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## A COMPUTER PROGRAM FOR EVALUATION OF CHILDREN'S FITNESS AT FOOTBALL CLASSES

**Abstract.** The article features a method of evaluation of individual fitness of children aged 10-14 at football classes involving the use of the "E-journal Football" computer program, taking into consideration children's health condition, age, gender, morpho-functional and mental health characteristics. «E-journal Football» computer program has been described in terms of evaluation of academic progress efficiency during football lessons. Additionally, the program may also assess technical aspects of children's activities based on their anthropometric, psychophysical and musculoskeletal characteristics. In total, 212 children aged 10–14 took part in the study. They were subdivided into two groups – the experimental group (EG) with 53 boys and 53 girls and the control group (CG) with 54 boys and 52 girls. The traditional methods based on the average indices of preliminary qualification used to teach movements in football have been applied in CG, while the other group employed the methods based on "E-journal Football" computer program considering the children's age, gender and physical characteristics. The implementation of the developed method of evaluation of children's individual physical preparedness at football classes based on the use of "E-journal Football" computer program resulted in improvement of the children's psycho-emotional health and motor functions. It was concluded that according to all performance indicators of children's physical fitness during football classes, there was a clear increase in certain indicators in the experimental group compared with those in the control group ( $p < 0.05$ ): for example, keeping the ball indicators among the boys in EG rose by 7% against those of 4.5% in CG; similarly, the girls in EG showed a 7.3% increase in keeping the ball compared with only 5.5% in CG. Stopping the ball performance showed the improvement of 23.5% and 12.3% among the boys in EG and CG correspondingly, while the girls demonstrated 32% and 12.2% in EG and CG correspondingly. The application of the experimental method of evaluation of children's individual fitness at football classes with the use of informational-communication technologies (ICT) resulted in children's increased motivation to physical education regardless age and gender, which improved general performance in football classes.

**Keywords:** physical education; children aged 10–14; football; E-journal Football; ICT.

## 1. INTRODUCTION

**The problem statement.** Football is considered as one of the most popular games and an affordable means of physical development and overall fitness promotion among children and teenagers. Such issues as methods of teaching football motor activity as well as design and contents of football lessons are very topical nowadays. It is necessary to note that control and evaluation of children's learning activity are crucial components of the learning process.

So far neither domestic nor foreign specialists have succeeded in developing an evaluation system which would be the benchmark. Every judgment is subjective. Evaluation of children's progress is an integral part of learning process and is vital for its overall efficiency, diagnosis and control of performance. In the conditions of a competitive society, evaluation of learning progress as a means of motivation takes on special significance. It contributes to rational definition of personality rating (subjective significance index) as well as self-actualization, development of creativity, emotional and axiological indices.

**Analysis of recent studies and publications.** S. Lebedev, B. Bezyasichny, T. Shpanko, S. Stadnik, A. Bulgakov and V. Khudyakova [1] regard football as a means of physical development of children and teenagers, while A. G. Vasylichuk [5] has designed a technology of teaching football as part of school curriculum. Currently, issues concerning the selection of young footballers have been thoroughly studied by M. Grabara [2], Ye. Imas, O. Borysova, I. Kogut, M. Yarmolenko, V. Marynych and O. Shlonska [3], V. Shalenko, and V. Perevoznyk [4], K. Mouloud [6], J. Gardasevic, D. Bjelica and M. Corluka [7]. A. Bolotin and V. Bakayev [8] also looked at young footballers' potential in their works. V. Shalenko and V. Perevoznyk [4] studied the organization of learning process in football. The factor structure of physical and psycho-emotional characteristics of children who play football was defined by G. Polevoy [9], Ye. Imas, O. Borysova, I. Kogut, M. Yarmolenko, V. Marynych and O. Shlonska [3], while A. Burdukiewicz, J. Chmura, J. Pietraszewska, J. Andrzejewska, A. Stachoń and J. Nosal [10], V. M. Kostiykevuch [11] dedicated their works to the study of functional readiness of young footballers.

