THE FACTOR STRUCTURE OF MOTOR SKILLS AND KNOWLEDGE OF THE FEMALE STUDENTS OF THE FIRST YEAR OF SECONDARY SCHOOL

Said Hasanbegović[1]
Mirela Osmanović

Mixed Secondary School Banovići

Original scientific paper

Received: 03.04.2012
Accepted: 20.04.2012

UDC: **796.012.1-055.25:373.4**

ABSTRACT

The aim of this research is to determine the latent space of motor skills and knowledge of the female students of the first year of secondary school. This study included 120 girls, and it was conducted at the end of the school year, after the realization of the regular physical education classes. According to nine tests aimed to evaluate motor skills and 16 more to assess motor knowledge, factors that define the latent space of motor skills of the test group were isolated by factor analysis, which shows in what way this program influenced the development of the test area. The agility and frequency of movement factor, as well as the factor of explosive strength were isolated in the motor skills area, which indicates that the standard program does not provide the development of fine motor skills in subjects. There were also isolated factors such as: the factor of average motor skills in the manipulation of the ball, the random factor of motor coordination, manual manipulation factor with the ball and the factor of insufficient movement coordination, from which it can be concluded that there is no logical development dimension in this area, nor proper development of motor skills.

***Key words**: motor skills, motor knowledge, factor analysis*

INTRODUCTION

One of the goals of the physical and medical tutoring is establishing the size of the impact or the effect of the educational program on students' knowledge of locomotion and their physical ability. In the first class of the secondary school (i.e. High School) students' physical ability and their condition of the physical development is assessed and documented. This information is used as the starting point for the creation of the future physical development programs. During students' attendance of such programs, it is expected that they develop optimal skills and abilities from various sports disciplines. Furthermore, it is also expected that students go through the transformation of their anthropological

1 **Correspodence to:**
Said Hasanbegović, Mixed Secondary School Banovići
Ulica, OSK. 45. Banovići, B&H
Phone: +387 61 705 084
E-mail: sajohb@hotmail.com

status and become aware of the importance of the physical activities and of the healthy way of living. Student's success in the physical education programs could be a boost for furthering physical activities. Period of secondary education is one of the most important time frames for the students' habit development for regular physical activities. Special importance of regular physical activity for psychophysical development is emphasized for female students because they go through significant physical changes during this age. Previous studies have shown that students of middle adolescence have the greatest problems in motivation for school learning (Suzić, 2006, pp. 289-310), and for students to achieve high goals in the aspect of achievement (Ayers, 2010). The aim of the research is to determine the latent structure of the space movement skills andabilities of the students first year of high school.

Besides physical changes, female students go through significant psychological transformations as well, which can cause certain issues during their education (i.e. skipping classes). To attain a goal of physical education with total consideration for the students and their needs, with planning and leading of the educational process, the teacher would have to be very knowledgeable in theoretical aspects of students' psychophysical development. Considering that educational process of physical and medical tutoring encompasses determination of models, means, shapes and operators, verification of the final state, measuring steps, handling and diagnosing; knowledge of locomotion and abilities are based on construction of individual and specific motion structures. The goal of this composition is to establish effects of regular scholastic process of physical education in regards to female students of the first year of secondary school.

METHODS

The factor analysis was used in this paper.

The sample of the subjects

The sample consists of 120 female students of the first year of secondary school.

The sample of the variables

Tests for motor skills evaluations:

MESSDM-The long jump
MES20V-The sprint from high start at 20 metres
MESBML-Throwing medicine ball from the lying pose
MBFTAR-Hand tapping
MBFTNZ-Foot tapping to the wall

MBFPZD-Bend – touch
MAGKUS-Side steps

MAGTUP-Running in the rectangle

MAGOSS-A bend eight

Tests for motor knowledge evaluation:

Volleyball:
OGOL-the upper bounce
ODOL-the lower bounce
OGČS- the upper frontal service
OPLS-the placed smash

Basketball:
KHDL- ball catching and passing
KVOL-ball leading
KKDV-double-step
KSŠT-jump-shot

Handball:
RHDL-ball catching and passing
RVLT-ball leading
RŠSK-jump-shot
RSŠT-lap kick

Football:
NOŽO-juggling
NDIZ-passing and stopping the ball
NVOL-ball leading
NŠUL-ball kicking

RESULTS AND DISCUSSIONS

The motor skills factor structure

Table 1. KMO and Bartlett Test

Kaiser-Meyer-Olkin Measure		0,81
Bartlett's Test	Approx. Chi-Square	324,76
	df	36
	Sig.	0,00

The Table 1 shows that the Bartlett's Test coefficient is very high and amounts 0.81 which shows the benefit of factoring variables.

