

Comparison of the Effectiveness of Passing Performance in Football Matches for U-13 and U-14 Elite League Players of Latvian Academy of Sport Education

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Abstract

This study critically examines the evolution of male youth football, emphasizing the influence of changing rules, tactical innovations, and enhanced training methods. It highlights the digitalization of football, aiming to make the game more scientifically comprehensible and manageable for coaches amidst an information overload. The research emphasizes the importance of understanding various performance factors, including physical, psychological, technical, and tactical aspects, for football players. Addressing challenges in youth football, the study criticizes the prevalent practice of 11 against 11 games for players below the U13 category, mentioning limited opportunities for skill development and tactical learning. Employing a comparative descriptive methodology, the research focuses on the U13 and U14 age groups' efficiency and variability in passing during the Latvian Youth Championship. Utilizing the Game Performance Evaluation Tool (GPET) and video analysis, the study aims to draw comparisons and understand the impact of transitioning to larger fields and more complex game formats on young players' performance. In conclusion, the study emphasizes the need for a developmentally appropriate approach in youth football, aligning training and gameplay with players' growth and capabilities, contributing valuable insights for optimizing youth football training.

Keywords: Football, passing performance, player's development, tactical behavior.

Introduction

Football has never lacked attention from the scientific community; it has strived to reciprocate by evolving under the influence of changing rules (You, 2017), the adoption of various

tactical innovations (Trequattrini, Giudice, Cuzzo, Palmaccio, 2016) and the enhancement of training methods (García-Ceberino, Gamero, Feu, Ibáñez, 2020). One of the reasons for the significant increase in research is the attempt to digitalize (Bitilis, Chatziapanagiotou, 2022) the football experience and make the game more understandable from a scientific perspective.

Many studies in recent years have provided a better understanding of the relationships between football players' performance factors, such as physical (Svensson, Alricsson, Olausson, Werner, 2017) and psychological (Ivarsson, Kilhage-Persson, Martindale, Priestley, Huijgen, Ardern, McCall, 2019), technical (Karpa, Budzyn, Matviyas, Ripak, Lapychak, Khorkavyy, 2021) and tactical abilities (Otero-Saborido, Aguado-Méndez, Torreblanca-Martínez González-Jurado, 2021). But in another way, the amount of information provided to coaches has increased exponentially (Jonsson, Anguera, Blanco-Villasenor, Losada, Hernandez-Mendao, Arda, Camerino, Castellano, 2006) requiring a deep understanding of the game and the utilization of contextual variables (such as the date and location of the game, field surface, home or away game, championship, or cup match, etc.).

Numerous investigations show the statistical significance between playing positions in successful and unsuccessful games (Korte, Link, Groll, Lames, 2019), and which of these field positions are most important in the passing process (Wu, XIA, T.Wu, Yi, Yu, Wang, 2020). An essential element of this is undoubtedly the player's ability to make passes at different distances, which leads to the need to the comparison of the effectiveness of passing performance (McGuckian, Beavan, Mayer, Chalkley, Pepping, 2020), whose basic principle is to combine a set of valid and reliable variables indicative of its performance (McGarry, O'Donoghue, Sampaio, 2013). Such knowledge enables coaches to identify crucial issues in planning training sessions and effectively translate them into the game (Sarmiento, Pereira, Anguera, Campaniço, Leitão, 2013), to achieve favorable results.

Well-known for successful performance on the international level, competitive youth soccer players need to pass a long-term development system where the training, competition, and coach preparation systems are integrated and aligned with the goal of maximizing the individual inclinations of players (Nikolaienko, Maksymchuk, Donets, Verbyn, Shemchuk, I.Maksymchuk, 2021). Usually, becoming a professional footballer requires young players to spend many training hours over a long period to increase their chances of a successful career (Jonker, Huijgen, Heuvingh, Elferink-Gemser, Visscher, 2019). It is the gradual accumulation of successful experiences during competition and training that allows players to increase their performance in the long term (Berry, Abernethy, Côté, 2008).

