

**THE EFFECTS OF A SPECIALLY PROGRAMMED PHYSICAL AND HEALTH EDUCATION CURRICULUM ON THE CORRELATION BETWEEN BASIC MOTOR AND SITUATIONAL MOTOR VARIABLES IN SIXTH-GRADE ELEMENTARY SCHOOL STUDENTS**<sup>1,\*</sup> **Almir Kalabušić** and <sup>2</sup> **Amela Bajrektarević**<sup>1</sup>Primary School "Fatima Gunić," Sarajevo, Bosnia and Herzegovina<sup>2</sup>Fitness Center "Pro-Fit Health," Center for Health, Sports Performance and Rehabilitation, Sarajevo, Bosnia and Herzegovina**Received 12<sup>th</sup> August 2025; Accepted 14<sup>th</sup> September 2025; Published online 23<sup>rd</sup> October 2025**

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**Abstract**

The aim of this research was to examine whether there is a greater influence of a specially designed teaching program compared to the standard teaching approach. Fifteen motor and six situational-motor variables were observed. The sample consisted of 106 students divided into a control group (53 students) and an experimental group (53 students). The students were both male and female, aged  $12 \pm 6$  months. The control group implemented teaching content in accordance with the regular curriculum and work plan, while the experimental group was subjected to an intensive sports games program basketball, volleyball, and handball. The duration of the program was one school semester. Descriptive statistical analysis showed a normal distribution of data for both motor and situational-motor variables. The applied correlation matrix indicated that, in both motor and situational-motor domains, the variables were significantly correlated at both the initial and final testing stages. The specially designed teaching program did not increase the correlation between variables within the same domains.

**Keywords:** Physical and health education, Descriptive statistics, Correlation, Eurofit, Situational motor skills.

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**INTRODUCTION**

Raising the anthropological system to a higher level requires a greater degree of management in the transformation process, directing the system toward the desired goal. This is possible only if we understand the elements of the system itself and the relationships among them (Findak, 2001; Neljak, 2009). The teaching process in physical education is conceptualized as a specific transformational process, in which various means lead to the transformation of the student (Faletar & Bonacin, 2007). These means include techniques from sports games, elements of gymnastics and athletics, as well as shaping exercises and natural movement forms. All are aimed at elevating the individual's overall ability level, which is reflected in improved health status and an increased level of motor, functional, and other systems that constitute the human (student's) system (Granić & Krstić, 2006). Thanks to the positive health effects of physical exercise, physical and health education is an integral part of the educational system. In schools, it is represented by two classes per week, totaling approximately 70 hours during the school year. It should be noted that this number of hours is considered insufficient to achieve an optimal effect in transforming the anthropological status of children. Numerous studies have shown that the effective exercise time in a 45-minute class is extremely low about nine minutes which raises questions about the possibility of actual transformational processes occurring (Užičanin et al., 2023). It should also be emphasized that transformation in physical and health education is a broader concept since, besides motor abilities, it is possible to transform motor knowledge and motor achievements. In the educational systems of Bosnia and Herzegovina, the curriculum includes basic sports (gymnastics and athletics) as well as sports games,

which are generally more popular among students (Malacko & Pejić, 2009). At times, the lack of material resources, training space, and spatial conditions represents a limiting factor in the implementation of all content foreseen by the curriculum (Mladenović, 2008). This study aims to determine the effects of a sports games program on basic-motor and situational-motor abilities, as well as the relationship between the applied anthropological characteristics and their influence on performance success in sports games (Kosinac, 2011). These abilities are prerequisites for the efficient execution or learning of technical-tactical elements in younger children who are transitioning to higher levels of knowledge and learning ability, specifically among sixth-grade students (Holfelder & Schott, 2014). The research was organized so that the control group implemented teaching content according to the regular curriculum and work plan, while the experimental group was subjected to an intensive program of sports games basketball, volleyball, and handball (Milenković & Aleksić, 2005; Nikolić, Bokor & Brerslauer, 2008). The duration of the program was one school semester (four months). The goal of this research was to answer the question of whether a specially designed curriculum, predominantly based on sports games, has a greater impact than the standard teaching approach with conventional curriculum content.

**METHODS****Participants**

The study included 106 primary school students. The students were divided into a control group (53 boys and girls) and an experimental group (53 boys and girls). The groups were intentionally composed of both genders to provide more realistic data, considering that school classes are of mixed composition. The students were 12 years old  $\pm 6$  months.

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Appropriate consents were obtained for all measurements and testing.

### Instruments

The selection of variables for this study was based on their measurement characteristics validity, reliability, sensitivity, economy, adaptability, and suitability for the age of the participants (Mikić, 1999). A system of 15 motor tests and 9 tests for assessing situational motor skills in sports games was applied to the sample.

Tests for the assessment of motor abilities:  
For the assessment of movement frequency:

1. Hand tapping (MTAPRU)
2. Foot tapping (MTAPNO)
3. Foot tapping against the wall (MTAPNZ)

For the assessment of flexibility:

1. Stick twist (MFLISK)
2. Sit and reach (MBFDSD)
3. Forward bend to the right (MPREDE)

For the assessment of explosive strength:

1. Standing long jump (MFESDM)
2. Vertical jump from standing position (MFESUM)
3. 20-meter sprint from a high start (MFE2OV)

For the assessment of repetitive strength:

1. Sit-ups (MRCLDM)
2. Squats in 40 seconds (MFRDCU)
3. Push-ups (MFRSKL)

For the assessment of coordination:

1. Side steps (MAGKUS)
2. Envelope test (MAGTUP)
3. Backward polygon test (MRGEPO)

Tests for the assessment of situational motor performance in sports games:

#### Basketball

1. Throwing the ball with both hands against the wall and catching for 30 seconds (OKBLR)
2. Dribbling in slalom (OKVLS)
3. Throwing the ball into the basket for 30 seconds (OKBLK)

#### Volleyball

1. Underhand serve (OSDCE)
2. Aiming at a target over the net from the basic position (OGCPM)
3. Forearm passing in a circle for 30 seconds (OLPKS)

#### Handball

1. Throwing the ball against the wall for 30 seconds (ORBLZ)
2. Dribbling in slalom (ORVLS)
3. Performing seven-meter throws (ORISE)

### Description of measurement

The students performed all tests dressed in physical education attire. All tests were conducted in a large, well-ventilated

gymnasium. The instruments used to record the results were of standard design, and their accuracy was checked before the start of testing. Each test had specific instructions that were carefully studied and read to each participant to ensure maximum objectivity (Hadžikadunić, Rađo, Grozdanić, & Turković, 2000). For the tests involving running and jumping, a non-slip surface was provided. All measurements were conducted by the same measurer. Testing was carried out at the beginning (initial measurement) and at the end of the four-month program (final measurement).

