OPEN ACCESS

https://dergipark.org.tr/en/pub/turkjkin

REVIEW ARTICLE

The importance of relevant criteria of selection in ensuring the success of the national selection systems in athletics: A review

Alina Ionela Predescu, Liliana Mihăilescu

Doctoral School of Sports Science and Physical Education, University of Pitești, Pitești, Romania.

Received: February 24, 2023

Accepted: March 17, 2023

Published: March 30, 2023

Abstract

Scientific selection represents one of the most important concerns of contemporary sports, as evidenced by the major world investments made in order to identify unique combinations of physical and mental potential and abilities that can be developed towards human biological limits. Some countries have developed complex systems and programs aimed at identifying and especially transforming sports potential into performance, emphasizing the need to develop potentially talented performers and not just to early identify them. The critical analysis of the Romanian selection system in athletics highlights the shortcomings and allows corrections to be outlined. Athletics in particular is a complex sports discipline that requires a multitude of psychomotor and coordinative skills such as rhythm, tempo, balance, segmental coordination, space orientation, and laterality, skills recommended to be detected from the initial phase of the selection in order to foresee the motor endowment of the child and to guide him accordingly. The purpose of this review was to examine the discrepancies between the Romanian selection system in athletics and other successful national systems in order to emphasize the necessity of new perspectives regarding the selection criteria, which need to be relevant in detecting skills in the area of psychomotricity and coordination.

Keywords: Athletics, selection criteria, selection system, specialization.

Introduction

Although all specialists in the field recognize the importance of talent selection and orientation in achieving athletic success, there is no consensus regarding certain universal procedures and methods for predicting success in an athletic event or group of events. The research on the identification of sports talent has been mostly carried out through anthropometric measurements and specific skills tests (Sumantri et al., 2021). The literature of the ′80s classified performance-enhancing factors in athletic events into six categories: (1) physiological and biomechanical, (2) anthropometric and somatic, (3) biological, (4) genetic, (5) psychological, and (6) social (Dabbs, 1992). Specialists then developed batteries of tests that were based on those factors that best predicted success in an athletic event or group of events. The predictive tests were tools through which the coaches could identify the potential of the sport, they could evaluate the current motor level of their athletes, but also, they could choose the most suitable event or group of events for their athletes. Therefore, a decisive factor in issuing objective and correct selection decisions is the choice of those norms and tests corresponding with the

✉ A. I. Predescu, e-mail: ali_predescu@yahoo.com

To Cite: Predescu, A. I., & Mihăilescu, L. (2023). The importance of relevant criteria of selection in ensuring the success of the national selection systems in athletics: A review. *Turk J Kinesiol*, 9(1), 77-84. **DOI:** 10.31459/turkjkin.1255805

somatic type required by a sport or event, and also with the motor and psychological skills needed. "High sports performances can only be obtained by applying a modern training technology, permanently adapted to the particularities of age and sex, on individuals with motor, morpho-functional, neuro-muscular and mental abilities compatible with the requirements of the athletic event" (Mihăilescu, 2005). A common aspect of the batteries of tests used today in Romania, but also in the former Soviet countries, Germany, England, Australia, or Canada, is the predominance of physical, and motor tests, especially in the stage of identifying sports talent (primary selection). We notice that many of these tests were developed in the '80s and are still used today for practical reasons (they do not require sophisticated equipment, they can be performed both indoors and outdoors and they are simple to apply). But limiting the testing only to the motor area neglects the complex specific peculiarities of the athletic events. For this reason, we can develop the hypotheses that the correlation between motor tests with tests from the psychomotor and coordinative areas, aimed at identifying skills such as segmental coordination, rhythmicity, tempo, dynamic balance, spatial-temporal orientation, or amplitude can better predict future performance. Furthermore, analyzing the athletic results recorded by Romanian athletes in the last decade that no longer have international value we can suppose that one of the causes of this decline is the inappropriate approach to the identification and development process of sports talent, a process inherently influenced by the political, social, economic and cultural climate (Prescot, 1999).