The central problem of youth football is the exploitation of talented young athletes, manifested in their orientation to sports results and victory in competitions (Platonov, Bolshakova, 2013), forgetting that athletes will learn quickly, effectively, and thoroughly only if the demands of training or competition match their intellectual, psychological, and motor skills. Training and competition programs should be like shoes for children: they should fit perfectly and feel comfortable (Wein, 2000). The rules and format of competition in youth sports must be adapted to the needs of children to provide them with

the appropriate environment to develop as young players and individuals (McCalpin, Evans, Côté, 2017).

Many authors conclude that playing 11 against 11 game formats, even on a field with the smallest possible dimensions, is too large for players until the U13 age group (Small, 2013), because they spend too much time without the ball and have very restricted opportunities for passing interactions, as well as limited chances for tactical skill and individual technical improvement (Gréhaigne, Godbout, 1995).

Generally, how players navigate through the potential possibilities of actions within a game as well as the movement of the ball across the field, is influenced not just by the situational context of the game, but also by the abilities and skills that the players possess (Deuker, Braunstein, Chow, Fichtl, Kim, Körner, Rein, 2023). This is exactly why older adolescents (U17, U19) use more medium and long passes than younger players in the game situations (Coito, Folgado, Monteiro, Travassos, 2023).

In summary, it may be considered that for youth football it is very important that the training and playing process is built by their physical, mental, and tactical development. There is no particular sense in setting tasks for athletes if they are not able to comprehend or perform them. Therefore, this study aimed to evaluate the efficiency and variability of passes used in the U13 and U14 age groups. Moreover, the success rate of long passes was expected to be significantly higher in the U14 age group than in the U13. This supports the hypothesis that transitioning to a larger field and playing 11 against 11 is premature for the U13 age group due to the players' inability to practically apply long passes to solve tactical game tasks.

Material and Methods

This study applies a comparative descriptive methodology for research purposes. Comparative descriptive research aims to assess and contrast the presence of one or more variables across two distinct samples, locations, or periods to understand which circumstances yield superior outcomes. This research method tests the relationship between two or more variables rather than studying the influence of one variable on another (Arikunto, 2010).

A comparative assessment of the effectiveness and variability of the passes of the U13 and U14 teams was carried out during their participation in the games of the Latvian Youth Championship in the Elite Group, in the 2022 and 2023 seasons. To collect the necessary data researchers used the game performance evaluation tool (GPET) in football (Garcia-Lopez, Gonzalez-Villora, Gutierrez, Serra, 2013), which provided encoding of the overall length (Bush, Barnes, Archer, Hogg, Bradley, 2015) of passes of long (> 25 m), medium (11–24 m), and short distances (< 10 m) to the following criteria:

- Successful pass (pass to a teammate, appropriate length and speed);
- Unsuccessful pass (pass was intercepted, or out of play).

At the time of the study, the team played 48 matches in two years period. From each annual competition, 2 video recordings were selected as samples, resulting in a cumulative

total of 4 videos for analysis. According to the competition regulations, in the U13 age category, a match lasts 2x30 minutes, while in the U14 age category, it lasts 2x35 minutes. All matches took place on fields with synthetic surfaces, 3 matches took place at the home stadium of the team under study, and one at the away stadium. The matches were selected so that in each season one match was played at the beginning of the season and one at the end. All 4 games were played with different teams, within the Elite Championship of Latvia in the relevant age categories.

The video source was obtained from the Video Enhanced Observation (VEO.co) technologies recording platform. Observations were conducted utilizing the LINCSE 2.1 software (Soto-Fernández, Camerino, Iglesias, Anguera, Castañer, 2021) to enhance the observations' precision (Figure 1). The gathered data was analyzed using descriptive statistics, followed by the application of the t-test to evaluate each performance individually (Goto, Morris, Nevill, 2015). Statistical analyses were conducted utilizing the Excel software for Windows.