It is argued that evaluation as an integral part of the conceptual-comparative and structural-systemic analysis is an important condition for increasing effectiveness of training, being an essential tool for diagnosing and controlling students' learning outcomes [2]. Most scholars emphasize the importance of evaluation in the educational process. Thus, Ye. Imas, O. Borysova, I. Kogut, M. Yarmolenko, V. Marynych and O. Shlonska [3] state that school assessment is the process of determining and expressing in grades, as well as in the instructor's evaluative judgments, the degree of students' knowledge and skill acquisition in view of the requirements of school curricula, students' diligence level, discipline, daily analysis of the results of students' work, etc. According to V. Shalenko and V. Perevoznyk [4], evaluation of educational and cognitive activity means determining the degree of students' accomplishment of the tasks assigned to them in the learning process, their attainment and development level, the quality of acquired knowledge, formed skills and abilities. As pointed out by V. M. Kostiykevuch [11], evaluation is a process of checking knowledge, skills and abilities. A. Bolotin and V. Bakayev [8] believe that evaluation is an organic element of classroom educational activity that is aimed at identification of the results achieved and thus serves as a form of feedback for a teacher, an essential component of effective management of the teaching process. G. Polevoy [9] defines assessment as a process of comparing the level of students' knowledge, skills and abilities with standard representations, descriptions set in curricula, guidelines and other normative documents.

Rapid development of pedagogical science in the context of informatization of the educational sphere led to the integration of computer technologies into such specific academic branch as physical education and sports. Recently there has been a considerable growth in the

number of studies which mainly focused on the implementation of informational-communication technologies into physical education lessons [12], [13], [14]. Researchers proposed specialized computer programs in different areas of physical training. For example, A. G. Vasylychuk [5] developed a computer-based system of comprehensive control “Football at school”; V. Akshanin [15] proposed a computer educational program “Basics of selection, learning and training of footballers”; H. Acar and E. Tutkun [16] introduced a computer-based system “Monitoring” for carrying out control of physical condition of children of the school age.

Currently, there is a shortage of works which focus on evaluation of children’s progress at football lessons based mostly on determining technical aspects. Thus, the issue of designing methods of evaluation of physical preparedness of children aged 10–14 during football lessons involving the use of informational-communication technologies (ICT) is topical in view of objectivity and ease of such evaluation.

**The article’s goal.** The aim of the study is to determine the connection between psychophysical state and technical preparedness in football among children aged 10–14 and describe a developed computer program which can determine possible individual norms of young footballers’ motion abilities.

## 2. RESEARCH METHODS

Two hundred and twelve children aged 10–14 took part in the study. They were divided into two groups – the experimental group (EG) with 53 boys and 53 girls involved and the control group (CG) with 54 boys and 52 girls involved. The traditional methods based on average figures of preliminary qualification used to teach movements in football have been applied in CG, while the other group employed the methods based on “E-journal Football” computer program, considering age, gender and physical characteristics of children.

A specially designed test was carried out in order to measure the children’s motion readiness, during which the progress was determined in terms of the following activities: keeping the ball, stopping the ball, range of impact, accuracy of impact, juggling the ball.

To measure the children’s psycho-emotional state, the “SAN” method was applied.

The study was based on the following methods: theoretical analysis and generalization of literary sources, pedagogical observation, testing, and methods of mathematical statistics.

## 3. THE RESULTS AND DISCUSSION

During the study it was determined that the age dynamics of individual physical preparedness among children aged 10–14 features heterochrony and certain differences in learning progress in football. By means of correlation analysis the connection between the level of special motion readiness in football (efficiency of key techniques – keeping the ball, stopping the ball, range of impact, accuracy of impact, juggling the ball) and morpho-functional and psychic characteristics of body development of children aged 10–14 was determined. Other factors which influenced the progress in football in each age and gender group ( $p < 0.05$ ) were the anthropometric and psychophysiological peculiarities of body development, characteristics of physical readiness and somatic health of children aged 10–14.