History of The National Selection System (NSS) of Romania

The NSS, "result of Romanian thinking and sports practice" (Nicu, 1993) was based on measurements of the bio-physic potential of a significant sample of schoolchildren and pre-schoolchildren (aged between 4 and 18 years) from different social and geographical backgrounds of the country, conducted by the Scientific Research Center of the Ministry of Youth and Sports during 1969-1972. Children already involved in a training process were also subjected to the measurements; the results obtained led to the establishment of bio-physical criteria for sports selection. The institutionalization of a unique system of selection and orientation of children and juniors was achieved in 1976 (Nicu, 1993) and the effects of this system reflected in a gold medal, two silver medals and two bronze medals won at the 1982 Moscow Olympics, five gold medals and one silver medal won at the 1984 Los Angeles Olympics and nine medals won at the 1988 Seoul Olympics (Bompa, 2002). So, the talent selection and orientation process must be a permanent concern of specialists, but in the perspective of new trends in modern sports. The national bodies responsible for the development of sports have a moral and professional obligation towards children gifted by nature to provide them with opportunities to realize their potential. The implementation of a national selection system is an important and necessary first step in complying with this obligation (Prescot, 1999).

Critical analysis of the national selection system in athletics

The NSS developed by Romanian Athletics Federation (RAF) was initially experimental, becoming mandatory in 1985. It is still applied today in its initial form and consists of tests, control norms and annual promotion scales for each of the three stages of selection: initial, secondary and final. The tests provided for the initial selection stage are: *50 m sprint from a standing position*, *standing long jump*, *oină throw* and *600 m run*, specific tests for the age segment between 9 and 12 years, corresponding to the categories of children in athletics system. The results are evaluated according to a national score table, by summing the points on three out of four tests for children of normal height and on two out of four tests for children of exceptional height. After the primary selection, a thorough multivalent athletic training is recommended in order to ensure the balanced development of all motor skills (considering the age particularities of the children) and the formation of a wide set of motor specific abilities, including learning the technique of running, jumping and throwing (Dulceanu, 2011). The promotion tests from one year to another are: *50 m sprint from a block-start*, *standing long jump*, *shot put throw*, *600 m run*, *20 m flying sprint*, *20 bounds (m)*, *30 sec. sit-ups*, *pull-ups*, *backwards shot put throw* and *300 m run*. We will present in Table 1 the abilities and skills necessary to practice the athletic events in order to highlight the discrepancy between the requests and the evaluation tests proposed by NSS.

Table 1
Abilities and skills required for the practice of athletic events in correlation with the tests provided by the current selection system (adapted Dulceanu & Mihăilescu, 2011).

Athletic events	Necessary abilities and skills		Tests provided by the current selection system
	Motor abilities and skills	Psyhomotor and coordination abilities and skills	
Sprint events Relay events	- Speed (reaction time, quickness, steps frequency, acceleration), strength, power, endurance	- Rhythm, motor coordination (lower and upper limb coordination, lower limb-eye coordination, hand-eye coordination), balance, spatial-temporal orientation (especially in relay events), agility, accuracy, laterality	50 m sprint
Distance running	- Speed endurance, general strength, endurance.	- Rhythm, pace, cadence, balance, motor coordination	600 m run
Hurdles/Steeplechase events	- Explosive strength, dynamic flexibility, speed (reaction time, quickness), endurance, mobility	- Rhythm, dynamic balance, arm-leg-trunk coordination, hand-eye coordination, laterality, spatial-temporal orientation	
Jumping events	- Speed (reaction time, quickness), power, endurance strength, mobility and flexibility	- Distance, amplitude, direction, position, rhythm, duration, dynamic balance, spatial-temporal orientation, arm-leg-trunk coordination	Standing long jump
Throwing events	- Explosive strength, flexibility, speed, dexterity, mobility and flexibility, endurance	- Dynamic balance, coordination: arm-leg-trunk, hand-eye, spatial-temporal orientation, rhythm, tempo	Oină throw