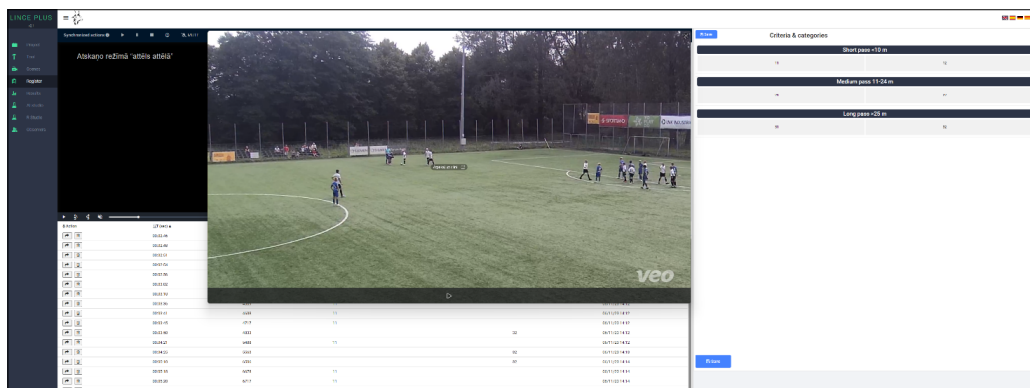


Figure 1. LINCSE 2.1 program desktop

Only one team from the club participated in the study. The opponent teams were not considered within the framework of this research. Goalkeepers were not excluded from the sample because in modern football, a goalkeeper not only clears the ball from the goal but also directly participates in the initial play of the ball, interacting directly with field players.

A total of fifty-two players who competed in the Latvian Elite Youth championship in age groups U13 (2022 season) and U14 (2023 season) were represented. In the 2022 season U13 team ($n = 23$ players, age 12.4 ± 0.5 years, height 1.45 ± 0.07 weight 42.2 ± 7.0 , biological maturation 84% middle and 16% early), in the 2023 season U14 team ($n = 29$ players, age 13.4 ± 0.4 years, height 1.54 ± 0.15 weight 46.2 ± 9.0 , biological maturation 79% middle and 21% early).

Distribution of the positions U13 players in the 2022 season and U14 in 2023 is shown in the Table 1 as follows:

Table 1

Distribution of player positions in the teams

Player Positions	U13 2022 season	U14 2023 season
Goalkeeper	2	2
Defender	8	8
Midfielder	8	11
Attacker	5	8

Results

The passes, with a total count of 1403 (746 for season 2022 and 657 for season 2023) were categorized into long, medium, and short, with this classification being done on a per-season basis through cluster analysis. In the 2022 season, the team made 71 long passes (18.3% – successful; 81.7% – unsuccessful), 136 (71.3%; 28.7%) medium passes, and 539 (87%; 13%) short passes. Accordingly, in the 2023 season – 100 (46%; 54%) long passes, 126 (61.1%; 38.9%) medium passes, and 431 (79.6%; 20.4%) short passes. The number of successful and unsuccessful passes was distributed in the Figure 2 as follows:

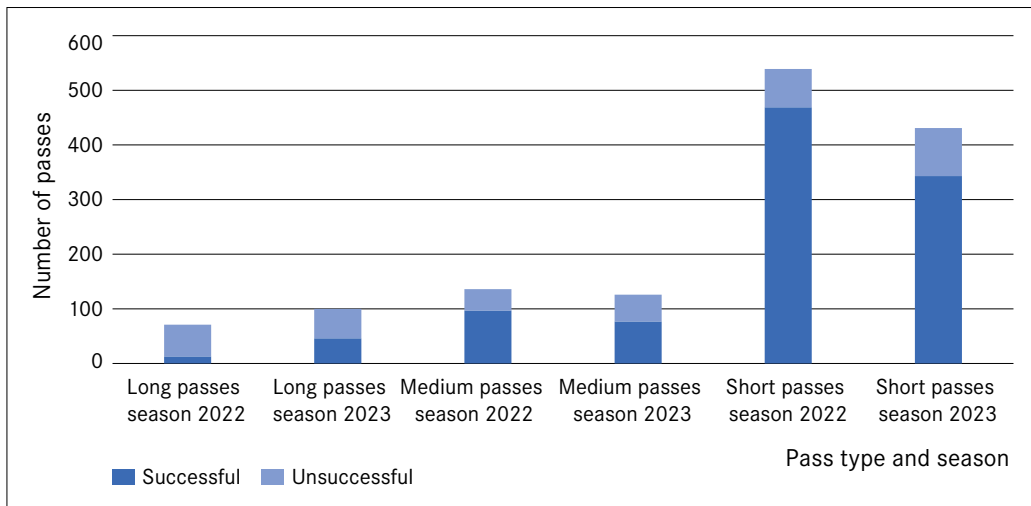


Figure 2. Variability and success of passes

The results of the t-test calculation for the performance of long successful passes in the season 2022 and season 2023 showed that the two-tailed P value equals 0.0237 (Pearson correlation – 0.6547, df – 2, P(T≤t) two-tail – 0.023704372). By conventional

