni); određivanje organizacijskih oblika rada; utvrđivanje finalnog stanja antropoloških karakteristika i tehničko- taktičkih znanja subjekta; korekcije transformacijskih programa preko tranzitivnih mjerenja i drugo. Potvrđeno je da se određenim procesima vježbanja začajno utječe na promjene različitih ljudskih osobina, sposobnosti i znanja. Ali, uvijek je aktuelno pitanje: "Koliko, šta i kako vježbati da bi promjene uslijedile, te kako kontrolirati promjenjivost u kvantitativnom i kvalitativnom smislu" (Rađo, 1998.). U europskom i balkanskom kontekstu postoje indicije da takvi modificirani programi mogu dati bolje efekte. Na primjer, u istraživanju koje su proveli Badrić, Sporiš i Krističević (2014), koje je obuhvatilo 434 učenika osnovnih škola u Sisku i Petrinji, pokazano je da učenici koji su aktivniji u slobodno vrijeme ostvaruju značajno bolje rezultate u motoričkim testovima (snaga, agilnost, koordinacija) nego manje aktivni učenici. Takođe, u istraživanju koje je proučavalo relacije između motoričkih sposobnosti i tjelesne aktivnosti učenika, Jakovljević (2015) utvrđeno je da intenzitet aktivnosti u slobodno vrijeme ima korelaciju s boljim razvojem motoričkih sposobnosti kod djece u osnovnoj

tor abilities in preschoolers, Badrić, Prskalo, & Sporiš (2015) demonstrated that controlled sports activities positively influence explosive strength, coordination, and speed in preschool-aged children. The aim of this study was to “examine and compare the effects of regular and specially programmed Physical and Health Education on the transformation of basic motor and situational–motor abilities of sixth-grade primary school students.”

METHODS OF WORK

Participants

The study included 106 primary school students. Students were divided into a control group (53 students) following the regular curriculum and an experimental group (53 students) participating in specially programmed activities. Both groups included male and female students to ensure realistic and representative results, as school classes typically consist of mixed-gender students. The students were 12 ± 6 months old. Students who were actively involved in training processes of any sport were excluded from the study. Proper consents were obtained for all measurements and testing procedures.

Instruments

The selection of variables was based on their measurement characteristics: validity, reliability, sensitivity, economy, and appropriateness for the age of the participants (Mikić, 1999). A set of 15 motor tests and 9 situational–motor tests in sports games was applied to the sample.

Table 1. Tests/Variables for Assessing Motor Abilities

For assessing movement frequency: / Za procjenu frekvencije pokreta:	Hand tapping / Taping rukom	MTAPRU
	Foot tapping / Taping nogom	MTAPNU
	Foot tapping against the wall / Taping nogama o zid	MTAPNZ
For assessing flexibility: / Za procjenu fleksibilnosti:	Stick rotation / Iskret palicom	MFLISK
	Sitting reach / Dohvat u sjedu	MBFDSD
	Forward bend to the right / Pretklon desno	MPREDE
For assessing explosive strength: / Za procjenu eksplozivne snage:	Standing long jump / Skok udalj iz mjesta	MFESDM
	Standing vertical jump / Skok uvis iz mjesta	MFESUM
	20m sprint from high start / Sprint iz visokog starta 20m	MFE2OV
For assessing repetitive strength: / Za procjenu repetativne snage:	Sit-up test / Test ležanje-sijed	MRCLDM
	Squats for 40 seconds / Test čučnjevi za 40 sekundi	MFRDCU
	Push-ups / Sklekovi	MFRSKL
For assessing coordination: / Za procjenu koordinacije:	Side steps / Koraci ustranu	MAGKUS
	Envelope test / Koverta test	MAGTUP
	Backward obstacle course / Poligon natraške	MRGEPO

školi. U radu o utjecaju sportskog programa na motoričke sposobnosti kod predškolaca, Badrić, Prskalo, & Sporiš, (2015) su dokazali da kontrolirane sportske aktivnosti pozitivno utječu na razvoj eksplozivne snage, koordinacije i brzine kod djece predškolske dobi. Cilj ovog istraživanja je bio „ispitati i uporediti efekte redovne nastave i posebno programirane nastave tjelesnog i zdravstvenog odgoja na transformaciju bazično- motoričkih i situaciono-motoričkih sposobnosti učenika VI razreda osnovne škole“.

METODE RADA

Učesnici

Istraživanje je uključivalo 106 učenika iz osnovne škole. Učenici su bili podjeljenih u kontrolnu grupu (53 učenika i učenice) koja je provodila redovni nastavni program i eksperimentalnu grupu (53 učenika i učenice) koja je provodila posebno programirane aktivnosti. Grupe su ciljano u sastavu imali učenike i učenice, kako bi istraživanje ponudilo što realnije podatke, obzirom da su školska odjeljenja mješovitog sastava. Starost učenika bila je 12 godina +/- 6 mjeseci. U istraživanju nisu učestvovali učenici i učenice koji su dodatno uključeni u trenažni proces bilo kojeg sporta. Za sva mjerenja i testiranja obezbijedene su odgovarajuće saglasnosti.

Instrumenti

Izbor varijabli za ovo istraživanje izvršen je na osnovu njihovih mjernih karakteristika; validnosti, pouzdanosti, osjetljivosti, ekonomičnosti te prilagodljivosti i prikladnosti uzrastu ispitanika (Mikić, 1999.). Na uzorak je bio primjenjen sistem od 15 motoričkih testova i 9 testova za procjenu situacijske motorike u sportskim igrama.

Tabela 1. Testovi/varijable za procjenu motoričkih sposobnosti

Table 2. Tests/Variables for Assessing Situational-Motor Abilities

Tabela 2. Testovi/varijable za procjenu situaciono-motoričkih sposobnosti

Basketball / Košarka	Throwing the ball with both hands against the wall and catching it for 30 seconds / Bacanje lopte objema rukama o zid i hvatanje u trajanju 30 sekundi	OKBLR
	Dribbling the ball in a slalom / Vođenje lopte rukom u slalomu	OKVLS
	Throwing the ball into the basket for 30 seconds / Bacanje lopte u koš u trajanju 30 sekundi	OKBLK
Volleyball / Odbojka	Underhand serve / Servis donji čeon	OSDCE
	Hitting a target over the net from the basic stance / Gađanje cilja preko mreže iz osnovnog stava	OGCPM
	Forearm passing in a circle for 30 seconds / Odbijanje podlakticama u krugu za 30 sekundi	OLPKS
Handball / Rukomet	Throwing the ball against the wall for 30 seconds / Bacanje lopte o zid u trajanju 30 sekundi	ORBLZ
	Dribbling the ball in a slalom / Vođenje lopte u slalomu	ORVLS
	Performing seven-meter throws / Izvođenje sedmeraca	ORISE

Description of Measurement

The students performed the tests dressed in appropriate sportswear and in a well-ventilated large indoor space – the school gym. The measuring instruments (stop-watches, balls) used for recording the results were of standard manufacture. Prior to the start of measurement, the functionality of the instruments was checked. The participants were familiarized with the tests for assessing motor and situational-motor abilities before testing, in order to ensure maximum objectivity (Hadžikadunić et al., 2000; Šoš & Rađo, 1998). All measurements were conducted by the same evaluator. The measurements were carried out at the beginning (initial measurement) and at the end of the four-month program (final measurement). Parents of the participants provided the required consent prior to testing.