The selection tests provided by RAF in order to detect athletes with predispositions for the running group (sprints, relays, hurdles, endurance) are *50 m sprint from a standing start* and *600 m running*. The former highlights the level of reaction time and the latter, the level of manifestation of general endurance and the motivation and ambition of athletes at the time of evaluation, but none of them reflect psychomotor and coordination abilities and skills such as balance, laterality, spatial-temporal orientation, general or segmental coordination. Many international coaches use speed tests accompanied by jumping tests (vertical jump, classic or standing triple jump, different hops), plyometric tests, flexibility tests, and psychology tests in order to identify sprinting skills. Freitas et al. (2020) recommend the Leger-Boucher test as relevant to the group of middle and long-distance events. This test involves the progressive increase of speed from 9 km/h for the first 50 m, by 1 km/h every 2 minutes. Voluntary abandonment or inability to reach the 50 m mark (cone) within the time period provided by the audible signals causes the test to be interrupted. Maximum Aerobic Speed (VMA - km/h) is calculated according to the formula (speed of the last completed 50 m + (time in seconds of the uncompleted 50 m/120) (Freitas et al., 2020). The *standing long jump* test, addressed to the jumping group, highlights the level of explosive force but does not reflect rhythmicity, tempo, limb-trunk coordination, amplitude, dynamic and static balance, spatial-temporal orientation, and skills required by all jumping events. Idrizović & Nićin (2014) even highlight the total irrelevance of this test in detecting the potential for the long jump event, recommending instead the test of *standing triple jump*, due to the dynamic structure and single-leg jumps that follow the initial two-leg start (Idrizović & Nićin, 2014). The same authors claim that every battery of tests aimed to detect talent for jumping events should include *vertical jump*, *standing triple jump (*for the estimation of explosive strength of lower extremities), *20 m fly*, *30 m sprint* (for the estimation of the running speed) and *medicine ball throw from lying on the back (*for the estimation of explosive strength of upper extremities) (Idrizović & Nićin, 2014). The *oină throw* test, addressed to the throwing group, involves a javelin-specific throw (without relevance for pushing or launching objects) and reveals arm strength and speed but no dynamic balance, coordination arm-trunk-legs, eye-hand coordination or space orientation skills. Analyzing

the tests for initial and secondary stage of selection proposed by RAF more than three decades ago in comparison with the multitude of athletic events for which future athletes are selected and their complexity in terms of motor and psychomotor skills needed, we notice that they are exclusively physical, without any value for detecting the absolutely necessary psychomotor and coordination skills. Therefore, the initial selection tests as well as those for promotion from one year to another provided by the current selection system determine the entry and advancement in training process of some athletes who are not in full accordance with the requirements and demands of the athletic events. These tests mostly estimate the current physical state of a trainee, but not his genetic traits and natural abilities (Moskovchenko et al., 2018), thus they cannot be used as objective and valid factors for predicting sports success in adulthood.

National selection systems developed by countries with international sports success

Nowadays, more and more countries manage to win medals at the World Championships and Olympics. Most of these have developed real structures for the identification and development of talented young people, such as the Sports Schools for Children and Youth in Eastern European states, the Australian Institute of Sport, the ASPIRE organization in Qatar or the English High Performance Talent Program (Vayens et al., 2009). These programs are of particular importance for countries with small populations, which face a limited number of young people with great sporting potential, unlike giants such as China, the United States, or Russia. In the United States of America, for example, no systematic talent identification process is currently used, with children taking up sports on their own initiative or at the urging of parents and teachers. But this world power develops extensive selection programs, especially in Olympic sports.