criteria, this difference is statistically significant. These results provide information that there is a significant difference in the long successful passing performance of the U13 season 2022 team and the U14 season 2023 team. There were no significant differences in the medium ($P(T \leq t)$ two-tail – 0.4905) and short ($P(T \leq t)$ two-tail – 0.3921) successful passing performance. Excel Data analysis plugin (t-Test: Paired Two Sample for Means) was used for statistical analysis.

Short passes were consistently the preferred method of play among players of U13 and U14 age groups (U13–72.3%; U14–65.6%), the next most frequently used are medium passes (U13–18.2%; U14–19.2%), and long passes are used the least (U13–9.5%; U14–15.2%), denoting a trend towards increasing the use of long passes (2022 season – 71 passes; 2023 season – 100 passes), due to a decrease in the number of short passes (2022 season – 539 passes; 2023 season – 431). The increase in the number of long passes in the 2022 season compared to 2023 was 41% (71–100), and the number of successful long passes in percentage terms increased from 18.3% in the 2022 season to 46% in the 2023 season.

Discussion

The increase in the proportion of long passes across age groups has been confirmed by previous researchers (Cotio et. al, 2023), which concluded that players at a younger age adapt their tactical decisions to their abilities. At the same time, we did not find significant differences in the proportion of short and medium passes. The variability of passes also does not have a significant difference, which is more important for building the team's game scheme.

Several studies relate to the number of technical and tactical actions of players, indicating a significant difference in the actions of players of different roles (Крайник, Мулик, Коваль, Федорина, 2019), other studies show that the total distance a player runs during a match increase with age (Goto et al., 2015). That is, players tend to organize and choose a position on the field based on information received from the performance environment (Sigrid, Olthof, Wouter, Frencken, Lemmink, 2019) and, on the other hand, the technical and tactical action he chooses based on their physical and practical capabilities.

It can be hypothesized that in this particular team, which was studied in this experiment, the team's coaches should and need to conduct more training sessions on long passes, while improving movement techniques (Soniawan, Setiawan, Edmizal, 2019), yes, this could be one of the reasons for an unsuccessful long passes, but we must not lose sight of the reception of the ball and the readiness of the partner (McGuckian, Cole, Jordet, Chalkley, Pepping, 2018). Another factor that will need to be considered in further research on this topic is the study of zones (pre-attack, offensive, defensive zone) in which the attack is formed and will subsequently develop (Sarmiento, Figueiredo, Lago-Penas, Milanovic, Barbosa, Tadeu, Bradley, 2018).

Comprehending the way young soccer players structure their in-game interactions can serve as a robust standard for refining the training process, ultimately leading to enhanced

individual and team outcomes (Goncalves, Coutinho, Santos, Lago-Penas, Jimenez, Sampaio, 2017). To ensure more effective training in the complex game of football, competitions should be adapted by the physical and intellectual abilities of players at each stage of a young person's growth, ultimately resulting in greater enjoyment of the game and an increase in their self-esteem (Wein, 2000).

However, we often see that coaches still allow children under 13 to participate in full-fledged games of the adult 11 against 11 formats, on a full-size field, arguing that this is the preparation for national championships. But following only the idea of a quick team result, coaches forget that acquiring gaming skills is an important component and players are more active in football development when they have the ball, and less active during transition phases of the game compared to the phases of team and opponent possession (McGuckain, Cole, Chalkley, Jordet, Pepping, 2020).

Based on the results of the study, it can be assumed that the use of the 11 against 11 formats in the U13 age category does not correspond to the principle of learning and that it is the gradual accumulation of successful experience during competitions and training that allows players to improve their performance in the long term (Berry et al., 2008). Accordingly, it is advisable to make the transition to the 11 vs 11 game format in the U14 age category, that is, precisely when the player, according to his capabilities, can not only complete a long pass, but also his partner is ready and able to receive it.