Significant indicators of physical state of girls aged 11–12 in terms of technical preparedness during football classes were demonstrated. It was determined that the ability to keep the ball greatly depends on motor memory ( $r = -0.53$  with  $p < 0.05$ ), attention switch ( $r = -0.63$  with  $p < 0.05$ ), agility and speed of information processing ( $r = -0.77$  and  $r = -0.82$  with  $p < 0.05$  correspondingly). Stopping the ball is highly influenced by spatial orientation ( $r = -0.50$

with  $p < 0.05$ ), motor memory ( $r = -0.41$  with  $p < 0.05$ ), balance ( $r = -0.46$  with  $p < 0.05$ ), capacity of visual memory ( $r = -0.39$  with  $p < 0.05$ ) and spatial and dynamic accuracy ( $r = -0.58$  with  $p < 0.05$ ). Another connection determined is that impact correlates with distance and reaction to a moving object ( $r = -0.55$  with  $p < 0.05$ ), whereas distance of impact correlates with strength index ( $r = -0.61$  with  $p < 0.05$ ), length of calf and flexibility ( $r = -0.94$  and  $r = -0.55$  with  $p < 0.05$ ). Motor memory ( $r = -0.86$  with  $p < 0.05$ ), balance ( $r = -0.69$  with  $p < 0.05$ ), attention switch and spatial dynamic accuracy ( $r = -0.86$  and  $r = -0.74$  correspondingly with  $p < 0.05$ ) equally affect the impact, while maximum frequency of movements (tapping test) ( $r = -0.21$  with  $p < 0.05$ ), motor memory ( $r = -0.35$  with  $p < 0.05$ ), agility ( $r = -0.57$  with  $p < 0.05$ ), length of foot and accuracy of time representation within 10 seconds (sec) ( $r = -0.52$  and  $r = -0.23$  with  $p < 0.05$  correspondingly) influence juggling the ball.

With boys aged 12–13, motor memory ( $r = -0.71$  with  $p < 0.05$ ), attention capacity ( $r = -0.77$  with  $p < 0.05$ ), reaction to a moving object and accuracy of time representation within 10 sec ( $r = -0.69$  with  $p < 0.05$ ), speed and agility ( $r = -0.46$  and  $r = -0.24$  with  $p < 0.05$  correspondingly) have a significant impact on keeping the ball. Stopping the ball is connected with length of foot ( $r = -0.45$  with  $p < 0.05$ ), attention capacity ( $r = -0.51$  with  $p < 0.05$ ), reaction to a moving object and accuracy of time representation within 10 sec ( $r = -0.43$  and  $r = -0.59$  with  $p < 0.05$  correspondingly). Impact in terms of distance clearly correlates with accurate representation of strength of impact if  $\frac{1}{2}$  max ( $r = -0.29$  with  $p < 0.05$ ), strength index ( $r = -0.77$  with  $p < 0.05$ ), endurance ( $r = -0.34$  with  $p < 0.05$ ), information processing rate and maximum frequency of movements (tapping test) ( $r = -0.35$  and  $r = -0.53$  with  $p < 0.05$  correspondingly). Impact in terms of accuracy correlates with accurate representation of strength of impact if  $\frac{1}{2}$  max ( $r = -0.29$  with  $p < 0.05$ ), strength index ( $r = -0.61$  with  $p < 0.05$ ), length of foot and maximum frequency of movements (tapping test) ( $r = -0.29$  and  $r = -0.59$  with  $p < 0.05$  correspondingly). Juggling the ball correlates with attention capacity ( $r = -0.24$  with  $p < 0.05$ ), motor memory ( $r = -0.45$  with  $p < 0.05$ ), endurance ( $r = -0.46$  with  $p < 0.05$ ), information processing rate ( $r = -0.68$  with  $p < 0.05$ ), accurate representation of strength of impact if  $\frac{1}{2}$  max and accuracy of time representation within 10 sec ( $r = -0.45$  and  $r = -0.59$  with  $p < 0.05$  correspondingly).

“E-journal Football” computer program has been developed and introduced in order to efficiently calculate the results of different techniques demonstrated by children, with its further implementation into school curriculum as part of physical education (Fig.1).

