THE EFFECTS OF THE APPLICATION OF THE WORK TRAINING PROGRAM ON THE TRANSFORMATION OF THE MOTOR SKILLS OF YOUNG BASKETBALL GIRLS AGES 13 TO 15

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ABSTRACT: Researching the impact of the training program on the structure and relationship of latent anthropological dimensions, as well as the progress of the overall situational performance, i.e. efficiency in basketball, could contribute to an easier understanding of the overall basketball game of young female basketball players. As opposed to that, well-designed and programmed training can effectively contribute to the desirable direction of growth and development of young basketball players.

The main goal of this research was to determine the level and magnitude of changes in motor skills of young basketball players aged 13 to 15 under the influence of the applied basketball training program. The goal of the factor analysis in this research was not only to determine the latent structure of the researched areas, but also to primarily establish the presence of qualitative changes that were created by the implementation of the training program process in basketball.

KEYWORDS: *basketball, transformations, training program, motor skills*

INTRODUCION

It can be concluded that it is necessary to research how and to what extent a certain program fulfills the assumptions, and whether it is possible to influence the abilities and improvement of the basketball game itself.

The need for research related to this topic, especially refers to the transformation of the morphological characteristics of female basketball players aged 13 to 15, under the influence of the applied training program.

It was necessary to research, discover and obtain significant information that can greatly improve the training process of basketball players, and therefore have a positive effect on their overall anthropological status.

Therefore, basketball, as an integral part of the broad field of physical education and sports, undoubtedly represents at the same time a means for energy-motor and intellectual activity. From the point of view of the movement and structure of the situation in the game, basketball is one of the most complex team games dominated by rapid transformations from action to action, which inevitably leads to transformations in the anthropological status of the participants of the basketball game.

METHOD OF WORK

In the methodological development of this research, an overview of the definition of the sample of respondents, instruments, i.e. battery of tests that were used to analyze the researched anthropological spaces, as well as a description of their technical performance, then a brief description of the research, methods of statistical data processing, and the time frame of the research is presented.

Sample of respondents

The population from which the entity sample was taken for this research was defined as a sample of young female basketball players aged 13 to 15, who actively play and train in the ŽKK "Ljubuški" from Ljubuški. 88 girls - players, who train at the basketball school ŽKK "Ljubuški" from Ljubuški - were included in this research. There were no special restrictions regarding the validity of the sample, except that the girls included in this sample at the time of testing and measurement, as well as the implementation of the training work, had to be healthy and had to complete the planned training program.

Sample of variables

12 variables were used to assess motor skills.

MESSAR - Sargent's test, MESSDM - standing long jump, MESBML - throwing a medicine ball from a lying position, MAGTUP - envelope test, MAOKTL - agility on the ground, MAGKUS – lateral steps, MFISKP – stick mobility, MFIUPS - seated forward bend, MFBOŠP - lateral twine, MRSSKL - push-ups, MRSDTL - body lifting from lying down, MRSDTZ - body lifting from a cover.

RESULTS AND DISCUSSION

The characteristics and size of the selected sample of respondents determined the basic methods for processing the data that were obtained through this research, using software packages for multivariate data analysis.

Factor analysis was used to analyze qualitative changes under the influence of the applied basketball training program, with the aim of investigating the latent structure of the researched areas as well as defining the structure of the applied variables.

Quantitative changes within the researched anthropological spaces were determined with the help of discriminative canonical analysis.

Analysis of qualitative changes in the investigated motor abilities

The results of the analysis of qualitative changes in 12 motor variables, on a sample of 88 female basketball players, aged 13 to 15, were performed by factor analysis - the congruency method. The possibility of subjecting this set of motor variables to any type of factorization was also first tested using Bartlett's test.

The data from Table 1 (initial and final measurement) confirmed to us that the data can be subjected to factorization (Sig ,000).

Using the congruence method - matching the factor scores of the initial and final measurements, we wanted to determine whether there were structural changes in the investigated motor area, under the influence of the applied basketball training program.

Table 1. Bartlet's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		INITIAL	FINAL
		.569	.607
Bartlett's Test of Sphericity	Approx. Chi-Square	621.083	714.015
	Df	87	87
	Sig.	.000	.000

Table 2 shows the characteristic roots and explained parts of the variance of the initial and final measurement of the variables for assessing the motor abilities of the investigated sample of female basketball players aged 13 to 15 years.