At the opposite pole is Australia, a country that has developed a national selection system based on major financial investments. Vayens et al. (2009) reported a linear relationship between financial investment and Olympic medals won, reporting an Australian Government investment of $37 million for an Olympic gold medal and $8 million for an Olympic medal overall. Another example of significant government investment is provided by Great Britain, which invested £2.3 million for a medal, prior to the 2004 Olympics (Houlihan & Green, 2008). Therefore, a clear advantage of the implementation of a national sports selection system consists in the efficient use of limited resources: human, financial, and material ones. Among all the conditional factors of an effective system, the amount of human resources has influenced and still drastically influences the dynamics of the selection process at the national level (Krasilshchikov, 2013). The modern approach to gradual selection involves the drastic sorting of athletes and the exclusion of those who do not possess real potential to become elite athletes for reasons of economy and efficiency. It undertakes a pyramid-type sports selection, built on three levels based on a very large number of children from which the most talented are automatically highlighted (Bailey & Collins, 2013). The first level is carried out in schools and aims at the assessment of anthropometric indices. The second level, that of reserves, investigates energy systems and the level of basic motor skills, while the third level addresses elite athletes. The Australian selection system model (Fig. 1) provides training space and equipment to a large number of athletes, who are allowed to train and compete against each other for 10 years, after which the leaders are recruited.

The Australian national selection system has undertaken numerous programs to identify and develop sporting talent. For example, for the successful national participation in the Olympic Games in Sydney (2000), a three-level national program was developed for the 14-16 age group and included eight sports disciplines (in which Australian athletes did not excel internationally): athletics, rowing, canoeing, swimming, polo, weightlifting, cycling and triathlon (Prescot, 1999). The first level involved an initial screening of schoolchildren through an interactive computer program called Sport Search. The program included a series of questions in order to investigate interests, previous sports experience, and current physical level and then recommended the placement of the child in one of the eight sports provided, based on the answers received. Those who registered a percentage equal to or greater than 98% concordance with the requirements of one of the sports were selected for the next level (Prescot, 1999).

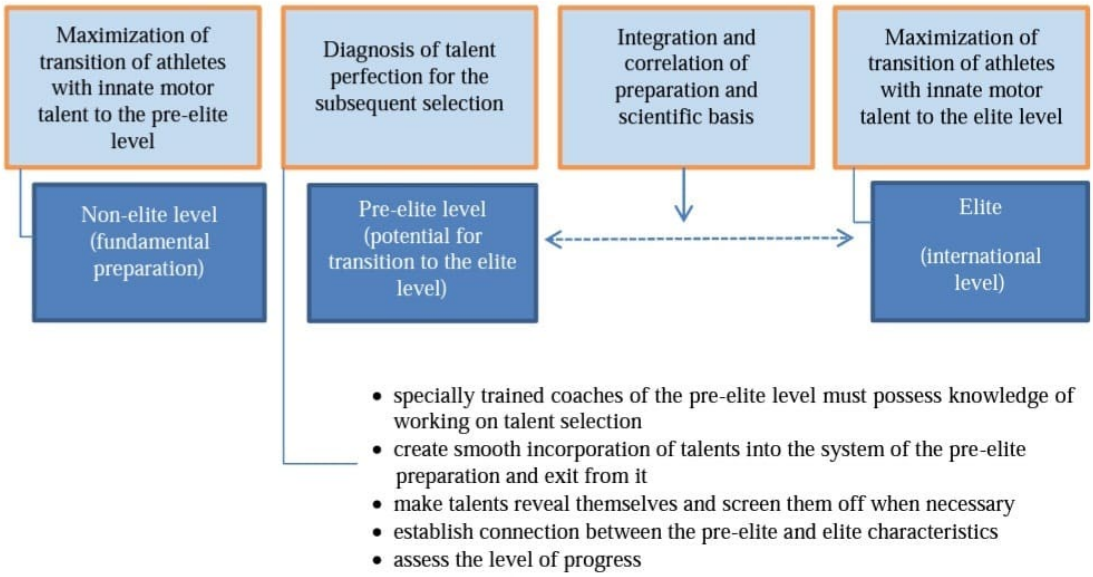

Figure 1. The conceptual model of identification and development of sports talents in Australia (Platonov, 2018).