### Statistical analysis

The data analysis technique used in this research included descriptive statistical analysis and intercorrelation analysis. Descriptive statistical measures included the mean (M), which reflects average results, and the standard deviation (SD), which indicates the degree of deviation from normality and highlights the level of variability among participants. Intercorrelation results were applied to determine the correlation between specific variables included in the study. The variables were observed in both the initial and final measurements. This statistical method is used to measure the strength and direction of the linear relationship between two continuous variables, with the correlation coefficient ranging from -1 to +1. A value of +1 indicates a perfect positive correlation, -1 indicates a perfect negative correlation, while a value close to 0 suggests a weak or nonexistent relationship between the variables.

### RESULTS

The columns contain values referring to the minimum result, maximum result, arithmetic mean, standard deviation, and the indices of skewness and kurtosis. The results are presented separately for the control and experimental groups in both the initial and final testing situations. The skewness and kurtosis indices are important for testing the normality of the distribution of results across the observed variables, since it is essential for parametric statistical methods that the data be normally distributed. These indices are considered acceptable if their values fall within the range of -1 to 1.

If the skewness index (referred to as SI hereafter) is less than -1, this indicates a negatively skewed distribution. If it exceeds 1, it indicates a positively skewed distribution. For the kurtosis index (referred to as KI hereafter), values below -1 indicate a flat or platykurtic distribution, while values above 1 indicate a peaked or leptokurtic distribution. If these values are only slightly below -1 or above 1, the distribution can still be considered approximately normal. Each table should be compared based on the mean values of the variables (Mean column) to observe the differences between the final and initial testing in both the control and experimental groups, as well as to identify any changes. In Table 1, according to the values of the skewness index (IZ) and the kurtosis index (IS), some variables show deviations. With acceptable values of the skewness index (IZ) and kurtosis index (IS) greater than 1, symmetrical but slightly elongated distributions of the control group's results are observed in the variable assessing movement frequency (MTAPNO) in both the initial and final measurements. In the experimental group, the variable assessing explosive strength (MFESUM) shows the same behavior in the initial measurement, while in the final measurement the explosive strength variable (MFESUM) is normally distributed.

**Table 1. Central and dispersion parameters of the applied variables for the experimental and control groups in the domain of basic motor skills**

Varijable	Grupa	Min.		Max.		Mean		SD		IZ		IS	
		IT	FT	IT	FT	IT	FT	IT	FT	IT	FT	IT	FT
MTAPRU	K	21,00	24,00	34,00	36,00	27,30	29,85	2,74	2,82	0,32	0,34	-0,04	-0,51
	E	20,00	21,00	37,00	37,00	28,09	30,21	4,01	3,50	0,14	-0,21	-0,27	0,17
MTAPNO	K	15,00	20,00	30,00	36,00	24,57	26,70	2,79	2,84	-0,78	0,49	1,71	1,49
	E	15,00	16,00	29,00	33,00	22,66	26,68	2,71	3,22	-0,28	-0,38	0,57	1,00
MTAPNZ	K	12,00	16,00	22,00	26,00	18,74	21,26	2,25	2,53	-0,88	-0,35	0,96	-0,28
	E	13,00	14,00	30,00	32,00	19,36	21,53	3,26	3,10	0,57	0,83	1,22	2,31
MFLISK	K	29,00	29,00	106,00	101,00	71,89	62,96	15,91	14,92	0,08	0,42	0,23	0,33
	E	27,00	15,00	109,00	98,00	74,57	63,40	18,63	17,72	-0,27	-0,32	-0,37	-0,06
MBFSD	K	3,00	6,00	50,00	52,00	21,30	23,28	7,83	7,75	0,63	0,66	2,84	2,87
	E	2,00	6,00	32,00	33,00	19,38	21,30	7,06	6,64	-0,51	-0,64	-0,44	-0,32
MPREDE	K	14,00	22,00	67,00	73,00	42,17	46,98	11,35	10,61	-0,14	0,08	0,02	0,22
	E	19,00	24,00	60,00	64,00	42,36	45,96	9,91	10,06	-0,36	-0,29	-0,19	-0,52
MFESDM	K	100,00	105,00	195,00	210,00	147,17	157,26	24,91	24,49	-0,01	-0,13	-0,98	-0,37
	E	90,00	110,00	195,00	195,00	148,68	159,15	25,06	22,91	-0,23	-0,37	-0,56	-0,59
MFESUM	K	15,00	17,00	39,00	44,00	26,72	29,53	5,22	5,44	-0,03	0,34	0,15	0,60
	E	14,00	18,00	42,00	43,00	26,49	29,72	5,57	5,38	0,48	0,48	1,45	0,79
MFE20V	K	3,57	3,53	5,38	5,09	4,31	4,10	0,41	0,36	0,36	0,53	-0,54	-0,28
	E	3,62	3,44	5,88	5,38	4,41	4,08	0,55	0,47	0,92	0,94	0,15	0,32
MRCLDM	K	10,00	15,00	27,00	31,00	20,60	23,45	4,03	4,01	-0,36	0,01	-0,27	-0,67
	E	10,00	15,00	32,00	33,00	21,42	24,49	4,77	4,25	0,00	0,20	0,34	-0,51
MFRDCU	K	20,00	23,00	45,00	47,00	31,25	35,43	5,57	5,42	0,05	-0,53	-0,36	-0,04
	E	10,00	21,00	46,00	49,00	29,72	35,04	7,60	6,59	-0,48	-0,29	0,30	-0,51
MFRSKL	K	1,00	1,00	36,00	41,00	8,21	12,00	8,78	10,48	1,39	0,99	1,30	0,20
	E	1,00	1,00	40,00	53,00	11,04	15,81	9,86	11,99	1,04	0,88	0,74	0,89
MAGKUS	K	10,50	9,68	14,87	14,56	12,87	12,01	1,17	1,18	-0,15	0,12	-0,91	-0,79
	E	9,28	9,15	16,19	15,00	13,04	11,97	1,61	1,38	-0,32	0,00	-0,63	-0,56
MAGTUP	K	27,06	25,56	39,24	36,34	31,18	29,44	2,73	2,50	0,70	1,02	0,28	0,71
	E	25,07	24,03	45,06	39,06	32,17	29,93	4,02	3,30	0,62	0,53	0,65	-0,03
MRGEPO	K	12,69	9,63	40,69	35,38	22,82	17,78	6,52	5,22	0,98	1,24	0,85	1,97
	E	12,75	10,97	46,93	35,06	22,08	18,47	6,57	5,44	1,31	1,12	3,21	1,30