Statistical Analysis

The statistical methods used in this study included descriptive statistical analysis and independent samples t-tests. The descriptive statistical measures included the mean value (M), which reflects the average results, and the standard deviation (SD), which indicates the extent of deviation from the norm and highlights the level of variability among participants. Independent samples t-tests were applied at both the initial and final measurements to determine differences between groups and to assess the effects of the implemented programs.

Opis mjerenja

Učenci su izvodili testove, obučeni u adekvatnu opremu i u dobro prozračenoj velikoj prostoriji - školskoj sali. Instrumentarij za mjerenje (štoperice, lopte) korišteni za evidentiranje rezultata bili su standardne izrade. Prije početka mjerenja kontrolisana je ispravnost instrumenata. Sa testovima za procjenu motoričkih i situaciono – motoričkih sposobnosti, ispitanici su upoznati prije testiranja, kako bi test bio što je moguće objektivniji (Hadžikadunić i saradnici, 2000; Šoš & Rađo, 1998.). Mjerenje je uvijek izvodio isti mjerioci. Mjerenja su se obavljala na početku (inicijalno mjerenje) i na kraju četveromjesečnog programa (finalno mjerenje). Roditelji ispitanika su prije provođenja testiranja, dali odgovarajuće saglasnosti.

Statistička analiza

Statističke metode korištene u ovom istraživanju su deskriptivno statistička analiza i T- testovi za nezavisne uzorke. Deskriptivne statističke mjere su uključivale srednju vrijednost (M) koja odražava prosječne rezultate i standardnu devijaciju (SD) koja otkriva stepen odstupanja od normale i ističe nivo varijabilnosti između učesnika. T- testovi za nezavisne uzorke primjenjeni su pri inicijalnom i finalnom mjerenju za utvrđivanje razlika između grupa, te utvrđivanje efekata provedenih programa.

RESULTS

Table 3. Descriptive statistics – Mean values and standard deviations at the INITIAL measurement of motor abilities

Variables / Varijable	Group / Grupa	N	Mean	Std. Deviation	Std. Error Mean
MTAPRU	1	53.00	27.30	2.74	.38
	2	53.00	28.09	4.01	.55
MTAPNO	1	53.00	24.57	2.79	.38
	2	53.00	22.66	2.71	.37
MTAPNZ	1	53.00	18.74	2.25	.31
	2	53.00	19.36	3.26	.45
MFLISK	1	53.00	71.89	15.91	2.19
	2	53.00	74.57	18.63	2.56
MBFDSD	1	53.00	21.30	7.83	1.08
	2	53.00	19.38	7.06	.97
MPREDE	1	53.00	42.17	11.35	1.56
	2	53.00	42.36	9.91	1.36
MFESDM	1	53.00	147.17	24.91	3.42
	2	53.00	148.68	25.06	3.44
MFESUM	1	53.00	26.72	5.22	.72
	2	53.00	26.49	5.57	.77
MFE20V	1	53.00	4.31	.41	.06
	2	53.00	4.41	.55	.08
MRCLDM	1	53.00	20.60	4.03	.55
	2	53.00	21.42	4.77	.66
MFRDCU	1	53.00	31.25	5.57	.77
	2	53.00	29.72	7.60	1.04
MFRSKL	1	53.00	8.21	8.78	1.21
	2	53.00	11.04	9.86	1.35
MAGKUS	1	53.00	12.87	1.17	.16
	2	53.00	13.04	1.61	.22
MAGTUP	1	53.00	31.18	2.73	.37
	2	53.00	32.17	4.02	.55
MRGEPO	1	53.00	22.82	6.52	.90
	2	53.00	22.08	6.57	.90

REZULTATI

Tabela 3. Deskriptivna statistika- Vrijednosti aritmetičkih sredina i standardnih devijacija pri INICIJALNOM mjeranju motoričkih sposobnosti

Legend: MTAPRU – Hand tapping; MTAPNO – Foot tapping; MTAPNZ – Foot tapping against a wall; MFLISK – Stick rotation; MBFDSD – Sit-and-reach test; MPREDE – Side bend to the right; MFESDM – Standing long jump; MFESUM – Standing vertical jump; MFE20V – 20 m sprint from a standing start; MRCLDM – Sit-ups test; MFRDCU – Squats for 40 seconds; MFRSKL – Push-ups; MAGKUS – Side steps; MAGTUP – Envelope (agility) test; MRGEPO – Backward obstacle course; Group – classification of participants according to experimental conditions; N – number of participants; Mean – arithmetic mean; Std. Deviation – standard deviation; Std. Error Mean – standard error of the mean

Legenda: MTAPRU – Taping rukom; MTAPNO – Taping nogom; MTAPNZ – Taping nogama o zid; MFLISK – Iskret palicom; MBFDSD – Dohvat u sjedu; MPREDE – Pretklon desno; MFESDM – Skok udalj iz mjesta; MFESUM – Skok uvis iz mjesta; MFE20V – Sprint iz visokog starta 20m; MRCLDM – Test ležanje – sijek; MFRDCU – Test čučnjevi za 40 sekundi; MFRSKL – Sklekovi; MAGKUS – Koraci u stranu; MAGTUP – Koverta test; MRGEPO – Poligon natraške; Grupa – podjela ispitanika prema eksperimentalnim uslovima; N – broj ispitanika; Mean – aritmetička sredina; Std. Deviation – standardna devijacija; Std. Error Mean – standardna greška aritmetičke sredine

Table 4. T-test Values for the INITIAL Measurement of Motor Skills

Tabela 4. Vrijednosti T- testa pri INICIJALNOM mjerjenju motoričkih sposobnosti

VARIABLES	Levene's Test for Equality of Variances				t-test for Equality of Means					
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
MTAPRU	7.47	0.01	-1.19	104.00	0.24	-0.79	0.67	-2.12	0.53	
			-1.19	91.91	0.24	-0.79	0.67	-2.12	0.53	
MTAPNO	0.05	0.83	3.57	104.00	0.00	1.91	0.53	0.85	2.97	
			3.57	103.91	0.00	1.91	0.53	0.85	2.97	
MTAPNZ	4.77	0.03	-1.15	104.00	0.25	-0.62	0.54	-1.70	0.46	
			-1.15	92.31	0.26	-0.62	0.54	-1.70	0.46	
MFLISK	1.75	0.19	-0.80	104.00	0.43	-2.68	3.36	-9.35	3.99	
			-0.80	101.52	0.43	-2.68	3.36	-9.35	4.00	
MBFDSD	0.12	0.73	1.33	104.00	0.19	1.92	1.45	-0.95	4.80	
			1.33	102.89	0.19	1.92	1.45	-0.95	4.80	
MPREDE	0.48	0.49	-0.09	104.00	0.93	-0.19	2.07	-4.29	3.92	
			-0.09	102.15	0.93	-0.19	2.07	-4.29	3.92	
MFESDM	0.11	0.74	-0.31	104.00	0.76	-1.51	4.85	-11.13	8.12	
			-0.31	104.00	0.76	-1.51	4.85	-11.13	8.12	
MFESUM	0.00	0.98	0.22	104.00	0.83	0.23	1.05	-1.85	2.31	
			0.22	103.56	0.83	0.23	1.05	-1.85	2.31	
MFE20V	3.13	0.08	-1.07	104.00	0.29	-0.10	0.09	-0.29	0.09	
			-1.07	95.61	0.29	-0.10	0.09	-0.29	0.09	
MRCLDM	0.21	0.65	-0.95	104.00	0.35	-0.81	0.86	-2.51	0.89	
			-0.95	101.18	0.35	-0.81	0.86	-2.51	0.89	
MFRDCU	2.85	0.09	1.18	104.00	0.24	1.53	1.29	-1.04	4.10	
			1.18	95.34	0.24	1.53	1.29	-1.04	4.10	
MFRSKL	0.66	0.42	-1.56	104.00	0.12	-2.83	1.81	-6.43	0.77	
			-1.56	102.62	0.12	-2.83	1.81	-6.43	0.77	
MAGKUS	5.83	0.02	-0.62	104.00	0.53	-0.17	0.27	-0.71	0.37	
			-0.62	95.06	0.53	-0.17	0.27	-0.71	0.37	
MAGTUP	7.20	0.01	-1.48	104.00	0.14	-0.99	0.67	-2.31	0.34	
			-1.48	91.48	0.14	-0.99	0.67	-2.31	0.34	
MRGEPO	0.01	0.92	0.58	104.00	0.57	0.73	1.27	-1.79	3.26	
			0.58	103.99	0.57	0.73	1.27	-1.79	3.26	