Table 2. The characteristic roots (lambda, the percentage of common variable and the cumulative percentage of common variable)

Factors	L	% Var	Cum %
1	4,99	55,53	55,53

Table 2 shows the latent area of the nine applied variable motor skills which clearly points out one main component that amounts 55.53% of the variability.

Table 3. The structure of the variable matrix of motor skills under the component model-the variable parallel projection on factors

	Component
	1
MAGKUS	0,91
MFPTAN	-0,82
MAGTUP	0,82
MAGOSS	-0,80
MFPTAP	-0,80
MFPPZD	0,75
MESSDM	0,63
MESBML	-0,59
MES20V	0,47

Table 3 shows that there is only one component as well as that the variables in the entire area contribute with their common variable percentage to the isolated factor, so this factor can be defined as the factor of agility, explosive strength and the frequency of movement.

The isolated factor indicates to the fact that the standard program does not support the development of fine motor skills in subjects, which is obvious from the analysing of the latent area structure with the variable coefficients that point to the selective development of motor skills.

Table 4. The variables communality

Variables	Communality
MESSDM	0,83
MES20V	0,64
MESBML	0,67
MFPTAP	0,57
MFPTAN	**0,22**
MFPPZD	0,40
MAGKUS	0,65
MAGTUP	0,67
MAGOSS	**0,35**

Here can be noticed that the variables correlation coefficients through their communalities are mostly high, except for the MAGOSS and MFPTAN variables, which points to the fact that there was no expected overall development of motor skills.

The factor structure of motor knowledge

Table 5. KMO and Bartlett test

Kaiser-Meyer-Olkin Measure		0,78
Bartlett's Test	Approx. Chi-Square	415,51
	df	120
	Sig.	0,00

Table 5 presents the coefficient of Bartlett test amounting 0.78 which shows that it is very important to do the qualitative insight into the contribution of certain variables of isolated factor area.

Table 6. The characteristic roots (lambda, the percentage of common variable and the cumulative percentage of common variable)

Factors	L	% Var	Cum %
1	6,29	39,33	39,33
2	1,53	9,59	48,93
3	1,11	6,96	55,89
4	1,07	6,68	62,57

Table 6 shows the latent area of the 16 applied motor skills variables in measuring respondents, from which it can be seen that there are four main components after the first survey, taking 62.57 % of the common variables. The first main component is at the same time the first overview of measurement, which carries 39.33% of the common variable.

Table 7. Parallel and orthogonal variable projections on factors (matrix pattern and structure)

Var	F 1	F 1	F 2	F 2	F 3	F 3	F 4	F 4
	PAP	ORP	PAP	ORP	PAP	ORP	PAP	ORP
RŠSK	**0,81**	**0,77**						
KSŠT	**0,79**	**0,74**						
OPLS	**0,77**	**0,69**						
RSŠT	**0,77**	**0,58**						
NVOL	**0,68**	**0,67**						
NOŽO	**0,57**	**0,52**						
KKDV	**0,51**	**0,38**						
NŠUL			**0,69**	**0,68**				
ODOL			**0,63**	**0,58**				
KHDL					**0,84**	**0,79**		
KVOL					**0,75**	**0,71**		
OGOL					**0,71**	**0,65**		
OGČS					**0,68**	**0,59**		
RHDL					**0,65**	**0,65**		
RVLT					**0,58**	**0,58**	**0,53**	**0,44**
NDIZ							**0,83**	**0,81**

The table 7 shows contribution of variables to some of the factors, where it can be noted the differences through the best parallel and orthogonal projections on those factors. The first factor is defined by seven variables: RSSK, KSST, OPLS, RSST, NVOL, NOZO and KKDV, which explain the variables that point on manipulation with ball with use of hands and legs, which also points to the fact that they have not significantly detached from determined variable that more clearly define the area of knowledge of locomotion of this population and this age group, so we can define this factor as **Factor of average knowledge of locomotion in manipulation with ball.**

The best parallel and orthogonal projections on the second factor have variables NSUL and ODOL, which show that this factor is defined by variables of kicking the ball (derived from football) and lower ball rebound in volleyball, which points to the fact that subjects have shown certain correlation in this two measured disciplines are very random because there is not any logical explanation that it is possible, with training process, to coordinate these two activities in adopting knowledge of locomotion, so this factor can be named as **Factor of random coordination of movement.**

The best parallel and orthogonal projections on the third factor have variables KHDL, KVOL, OGOL, OGCS, RHDL and RVLT, which show, in the sequence of the coefficient values, that in manipulation with ball of subject's variables this factor is important for manual manipulation with ball, which is logical, so it can be named **Factor of manual manipulation with ball.**

The best parallel and orthogonal projections on the fourth factor have two variables RVLT and NDIZ.