Min.–minimum value, Max.–maximum value, Mean–arithmetic mean, SD–standard deviation, IZ–skewness index, IS–kurtosis index, IT–initial testing, FT–final testing

**Table 2. Central tendency and dispersion parameters of the applied variables in the experimental and control groups in the domain of situational motor skills**

Varijable	Grupa	Min.		Max.		Mean		SD		IZ		IS	
		IT	FT	IT	FT	IT	FT	IT	FT	IT	FT	IT	FT
OKBLR	K	5,00	17,00	33,00	36,00	23,38	26,66	5,20	4,02	-1,05	-0,19	2,22	-0,05
	E	8,00	11,00	30,00	32,00	22,19	24,89	5,89	5,59	-0,83	-0,96	0,08	0,29
OKVLS	K	7,81	7,62	13,19	11,25	10,32	9,24	1,39	1,00	0,22	0,14	-0,61	-1,06
	E	7,72	7,09	18,94	16,16	11,41	10,21	2,64	1,97	0,91	0,80	0,30	0,49
OKBLK	K	1,00	2,00	13,00	13,00	4,17	6,58	2,52	2,56	1,18	0,62	1,89	0,08
	E	1,00	1,00	12,00	14,00	3,83	5,51	2,42	2,85	1,13	0,75	1,37	0,19
OSDCE	K	1,00	2,00	12,00	12,00	6,72	8,89	3,07	2,49	-0,12	-0,74	-0,97	0,11
	E	1,00	2,00	12,00	12,00	6,83	9,06	3,34	2,94	-0,11	-0,94	-1,28	-0,15
OGCPM	K	1,00	2,00	8,00	9,00	4,34	6,30	2,36	2,05	0,11	-0,36	-1,23	-0,72
	E	1,00	2,00	9,00	9,00	4,98	6,68	2,23	2,06	-0,31	-1,06	-0,85	0,16
OLPKS	K	7,00	8,00	32,00	33,00	18,34	21,83	4,93	5,36	-0,21	-0,01	0,71	0,42
	E	6,00	10,00	34,00	43,00	20,13	24,83	6,65	7,22	-0,18	-0,12	-0,40	-0,22
ORBLZ	K	12,00	14,00	30,00	32,00	21,42	23,45	3,86	3,94	-0,16	-0,06	-0,11	0,06
	E	13,00	15,00	32,00	38,00	23,32	25,81	4,55	4,21	-0,26	0,14	-0,59	0,73
ORVLS	K	8,25	7,90	16,69	14,59	11,05	10,15	1,73	1,43	0,93	0,82	1,22	1,07
	E	7,97	7,75	20,15	15,03	11,90	10,57	2,33	1,80	1,13	0,50	1,90	-0,56
ORISE	K	1,00	2,00	7,00	9,00	3,36	5,09	1,67	1,89	0,10	0,21	-0,98	-0,68
	E	1,00	1,00	8,00	10,00	3,92	6,06	2,06	2,32	0,25	-0,27	-0,82	-0,68

Min.–minimum value, Max.–maximum value, Mean–arithmetic mean, SD–standard deviation, IZ–skewness index, IS–kurtosis index, IT–initial testing, FT–final testing

In the initial measurement, it was found that the skewness (IZ) and kurtosis (IS) indices in the control group are greater than 1 for the variable assessing repetitive strength (MFRSKL), indicating a slightly positively skewed distribution, whereas in the experimental group the kurtosis index (IS) is acceptable. The skewness index (IZ) in the experimental group for the repetitive strength variable (MFRSKL) indicates a mild positive skewness. The distribution of results in the coordination assessment space (MRGEPO) shows positive skewness and elongation (IZ and IS greater than 1) in the final measurement for the control group. In the experimental group, this phenomenon is observed in the initial measurement. According to the values of the skewness index (IZ) and the

kurtosis index (IS), it can be observed that there are slight deviations from normality in certain variables used to assess situational motor skills. A slight negative skewness and elongation of the distribution of results can be noticed in the control group for the variable assessing the technique of catching and passing, as well as in the variable assessing the technique of performing the underhand serve in volleyball (OSDCE). In both the control and experimental groups, this variable is slightly symmetrically elongated. The results related to the variable assessing dribbling technique in handball (ORVLS) are slightly elongated in the control group, while in the experimental group they are additionally positively skewed.