Legend: MTAPRU – Hand tapping; MTAPNO – Foot tapping; MTAPNZ – Foot tapping against a wall; MFLISK – Stick rotation; MBFDSD – Sit-and-reach test; MPREDE – Side bend to the right; MFESDM – Standing long jump; MFESUM – Standing vertical jump; MFE20V – 20 m sprint from a standing start; MRCLDM – Sit-ups test; MFRDCU – Squats for 40 seconds; MFRSKL – Push-ups; MAGKUS – Side steps; MAGTUP – Envelope (agility) test; MRGEPO – Backward obstacle course; F – value of Levene's test for assessing equality of variances; Sig. – level of statistical significance; t – value of Student's t-test; df – degrees of freedom; Sig. (2-tailed) – two-tailed p-value of statistical significance; Mean Difference – difference between arithmetic means; Std. Error Difference – standard error of the difference; 95% Confidence Interval of the Difference (Lower–Upper) – confidence interval of the difference between means

Legenda: MTAPRU – Taping rukom; MTAPNO – Taping nogom; MTAPNZ – Taping nogama o zid; MFLISK – Iskret palicom; MBFDSD – Dohvat u sjedu; MPREDE – Pretklon desno; MFESDM – Skok udalj iz mjesta; MFESUM – Skok uvis iz mjesta; MFE20V – Sprint iz visokog starta 20m; MRCLDM – Test ležanje – sijed; MFRDCU – Test čučnjevi za 40 sekundi; MFRSKL – Sklekovi; MAGKUS – Koraci u stranu; MAGTUP – Koverta test; MRGEPO – Poligon natraške; F – vrijednost Leveneov test za procjenu jednakosti varijansi; Sig. – nivo statističke značajnosti; t – vrijednost Studentov t-test; df – stepeni slobode; Sig. (2-tailed) – dvosmjerna p-vrijednost statističke značajnosti; Mean Difference – razlika između aritmetičkih sredina; Std. Error Difference – standardna greška razlike; 95% Confidence Interval of the Difference (Lower–Upper) – interval pouzdanosti razlike između sredina

Table 3 presents the mean values and measures of dispersion of the results in the basic motor domain for participants in the control and experimental groups during the initial measurement. Although differences in results between the groups can be observed, they were only confirmed at the descriptive level. It can be stated that the differences in the mean values of the groups are small, which cannot be said for the differences between standard deviations. The results from Table 4 show that the groups differ in the basic motor domain during the initial measurement only in the variable MTAPNO (assessment of lower limb movement frequency). When comparing the mean values (24.57 / 22.66), an advantage can be observed for the control group participants compared to the experimental group participants. The T-test values are at the significance level (.00 / .00).

Table 5. Descriptive Statistics – Mean and Standard Deviation Values for the INITIAL Measurement of Situational Motor Skills

Variables / Varijable	Group / Grupa	N	Mean	Std. Deviation	Std. Error Mean
OKBLR	1	53.00	23.38	5.20	0.71
	2	53.00	22.19	5.89	0.81
OKVLS	1	53.00	10.32	1.39	0.19
	2	53.00	11.41	2.64	0.36
OKBLK	1	53.00	4.17	2.52	0.35
	2	53.00	3.83	2.42	0.33
OSDCE	1	53.00	6.72	3.07	0.42
	2	53.00	6.83	3.34	0.46
OGCPM	1	53.00	4.34	2.36	0.32
	2	53.00	4.98	2.23	0.31
OLPKS	1	53.00	18.34	4.93	0.68
	2	53.00	20.13	6.65	0.91
ORBLZ	1	53.00	21.42	3.86	0.53
	2	53.00	23.32	4.55	0.63
ORVLS	1	53.00	11.05	1.73	0.24
	2	53.00	11.90	2.33	0.32
ORISE	1	53.00	3.36	1.67	0.23
	2	53.00	3.92	2.06	0.28

Legend: OKBLR – Throwing a ball with both hands against a wall and catching it for 30 seconds; OKVLS – Dribbling a ball by hand through a slalom; OKBLK – Shooting a ball into a basket for 30 seconds; OSDCE – Underhand frontal serve; OGCPM – Target shooting over a net from a basic stance; OLPKS – Forearm passing (bumping) in a circle for 30 seconds; ORBLZ – Throwing a ball against a wall for 30 seconds; ORVLS – Dribbling a ball through a slalom; ORISE – Taking a seven-meter throw; Group – classification of participants according to experimental conditions; N – number of participants; Mean – arithmetic mean; Std. Deviation – standard deviation; Std. Error Mean – standard error of the mean

U tabeli 3 prikazane su prosječne vrijednosti i mjere odstupanja rezultata u bazično motoričkom prostoru ispitanika kontrolne i eksperimentalne grupe u inicijalnom mjerenju. Iako se mogu primjetiti razlike u rezultatima između grupa, tek su potvrđene na deskriptivnom nivou. Može se konstatovati da su razlike za prosječne vrijednosti grupa male, što se ne može konstatovati za razlike između standardnih devijacija. Rezultati iz tabele 4. pokazuju da se grupe u prostoru bazične motorike međusobno razlikuju u inicijalnom mjerenju samo u varijabli MTAPNO (procjena frekvencije pokreta donjih ekstremiteta). Kada se uporede prosječne vrijednosti Mean-a (24.57/22.66) može se konstatovati prednost ispitanika kontrolne u odnosu na ispitanike eksperimentalne grupe. Vrijednosti T- testa su na nivou značajnosti (.00/ .00).