Conclusions

This comprehensive analysis of long passes in youth football has provided valuable insights into the developmental aspects of young players' technical and tactical skills. The study underscores the importance of tailoring training and competition formats to different age group's specific needs and capabilities, particularly highlighting the distinctions between the U13 and U14 categories.

The findings suggest that while the U13 group exhibits a slightly lower frequency of long passes than the U14 group, their accuracy in executing these passes is significantly compromised. This calls for a strategic adjustment in coaching methods, emphasizing the need for more focused training on long passes and movement techniques to enhance overall gameplay and reduce the likelihood of inaccuracies.

Furthermore, the research highlights the critical role of understanding players' in-game interactions and the impact of their physical and intellectual development on their performance. Adapting competitions to align with players' developmental stages can foster for more enjoyable and rewarding football experience, ultimately contributing to their self-esteem and long-term development in the sport.

The study also sheds light on the potential pitfalls of prematurely introducing young players to full-scale adult game formats, advocating for a more gradual transition to the 11 against 11 formats in the U14 age category. This approach ensures that players are adequately prepared, both physically and technically, to handle the demands of the game.

By considering these factors, coaches, trainers, and football National federations can make informed decisions that contribute to the holistic development of young football players, paving the way for improved individual and team performances.

References

1. Arikunto, S. (2010). *Suatu pendekatan praktik*. Jakarta: Rineka Cipta.
2. Berry, J., Abernethy, B., Cote, J. (2008). The Contribution of Structured Activity and Deliberate Play to the Development of Expert Perceptual and Decision-Making Skill. *Journal of Sport & Exercise Psychology*, 2008, 30, 685–708.
3. Bitilis, P., Chatzipanagiotou, N. (2022). Digitalizing the Football Experience A study on Electronic Performance and Tracking Systems (EPTS) from the perspective of football athletes and training staff. *New Trends in HCI and Sports Workshop at MobileHCI'22*, 2022, 3267.
4. Bush, M., Barnes, C., Archer, D., Hogg, B., Bradley, P. (2015). Evolution of match performance parameters for various playing positions in the English Premier League. *Human Movement Science*, 2015, 39, 1–11.
5. Coito, N., Folgado, H., Monteiro, D., & Travassos, B. (2023). How Football Players' Age Affect Passing Patterns of Play According to Field Location. *Children*, 2023, 10(1), 157, 1–10.
6. Deuker, A., Braunstein, B., Chow, J., Fichtl, M., Kim, H., Körner, S., Rein, R. (2023). "Train as you play": Improving effectiveness of training in youth soccer players. *International Journal of Sports Science & Coaching*, 2023.
7. Esposito, G., Raiola, G. (2020). Monitoring the performance and technique consolidation in youth football players. *TRENDS in Sport Sciences*, 2020, 27(2), 93–100.
8. García-Ceberino, J., Gamero, G., Feu, S., Ibáñez, S. (2020). Differences in technical and tactical learning of football according to the teaching methodology: A study in an educational context. *Sustainability*, 2020, 12(16), 1–14.
9. García López, L. M, González Villora, S., Gutiérrez, D., Serra, J. (2013). Development and validation of the Game Performance Evaluation Tool (GPET) in soccer. *Sport TK*, 2013, 2(1), 89–99.
10. Gonçalves, B., Coutinho, D., Santos, S., Lago-Penas, C., Jiménez, S., Sampaio, J. (2017). Exploring team passing networks and player movement dynamics in youth association football. *PLoS one*, 2017, 12(1), 1–13.
11. Goto, H., Morris, J. G., Nevill, M. E. (2015). Motion analysis of U11 to U16 elite English Premier League Academy players. *Journal of sports sciences*, 2015, 33(12), 1248–1258.
12. Gréhaigne, J. F., Godbout, P. (1995). Tactical knowledge in team sports from a constructivist and cognitivist perspective. *Quest*, 1995, 47(4), 490–505.
13. Ivarsson, A., Kilhage-Persson, A., Martindale, R., Priestley, D., Huijgen, B., Arden, C., McCall, A. (2020). Psychological factors and future performance of football players: A systematic review with meta-analysis. *Journal of science and medicine in sport*, 2020, 23(4), 415–420.
14. Jonker, L., Huijgen, B. C., Heuvingh, B., Elferink-Gemser, M. T., Visscher, C. (2019). How youth football players learn to succeed. *In Football Psychology*, 2019, 297–312.
15. Jonsson, G. K., Anguera, M. T., Blanco-Villaseñor, Á., Luis Losada, J., Hernández-Mendo, A., Ardá, T., Castellano, J. (2006). Hidden patterns of play interaction in soccer using SOF-CODER. *Behavior Research Methods*, 2006, 38, 372–381.
16. Karpa, I., Budzyn, V., Matviyas, O., Ripak, I., Lapychak, I., & Khorkavyy, B. (2021). Improving the technical and tactical actions of qualified football players of various positions in certain areas of the field. *Journal of Physical Education and Sport*, 2021, 21(3), 1461–1468.