**Table 3. Intercorrelation matrix of variables in the initial and final measurement of basic motor skills in the control group**

	MTAPRU	MTAPNO	MTAPNZ	MFLISK	MBFDSD	MPREDE	MFESDM	MFESUM	MFE20V	MRCLDM	MFRDCU	MFRSKL	MAGKUS	MAGTUP
MTAPRU	1.00													
F	1.00													
MTAPNO	0.40	1.00												
F	0.53	1.00												
MTAPNZ	0.19	0.42	1.00											
F	0.20	0.24	1.00											
MFLISK	-0.21	-0.42	-0.19	1.00										
F	-0.26	-0.33	0.05	1.00										
MBFDSD	0.33	0.29	0.12	-0.26	1.00									
F	0.31	0.29	-0.17	-0.27	1.00									
MPREDE	0.37	0.35	0.19	-0.19	0.70	1.00								
F	0.40	0.40	-0.10	-0.29	0.75	1.00								
MFESDM	0.15	0.30	0.50	-0.17	0.09	-0.03	1.00							
F	0.19	0.27	0.29	-0.22	0.07	0.06	1.00							
MFESUM	0.04	0.40	0.28	-0.37	0.00	-0.07	0.62	1.00						
F	0.04	0.37	0.24	-0.27	0.06	0.01	0.66	1.00						
MFE20V	0.05	-0.04	-0.40	0.17	-0.07	0.06	-0.75	-0.43	1.00					
F	-0.07	-0.22	-0.32	0.20	0.00	0.03	-0.84	-0.60	1.00					
MRCLDM	0.20	0.15	0.27	-0.17	0.17	0.04	0.63	0.28	-0.48	1.00				
F	0.10	0.07	0.08	-0.18	-0.06	0.11	0.62	0.28	-0.51	1.00				
MFRDCU	0.19	0.10	0.32	-0.28	0.12	0.07	0.60	0.39	-0.49	0.43	1.00			
F	0.25	0.25	0.25	-0.14	0.06	0.16	0.70	0.47	-0.64	0.52	1.00			
MFRSKL	0.17	-0.11	0.18	-0.20	0.13	-0.03	0.54	0.34	-0.47	0.39	0.56	1.00		
F	0.12	0.09	0.11	0.01	0.11	0.06	0.51	0.42	-0.44	0.37	0.50	1.00		
MAGKUS	-0.18	-0.16	-0.40	0.10	-0.18	-0.14	-0.66	-0.22	0.66	-0.58	-0.50	-0.40	1.00	
F	-0.21	-0.24	-0.23	0.19	-0.08	-0.11	-0.71	-0.37	0.74	-0.44	-0.59	-0.39	1.00	
MAGTUP	0.06	-0.18	-0.37	0.10	-0.03	0.05	-0.67	-0.36	0.73	-0.54	-0.40	-0.35	0.73	1.00
F	-0.10	-0.14	-0.31	0.17	-0.04	-0.01	-0.72	-0.43	0.79	-0.57	-0.52	-0.40	0.78	1.00
MRGEPOL	-0.24	-0.29	-0.37	0.15	-0.18	-0.14	-0.58	-0.29	0.54	-0.37	-0.44	-0.25	0.45	0.40
F	-0.21	-0.33	-0.13	0.32	-0.21	-0.20	-0.64	-0.47	0.69	-0.42	-0.56	-0.40	0.59	0.58

However, these deviations from normality are marginal, and all variables can be analyzed using parametric methods. The results for the variable assessing the accuracy of throwing the ball into the basket (OKBLK) are slightly elongated and positively skewed in the initial measurement in both the control and experimental groups. In the initial testing, it was determined that the distribution of results in the variable assessing the technique of performing the underhand serve in volleyball (OSDCE) is slightly elongated but symmetrical in both the control and experimental groups. The results related to the variable assessing dribbling technique in handball (ORVLS) are slightly elongated in the control group and additionally positively skewed in the experimental group. The highest correlation values with other variables in the basic motor skills domain in the final measurement for the control group are observed in the variables assessing leg coordination (MAGKUS) and body movement speed in space (MAGTUP), with a correlation coefficient of 0.78.

Such a correlation between these two manifest variables is expected, considering that the speed and coordination of leg movements directly affect performance in the envelope test (MAGTUP), which assesses overall coordination and speed. The manifest variable for assessing overall coordination (MAGTUP), although showing high correlations with most other indicators in the basic motor skills domain, also has several low and non-significant correlation coefficients. The next correlation, recorded as the second highest with a value of 0.75, occurs between two variables assessing flexibility (MPREDE and MBFDSD). This relationship is expected, as both variables represent performance in flexibility tests. The third highest correlation (0.66) represents the connection between manifest variables assessing explosive leg power (MFESUM and MFESDM). This significant relationship can be explained by the engagement of the same muscle groups during both tests, as well as the very similar execution techniques of the tests.

Table 4. Correlations of variables in the initial and final measurement of situational motor skills for the control group

	OKBLR	OKVLS	OKBLK	OSDCE	OGCPM	OLPKS	ORBLZ	ORVLS	ORISE
OKBLR	1.00								
F	1.00								
OKVLS	-0.28	1.00							
F	-0.32	1.00							
OKBLK	0.40	-0.52	1.00						
F	0.39	-0.58	1.00						
OSDCE	0.36	-0.39	0.45	1.00					
F	0.52	-0.47	0.34	1.00					
OGCPM	0.62	-0.30	0.40	0.56	1.00				
F	0.59	-0.25	0.30	0.39	1.00				
OLPKS	0.42	-0.21	0.30	0.51	0.43	1.00			
F	0.50	-0.27	0.22	0.51	0.52	1.00			
ORBLZ	0.51	-0.38	0.23	0.45	0.57	0.33	1.00		
F	0.65	-0.45	0.40	0.56	0.61	0.45	1.00		
ORVLS	-0.32	0.77	-0.44	-0.57	-0.36	-0.37	-0.35	1.00	
F	-0.25	0.76	-0.56	-0.45	-0.41	-0.26	-0.42	1.00	
ORISE	0.44	-0.44	0.26	0.16	0.35	0.21	0.22	-0.45	1.00
F	0.38	-0.29	0.27	0.08	0.21	0.14	0.17	-0.27	1.00