Tabela 5. Deskriptivna statistika- Vrijednosti aritmetičkih sredina i standardnih devijacija pri INICIJALNOM mjeremju situaciono - motoričkih sposobnosti

Legenda: OKBLR – Bacanje lopte objema rukama o zid i hvatanje u trajanju 30 sekundi; OKVLS – Vođenje lopte rukom u slalomu; OKBLK – Bacanje lopte u koš u trajanju 30 sekundi; OSDCE - Servis donji čeon; OGCPM – Gađanje cilja preko mreže iz osnovnog stava; OLPKS – Odbijanje podlakticama u krugu za 30 sekundi; ORBLZ – Bacanje lopte o zid u trajanju 30 sekundi; ORVLS – Vođenje lopte u slalomu; ORISE – Izvođenje sedmerca; Grupa – podjela ispitanika prema eksperimentalnim uslovima; N – broj ispitanika; Mean – aritmetička sredina; Std. Deviation – standardna devijacija; Std. Error Mean – standardna greška aritmetičke sredine

Table 6. T-test Values in the INITIAL Measurement of Situational-Motor Abilities

Tabela 6. Vrijednosti T testa pri INICIJALNOM mjerenju situaciono - motoričkih sposobnosti

VARIABLES	Levene's Test for Equality of Variances				t-test for Equality of Means					
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
OKBLR	1.20	0.28	1.10	104.00	0.27	1.19	1.08	-0.95	3.33	
			1.10	102.45						
OKVLS	16.21	0.00	-2.66	104.00	0.01	-1.09	0.41	-1.90	-0.28	
			-2.66	78.57						
OKBLK	0.00	0.99	0.71	104.00	0.48	0.34	0.48	-0.61	1.29	
			0.71	103.82						
OSDCE	1.25	0.27	-0.18	104.00	0.86	-0.11	0.62	-1.35	1.12	
			-0.18	103.23						
OGCPM	0.61	0.44	-1.44	104.00	0.15	-0.64	0.45	-1.53	0.24	
			-1.44	103.67						
OLPKS	4.79	0.03	-1.58	104.00	0.12	-1.79	1.14	-4.05	0.46	
			-1.58	95.88						
ORBLZ	1.15	0.29	-2.33	104.00	0.02	-1.91	0.82	-3.53	-0.28	
			-2.33	101.25						
ORVLS	3.46	0.07	-2.14	104.00	0.03	-0.85	0.40	-1.64	-0.06	
			-2.14	96.00						
ORISE	1.69	0.20	-1.55	104.00	0.12	-0.57	0.36	-1.29	0.16	
			-1.55	99.53						

Legend: OKBLR – Throwing a ball with both hands against a wall and catching it for 30 seconds; OKVLS – Dribbling a ball by hand through a slalom; OKBLK – Shooting a ball into a basket for 30 seconds; OSDCE – Underhand frontal serve; OGCPM – Target shooting over a net from a basic stance; OLPKS – Forearm passing (bumping) in a circle for 30 seconds; ORBLZ – Throwing a ball against a wall for 30 seconds; ORVLS – Dribbling a ball through a slalom; ORISE – Taking a seven-meter throw; F – value of Levene's test for assessing equality of variances; Sig. – level of statistical significance; t – value of Student's t-test; df – degrees of freedom; Sig. (2-tailed) – two-tailed p-value of statistical significance; Mean Difference – difference between arithmetic means; Std. Error Difference – standard error of the difference; 95% Confidence Interval of the Difference (Lower–Upper) – confidence interval of the difference between means.

Legenda: OKBLR – Bacanje lopte objema rukama o zid i hvatanje u trajanju 30 sekundi; OKVLS – Vođenje lopte rukom u slalomu; OKBLK – Bacanje lopte u koš u trajanju 30 sekundi; OSDCE - Servis donji čeon; OGCPM – Gađanje cilja preko mreže iz osnovnog stava; OLPKS – Odbijanje podlakticama u krugu za 30 sekundi; ORBLZ – Bacanje lopte o zid u trajanju 30 sekundi; ORVLS – Vođenje lopte u slalomu; ORISE – Izvođenje sedmerca; F – vrijednost Leveneov test za procjenu jednakosti varijansi; Sig. – nivo statističke značajnosti; t – vrijednost Studentov t-test; df – stepeni slobode; Sig. (2-tailed) – dvosmjerna p-vrijednost statističke značajnosti; Mean Difference – razlika između aritmetičkih sredina; Std. Error Difference – standardna greška razlike; 95% Confidence Interval of the Difference (Lower–Upper) – interval pouzdanosti razlike između sredina.

In Table 5, the Mean and SD values of the control and experimental groups for the situational motor domain in the initial measurement are presented. It is noted that, at the descriptive level, differences between Group 1 and Group 2 can be observed. This phenomenon should be interpreted with caution, considering that the results may contain certain extreme values, and their significance needs to be verified using a T-test.

Table 6, which contains the results of independent

U tabeli 5. predstavljene su vrijednosti Mean i SD kontrolne i eksperimentalne grupe za situaciono motorički prostor u inicijalnom mjerenju. Konstatacija je da se na deskriptivnom nivou mogu primjetiti razlike između grupe 1 i 2. Pojava se treba oprezno tumačiti obzirom da rezultati mogu sadržati određene ekstremne varijable, te se njihova značajnost treba provjeriti T- testom.

Tabela 6. koja sadrži rezultate T -testova za nezavisne uzorke pokazala je tri statistički značajna rezul-

samples T-tests, showed three statistically significant results. At a significance level of less than 1%, for the variable OKVLS (a basketball variable assessing dribbling technique), and at significance levels of less than 5% for the variables ORBLZ (assessing the technique of catching and passing the ball against the wall in handball) and ORVLS (assessing dribbling technique in handball).

When looking at the mean values from Table 5, the control group has lower results compared to the experimental group for all three variables: OKVLS (10.32 / 11.41), ORBLZ (21.42 / 23.32), and ORVLS (11.05 / 11.90). It can therefore be concluded that, in the initial measurement, the experimental group has statistically significantly better results for all three mentioned variables compared to the control group.

Table 7. Descriptive statistics – Values of arithmetic means and standard deviations in the FINAL measurement of motor abilities

Variables / Varijables	Group / Grupa	N	Mean	Std. Deviation	Std. Error Mean
MTAPRU	2	53.00	29.85	2.82	0.39
	4	53.00	30.21	3.50	0.48
MTAPNO	2	53.00	26.70	2.84	0.39
	4	53.00	26.68	3.22	0.44
MTAPNZ	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
MBFSDSD	2	53.00	23.28	7.75	1.06
	4	53.00	21.30	6.64	0.91
MPREDE	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

Legend: MTAPRU – Hand tapping; MTAPNO – Foot tapping; MTAPNZ – Foot tapping against a wall; MFLISK – Stick rotation; MBFSDSD – Sit-and-reach test; MPREDE – Side bend to the right; MFESDM – Standing long jump; MFESUM – Standing vertical jump; MFE20V – 20 m sprint from a standing start; MRCLDM – Sit-ups test; MFRDCU – Squats for 40 seconds; MFRSKL – Push-ups; MAGKUS – Side steps; MAGTUP – Envelope (agility) test; MRGEPO – Backward obstacle course; Group – classification of participants according to experimental conditions; N – number of participants; Mean – arithmetic mean; Std. Deviation – standard deviation; Std. Error Mean – standard error of the mean.

tata. Na nivou značajnosti manjem od 1% za varijablu OKVLS (košarkašku varijablu koja procjenjuje tehniku vođenja lopte u košarci), te na nivoima manjim od 5% za varijable ORBLZ (procjenjuju tehniku hvatanja i davanja lopte o zid u rukometu) i varijablu ORVLS (procjenjuje tehniku vođenja lopte u rukometu).

