

THE STRUCTURAL CHANGES IN SPORT GAMES DURING PHYSICAL AND HEALTH EDUCATION CLASSES

Milan Mladenović

Catholic School Center, Sarajevo, Bosnia & Herzegovina

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Abstract

On the sample of 152 examinees (male students) of Catholic School Center (High School) in Sarajevo, a program has been conducted in duration of one school year, from basketball, volleyball, handball and football classes. For estimation of basic motor abilities 24 tests were applied and 12 tests were applied for situational motor abilities (3 per each sport game). Initial and final measurements were also made (in September and May). The goal of this research was to ascertain the structural changes in basic mobility and situational mobility after the scheduled action, namely, to ascertain the transformational process. For the analysis of qualitative changes the Lsdif, Qdiff1 and Cramer analyses were used. The results of this research show that a general, systematic and continual reconstruction of general and specific motor abilities has occurred, namely the transformation of the same, but not in a significant measure. The smallest effects have been achieved in the case of football.

Key words: structural changes, transformation, sport games, basic, situational motor abilities

Introduction

In many former researches, it has been ascertained that the usage of specific exercise processes can significantly effect the changes of different human features, abilities and motor proficiencies. In this sphere of education's interests, there are numbers of scientific questions. Some of the basic scientific questions in this aspect of education problems are what to train, how to train and how much in order for changes to occur, how to control the quantitative and qualitative variability.

The changes of motor abilities in education process represent a dynamic, billowy process which is specific for its adequate quantitative and qualitative indicators. It is clear that this is the case of transformational process which occurs during classes, namely through his "most often occurring" units. It is not necessary to waste words on didactical and methodical protocols such as: planning, programming, feedback info, the intensity and size of the project, etc, which should by all means be valued in case of any longitudinal study. The works of recent "dates" treat the motor area not only in quantitative but also in qualitative sense. The structural changes represent the difference in motor abilities ratio trough

specific transformational process and within a time distance of course. The qualitative changes indicate basic progress in the motor achievement segment and they represent a kind of "basis" on which the quantitative, linear, global, fractal and other transformational effect indicators are achieved. It is necessary to mention that sport games all have their separate characteristics, goals and exercises, thus their own rules of "development" (in the motor sense). The goal of this research was to register the qualitative changes in basic and situational mobility (basketball, volleyball, football and handball) during the classes of Physical Education in duration of a school year (in initial and final measurement).

Methods

The research has been conducted on the sample of 152 examinees (males), students of II and III grade, attending Basic Gymnasium in Sarajevo. The program consisted of standard class units in sport games including dribbling, ball passage, kicking, except volleyball which had ball lifting, smash and serving. The program was realized during one school year at which time initial and final measurement took place.

Frequency of classes was two times a week, and each class unit from sport games was realized during 12 classes. The bank of tests for the estimation of basic motor abilities were constituted as followed: fractal speed (hand tapping MTAP, foot tapping MTAN, foot tapping against the wall MTAZ), precision (darts MPIK, striking the horizontal goal with a ball MPLO, striking the goal with a foot MPNG) balance (standing on one foot with closed eyes MRIZ, standing on reverse bench MROK, standing on one foot along the balance bench MRIU), flexibility (touch-toe to the right MFDE, deep touch-toe on the bench MFDP, splits MFSP), coordination (coordination with a stick MKPA, slalom with three medical MKSL, 20 lunges with a stick MK20), sprint speed (50 meter running with high start MB50, 20 meter running with high start MB20, 4x15 meter running MB15), explosive strength (standing long jump MESM, ball throwing MEBL, vertical jump MEVS, repetitive strength (body alignment MRIT, body ascension in 30 seconds MR30, push-ups MRSK).

Situational motor abilities were estimated by tests: basketball (throwing the ball with both hands against a wall, capturing it in 30 seconds KOBA, dribbling in slalom KOVO, shooting at the basket in duration of 30 seconds ODOD), volleyball (shooting at the goal across the net from the basic position ODGA, "bat sledge" rejection inside a circle in duration of 30 seconds, tennis serving and scholastic serving ODSE), handball (throwing and capturing of the ball against a wall in duration of 30 s RUBA, dribbling in slalom RUVO penalty throw RUSE), football (ball juggling NGZO, ball dribbling in slalom NGVO, strength of the ball hit NGSU). For the analysis of obtained data the Lsdif, Qdiff1 and Cramer analyses were used in order to register structural changes and situational motor abilities.