As can be seen from the initial measurement (table 2), six latent dimensions were isolated that explain the total manifest space with 60.02% of the common variance. The individual contribution to the explanation of the common variance is for the first main component 19.11%, for the second 14.29%, for the third 7.65%, for the fourth 7.20%, for the fifth isolated component 6.22% and for the sixth isolated component 5.56 % of the common variability. By analyzing the obtained values of the results of the qualitative analysis of the researched motor space, we can state that six latent dimensions were also isolated in the final measurement, which explains the total investigated manifest motor space with 61.71% of the common variability. By looking at the results of the individual contribution to the explanation of the common variability, we can say that the same for the first main component is 19.35%, for the second 13.70%, for the third 9.52%, for the fourth 7.36%, for the fifth 6.15% and for the sixth isolated component 5.64% of the common variability.

Looking at table 3 (the matrix of the set of isolated factors of the motor space at the initial measurement), it is evident that the largest part of the explanation of the variance is exhausted by the first main component, which can be defined as a power factor, with the dominance of explosive power because the variables have the highest projections on it: throwing a medicine ball from lying down (MESBML), Sargent's test (MESSAR), push-ups (MRSSKL) and standing long jump (MESSDM).

On the second main component, significant projections have the variables: lateral twine (MFBOŠP) and agility on the ground (MAOKTL). We can define this main component as a mixed factor of flexibility and coordination.

On the third main component, the most significant projection, have the variables: seated forward bend (MFIUPS), stick mobility (MFISKP) and lateral twine (MFBOŠP), and we can define this main component as a pure flexibility factor.

On the fourth main component, the variables lateral steps (MAGKUS) and agility on the ground (MAOKTL) have significant projections. This isolated main component can be defined as a pure coordination factor.

On the fifth main component, which is isolated from the residual variability of all applied variables for the assessment of motor abilities, significant projections have the variables body lifting from a cover (MRSDTZ) and body lifting from lying down (MRSDTL). This isolated main component can be defined as a pure factor of repetitive strength.

The variable: the envelope test (MAGTUP) has a significant projection on the sixth main component, which is isolated from the residual variability of all applied variables for the assessment of motor skills. This isolated main component can be defined as a pure coordination factor. Analyzing Table 3 (the matrix of the set of isolated factors of the motor space at the final measurement), it is also evident that the largest part of the explanation of the common variability is exhausted by the first main component, which can be defined as a pure strength factor, because the variables have the largest projections on it: MESBML - throwing a medicine ball from lying down, standing long jump (MESSDM), push-ups (MRSSKL), and the Sargent test (MESSAR).

On the second main component, significant projections have the variables: (MFISKP) stick mobility and (MFIUPS) seated forward bend. This main component can be defined as a mixed factor of flexibility and repetitive strength.

On the third main component, the most significant projection, has the variables: stick mobility (MFISKP) and lateral twine (MFBOŠP), and the same main component can be defined as a pure flexibility factor.

On the fourth principal component, significant projections have the variable lateral steps throwing a medicine ball from a lying position (MESBML). This isolated main component can be defined as a pure factor of explosive strength ofthe upper body muscles and shoulder girdle.

On the fifth main component, which is isolated from the residual variability of all applied variables for the assessment of motor abilities, significant projections have the variables lateral steps (MAGKUS) and floor

coordination (MAOKTL). This isolated main component can be defined as a pure coordination factor.

On the sixth main component, which is isolated from the residual variability of all applied variables for the assessment of motor abilities in the final test, significant projections have the variables: body lifting from cover (MRSDTZ) and body lifting from lying down (MRSDTL). This isolated main component can be defined as a pure repetitive strength factor.

Looking at the obtained results within the component correlation matrix of the investigated motor variables (initial measurement, table 4), we see that a statistically significant correlation coefficient was achieved between FAK-6 (which is defined as a mixed factor of segmental speed and repetitive strength) and FAK-1 (which is defined as a mixed factor of coordination and strength), and the achieved correlation coefficient is .209. This connection has its own logical sequence, because the isolated factors are mutually conditioned and are in direct mutual correlation. By looking at the results obtained within the component correlation matrix of the researched motor variables at the final measurement (table 4), we can see that a statistically significant correlation coefficient was achieved between FAK-4 (which is defined as a pure factor of the explosive strength of the muscles of the upper extremities and shoulder girdle) and FAK-1 (which is defined as a mixed factor of coordination and strength), and that the value of the achieved correlation coefficient is .207.

A statistically significant correlation coefficient was also achieved between FAK-6 (which is defined as a mixed factor of segmental speed and repetitive strength) and FAK-1 (which is defined as a mixed factor of coordination and strength), and that the value of the achieved correlation coefficient is .215.