Kada se pogledaju prosječne vrijednosti iz tabele 5, kontrolna grupa ima niže rezultate u odnosu na eksperimentalnu grupu za sve tri varijable OKVLS (10,32/11,41), ORBLZ (21,42/23,32) i ORVLS (11,05/11,90) pa se može zaključiti da pri inicijalnom mjerenju eksperimentalna grupa ima statistički značajno bolje rezultate za sve tri navedene varijable u odnosu na kontrolnu grupu.

Tabela 7. Deskriptivna statistika- Vrijednosti aritmetičkih sredina i standardnih devijacija pri FINALNOM mjerenju motoričkih sposobnosti

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
MFRDCU	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
MRGEPO	2	53.00	17.78	5.22	0.72
	4	53.00	18.47	5.44	0.75

Legenda: MTAPRU – Taping rukom; MTAPNO – Taping nogom; MTAPNZ – Taping nogama o zid; MFLISK – Iskret palicom; MBFSDSD – Dohvat u sjedu; MPREDE – Pretklon desno; MFESDM – Skok udalj iz mjesta; MFESUM – Skok uvis iz mjesta; MFE20V – Sprint iz visokog starta 20m; MRCLDM – Test ležanje – sijek; MFRDCU – Test čučnjevi za 40 sekundi; MFRSKL – Sklekovi; MAGKUS – Koraci u stranu; MAGTUP – Koverta test; MRGEPO – Poligon natraške; Grupa – podjela ispitanika prema eksperimentalnim uslovima; N – broj ispitanika; Mean – aritmetička sredina; Std. Deviation – standardna devijacija; Std. Error Mean – standardna greška aritmetičke sredine.

Table 8. *T-test values for the FINAL measurement of motor abilities*

Tabela 8. *Vrijednosti T testa pri FINALNOM mjerenju motoričkih sposobnosti*

VARIABLES	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
MTAPRU	1.22	0.27	-0.58	104.00	0.56	-0.36	0.62	-1.58	0.87
			-0.58	99.57	0.56	-0.36	0.62	-1.58	0.87
MTAPNO	1.27	0.26	0.03	104.00	0.97	0.02	0.59	-1.15	1.19
			0.03	102.39	0.97	0.02	0.59	-1.15	1.19
MTAPNZ	0.52	0.47	-0.48	104.00	0.63	-0.26	0.55	-1.35	0.83
			-0.48	99.90	0.63	-0.26	0.55	-1.36	0.83
MFLISK	1.68	0.20	-0.14	104.00	0.89	-0.43	3.18	-6.74	5.88
			-0.14	101.06	0.89	-0.43	3.18	-6.75	5.88
MBFDSD	0.01	0.92	1.41	104.00	0.16	1.98	1.40	-0.80	4.76
			1.41	101.61	0.16	1.98	1.40	-0.80	4.76
MPREDE	0.00	0.96	0.51	104.00	0.61	1.02	2.01	-2.96	5.00
			0.51	103.71	0.61	1.02	2.01	-2.96	5.00
MFESDM	0.14	0.71	-0.41	104.00	0.68	-1.89	4.61	-11.02	7.25
			-0.41	103.54	0.68	-1.89	4.61	-11.02	7.25
MFESUM	0.20	0.66	-0.18	104.00	0.86	-0.19	1.05	-2.27	1.90
			-0.18	103.99	0.86	-0.19	1.05	-2.27	1.90
MFE20V	2.54	0.11	0.22	104.00	0.83	0.02	0.08	-0.14	0.18
			0.22	97.11	0.83	0.02	0.08	-0.14	0.18
MRCLDM	0.22	0.64	-1.29	104.00	0.20	-1.04	0.80	-2.63	0.56
			-1.29	103.64	0.20	-1.04	0.80	-2.63	0.56
MFRDCU	3.02	0.09	0.34	104.00	0.74	0.40	1.17	-1.93	2.72
			0.34	100.26	0.74	0.40	1.17	-1.93	2.72
MFRSKL	0.30	0.59	-1.74	104.00	0.08	-3.81	2.19	-8.15	0.53
			-1.74	102.17	0.08	-3.81	2.19	-8.15	0.53
MAGKUS	0.86	0.35	0.16	104.00	0.87	0.04	0.25	-0.45	0.53
			0.16	101.61	0.87	0.04	0.25	-0.45	0.53
MAGTUP	5.24	0.02	-0.87	104.00	0.39	-0.49	0.57	-1.62	0.64
			-0.87	96.83	0.39	-0.49	0.57	-1.62	0.64
MRGEPO	0.01	0.92	-0.67	104.00	0.51	-0.69	1.04	-2.75	1.36
			-0.67	103.82	0.51	-0.69	1.04	-2.75	1.36

Legend: MTAPRU – Hand tapping; MTAPNO – Foot tapping; MTAPNZ – Foot tapping against a wall; MFLISK – Stick rotation; MBFDSD – Sit-and-reach test; MPREDE – Side bend to the right; MFESDM – Standing long jump; MFESUM – Standing vertical jump; MFE20V – 20 m sprint from a standing start; MRCLDM – Sit-ups test; MFRDCU – Squats for 40 seconds; MFRSKL – Push-ups; MAGKUS – Side steps; MAGTUP – Envelope (agility) test; MRGEPO – Backward obstacle course; F – value of Levene's test for assessing equality of variances; Sig. – level of statistical significance; t – value of Student's t-test; df – degrees of freedom; Sig. (2-tailed) – two-tailed p-value of statistical significance; Mean Difference – difference between arithmetic means; Std. Error Difference – standard error of the difference; 95% Confidence Interval of the Difference (Lower–Upper) – confidence interval of the difference between means.

Legenda: MTAPRU – Taping rukom; MTAPNO – Taping nogom; MTAPNZ – Taping nogama o zid; MFLISK – Iskret palicom; MBFDSD – Dohvat u sjedu; MPREDE – Pretklon desno; MFESDM – Skok udalj iz mjesta; MFESUM – Skok uvis iz mjesta; MFE20V – Sprint iz visokog starta 20m; MRCLDM – Test ležanje – sijed; MFRDCU – Test čučnjevi za 40 sekundi; MFRSKL – Sklekovi; MAGKUS – Koraci u stranu; MAGTUP – Koverta test; MRGEPO – Polygon natraške; F – vrijednost Leveneov test za procjenu jednakosti varijansi; Sig. – nivo statističke značajnosti; t – vrijednost Studentov t-test; df – stepeni slobode; Sig. (2-tailed) – dvosmjerna p-vrijednost statističke značajnosti; Mean Difference – razlika između aritmetičkih sredina; Std. Error Difference – standardna greška razlike; 95% Confidence Interval of the Difference (Lower–Upper) – interval pouzdanosti razlike između sredina.

Table 7 presents the mean values and measures of deviation for variables in the basic motor skills domain for the control and experimental groups in the final measurement. At the descriptive level, certain differences between the groups can be observed, but they need to be verified using the independent samples T-test. The results of this analysis are presented in Table 8. It can be concluded that none of the T-tests are statistically significant. The final measurement showed no statistically significant differences between the control and experimental groups in the values of variables in the basic motor skills domain.