RVLT is the variable that divides its projection with the third and the fourth factor, and the composition of these two variables point to the fact that knowledge of locomotion in control group of the subjects are not coordinated, so we can name this factor as **Factor of insufficient coordination of movement.**

On the basis of the taken factors, it can be concluded that in this space there is no logical developmental dimension, so that there is not any regular development of knowledge of locomotion.

Table 8. Variables communality

Variables	Communalities
OGOL	**0,75**
ODOL	0,61
OGČS	0,50
OPLS	**0,82**
KHDL	**0,75**
KVOL	0,58
KKDV	0,53
KSŠT	0,64
RHDL	0,52
RVLT	0,58
RSŠT	**0,74**
RŠSK	0,68
NOŽO	0,47
NDIZ	0,72
NVOL	0,50
NŠUL	0,61

This table shows that there are high coefficients of variable communality on targeted factors, which is logical, because every sports activity of the applied variables of the measured area defines motor knowledge of the subject. Variables such as OPLS, OGOL, KHDL and RSŠT have made the highest projections.

Table 9. Factor correlation

Component	1	2	3	4
1	1,00	6,14	0,49	0,22
2	6,14	1,00	0,12	-9,96
3	0,49	0,12	1,00	0,26
4	0,22	-9,96	0,26	1,00

Table 9 presents the correlation of selected factors which shows that the best correlation is between first and the second factor, which can be explained by the fact that the first and the second factor are defined by variables that would usually define area of any of the sample subject drawn from this population of students. Factors four and two showed the negative correlation which is explained by the fact that the subjects that showed interest and certain skills in one discipline, were not interested in the other discipline which is corresponding to the first one.

CONCLUSION

The need for qualitative analysis is derived from the need of interpretation of contributions of certain variables in the structure of development of sport dimensions students' knowledge of locomotion and their physical abilities. From this research it can be concluded that no proper development of motor skills is achieved during the teaching process in the realization of the physical education classes. The subject sample shows only minimum results and no coordination among motor skills, which can negatively affect the entire population. This means that the traditional physical education classes are worn out, because the operators are often identical for each teaching lesson, especially the introductory, preparatory and the finishing part of the lesson. Students probably do not manage to find themselves the elements of the game, so they are not motivated to be spontaneous, self assured,

sensible, creative, expressive, nor to challenge or risk anything. It can be also said that there have to be certain changes during the teaching process that would help student to establish the perceptive, motorical, and cognitive harmony which would enable them to reach the higher level of functioning. Considering that the teaching process of physical education includes determination of model, resources, forms and operators, final state, measurement procedure, treatment and diagnosis; the adoption of motor skills should be based on the new construction of specific structures. A special motivation for the exercise represents a tangible and recognizable transformation, which causes their conscious engagement and the exercise acceptance. Reasonably, it can be assumed that changes in teacher's approach to students and teaching, affect the students' motivation development. The quality of relationships between students and teachers is also motivating forcefor students (Bratanić & Marišić, 2003, pp. 133-144). The experiments could positively affect the motivation development of high school students, and also help them in getting to know their own motives while discovering their new, unconscious motives that make them to act.

REFERENCES

- Bratanić, M. and Maršić, T. (2004). Relacije između stavova učenika prema nastavniku i uspjeha u učenju. *Napredak, Vol. 145*, br. 1. Zagreb.
- Ayers, F. S. (2010). Motivation Profiles and Adolescents' PACER Performance. *Journal of Physical Education, Recreation & Dance*, 81, 9. ProQuest Nursing & Allied Health Source.
- Findak, V. (1999). *Metodika tjelesne i zdravstvene kulture*. Zagreb: Školska knjiga.
- Malacko, J. (2000). *Osnove sportskog treninga*. Zagreb.
- Suzić, N. (2006). Unutrašnja i vanjska motivacija u školskom postignuću. *Vaspitanje i obrazovanje – časopis za pedagošku teoriju i praksu br. 4*. Banja Luka.