Results

The structural changes in basic motor ability

Table 1. The results of Lsdif analysis of structural changes in basic motor ability

LSDIF		
TRACE OF MATRIX	=	5.24
HI-QUADRAT	=	398.36
DEGREES OF FREEDOM	=	24
PROBABILITY	=	0.0000

According to the results in table 1. After the final measurement, an obvious structural changes have occurred, which are more than significant as the quadrant of differences matrix explains, and the probability of a mistake in such a claim is 0.0000.

Table 2. The results of Qdiff1 analysis in basic motor ability

QDIFF1	Differences
MTAP	0.20
MTAZ	0.13
MTAN	0.36
MPIK	0.34
MPLO	0.28
MPNG	0.38
MR1Z	0.47
MROK	0.14
MR1U	0.33
MFDE	0.26
MFDP	0.16
MFSP	0.27
MKPA	0.38
MKSL	0.29
MK20	0.28
MB50	0.32
MB20	0.25
MB15	0.37
MESM	0.22
MEBL	0.41
MEVS	0.21
MRIT	0.19
MR30	0.15
MRSK	0.18
G =	0.1665

The detailed information of the forms of structural changes can be seen in table 2, which contains the indicators of Qdiff1 analysis of structural changes. It is obvious that significant and unified changes have occurred along the entire spectrum of basic motor dimensions. The highest multi-variant structural changes occurred with balance and flexibility, but also in almost the same amount with all the other used variables. Weaker changes were gained only with a few variables, and even so they are not zero.

Additional information, which can corroborate claims that the structural changes exist, are visible in table 3. It can be seen that the changes are still medium in size, but also that they are present along the entire set of variables, as well that they all are over 0.10, which testifies of deep and radical changes in the structure of motor dimensions ratio, which have occurred after the treatment period. Weaker changes are shown with only a few variables, and even so they are not zero.

Table 3. The results of Cramer analysis of structural changes in basic motor ability (VKK-the coefficient of vector correlation, RO-the measurement of similarities, ALRO-the measurement of differences)

CRAMER	Similarities	Differences
MTAP	0.55	0.26
MTAZ	0.60	0.23
MTAN	0.61	0.22
MPIK	0.47	0.32
MPLO	0.50	0.29
MPNG	0.38	0.39
MR1Z	0.58	0.24
MROK	0.37	0.39
MR1U	0.58	0.24
MFDE	0.66	0.19
MFDP	0.74	0.14
MFSP	0.63	0.21
MKPA	0.34	0.42
MKSL	0.50	0.29
MK20	0.53	0.27
MB50	0.69	0.17
MB20	0.56	0.25
MB15	0.66	0.19
MESM	0.63	0.20
MEBL	0.79	0.11
MEVS	0.66	0.19
MRIT	0.44	0.33
MR30	0.55	0.26
MRSK	0.34	0.42
VKK =	0.0000	
RO =	0.0000	
ALRO =	1.0000	

It seems that under the influence of transformational process, a general systematic reconstruction of basic motor abilities has occurred, which is in many ways an interesting effect from the kineziological point of view, because it testifies that treated protocol can cause serious structural changes on the chosen sample of treated age.

Namely, that it is possible to cause an adequate reconstruction of motor abilities, with the help of sport games stimuli usage (basketball, volleyball, handball, football). The fact is that the examinees needed to adapt in great measure to the new requests and to learn new motions, which placed serious exercises in front of their motor functions.

But it is also a fact that under such a process an adaptation of motor functions was achieved, which were surely headed in the course of integrating dimensions responsible for the realization of motions, which is undoubtedly a positive kineziological influence.

Structural changes in specific motor ability

Table 4. The results of Lsdif analysis of structural changes in specific motor ability

LSDIF		
TRACE OF MATRIX	=	0.85
HI-QUADRAT	=	64.40
DEGREES OF FREEDOM	=	12
PROBABILITY	=	0.0000

According to the results in table 4, it is obvious that structural changes have occurred in the set of specific motions, changes which are more than significant. Lsdif probability of a mistake in such a claim is 0.0000, but it is also noticeable that the degree of change is lower by comparison with the motor functions. This can be explained with the fact that the examinees were constantly embedded with new parameters in motion engrams, which means that the period for this kind of treatment is relatively short, and it should certainly be considerably prolonged in sport.