Table 9. Descriptive statistics – Mean values and standard deviations for the FINAL measurement of situational-motor abilities

Varijables / Varijable	Group / Grupa	N	Mean	Std. Deviation	Std. Error Mean
OKBLR	1	53.00	26.66	4.02	0.55
	2	53.00	24.89	5.59	0.77
OKVLS	1	53.00	9.24	1.00	0.14
	2	53.00	10.21	1.97	0.27
OKBLK	1	53.00	6.58	2.56	0.35
	2	53.00	5.51	2.85	0.39
OSDCE	1	53.00	8.89	2.49	0.34
	2	53.00	9.06	2.94	0.40
OGCPM	1	53.00	6.30	2.05	0.28
	2	53.00	6.68	2.06	0.28
OLPKS	1	53.00	21.83	5.36	0.74
	2	53.00	24.83	7.22	0.99
ORBLZ	1	53.00	23.45	3.94	0.54
	2	53.00	25.81	4.21	0.58
ORVLS	1	53.00	10.15	1.43	0.20
	2	53.00	10.57	1.80	0.25
ORISE	1	53.00	5.09	1.89	0.26
	2	53.00	6.06	2.32	0.32

Legend: OKBLR – Throwing a ball with both hands against a wall and catching it for 30 seconds; OKVLS – Dribbling a ball by hand through a slalom; OKBLK – Shooting a ball into a basket for 30 seconds; OSDCE – Underhand frontal serve; OGCPM – Target shooting over a net from a basic stance; OLPKS – Forearm passing (bumping) in a circle for 30 seconds; ORBLZ – Throwing a ball against a wall for 30 seconds; ORVLS – Dribbling a ball through a slalom; ORISE – Taking a seven-meter throw; Group – classification of participants according to experimental conditions; N – number of participants; Mean – arithmetic mean; Std. Deviation – standard deviation; Std. Error Mean – standard error of the mean

U tabeli 7. dat je prikaz prosječnih vrijednosti i mjera odstupanja za varijable u prostoru bazične motorike kod kontrolne i eksperimentalne grupe u finalnom mjerenju. Na deskriptivnom nivou su prisutne određene razlike između grupa, ali ih je potrebno provjeriti T- testom za nezavisne uzorke. Rezultati te analize su prikazani u tabeli 8. Može se konstatovati da niti jedan od T-testova nije statistički značajan. Finalno mjerenje je pokazalo da nema statistički značajnih razlika između kontrolne i eksperimentalne grupe u vrijednostima varijabli prostora bazičnih motoričkih sposobnosti.

Tabela 9. Deskriptivna statistika- Vrijednosti aritmetičkih sredina i standardnih devijacija pri FINALNOM mjeremju situaciono - motoričkih sposobnosti

Legenda: OKBLR – Bacanje lopte objema rukama o zid i hvatanje u trajanju 30 sekundi; OKVLS – Vođenje lopte rukom u slalomu; OKBLK – Bacanje lopte u koš u trajanju 30 sekundi; OSDCE - Servis donji čeon; OGCPM – Gađanje cilja preko mreže iz osnovnog stava; OLPKS – Odbijanje podlakticama u krugu za 30 sekundi; ORBLZ – Bacanje lopte o zid u trajanju 30 sekundi; ORVLS – Vođenje lopte u slalomu; ORISE – Izvođenje sedmerca; Grupa – podjela ispitanika prema eksperimentalnim uslovima; N – broj ispitanika; Mean – aritmetička sredina; Std. Deviation – standardna devijacija; Std. Error Mean – standardna greška aritmetičke sredine

Table 10. T-test values for the FINAL measurement of situational-motor abilities

Tabela 10. Vrijednosti T testa pri FINALNOM mjerenju situaciono - motoričkih sposobnosti

VARAIABLES	Levene's Test for Equality of Variances				t-test for Equality of Means					
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
OKBLR	5.48	0.02	1.88	104.00	0.06	1.77	0.95	-0.10	3.65	
			1.88	94.42	0.06	1.77	0.95	-0.10	3.65	
OKVLS	16.56	0.00	-3.18	104.00	0.00	-0.97	0.30	-1.57	-0.36	
			-3.18	77.04	0.00	-0.97	0.30	-1.57	-0.36	
OKBLK	1.51	0.22	2.04	104.00	0.04	1.08	0.53	0.03	2.12	
			2.04	102.81	0.04	1.08	0.53	0.03	2.12	
OSDCE	1.00	0.32	-0.32	104.00	0.75	-0.17	0.53	-1.22	0.88	
			-0.32	101.15	0.75	-0.17	0.53	-1.22	0.88	
OGCPM	0.07	0.80	-0.94	104.00	0.35	-0.38	0.40	-1.17	0.42	
			-0.94	104.00	0.35	-0.38	0.40	-1.17	0.42	
OLPKS	5.96	0.02	-2.43	104.00	0.02	-3.00	1.23	-5.45	-0.55	
			-2.43	95.92	0.02	-3.00	1.23	-5.45	-0.55	
ORBLZ	0.15	0.70	-2.98	104.00	0.00	-2.36	0.79	-3.93	-0.79	
			-2.98	103.56	0.00	-2.36	0.79	-3.93	-0.79	
ORVLS	3.93	0.05	-1.33	104.00	0.19	-0.42	0.32	-1.05	0.21	
			-1.33	99.02	0.19	-0.42	0.32	-1.05	0.21	
ORISE	2.19	0.14	-2.34	104.00	0.02	-0.96	0.41	-1.78	-0.15	
			-2.34	99.93	0.02	-0.96	0.41	-1.78	-0.15	

Legend: OKBLR – Throwing a ball with both hands against a wall and catching it for 30 seconds; OKVLS – Dribbling a ball by hand through a slalom; OKBLK – Shooting a ball into a basket for 30 seconds; OSDCE – Underhand frontal serve; OGCPM – Target shooting over a net from a basic stance; OLPKS – Forearm passing (bumping) in a circle for 30 seconds; ORBLZ – Throwing a ball against a wall for 30 seconds; ORVLS – Dribbling a ball through a slalom; ORISE – Taking a seven-meter throw; F – value of Levene's test for assessing equality of variances; Sig. – level of statistical significance; t – value of Student's t-test; df – degrees of freedom; Sig. (2-tailed) – two-tailed p-value of statistical significance; Mean Difference – difference between arithmetic means; Std. Error Difference – standard error of the difference; 95% Confidence Interval of the Difference (Lower–Upper) – confidence interval of the difference between means

Table 9 presents the mean values of the control and experimental groups (mean column) for individual variables in the situational motor skills domain at the final measurement. In this case as well, differences between groups are noticeable at the descriptive level, and their significance was tested using the paired-samples T-test. The T-test results are shown in Table 10. Statistical significance was found for the variable OKVLS (assessing basketball dribbling technique) at the level of $p < 0.01$ in favor of the experimental group (C9.24/E10.21); the variable OKBLK (assessing shooting accuracy in basketball) at a level of $p < 0.05$ in favor of the control group

Legenda: OKBLR – Bacanje lopte objema rukama o zid i hvatanje u trajanju 30 sekundi; OKVLS – Vođenje lopte rukom u slalomu; OKBLK – Bacanje lopte u koš u trajanju 30 sekundi; OSDCE – Servis donji čeon; OGCPM – Gađanje cilja preko mreže iz osnovnog stava; OLPKS – Odbijanje podlakticama u krugu za 30 sekundi; ORBLZ – Bacanje lopte o zid u trajanju 30 sekundi; ORVLS – Vođenje lopte u slalomu; ORISE – Izvođenje sedmerca; F – vrijednost Leveneov test za procjenu jednakosti varijansi; Sig. – nivo statističke značajnosti; t – vrijednost Studentov t-test; df – stepeni slobode; Sig. (2-tailed) – dvosmjerna p-vrijednost statističke značajnosti; Mean Difference – razlika između aritmetičkih sredina; Std. Error Difference – standardna greška razlike; 95% Confidence Interval of the Difference (Lower–Upper) – interval pouzdanosti razlike između sredina