The second level implied an advanced screening of general and specific skills and was carried out at State Institutes or Regional Centers, in accordance with the standards of the National Sports Organization. The latter institution was responsible for the third level of selection, namely the development of talent through national sports training programs. In recent years, Australia has intensified the system of identifying and developing sporting talent by implementing the national strategy to promote Australian athletes from world-class to the best in the world. In this regard, Australian specialists have created individualized programs for each Olympic sport, all built on the FTEEM scheme - Foundation, Talent, Elite, Mastery. This approach encourages the population to an active life by practicing leisure and sports activities, a strategy aimed at the long-term selection of future world champions (Weissensteiner, 2016). An example of Australia's adaptation of strategies to current trends is the creation of an electronic tool for identifying sports talent, a tool aimed at young people between the ages of 12 and 29 and which involves carrying out some motor tests at home and uploading the results to the platform of the Australian Institute of Sports. Young people with above-average results are later invited to retest at a Regional Center. This program involves three test sections based on specific criteria: general (height, weight, span, number of push-ups on a chair in 30 seconds, vertical jump, 40 m sprint, 20 m shuttle or the audio test on 20 m with the recording of the last repetition in accordance with the audio instructions), specific to athletic events (endurance events - height, weight, 1.6 km run; speed events - height, weight, vertical jump, 60 m sprint; jumping events - height, weight, standing long jump, vertical jump; throwing events - height, weight, vertical jump, cricket ball throw) and elite (personal and current sports performance information for athletes who wish to change their sports career).

Another successful example is the German selection system. Sports federations from this country currently apply a selection system developed on five consecutive squads: D, DC and C are squads specific to child and junior categories, while B and A cover the categories after junior level, as mentioned in Fig. 2. Selection at D squad is carried out by regional federations, while national sports federations carry out the selection at all other squads. Twenty Olympic Centers undertake specific measures aimed at providing recruited athletes with multidisciplinary support from sports training science, medicine, physiotherapy, psychology, nutrition, and career guidance (Guellich & Emrich, 2012).