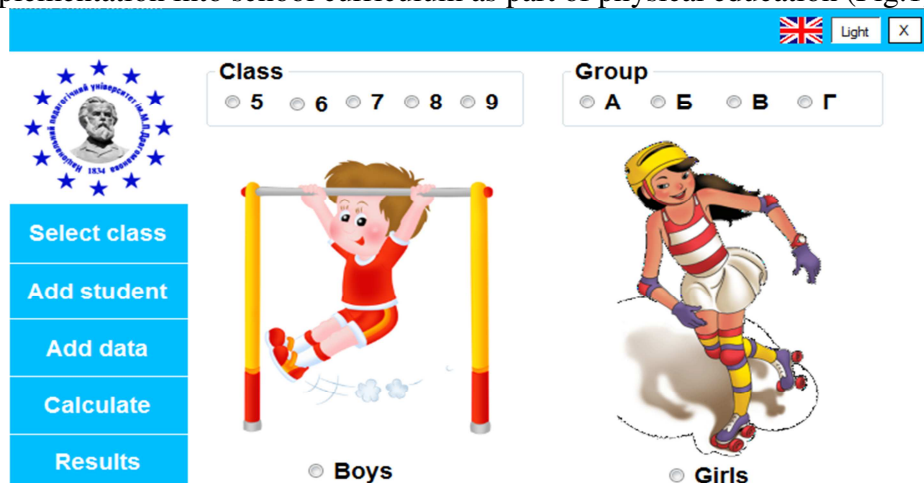


Fig. 1. E-journal Football

The program works in the following way: at the beginning of a school year a teacher administers the placement test so as to determine informatively significant anthropological

and psychophysiological characteristics as well as characteristics of physical activity and somatic condition of every child to perform basic techniques at football lessons and logs the data in “E-journal Football”. At the first stage a teacher selects age and gender of the student for further evaluation of their achievements. Next, they select the class to be evaluated. To do so, the teacher needs to click the icon “Create” and then “Add student”. At this stage the teacher adds list number and the name of the student. Number and name of the added student then appear in on the right part of the table (Fig.2).

Fig. 2. Adding students to “E-journal Football”

Once the list is created, the teacher selects the game or sport from the list: football, gymnastics, handball etc. If football is selected, for example, the list of anthropological, psychophysiological, physical activity characteristics and somatic condition appears on the screen. The teacher completes the information about a student, which is informatively significant for each technique demonstrated during a football lesson (Fig.3).

Fig. 3. Example of table completion for student progress in football

The program allows adding data at any point by clicking “Add data”. After data completion, the teacher opens the first window and clicks “Calculation” which is under the icon “Create”. After a new window with the list of kinds of games or sports appears on the screen, the teacher selects the game/sport to be evaluated. If football is selected, for example,

a list of techniques appears on the screen and the teacher adds new figures demonstrated by the student at the recent lesson. Similarly, any other student is selected and new data is added. By doing so, text fields “expected result” are automatically filled using regressive equations. Such result can be demonstrated based on psychophysical development of the student.

After data completion, teacher clicks “calculate” and a score from 1 to 12 appears, which shows factual and expected results (Fig.4).

Fig. 4. Calculation of results in “E-journal Football”

By clicking “Total score”, the teacher receives the total scores in the Football module. The total score is calculated by adding up the scores for each technique and then dividing the sum by 5, which is the number of techniques evaluated. Total score is calculated by 12-score scale with the use of the following keys:

$Y_{tp}$  – the expected (adequate) result relying on anthropological and psychophysiological characteristics of body development;  $Y_{f_{tp}}$  – the actual result;  $\Delta$  – difference between the expected result and the actual result, which is based on direct or inverse pattern of relationship. Thus, comparison  $\frac{Y_{tp}}{Y_{f_{tp}}}$  is used to calculate the inverse relationship, for example, when evaluating the progress of keeping the ball – the lower is the score in seconds the higher is the speed of keeping. Otherwise, direct relationship  $\frac{Y_{f_{tp}}}{Y_{tp}}$  is used.

The implementation of the proposed method of evaluation of children’s individual fitness using “E-journal Football” computer program increased psycho-emotional health and physical preparedness of the children.

Thus, the objective evaluation of progress among children in EG considering their physical state resulted in increased mood characteristics among boys by 0.8 s. u. and among girls by 0.7 s. u. ( $p < 0.01$ ). Equally, boys and girls in CG showed increased progress indicators. However, they were not as significant as in EG with characteristics increased by 0.5 s. u. among the boys and by 0.3 s. u. ( $p < 0.01$ ) among the girls.