Table 5. The results of Qdiff1 analysis of structural changes in specific motor ability

QDIFF1	Differences
KOBA	0.23
KOVO	0.11
KOST	0.19
ODGA	0.28
ODOD	0.20
ODSE	0.27
RUBA	0.38
RUVO	0.14
RUSE	0.34
NGZO	0.12
NGVO	0.12
NGSU	0.19
G =	0.1266

According to the indicators in tables 5 and 6, which are completely coherent by all variables, it is clear that numerous and quite clear structural effects were caused. It can be seen that these effects were the lowest in the case of football, which can be explained with the fact that the examinees have already had experiences with football, so the transfer of these new football motions during this treatment would surely be less expressed.

It is similar with ball dribbling in basketball and handball. All other specific motions however, have gone through solid changes, which is especially true for handball actions.

But also the entire volleyball set of variables, most probably because the examinees have had much less experience with these motions in the true sense of the word and in the correct kinesiological way.

Table 6. The results of Cramer analysis of structural changes in specific motor ability

CRAMER	Similarities	Differences
KOBA	0.58	0.24
KOVO	0.79	0.11
KOST	0.56	0.25
ODGA	0.56	0.25
ODOD	0.65	0.19
ODSE	0.49	0.30
RUBA	0.38	0.38
RUVU	0.75	0.14
RUSE	0.38	0.38
NGZO	0.77	0.12
NGVO	0.81	0.10
NGSU	0.55	0.26
VKK =	0.0001	
RO =	0.0000	
ALRO =	1.0000	

Conclusion

It can be generally concluded that both with basic and specific motor variables structural changes were caused, and also that these changes are more than significant. This testifies to the fact that by applying the stimuli from chosen sport games it is, of course, possible to change the structure of motor functions from which specific motor output directly depends. This is by itself clear, because in the process of learning any new motions, these effects will show it the treatment is seriously prepared and conducted. However, what is maybe much more important, is the fact that using these same stimuli the examinees' motor functions have changed and surely began to function on a higher level, which can be described as integration of these functions.

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Such changes in structure are in this case welcomed and the purpose of education (along with all educational, functional and the other kinds of exercises) is largely achieved.

These changes should be „provoked“ anyway, so that before an adequate boost of motor and other abilities on a higher quantitative level occurs, a good and desirable relations between motor dimensions and functions in general are founded. Only in such a way can we say that a successful transformational process has taken place, because the quantitative changes would almost always (and in education truly always) need to be preceded by the structural ones, so that an adequate „net“ of relations could be set up, on which it could be possible to further increase other functions such as explosive strength, flexibility, etc. In such a context, it would be difficult for different dimensions to clash, namely the synergy and coordination of these dimensions would be facilitated, since they strive to a common goal-an optimal management over complete and complex motions of any type.

Moreover, rare are the situations in which the interest for structural changes is small and in which the quantitative changes would be focus of interest. Maybe, (with a big question mark) in a situation of top-quality athletes, which have achieved an optimal structure of their dimensions in some part of their preparation, so further progress in the quantitative sense is enabled (eg. certain athletic disciplines during the year).

In all other cases, structural changes are and will remain the basis for understanding any kinds of treatment effects, even the quantitative ones.

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STRUKTURALNE PROMJENE U SPORTSKIM IGRAMA U NASTAVI TJELESNE I ZDRAVSTVENE KULTURE

Sažetak

Na uzorku od 152 ispitanika muškog spola, koji pohađaju nastavu u Katoličkom Školskom Centru u Sarajevu, proveden je program u trajanju od jedne školske godine, s nastavom iz košarke, odbojke, rukometa i nogometa. Za procjenu bazičnih motoričkih sposobnosti primjenjena su 24 testa kao i 12 situacijskih motoričkih varijabli (po 3 za svaku sportsku igru). Inicijalno i finalno mjerenje su izvršeni u septembru i maju). Cilj ovog istraživanja bio je utvrđivanje strukturalnih promjena u bazičnoj i situacionoj motorici nakon provedenog programa, u suštini, valorizacija transformacijskog procesa. Za utvrđivanje strukturalnih promjena primjenjene su procedure Lsdif, Qdiff1 i Cramer. Rezultati ovog istraživanja pokazali su opću, sistematsku i kontinualnu rekonstrukciju općih i specifičnih motoričkih sposobnosti, za što je odgovoran transformacijski proces, iako ne u svim situacijama u jednakoj mjeri. Najslabiji efekti su zabilježeni u slučaju nogometa.

Key words: strukturalne promjene, transformacije, igre, bazična i situacijska motorika

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Correspondence to:

Milan Mladenović, MSc

Catholic School Center

Mehmed P. Sokolovića 11, 71000 Sarajevo, BiH

Phone: +387(0)33 653 506

E-mail: milan_ml@yahoo.com