The fourth highest correlation (-0.60) is between variables assessing explosive leg power in horizontal jumps (MFESUM) and variables assessing speed and explosive power (MFE20V). The fifth highest correlation (0.58) involves the variable assessing body speed and agility, which also influences body movement speed in space (MAGTUP), and the variable assessing overall coordination (MRGEPO). The connection between these two manifest variables can be explained by the execution technique of both tests, where performance directly depends on the speed of movements of the lower and upper limbs and the coordination of arms and legs during the test. The next significant correlation (0.53) is between variables assessing hand movement speed (MTAPRU) and leg movement speed (MTAPNO). This relationship can be explained by the test execution technique tapping the wall with the foot, where arm movement significantly contributes to the performance of the test. In seventh position are the variables assessing repetitive abdominal muscle strength (MRCLDM) and repetitive leg muscle strength (MFRDCU), with a correlation coefficient of 0.52. This relationship can be explained by improper test technique the lying-to-sitting test, where students, aiming for the best possible result, may engage additional muscle groups, in this case, the quadriceps, which play a major role in performing squats. With a correlation coefficient of -0.51, in eighth position are the variables assessing explosive power (MFE20V) and repetitive abdominal muscle strength (MRCLDM). This relationship is explainable, as running speed depends on running technique, which is directly related to arm movement speed and the strength of muscles involved in running mechanics, including the abdominal muscles responsible for proper sprinting technique. The next correlation (0.50) is between variables assessing repetitive leg muscle strength (MFRDCU) and repetitive arm muscle strength (MFRSKL). Similar to the previous explanations, the strength of a particular muscle group directly affects the technique of performing specific tests, including leg and abdominal muscles. In the control group, these tests are often not performed correctly, so part of the measured strength comes from other muscle groups. For example, higher arm strength may influence better results in basic motor skills tests, even though these tests do not directly assess that anatomical region. This may explain why variables assessing hand movement speed and frequency (MTAPRU and MTAPNO) correlate with other basic motor skill indicators, while the variable assessing overall coordination (MAGTUP) shows many low and non-significant correlations.

Thus, the pattern of correlation coefficient changes in the intercorrelation matrix for the basic motor skills domain is similar in the initial and final testing for the control group. By inspecting Table 4, which shows the correlation values of the manifest variables for assessing the situational motor skills of students in the control group, we can observe a fairly uniform pattern of intercorrelation values. The highest values were recorded between the variable assessing the technique of performing an overhead volleyball pass and the variable assessing the technique of performing an underhand forearm serve in volleyball. The second most significant correlation, with a coefficient of (-0.52), was recorded between the variable assessing the technique of shooting in basketball (OKBLK) and the technique of dribbling in basketball (OKVLS). The logic of this connection can be explained by the procedure of performing the OKBLK test, which depends not only on the shooting technique but also on the speed of arm movements and the ability to quickly change direction agility. This is because the test does not only assess shooting technique but also the speed of shooting, where the participant must score as many baskets as possible within 30 seconds, which involves catching rebound balls and shooting. The third highest correlation (.45) was observed between the variables assessing the technique of performing the underhand forearm serve in volleyball (OSDCE) and the technique of shooting a basketball (OKBLK). This connection, as in other similar cases, can be explained not by the execution technique itself but by the technique that allows shooting accuracy. The fourth correlation, with a coefficient of (.43), is between the technique of performing the underhand volleyball pass hammer technique (OLPKS) and the overhead volleyball pass technique. This connection can be explained by the execution technique of both tests, which primarily depends on proper performance, including the same basic stance in volleyball and striking the ball from the knees with correctly positioned hands. Other variables showed somewhat lower correlation coefficients, from (-.35) between the variable (ORVLS) and the variable (ORBLZ), and between (ORBLZ) and (OLPKS), while the lowest correlation was recorded between the variable (OKVLS) and the variable (OKBLR). In the final measurement of the control group in the domain of situational motor skills, we observe the following correlation coefficients: The highest was between the variable (OKBLK), assessing basketball shooting technique, and the variable (OKVLS), assessing basketball dribbling technique. This connection also appeared in the initial measurement with a correlation coefficient of (-.52).

The second most significant correlation is between the variable (OLPKS), assessing the underhand volleyball pass technique, and the variable (OGCPM), assessing the overhead volleyball pass technique. As in the previous case, this connection with a correlation coefficient of (.43) also appeared in the initial measurement in the domain of situational motor skills of the control group and was explained in the analysis of Table 5. The third correlation (.45) is between the variable assessing passing and catching a basketball (ORBLZ) and the variable (OLPKS), assessing the underhand volleyball pass technique. This connection between manifest variables was not observed in the initial measurement and can be explained by the ability to position the body and hands properly relative to the ball during both tests. Additionally, due to the time constraint of the test, the speed of the ball pass is crucial; in the ORBLZ test, due to the speed, the ball is often not caught but may bounce off the wall. Another significant correlation is between the variable (ORVLS), assessing handball dribbling technique, and the variable (ORBLZ), assessing passing and catching in handball (-.42). This can be explained similarly to the previous connection between ORBLZ and OLPKS, where in both cases, the ball is often deflected by the hands to perform the test more efficiently.