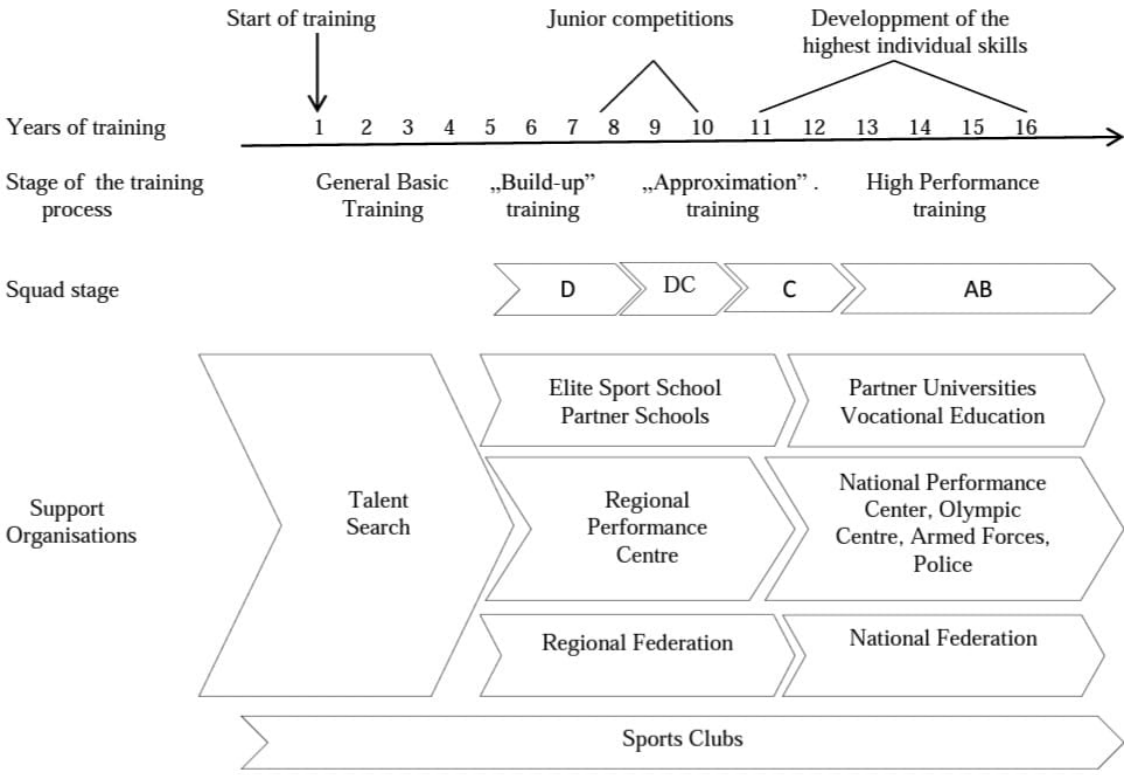

Figure 2. Structure of long-term athlete development and of athlete support organizations (Guellich & Emrich, 2012).

Vaeyens et al. (2009) analyzed the longitudinal study undertaken by Guellich & Emrich in 2007 on a number of 1558 German athletes who were part of an Olympic program at some point in their sports career. The analysis focused on senior athletes (680 people) in terms of volume, intensity, specialization of training, success achieved, number of competitions, and institutional support at the level of children and juniors and tried to make a comparison between world level and national level athletes. The following conclusions emerged from this analysis: (1) no differences were identified between the two groups in terms of the age of onset in training and competition in various sports activities, or in terms of the intensity of training at the juvenile level; (2) the volume and intensity of training in the main sport is similar for both groups, but the development of world-class athletes in this sport came later on. World-class athletes began training, competition and international participation in their main sport significantly later than national-level athletes, who were already competing at the age of 11; (3) a significantly higher percentage of all world-class athletes trained and competed in sports other than their main sport and invested significantly more time in training for other sports. In total, German world-class athletes did about 50% more training in disciplines other than their main one compared to national-level athletes; (4) top world athletes were selected in sports talent development programs at an older age than national-level athletes; (5) athletic success in adolescence does not predict athletic success in senior category (Vaeyens et al., 2009).

Conclusions and Recommendations

According to this review, valid and reliable instruments are needed in order to make correct decisions in the process of identification and development of sports talent. We recommend the introduction of tests for investigating the level of proprioception, coordination, balance, laterality and ambidexterity, in accordance with the psycho-motor demands for the practice of various athletic events and with the age characteristics of the children to whom they are addressed. The good practices of other sports selection and orientation systems, organizational measures, and public policies in the field must be known and implemented in Romania to increase the efficiency of the selection process, at all its stages. It is necessary to

encourage young population to practice various sports, to attract as many children as possible to athletics, to develop and apply objective and realistic motor, psychomotor and coordinative criteria at all levels of the selection process, to ensure an effective competing system corresponding to the peculiarities of age and biological development of children, to create programs for supporting talented young people and elite athletes, to ensure the permanent supply of national sports centers with athletes with potential for great performance detected by regional centers. An objective and realistic national sports selection system must have as its final goal the permanent supply of the national team with promising athletes (Platonov, 2018). From these perspectives, we consider that the national selection system currently applied by the Romanian Athletics Federation must be revised from the level of conception to the sphere of content, at all stages of the process and for every group of events or even for each event.

Authors' Contribution

Study Design: AIP, LM; Manuscript Preparation; AIP; LM.