Similar dynamics was demonstrated by children in both groups in terms of activity levels and well-being. Thereby, activity levels among the boys in EG increased by 1.2 s. u. and the girls by 1.8 s. u. ( $p < 0.01$ ), whereas the boys and the girls in CG showed a less significant increase – by 0.4 s. u. and 0.6 s. u. ( $p < 0.01$ ) correspondingly. Well-being characteristics rose by 0.9 s. u. among the boys and by 0.3 s. u. ( $p < 0.01$ ) among the girls in

EG. The boys and the girls in CG showed less significant difference with 0.6 s. u. and 0.7 s. u. ( $p < 0.01$ ) correspondingly (Table 1).

Table 1

**Comparison of characteristics of emotional conditions among children aged 10–14 in experimental and control groups during pedagogical experiment (n=212, s. u.)**

Characteristics evaluated	Results in EG before experiment		Results in EG after experiment		Results in CG before experiment		Results in CG after experiment	
	X	m	X	m	X	m	X	m
Boys (EG, n=53; CG, n=54)								
Well-being	4.9	0.85	5.8	0.48	4.8	0.67	5.4	0.58
Activity levels	4.9	0.79	6.1	0.67	4.9	0.66	5.3	0.42
Mood	5.4	0.62	6.2	0.87	5.4	0.62	5.9	0.55
Girls (EG, n=53; CG, n=54)								
Well-being	4.4	0.41	5.7	0.32	4.3	0.40	5.0	0.49
Activity levels	4.4	0.37	6.2	0.44	4.5	0.32	5.1	0.57
Mood	5.1	0.22	5.8	0.56	5.1	0.33	5.4	0.39

The analysis of dynamics of keeping the ball, stopping the ball, range of impact, accuracy of impact and juggling the ball was carried out so as to rate the effect of objective evaluation of children's progress considering their physical conditions of motor readiness at secondary school. It was found out that children in EG demonstrated much higher progress in terms of techniques in football compared with their peers in CG.

Thus, keeping the ball indicators increased by 7% among the boys in EG, whereas the same indicators in CG increased only by 4.5%. The girls in EG showed an increase of 7.3% in keeping the ball compared with 5.5% in CG. Stopping the ball indicators among the boys in EG were significantly higher compared with the results in CG (23.5% and 12.3% correspondingly ( $p < 0.05$ )). The girls showed the results of 32% in EG and 12.2% in CG. Similar dynamics was seen with regard to accuracy and length of impact. Accordingly, the boys in EG showed improvement of 28.5% in length of impact, whereas the boys in CG showed improvement of only 17.1%. Similar figures of 14.5% and 7.9% correspondingly were demonstrated by the girls in EG and CG. In terms of accuracy of impact, the figures were the following – 13.4% showed by the boys in EG compared with 4.4% in CG and 11.9% showed by the girls in EG compared with 4.9% in CG. Juggling the ball indicators increased by 22.3% among the boys in EG and 19.7% in CG. Similarly, progress indicators among the girls in juggling the ball improved by 31.1% in EG compared with 19.6% in CG (Table 2).

Table 2

**Comparison of results of evaluation of motor readiness among children aged 10–14 in experimental and control groups during pedagogical experiment (n=212, s. u.)**

Indicators evaluated	Results in EG before experiment		Results in EG after experiment		Results in CG before experiment		Results in CG after experiment	
	X	m	X	m	X	m	X	m
Boys (EG, n=53; CG, n=54)								
Keeping the ball	10.83	0.14	10.08	0.24	10.84	0.27	10.35	0.22
Stopping the ball	0.62	0.07	0.81	0.09	0.64	0.06	0.73	0.08
Range of impact	28.76	3.45	40.2	5.28	28.68	3.45	34.6	3.89
Accuracy of impact	1.94	0.11	2.24	0.14	1.95	0.04	2.04	0.03
Juggling the ball	7.3	0.56	9.4	0.98	7.4	0.51	8.9	0.81
Girls (EG, n=53; CG, n=54)								
Keeping the ball	12.01	0.19	11.14	0.22	11.97	0.21	11.31	0.54
Stopping the ball	0.41	0.04	0.61	0.08	0.42	0.03	0.53	0.07
Range of impact	24.2	2.04	28.3	2.01	24.5	2.29	26.6	2.18