The scores in these tests are inversely proportional, i.e., less time indicates a better result. Other variables achieved slightly lower correlation coefficients, such as the variable (OGCPM), assessing overhead volleyball pass technique, and the variable (OSDCE), assessing underhand forearm serve technique. This connection was also recorded in the initial measurement with a very high degree of correlation (.56) and was explained in the analysis of Table 5. The lowest correlation coefficient in the domain of situational motor skills in the control group in the final measurement was between the variable (OKVLS), assessing basketball slalom dribbling, and the variable (OKBLR), assessing catching and passing in basketball (-.32), and between the variable (ORIS), performing seven-meter throws, and the variable (ORVLS), assessing handball slalom dribbling. Analyzing the control group in the domain of situational motor skills, we can conclude that there are certain similarities in the observed correlation patterns between manifest variables. By analyzing Table 5, which presents the values of manifest variables in the basic motor skills domain in the initial measurement of the experimental group, we observe relatively high correlation coefficients between the variables assessing flexibility (MPREDE Forward Bend Right and MBFSD Sit and Reach) with a coefficient of (.78). Such a correlation, but with a much lower coefficient, was also recorded in the initial measurement of the control group. This relationship can be explained by the execution technique of both tests, which is defined by the students' degree of flexibility. Similarly, a very high correlation of (.69) was observed between the variable (MFRDCU), which assesses the repetitive strength of the lower extremities, and the repetitive strength of the abdominal muscles (MRCLDM). The same relationship was also recorded in the second measurement of the control group with a correlation coefficient of (.52). This relationship can be explained by the improper technique used in the sit-up test, which additionally engages the lower extremity muscles (quadriceps and hamstrings). With the same correlation coefficient (.69), a relationship was observed between the variable (MAGTUP) and the variable (MAGKUS), both of which assess coordination. Such a relationship, with a correlation coefficient of (.78), was also observed in the basic motor skills domain of the control group

in the final measurement. This relationship is explained by the close connection between leg speed and coordination with overall coordination. The third-highest correlation, with a coefficient of (.66), was recorded between the variables (MFESUM) and (MFESDM), which assess explosive strength. This relationship between these two variables, with a correlation coefficient of (.66), also appeared in the second measurement in the basic motor skills domain of the control group. This relationship is explained by the engagement of the same muscle groups during the execution of both tests. The fourth-highest correlation, with a coefficient of (.58), was observed between the variable (MFRSKL), which assesses repetitive strength of the arms, and the variable (MFRDCU), which assesses repetitive strength of the legs. Such a relationship, with a correlation coefficient of (.50), also appeared in the basic motor skills domain of the control group.

The same level of correlation, but with a negative sign (-.58), defines the relationship between the variables (MAGKUS), which assesses leg coordination, and (MFRSKL), which assesses repetitive strength of the arms. This relationship was also observed in the initial measurement of the control group with a slightly lower correlation coefficient and can be explained by the test execution technique, where arm speed also influences leg speed, thus determining the success of the test performance. With slightly lower correlation coefficients, ranging from (-.51) to very low correlations of (.01), the following relationships were observed: (MFE20V) and (MFESUM); (MRGEPO) and (MAGTUP) with (.49); (MRCLDM) and (MFE20V) with (-.41); (MTAPNZ) and (MTAPNO) with (.12); (MFLISK) and (MTAPNZ) with (-.05); (MFESDM) and (MPREDE) with (.03); (MTAPNO) and (MTAPRU). The relationship between (MTAPNO) and (MTAPRU) with such a low correlation coefficient is interesting, considering that a much higher correlation coefficient of (.53) was recorded in the final measurement of the control group. By analyzing and comparing the correlation values in the basic motor skills domain between students of the control and experimental groups, we can conclude that there are certain similarities, which can be explained by the same method of performing individual tests, appropriate for the age of the students. This is evidenced by certain relationships between variables that are defined by high or low correlation coefficients. Even this type of analysis allows us to state that the groups are approximately homogenized, with potential differences in smaller or larger degrees of motor abilities. The pattern of intercorrelations between variables in the basic motor skills domain of the experimental group in the final measurement is somewhat different from the pattern in the experimental group in the initial measurement. The lowest correlation was recorded between the variables assessing flexibility (MFLISK) and the variables assessing repetitive strength of the abdominal muscles (MRCLDM). Both of these variables moderately, i.e., more, correlate with other components in the basic motor skills domain. The highest correlation is still between the variables assessing coordination (MAGKUS and MAGTUP). Other variables moderately correlate with each other. This relationship was also recorded in the basic motor skills domain with a fairly high correlation coefficient of (.69) in the first measurement of the experimental group, with an even higher correlation coefficient of (.78) in the basic motor skills domain of the control group in the final measurement, as well as in the initial measurement of the control group with a correlation coefficient of (.73).

**Table 5. Correlations of Variables in the Initial and Final Measurements of the Basic Motor Skills of the Experimental Group**

	MTAPRU	MTAPNO	MTAPNZ	MFLISK	MBFSDS	MPREDE	MFESDM	MFESUM	MFE20V	MRCLDM	MFRDCU	MFRSKL	MAGKUS	MAGTUP
MTAPRU	1.00													
F	1.00													
MTAPNO	0.01	1.00												
F	0.53	1.00												
MTAPNZ	0.58	0.12	1.00											
F	0.68	0.70	1.00											
MFLISK	0.01	-0.16	-0.05	1.00										
F	0.07	-0.03	-0.15	1.00										
MBFSDS	0.11	-0.00	0.03	-0.45	1.00									
F	0.11	0.07	0.10	-0.52	1.00									
MPREDE	0.24	-0.02	0.15	-0.32	0.78	1.00								
F	0.23	0.20	0.19	-0.45	0.74	1.00								
MFESDM	0.49	0.19	0.44	-0.07	0.07	0.03	1.00							
F	0.38	0.43	0.44	0.06	0.00	0.04	1.00							
MFESUM	0.42	0.30	0.52	-0.21	0.06	-0.05	0.66	1.00						
F	0.29	0.49	0.47	-0.09	0.15	0.11	0.66	1.00						
MFE20V	-0.51	-0.13	-0.42	0.05	-0.18	-0.14	-0.67	-0.51	1.00					
F	-0.42	-0.39	-0.45	0.12	-0.27	-0.29	-0.73	-0.59	1.00					
MRCLDM	0.45	0.09	0.64	-0.08	0.15	0.15	0.53	0.49	-0.41	1.00				
F	0.51	0.35	0.59	-0.01	0.07	0.07	0.52	0.38	-0.57	1.00				
MFRDCU	0.44	0.17	0.59	-0.23	0.42	0.36	0.64	0.51	-0.55	0.69	1.00			
F	0.37	0.42	0.55	-0.31	0.33	0.24	0.45	0.35	-0.48	0.53	1.00			
MFRSKL	0.35	0.08	0.62	-0.14	0.08	0.09	0.49	0.49	-0.37	0.61	0.58	1.00		
F	0.31	0.36	0.58	-0.15	0.04	-0.01	0.50	0.41	-0.38	0.60	0.55	1.00		
MAGKUS	-0.59	0.03	-0.65	0.09	0.06	0.03	-0.61	-0.56	0.51	-0.63	-0.56	-0.58	1.00	
F	-0.49	-0.41	-0.60	0.08	-0.01	-0.03	-0.71	-0.56	0.58	-0.59	-0.57	-0.56	1.00	
MAGTUP	-0.61	-0.07	-0.62	0.20	-0.04	-0.13	-0.59	-0.47	0.57	-0.51	-0.55	-0.34	0.69	1.00
F	-0.55	-0.41	-0.60	0.12	-0.03	-0.10	-0.74	-0.48	0.70	-0.56	-0.48	-0.43	0.81	1.00
MRGEPO	-0.29	-0.13	-0.41	0.31	-0.36	-0.29	-0.55	-0.43	0.53	-0.49	-0.61	-0.57	0.46	0.49
F	-0.46	-0.39	-0.57	0.21	-0.29	-0.34	-0.60	-0.40	0.66	-0.55	-0.61	-0.52	0.54	0.62