Ethical Approval

The review is part of my research for the Doctoral thesis titled Optimizing the second stage of selection of athletes for the practice of different groups of events or for a specific event and has the ethical approval of the Doctoral School of Sports Science and Physical Education, University of Pitești. The review was carried out in accordance with the Code of Ethics of the World Medical Association also known as a declaration of Helsinki. The co-author is the coordinator of the Doctoral Thesis.

Funding

The authors declare that the study received no funding.

Conflict of interest

The authors hereby declare that there was no conflict of interest in conducting this research.

References

Abbott, A. J. (2006). *Talent identification and development in sport*. Doctoral Thesis, Edinburgh University, UK.

Bailey, R. & Collins, D. (2013). The standard model of talent development and its discontents. *Kinesiol Rev*, 2, 248-259.

Bompa, T. O. (2002). *Periodization: Theory and methodology of training*. București: EX PONTO Publishing House.

Dabbs, T. J. (1992). *Performance prediction in track and field*. Master's Thesis. Western Michigan University, Kalamazoo, Michigan, USA.

Dulceanu, C. R. (2011). *Contributions on the optimization of the selection system in first formative stage in athletics*. Master's Thesis, University of Pitești, Pitești, Romania.

Dulceanu, C. R. & Mihăilescu, L. (2011). Contributions regarding sport selection and orientation for the first formative stage in athletics. *Journal of Physical Education and Sports*, *11(3)*, 329-335.

Freitas J. V., Werneck F. Z., Souza R.S., Castro P.H.C., Figueiredo A. J. & Lima J.R.P. (2020). Maturation, morphological, motor and technical characteristics of under 16 female track and field athletes. *Rev Bras Cineantropom Desempenho Hum, 2020*, 22, e68128.

Guellich, A. E. & Emrich, E. (2012). Individualistic and collectivistic approach in athlete support programmes in the German high-performance sport system. *Eur J Sport Soc*, *9(4)*, 243-268.

Houlihan, B. & Green, M. (2008). *Comparative elite sport development: systems, structures and policy*. Burlington, USA: Elsevier Publishing House.

Idrizović, K. N. & Nićin, D. (2014). The selective battery of motor tests for a track and field event long jump. *Sport Sci Health,* 4(1), 20-32.

Krasilshchikov, O. (2013). Talent identification an development-Reassessing the Principle Model. *Acta Facultatis Educationis Physicae Universitatis Comenianae*, 53(1), 25-32.

Mihăilescu, L. N. (2005). *Athletics: Hurdles*. Chișinău: Valinex Publishing House.

Moskovchenko, O., Ivanitsky V., Zacharova, L.& Shubin, D. (2018). Morphofunctional markers of kinetic aptitude in a sport -selection system. *Journal of Physical Education and Sport*, 18(2), 670-677.

Nicu, A. (1993). Modern Training. EDITIS Publishing House.

Platonov, V. (2018). Theoretical and methodological background for sports selection and orientation in modern elite sports. *Science in Olympic Sport*, *3*, 24-51.

Prescot, J. (1999). *Identification and development of talent in young female gymnasts*. Doctoral Thesis, Loughborough University, UK.

Sumantri, M., S., Hidayat, D., R., & Juriana, J. (2021). The urgency of sports talent instruments: Perspectives of early childhood teachers in Indonesia, *Journal of Physical Education and Sports*, *2(suppl. Issue 4)*, 2343-2349.

Vaeyens, R., Gullich, A., Warr, C. R. & Philippaerts, R. (2009). Talent identification and promotion programmes of Olympic athletes. *J Sports Sci*, *27(13)*, 1367-1380.

Weissensteiner, J. (November, 2016). From active lifestyle to sporting excellence: Deconstructing the FTEM framework and its applicability within Australia. *NYSI Youth Athlete Development Conference*. https://www.nysi.org.sg/qql/slot/u736/TID%20Conference/PowerPoint%20Slides/4.%20Dr._Juanita_Weissensteiner.pdf