Also, between FAK-6 and FAK-4, a statistically significant correlation coefficient was achieved, and it amounts to .204. This kind of connection has its own logical sequence, because the motor abilities expressed by dominance within the isolated factors are mutually conditioned and directly dependent.

Table 2. Isolated main components of motor abilities

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	INTIAL
1	3.631	19.111	19.111	3.631	19.111	19.111	
2	2.715	14.288	33.399	2.715	14.288	33.399	
3	1.453	7.650	41.049	1.453	7.650	41.049	
4	1.368	7.199	48.248	1.368	7.199	48.248	
5	1.182	6.218	54.466	1.182	6.218	54.466	
6	1.056	5.559	60.025	1.056	5.559	60.025	
	Initial Eigenvalues			Extraction Sums of Squared Loadings			FINAL
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
1	3.676	19.349	19.349	3.676	19.349	19.349	
2	2.602	13.696	33.045	2.602	13.696	33.045	
3	1.809	9.522	42.567	1.809	9.522	42.567	
4	1.398	7.359	49.926	1.398	7.359	49.926	
5	1.169	6.153	56.079	1.169	6.153	56.079	
6	1.071	5.637	61.715	1.071	5.637	61.715	

Table 3. Matrix of the set of isolated of motor abilities

Varijable	INICIJALNO						FINALNO					
	Component						Component					
	1	2	3	4	5	6	1	2	3	4	5	6
MESSAR	.594	.023	-.015	-.257	.074	.088	.510	-.042	.030	.400	-.063	.000
MESSDM	.483	-.107	.078	-.149	-.180	.335	.640	-.267	.015	.256	.148	.044
MESBML	.839	.033	-.081	.119	.142	-.033	.564	.089	-.109	.888	-.038	.027
MAGTUP	-.081	.240	.143	.141	.137	-.683	-.250	-.281	.201	.148	.029	-.031
MAOKTL	.022	.266	-.113	.611	-.069	-.132	-.312	.164	-.011	.274	.407	-.159
MAGKUS	.008	-.179	-.019	.757	-.072	-.007	-.041	-.078	-.091	-.110	.884	.061
MFISKP	.281	-.167	-.536	-.097	-.159	-.290	.226	-.520	-.671	.113	.106	-.208
MFIUPS	.044	-.179	.928	-.211	-.070	-.209	.051	-.434	.234	-.067	-.056	-.156
MFBOŠP	.265	.382	.467	.238	-.030	.127	.064	.195	.463	.236	.376	.194
MRSSKL	.514	.136	-.034	-.322	-.102	.131	.541	.152	.206	.263	-.143	.000
MRSDTL	.384	-.121	.098	-.007	.655	-.023	-.016	-.223	.154	.339	-.138	.412
MRSDTZ	.057	.017	-.106	-.471	.671	-.028	.028	.009	-.100	.150	-.231	.583

Table 4. Intercorrelation matrix of isolated factors

Component	1	2	3	4	5	6	
1	1.000	-.043	.077	-.176	.081	.209	INITIAL
2	-.043	1.000	.119	.111	.014	.088	
3	.077	.119	1.000	.066	.076	.164	
4	-.176	.111	.066	1.000	-.010	-.116	
5	.081	.014	.076	-.010	1.000	.038	
6	.209	.088	.164	-.116	.038	1.000	
Component	1	2	3	4	5	6	FINAL
1	1.000	-.057	-.014	.207	-.095	.215	
2	-.057	1.000	.051	-.011	.093	.033	
3	-.014	.051	1.000	.157	.107	.111	
4	.207	-.011	.157	1.000	.021	.204	
5	-.095	.093	.107	.021	1.000	-.101	
6	.215	.033	.111	.204	-.101	1.000	

CONCLUSION

The goal of the factor analysis in this research was not only to determine the latent structure of the researched spaces, but also to establish primarily the presence of qualitative changes that were caused by the implementation of the training program process in basketball.

Using the congruence method - matching the factor scores of the initial and final measurements, it was determined that structural changes occurred as a product of the applied planned and programmed training process lasting 90 days.

Analyzing the results of the qualitative analysis of the space of the investigated motor variables, we can conclude that under the influence of the applied basketball training program, there were transformational changes in the structure of the investigated motor space of female basketball players aged 13 to 15 years.

The results of the factor analysis provide the basis that in the basic structure of motor skills after the implementation of the work training program, there were significant qualitative changes in this research.

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