**Table 6. Correlations of variables in the initial and final measurements of situational motor skills in the experimental group**

	OKBLR	OKVLS	OKBLK	OSDCE	OGCPM	OLPKSE	ORBLZ	ORVLS	ORISE
OKBLR	1.00								
F	1.00								
OKVLS	-0.71	1.00							
F	-0.81	1.00							
OKBLK	0.54	-0.62	1.00						
F	0.51	-0.70	1.00						
OSDCE	0.59	-0.59	0.62	1.00					
F	0.66	-0.59	0.49	1.00					
OGCPM	0.69	-0.49	0.51	0.47	1.00				
F	0.62	-0.56	0.43	0.56	1.00				
OLPKS	0.62	-0.60	0.55	0.56	0.61	1.00			
F	0.61	-0.60	0.54	0.69	0.57	1.00			
ORBLZ	0.80	-0.73	0.63	0.54	0.61	0.67	1.00		
F	0.76	-0.75	0.47	0.55	0.55	0.57	1.00		
ORVLS	-0.81	0.81	-0.62	-0.51	-0.59	-0.54	-0.78	1.00	
F	-0.72	0.88	-0.65	-0.64	-0.62	-0.63	-0.74	1.00	
ORISE	0.69	-0.59	0.42	0.35	0.45	0.56	0.65	-0.63	1.00
F	0.66	-0.62	0.48	0.40	0.55	0.40	0.62	-0.61	1.00

This relationship, with the highest correlation coefficient observed so far between these two variables, occurs in the basic motor skills domain of the experimental group in the final measurement. By examining Table 6, which presents the correlation values of variables in the initial measurement of the situational motor skills domain, we can observe relatively high correlation coefficients. The highest correlation coefficient (-.78) occurs between the variables assessing the technique of dribbling the ball in a handball slalom (ORVLS) and the variable (ORBLZ), which evaluates the technique of throwing and catching the ball in handball. This correlation, or the relationship between these two variables, can be explained by the execution technique of these tests, which primarily depends on general coordination, hand coordination, as well as the degree of mastery of dribbling and catching/passing techniques in handball. The next correlation coefficient, which amounts to (-.71), explains the relationship between the dribbling technique in a basketball slalom (OKVLS) and the variable

assessing the technique of catching and passing the ball in basketball (OKBLR). This relationship can be defined similarly to the previous case, especially considering that the dribbling and catching techniques in basketball are very similar to those in handball. In third place, with a correlation coefficient of (.67), are the variables assessing the technique of catching and passing the ball in handball (ORBLZ) and the technique of underhand passing in volleyball (OLPKS). This relationship can be explained by the influence of hand coordination and movement speed on the successful execution of this test. With correlation coefficients of (.62) and (-.62), the variables (OSDCE), which evaluates the technique of performing the underhand volleyball serve, and the variables (OKBLK), which assesses the technique and speed of shooting the ball into the basket within a limited time, are positioned. The performance in both tests is defined by the execution technique as well as the degree of developed accuracy as a motor skill. With the same coefficient but with a negative sign,

the relationship is defined between the variable (OKBLK), which assesses the mastery of the shooting technique, and the variable (OKVLS), which evaluates the mastery of dribbling in basketball. This relationship can be attributed to the degree of hand coordination, movement speed, and body agility, which influence the successful execution of both tests. With somewhat lower correlation coefficients (-.54), the relationships are defined between the variables (ORVLS) and (OLPKS), and with a correlation coefficient of (.47), the relationship between the variable (OGCPM) and the variable (OSDCE) is defined. By examining the intercorrelation matrix in the situational motor skills domain of the experimental group, we can observe that the pattern of components is somewhat different. The strongest relationship, defined by a correlation coefficient of (-.81), occurs between two variables: (OKVLS), which assesses the dribbling technique in basketball, and (OKBLR), which evaluates the technique of catching and passing in basketball. This relationship was also observed in the initial measurement of the experimental group and was previously explained in the same way. The next relationship, with a correlation coefficient of (-.74), defines the connection between the variable (ORVLS), which assesses the dribbling technique in handball, and the variable (ORBLZ), which evaluates the technique of catching and passing the ball in handball. The same relationship, with a slightly higher coefficient, appeared in the intercorrelation matrix of the experimental group in the initial measurement. With a correlation coefficient of (-.70), the relationship is defined between the variable (OKBLK), which evaluates the technique of shooting into the basket within a limited time, and the variable (OKVLS), which assesses dribbling in basketball. A similar relationship, with a coefficient of (-.62), also appeared in the initial measurement. Further analysis of the intercorrelation matrix in the situational motor skills domain of the experimental group in the final measurement shows very similar correlation coefficients between the given variables, generally slightly higher coefficients, which define certain relationships between the applied variables compared to the intercorrelation matrix in the initial measurement.