U tabeli 9. je dat prikaz prosječnih vrijednosti kontrolne i eksperimentalne grupe (mean kolona) na pojedinim varijablama u prostoru situacione motorike u finalnom mjerenju. I u ovom slučaju razlike između grupa su primjetne na deskriptivnom nivou a njihova značajnost je testirana uz pomoć T-testa za zavisne uzorke. Rezultati T- testa su prikazani u tabeli 10. Statistička značajnost se pojavila za varijable OKVLS (procjenjuje tehniku vođenja lopte u košarci) na nivou $p < 0,01$, u korist eksperimentalne grupe (K9.24/E10.21), varijablu OKBLK (procjenjuje preciznost bacanja lopte u koš) na nivou manjem $p < 0,05$ u korist kontrolne grupe (K6.58/5.51), varijablu OLPKS (procjenjuje tehniku odbijanja lopte čekićem) na nivou manjem od 5% ili $p < 0,05$ u korist

(C6.58/5.51); the variable OLPKS (assessing hammer pass technique) at a level of $p < 0.05$ in favor of the experimental group (C21.83/E24.83); the variable ORBLZ (assessing passing and catching technique in handball) at a level of $p < 0.01$ in favor of the experimental group (C23.45/E25.81); and the variable ORISE (assessing shooting accuracy in handball) at a level of $p < 0.05$ in favor of the experimental group (C5.09/E6.06). On average, at the final measurement, the experimental group achieved higher values on variables assessing basketball dribbling technique.

DISCUSSION

The research results indicate a complex relationship between regular physical education classes and a specially programmed curriculum within the Physical and Health Education (PHE) subject for sixth-grade students, regarding the transformation of basic motor and situational motor skills. Regarding the effect of regular and specially programmed PHE classes on the transformation of basic motor skills in sixth-grade students, it was hypothesized that the experimental program would have better effects (de Privitellio et al., 2007; Reif et al., 2021). This assumption was based on the intensity of work and frequency of content repetition, even though the program duration of four months was the same for both groups. It was assumed that a wide range of transformational impacts and concentrated work with three sports games (basketball, volleyball, handball) would produce better effects on students' motor skills (Ericsson & Karlsson, 2012). It was particularly expected that transformations would occur in the situational motor domain, since the regular curriculum had a lower frequency of content repetition in these three games.

To avoid confounding factors in the results between groups, lessons were conducted by two PHE teachers with 15 and 18 years of experience. Before implementing the program, the lesson delivery, as well as teaching units, topics, and modules, were standardized. The regular curriculum included initial student testing (first 6 lessons), followed by general physical preparation lessons (4 lessons). In the next 20 lessons, four teaching themes were covered, each with four lessons (athletics 4 lessons, gymnastics 4 lessons, martial arts 4 lessons, team sports—soccer 4 lessons, and local dances 4 lessons). The final testing lasted 5 lessons, so the total program included 35 lessons.

The special program included initial testing (first 6 lessons), followed by general physical preparation (4 lessons). In the next 20 lessons, three sports games were

eksperimentalne grupe (K21.83/E24,83), varijablu ORBLZ (procjenjuje tehniku hvatanja i dodavanja lopte u rukometu) na nivou manjem od 1% ili $p < 0,01$ u korist eksperimentalne grupe (K23.45/E25,81) i varijablu ORISE (procjenjuje preciznost šutiranja na gol u rukometu) na nivou manjem od 5% u korist eksperimentalne grupe (K5.09/E6,06). U prosjeku, u finalnom mjerenju, eksperimentalna grupa ima više varijabli sa većim vrijednostima rezultata na varijablama koje procjenjuju tehniku vođenja lopte u košarci.

DISKUSIJA

Rezultati istraživanja pokazuju složen odnos između redovne nastave i posebno programirane nastave u okviru predmeta Tjelesni i zdravstveni odgoj (TZO) kod učenika VI razreda, u pogledu transformacije bazično-motoričkih i situaciono-motoričkih sposobnosti. Po pitanju efekta redovne nastave i posebno programirane nastave tjelesnog i zdravstvenog odgoja na transformaciju bazično-motoričkih sposobnosti učenika VI razreda osnovne škole, pretpostavilo se da će eksperimentalni program imati bolje efekte (de Privitellio i saradnici, 2007; Reif i saradnici, 2021.). Pretpostavka je zasnovana na intenzitetu rada i frekvenciji ponavljanja sadržaja iako je dužina trajanja programa od četiri mjeseca bila jednaka. Pretpostavilo se da će širok spektar transformacijskih uticaja te koncentrisani rad sa tri sportske igre (košarka, odbojka, rukomet) ostvariti bolje efekte na motorički prostor učenika (Ericsson & Karlsson, 2012.). Posebno se smatralo da će transformacije biti ostvarene u situaciono-motoričkom prostoru, obzirom da je redovni nastavni program imao manju frekvenciju ponavljanja sadržaja iz tri navedene igre. Kako bi se izbjegli ometajući faktori u rezultatima između grupa, vođenje časova je usaglašeno tako što su nastavu realizovala dva profesora sporta i tjelesnog odgoja sa 15 i 18 godina radnog iskustva. Prije provođenja programa, način realizacije časova je usaglašen, kao i nastavne cjeline, teme i jedinice. Redovni nastavni program sadržao je inicijalno tesiranje učenika (prvih 6 časova), zatim su realizovani časovi opšte fizičke pripreme učenika (4 časa). U sljedećih 20 časova realizovane su četiri nastavne teme sa po četiri časa (atletika 4 časa, gimnastika 4 časa, borilački sportovi 4 časa, timski sportovi-nogomet 4 časa i zavičajni plesovi 4 časa). Na kraju redovnog programa organizovano je finalno testiranje koje je trajalo 5 školskih časova, gdje je ukupni program imao 35 provedenih časova. Posebni program sadržao je inicijalno tesiranje učenika (prvih 6 časova), zatim su realizovani časovi opšte fizičke pripreme učenika (4 časa). U sljedećih 20 časova realizovane su tri sportske igre (košarka 7 časova, rukomet 7 časova, odbojka 6 časova). Na kraju klasičnog programa organizovano je finalno testiranje koje je trajalo 5 školskih časova,

implemented (basketball 7 lessons, handball 7 lessons, volleyball 6 lessons). Final testing also lasted 5 lessons, so the special program also totaled 35 lessons.

Statistical analysis showed that the initial status of motor skills between control and experimental groups was equal, i.e., the independent-samples T-test at the initial measurement indicated that groups differed only in one variable in this domain—movement frequency assessment. The difference in this variable (MTAPNO) was statistically significant in favor of the control group. No statistical significance was found for the remaining fourteen variables.

After the school semester (September–December) and 35 conducted 45-minute lessons, a final assessment was performed. The independent-samples T-test at the final measurement showed no statistically significant differences between the control and experimental groups, as the T-test did not reach significance. The difference present at the initial measurement did not persist, suggesting that the additional program in the experimental group caused changes that eliminated the control group's initial advantage.