Accuracy of impact	1.77	0.09	2.01	0.11	1.75	0.06	1.84	0.08
Juggling the ball	4.6	0.45	6.7	1.02	4.5	0.39	5.6	0.95

#### 4. CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

The introduced computer program for evaluation of physical activity levels among children aged 10–14 “E-journal Football” makes it possible to determine learning efficiency in football. The proposed journal was designed considering age, gender and particularly significant and factual indicators of anthropometrical, psychophysical and motor development of children’s bodies. The efficiency of the methods of evaluation of physical preparedness of children aged 10–14 at football lessons was proved by a range of positive changes. The boys and the girls in the experimental and the control groups were surveyed to find the motivation aspects. For example, the motivation characteristics among the girls and the boys in CG were 31.2% and 35.4% correspondingly, whereas those in EG showed the results of 44.3% and 49.8% correspondingly with the positive dynamics of 13.1% among the girls and 14.4% among the boys.

All indicators of children’s physical preparedness at football lessons increased in EG compared with those in CG ( $p < 0.05$ ). For example, keeping the ball indicators among the boys in EG increased by 7% against those of 4.5% in CG. Similarly, the girls in EG showed a 7.3% increase in keeping the ball compared with only 5.5% in CG. The improvement of 23.5% and 12.3% was seen in stopping the ball performance among the boys in EG and CG correspondingly, while the girls demonstrated 32% and 12.2% in EG and CG respectively. Thus, the introduction of motor activity evaluation methods of physical preparedness of children aged 10–14 in football lessons fostered both their motivation-value aspects and the performance techniques. The introduced evaluation methods and the described computer program “E-journal Football” can be successfully implemented at schools during football lessons and in the process of footballers’ training.

The research is not final and allows for further improvement of methods of evaluation of physical fitness of children aged 10–14 based on the use of ICTs. Recommendations need to be developed for the teaching staff of educational establishments as for the implementation of ICTs into football classes. The study provides a reliable foundation for future research of efficiency improvement in the area of pedagogical control and evaluation of learning progress in the sphere of physical education and sport.

#### REFERENCES (TRANSLATED AND TRANSLITERATED)

- [1] S. Lebedev, B. Bezyasichny, T. Shpanko, S. Stadnik, A. Bulgakov, and V. Khudyakova, "Comparative analysis of strength preparation indicators of 12–13-year-old junior football players", *Journal of Physical Education and Sport*, no. 18(4), pp. 2364–2367, 2018. doi:10.7752/jpes.2018.04356. (in English)
- [2] M. Grabara, "Analysis of body posture between young football players and their untrained peers", *Human Movement*, vol. 13, no. 2, pp. 120–126, 2012. doi: 10.2478/v10038-012-0012-7. (in English)
- [3] Ye. Imas, O. Borysova, I. Kogut, M. Yarmolenko, V. Marynych, and O. Shlonska, "Football training as a method to improve the psycho-emotional state of school children with mental development impairments", *Journal of Physical Education and Sport*, no. 18(1), pp. 23–27, 2018. doi:10.7752/jpes.2018.01003. (in English)
- [4] V. Shalenko, and V. Perevoznyk, *Organization and conducting of classes and competitions in football in a general education school and place of residence*. Kharkiv, Ukraine, 2003. (in Ukrainian)
- [5] A. Vasylychuk, "Dynamics of indicators of physical and techno-tactical preparedness of schoolchildren under the influence of football lessons on the basis of computer technologies", *Pedahohika, psykolohija ta medyko-biolohichni problemy fizychnogho vykhovannja i sportu*, no. 10, pp. 9–18, 2003. (in Ukrainian)
- [6] K. Mouloud, "Level of state anxiety among youth football players according different playing positions", *SportMont*, no. 17(1), pp. 33–37, 2019. doi 10.26773/smj.190206. (in English)