## DISCUSSION

In the domain of basic motor skills, regarding descriptive-statistical values, after reviewing the mean values of both the control and experimental groups in the initial and final measurements, it can be concluded that there are expected differences in the distribution of results. Differences can be observed not only between groups but also within each group, between the mean values of results recorded during the initial and final measurements. These differences are not large and can be assumed to result from variations in individual outcomes. Observing the skewness and kurtosis indices, it can be concluded that most variables fall within a normal distribution. Regarding the descriptive-statistical results within the situational-motor space, the relationships show a structure similar to that of the motor skills domain. Noticeable differences in mean values exist both between groups and between initial and final measurements within each group. These differences can be assumed to reflect variations in individual results, and the distribution of results can be considered to follow a "normal" distribution. Based on the intercorrelation of variables in the basic motor skills domain, which indirectly indicates the effects of regular teaching as well as the effects of a specially designed sports games program, it can be concluded that "movement frequency

speed" did not undergo significant transformation. Relationships with variables from different tests in the initial-final measurement remained at approximately the same level of correlation, and it cannot be stated that either applied program had a greater transformational effect. Regarding "student flexibility," the effects of neither of the two applied programs are significantly visible. It can be noted that trunk flexibility in students of both groups is naturally at a higher level, as evidenced by the high initial-final correlation of the "Sit-and-Reach" and "Forward Bend to the Right" tests. This level was maintained throughout the research period, but only within variables (tests) defining this domain. Regarding the variable "explosive strength of students," it is evident that after the conducted programs, the transformation remains primarily within the variables defining the basic motor skills domain. In the control group, no correlation with other variables is observed either before or after the program. In the experimental group, "explosive strength" variables negatively affect the movement frequency of the lower limbs, as the correlation between tests decreases in the final measurement. "Repetitive strength" of students remained at the same level of correlation between initial and final measurements. This observation applies to both groups control and experimental. For the assessment of "coordination," it can be stated that it underwent greater transformation under the special program (experimental group). "Explosive strength" and "student coordination," "lower limb movement frequency" and "student coordination," as well as "trunk strength" and "student coordination," showed greater correlation in the results of the experimental group, while in the control group, the correlation with variables from other domains was entirely absent.

In the basic motor skills domain, it cannot be stated that either the regular or the specially designed program had a greater impact on the transformation of inter-variable correlations. Based on the intercorrelation matrix of variables in the situational-motor skills domain, which can also indirectly show the effects of applying the regular program and the special sports games program on the transformation of students' abilities, for basketball situational-motor tests it can be concluded that the correlation between two variables assessing basketball performance exists initially and finally in the control group. These variables are "Hand dribbling in a slalom" and "Throwing the ball into the basket for 30 seconds." In the experimental group, the same correlation of these variables is observed in the final measurement, along with an additional correlation between "Hand dribbling in a slalom" and "Throwing the ball against a wall with both hands and catching it for 30 seconds." This indirectly suggests that the application of the special basketball program positively influenced the correlation of basketball situational-motor tests in the experimental group. Regarding situational-motor abilities in volleyball, in the control group, correlations in the final measurement were observed for: "Underhand front serve" and the basketball variable "Throwing the ball against a wall with both hands and catching it for 30 seconds," then "Target hitting over the net from the basic stance" and "Throwing the ball against a wall with both hands and catching it for 30 seconds" in both initial and final measurements, and finally "Forearm passing in a circle for 30 seconds" and "Throwing the ball against a wall with both hands and catching it for 30 seconds" in the final measurement. It can be concluded that there is a strong correlation of the basketball variable "Throwing the ball against a wall with both hands and catching it for 30 seconds" with all volleyball game variables. The

regular teaching program influenced the transformation of the situational-motor status of participants. For the experimental group, it can be stated that all three volleyball variables were mutually correlated in the final measurement, as expected. Particularly noteworthy is the moderate-to-low correlation of all volleyball variables with all basketball variables. It can be concluded that the experimental program had an effect on these transformations. In handball, for the control group, sporadic correlations of related variables across different sports were observed. For example, the handball variable "Throwing the ball against a wall for 30 seconds" correlated with the basketball variable "Throwing the ball against a wall with both hands and catching it for 30 seconds," as did the correlation between "Dribbling the ball in slalom" in handball and "Hand dribbling in slalom" in basketball. Regarding volleyball, correlations were observed between the variable "Target hitting over the net from the basic stance" and "Throwing the ball against a wall for 30 seconds" in both initial and final measurements. In the experimental group, within the situational-motor variables domain, correlations exist, both initially and finally, between all handball variables and two basketball variables: "Throwing the ball against a wall with both hands and catching it for 30 seconds" and "Hand dribbling in slalom." The variables "Throwing the ball against a wall with both hands and catching it for 30 seconds" and "Hand dribbling in slalom" were correlated, initially and finally, with all variables representing volleyball. Additionally, correlations were evident among variables representing handball performance. In conclusion, it can be stated that the specially designed program had a greater effect on transforming the correlations of variables in the situational-motor domain than the regular physical education program.

### Conclusion

For the basic motor space, it cannot be stated that either the regular or the specially designed teaching program had a greater influence on the transformation of the interrelationship among the investigated variables. For the situational motor space, it can be stated that the specially designed program caused a somewhat greater number of interrelationships among the investigated variables. This conclusion can be drawn based on the correlation coefficients in the intercorrelation matrices of the experimental group at the final measurement.

### Recommendation

To confirm the greater effects of the regular or specially designed program, it is necessary to conduct additional statistical analyses, such as a t-test or ANOVA analysis. A similar or identical study could be conducted on younger or older age groups to determine the behavioral patterns of the variables and the effects of both programs.

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