Regarding the initial status of situational motor skills, students in both groups were initially tested to determine if the starting point was equal. The independent-samples T-test at the initial measurement showed group differences at $p < 0.01$ for the variable assessing basketball dribbling technique (OKVLS) and at $p < 0.05$ for variables assessing handball passing/catching technique (ORBLZ) and handball dribbling technique (ORVLS). All three statistically significant higher values were in favor of the experimental group. For the remaining six variables (out of nine), no statistically significant differences were found.

At the final measurement, the T-test revealed some changes in variable relationships. Differences in favor of the experimental group persisted for variables where an initial advantage was noted, with the addition of the handball penalty shot variable (ORISE). A newly identified variable showing non-specific behavior at the final measurement was basketball shooting (OKBLK), which favored the control group—a less expected outcome. Out of nine variables in this domain, four did not show statistical differences.

CONCLUSION

Basic motor skills (strength, speed, flexibility, coordination) have a strong developmental component in school-aged children, and improvements can occur even without specific interventions. It is possible that the pro-

tako da je i posebni program trajao 35 časova. Statističkim analizama je utvrđeno da je inicijalno stanje motoričkih sposobnosti između učenika kontrolne i eksperimentalne grupe bilo jednako, odnosno T-test za nezavisne uzorke kontrolne i eksperimentalne grupe pri inicijalnom mjerenju pokazao je da se grupe međusobno razlikuju u samo u jednoj varijabli u tom prostoru- varijabli za procjenu frekvencije pokreta. Razlika u varijabli za procjenu frekvencije pokreta (MTA-PNO) bila je statistički značajna u korist kontrolne grupe. Statistička značajnost u razlici nije utvrđena za četrnaest preostalih varijabli.

Nakon školskog polugodištea (septembar – decembar) i provedenih 35 školskih časova u trajanju po 45 minuta izvršena je finalna provjera rezultata. T- test za nezavisne uzorke je pri finalnom mjerenju pokazao da između rezultata kontrolne i eksperimentalne grupe nema statistički značajnih razlika, obzirom da provedeni T-test za nezavisne uzorke nije imao statističku značajnost. Razlika koja je bila prisutna pri inicijalnom mjerenju se nije ponovila pa se može zaključiti da je dodatni program eksperimentalne grupe uzrokovao promjene zbog kojih se izgubila prednost kontrolne grupe. Po pitanju upoređivanja inicijalnog statusa situaciono- motoričkih sposobnosti učenika kao i u prethodnom slučaju učenici kontrolne i eksperimentalne grupe inicijalno su testirani kako bi se utvrdilo da li je početno stanje situaciono- motoričkih sposobnosti jednako. T- test za nezavisne uzorke, pri inicijalnom mjerenju pokazao je da se grupe međusobno razlikuju na nivoima manjim od 1% za varijablu koja procjenjuje tehniku vođenja lopte u košarci (OKVLS), te na nivoima manjim od 5% za varijable koje procjenjuju tehniku hvatanja i dodavanja lopte u rukometu (ORBLZ) i tehniku vođenja lopte u rukometu (ORVLS). Sve tri statistički značajno veće vrijednosti su na strani eksperimentalne grupe. U inicijalnom mjerenju rezultata za preostalih šest varijabli (od ukupno devet), nema statistički značajnih razlika. Pri finalnoj primjeni T- testa utvrđene su određene promjene u odnosima varijabli. Razlike u korist eksperimentalne grupe su se održale na varijablama kod kojih je prednost utvrđena pri inicijalnom mjerenju, uz dodatnu varijablu izvođenje sedmerca u rukometnoj igri (ORISE). Novootkrivena varijabla, sa nespecifičnim ponašanjem u finalnom mjerenju, je bacanje lopte u koš (OKBLK) obzirom da pripada kontrolnoj grupi, što je manje očekivana pojava u istraživanju. Od ukupno devet varijabli ovog prostora, kod četiri nije evidentirana statistička razlika (od ukupno devet).

ZAKLJUČAK

Bazično-motoričke sposobnosti (snaga, brzina, fleksibilnost, koordinacija) imaju snažnu razvojnu komponentu kod djece školskog uzrasta, te se poboljšanja mogu događati

gram applied in the experimental group was not intensive or specific enough to elicit significant changes in this dimension, or that the difference between groups was too small to be statistically significant. Furthermore, the fact that the control group participated in regular PHE classes implies that they were not “passive,” meaning basic motor stimulation was present in the control group as well. Different physical activity programs significantly affect motor skills in children and adolescents, but efficiency varies depending on activity type, frequency, and program duration (Füzéki & Woll, 2024). Authors recommend introducing additional programs for coordination, balance, and agility development and highlight the importance of continuous monitoring of students’ motor progress (Safrit & Ross, 2024; Behm & Wilhelm, 2022). In this study, it can be concluded that the additional program for the experimental group did not cause changes that would allow asserting its higher efficiency with certainty.

Recommendations

Research of the same or similar type could be organized with other elementary school age groups to examine the transformational effect of additional sports games programs.

It is possible to conduct a study with a greater number of PHE lessons between groups to verify whether two lessons per week, lasting 45 minutes each, are sufficient to achieve transformational effects in motor or situational motor domains in elementary school children.

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i bez specifičnih intervencija. Moguće je da program koji je primijenjen u eksperimentalnoj grupi nije imao dovoljno intenziteta ili specifikacije za izazivanje značajnijih promjena u ovoj dimenziji, ili da je razlika između eksperimentalne i kontrolne grupe bila previše mala da bi bila statistički značajna. Takođe, činjenica da kontrolna grupa učestvuje u redovnoj nastavi tjelesnog i zdravstvenog odgoja implicira da nije bila „pasivna“, što znači da je osnovna motorička stimulacija bila prisutna i kod kontrolne grupe. Različiti programi fizičke aktivnosti pokazuju značajan utjecaj na motoričke sposobnosti djece i adolescenata, ali efikasnost varira zavisno od tipa aktivnosti, učestalosti i trajanja programa (Füzéki & Woll, 2024.), gdje autori preporučuju uvođenje dodatnih programa za razvoj koordinacije, ravnoteže i agilnosti, te ističu važnost kontinuiranog praćenja motoričkog napretka učenika (Safrit & Ross, 2024; Behm & Wilhelm, 2022.). U okviru ovog istraživanja se može zaključiti da dodatni program eksperimentalne grupe nije uzrokovao promjene na osnovu kojih bi se sa sigurnošću mogla konstatovati njegova veća efikasnost.

Preporuke

Istraživanje istog ili sličnog oblika moglo bi se organizovati i provesti na drugim osnovnoškolskim uzrasnim kategorijama, gdje bi se provjerio transformacijski efekat dodatnog programa sportskih igara. Moguće je organizovati istraživački proces sa većim brojem časova tjelesnog i zdravstvenog odgoja između grupa, a sve kako bi se provjerilo da li su dva časa sedmično, u trajanju po 45 minuta dovoljna za efekte transformacije motoričkog ili situaciono motoričkog prostora kod osnovnoškolaca.

Primljen: 25. februar 2026. / Received: February 25, 2025
Prihvaćen: 04. maj 2026. / Accepted: May 04, 2026