- [7] J. Gardasevic, D. Bjelica, and M. Corluca, "The impact of the preparation period on endurance at football players U16", *SportMont*, no. 16(1), pp. 21–24, 2018. doi 10.26773/smj.180204. (in English)
- [8] A. Bolotin, and V. Bakayev, "Pedagogical conditions required to improve the speed-strength training of young football players", *Journal of Physical Education and Sport*, no. 17(2), pp. 638–642, 2017. doi:10.7752/jpes.2017.02095. (in English)
- [9] G. Polevoy, "Development of the ability to differentiate the parameters of football players' movements taking into account their typology", *International Journal of Applied Exercise Physiology*, vol. 7, no. 2, pp. 27–31, 2018. doi: 10.22631/ijaep.v7i2.268. (in English)
- [10] A. Burdukiewicz, J. Chmura, J. Pietraszewska, J. Andrzejewska, A. Stachoń, J. Nosal, "Characteristics of body tissue composition and functional traits in junior football players", *Human Movement*, vol. 14, no. 2, pp. 96–101, 2013. doi: 10.2478/humo-2013-0010. (in English)
- [11] V. Kostiykevuch, "Model indicators of functional readiness of soccer players". *Moloda sportyvna nauka Ukrainy*, no. 10 (2), pp. 196–202, 2006. (in Ukrainian)
- [12] O. Aksonova, "Computer at the lesson of physical education", *Komp'juter u shkoli ta sim'ji: naukovometodychnyj zhurnal*, no.7, pp. 30–33, 2012. (in Ukrainian)
- [13] C. Craggs, K. Corder, E. M. van Sluijs, and S. Griffin, "Determinants of change in physical activity in children and adolescents: a systematic review", *American journal of Preventive Medicine*, no. 40(6), pp. 645–658, 2011. (in English)
- [14] T. Krucevych, *Control in the physical education of children, adolescents and youth*. Kyiv, Ukraine: Olimpijska literatura, 2011. (in Ukrainian)
- [15] V. Akshinin, *Information support of physical education and sport*. Kharkiv, Ukraine, 2008. (in Ukrainian)
- [16] H. Acar, and E. Tutkun, "Analysis of the 2D:4D ratios of national and amateur football players", *International Journal of Applied Exercise Physiology*, vol. 8, no. 1, pp. 132–137, 2019. doi: 10.30472/ijaep.v8i1.326. (in English)

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## ПРОГРАМНЕ ЗАБЕЗПЕЧЕННЯ ОЦІНЮВАННЯ ІНДИВІДУАЛЬНОЇ РУХОВОЇ ПІДГОТОВЛЕНОСТІ ДІТЕЙ У ПРОЦЕСІ ЗАНЯТЬ ФУТБОЛОМ

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**Анотація.** У статті розкрито методику оцінювання рівня індивідуальної рухової підготовленості дітей 10–14 років з урахуванням стану здоров'я, вікових, статевих, морфофункціональних і психічних особливостей розвитку їх організму в процесі занять футболом з використанням комп'ютерної програми «Електронний журнал (Футбол)». Охарактеризовано комп'ютерну програму «Електронний журнал (Футбол)» для оцінювання

успішності під час занять футболом. Ця програма дає можливість здійснювати оцінку технічних дій дітей з урахуванням віку, статі, інформативних показників антропометричного, психофізіологічного і рухового розвитку. У дослідженні взяли участь двісті дванадцять дітей 10–14 років, з яких сформовано експериментальну (ЕГ) та контрольну (КГ) групи. До складу ЕГ увійшло 53 хлопчики і 53 дівчинки, а до КГ – 54 хлопчики та 52 дівчинки. У КГ оцінювання відбувалося за традиційною методикою на основі використання середніх показників в орієнтовних нормативах під час навчання рухових дій з футболу, а в ЕГ – за розробленою методикою з використанням комп'ютерної програми «Електронний журнал (Футбол)» на основі врахування віку, статі, фізичного стану дітей. Методи дослідження: теоретичний аналіз та узагальнення літературних джерел, педагогічне спостереження, тестування, методи математичної статистики. Упровадження методики оцінювання рівня індивідуальної рухової підготовленості дітей під час занять футболом з використанням комп'ютерної програми «Електронний журнал (Футбол)» сприяло покращенню психоемоційного стану та рівня рухової підготовленості дітей. Також за всіма показниками рухової підготовленості дітей у футболі зафіксовано достовірне покращення результатів в ЕГ відносно КГ ( $p < 0,05$ ), зокрема, результати з ведення м'яча у хлопців ЕГ зросли на 7%, а в КГ – на 4,5%. У дівчат ЕГ результати ведення м'яча покращились на 7,3%, у КГ – на 5,5%. Показники зупинки м'яча у хлопців ЕГ достовірно покращились порівняно з КГ (на 23,5% і 12,3% відповідно), а у дівчат – на 32% в ЕГ і на 12,2% у КГ. Застосування методики оцінювання індивідуальної рухової підготовленості дітей у процесі занять футболом із використанням ІКТ сприяло підвищенню мотивації дітей до занять фізичними вправами незалежно від статі та віку, що позитивно вплинуло на успішність навчання футболу.

**Ключові слова:** фізичне виховання; діти віком 10–14 років; футбол; Електронний журнал (Футбол); ІКТ.

## ПРОГРАММНОЕ ОБЕСПЕЧЕНИЕ ОЦЕНИВАНИЯ ИНДИВИДУАЛЬНОЙ ДВИГАТЕЛЬНОЙ ПОДГОТОВЛЕННОСТИ ДЕТЕЙ В ПРОЦЕССЕ ЗАНЯТИЙ ФУТБОЛОМ

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**Аннотация.** В статье раскрыта методика оценки уровня индивидуальной двигательной подготовленности детей 10–14 лет с учетом состояния здоровья, возрастных, половых, морфофункциональных и психических особенностей развития их организма в процессе занятий футболом с использованием компьютерной программы «Электронный журнал

(Футбол)». Охарактеризована компьютерная программа «Электронный журнал (Футбол)» для оценки успеваемости во время занятий футболом. Эта программа дает возможность осуществлять оценку технических действий детей с учетом возраста, пола, информативных показателей антропометрического, психофизиологического и двигательного развития. В исследовании приняли участие двести двенадцать детей 10–14 лет, из которых были сформированы экспериментальная (ЭГ) и контрольная (КГ) группы. В состав ЭГ вошли 53 мальчика и 53 девочки, а в КГ – 54 мальчика и 52 девочки. В КГ оценивание происходило по традиционной методике на основе использования средних показателей в ориентировочных нормативах во время обучения двигательным действиям по футболу, а в ЭГ – по разработанной методике с использованием компьютерной программы «Электронный журнал (Футбол)» с учетом возраста, пола, физического состояния детей. Методы исследования: теоретический анализ и обобщение литературных источников, педагогическое наблюдение, тестирование, методы математической статистики. Внедрение методики оценки уровня индивидуальной двигательной подготовленности детей во время занятий футболом с использованием компьютерной программы «Электронный журнал (Футбол)» способствовало улучшению психоэмоционального состояния и уровня двигательной подготовленности детей. Также по всем показателям двигательной подготовленности детей в футболе зафиксировано достоверное улучшение результатов в ЭГ относительно КГ ( $p < 0,05$ ), в частности, результаты по ведению мяча у ребят ЭГ выросли на 7%, а в КГ – на 4,5%. У девушек ЭГ результаты ведения мяча улучшились на 7,3%, в КГ – на 5,5%. Показатели остановки мяча у ребят ЭГ достоверно улучшились по сравнению с КГ (на 23,5% и 12,3% соответственно), а у девушек – на 32% в ЭГ и на 12,2% в КГ. Применение методики оценки индивидуальной двигательной подготовленности детей в процессе занятий футболом с использованием ИКТ способствовало повышению мотивации детей к занятиям физическими упражнениями независимо от пола и возраста, что положительно повлияло на успешность обучения футболу.

**Ключевые слова:** физическое воспитание; дети 10–14 лет; футбол; Электронный журнал (Футбол); ИКТ.



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