17. Korte, F., Link, D., Groll, J., & Lames, M. (2019). Play-by-play network analysis in football. *Frontiers in psychology*, 2019, 10(1738), 1–10.
18. McCalpin, M., Evans, B., & Côté, J. (2017). Young female soccer players' perceptions of their modified sport environment. *The Sport Psychologist*, 2017, 31(1), 65–77.
19. McGarry, T., O'Donoghue, P., Sampaio, J. (2013). *Routledge Handbook of Sports Performance Analysis*. London and New York: Routledge.
20. McGuckian, T. B., Cole, M. H., Jordet, G., Chalkley, D., & Pepping, G. J. (2018). Don't turn blind! The relationship between exploration before ball possession and on-ball performance in association football. *Frontiers in psychology*, 2018, 9(2520), 1–13.
21. McGuckian, T. B., Cole, M. H., Chalkley, D., Jordet, G., & Pepping, G. J. (2020). Constraints on visual exploration of youth football players during 11v11 match-play: The influence of playing role, pitch position and phase of play. *Journal of Sports Sciences*, 2020, 38(6), 658–668.
22. McGuckian, T. B., Beavan, A., Mayer, J., Chalkley, D., & Pepping, G. J. (2020). The association between visual exploration and passing performance in high-level U13 and U23 football players. *Science and Medicine in Football*, 2020, 4(4), 278–284.
23. Nikolaienko, V., Maksymchuk, B., Donets, I., Oksom, P., Verbyn, N., Shemchuk, V., & Maksymchuk, I. (2021). Cycles of training sessions and competitions of youth football players. *Revista Romaneasca Pentru Educatie Multidimensionala*, 2021, 13(2), 423–441.
24. Olthof, S. B., Frencken, W. G., & Lemmink, K. A. (2019). A match-derived relative pitch area facilitates the tactical representativeness of small-sided games for the official soccer match. *Journal of strength and conditioning research*, 2019, 33(2), 523–530.
25. Sarmento, H., Pereira, A., Anguera, M. T., Campaniço, J., & Leitão, J. (2014). The coaching process in football—A qualitative perspective. *Montenegrin Journal of Sports Science and Medicine*, 2014, 3(1), 9–16.
26. Sarmento, H., Figueiredo, A., Lago-Peñas, C., Milanovic, Z., Barbosa, A., Tadeu, P., & Bradley, P. S. (2018). Influence of tactical and situational variables on offensive sequences during elite football matches. *The Journal of Strength & Conditioning Research*, 2018, 32(8), 2331–2339.
27. Small, G. (2006). *Small-sided games study of young football players in Scotland*. Independent Consultation Paper; University of Abertay: Dundee, UK.
28. Soniawan, V., Setiawan, Y., & Edmizal, E. (2021). An Analysis of the Soccer Passing Technique Skills. *In 1st International Conference on Sport Sciences, Health and Tourism*, 2021, 20–23.
29. Svensson, K., Alricsson, M., Olausson, M., & Werner, S. (2018). Physical performance tests—a relationship of risk factors for muscle injuries in elite level male football players. *Journal of Exercise Rehabilitation*, 2018, 14(2), 282.
30. Soto-Fernández, A., Camerino, O., Iglesias, X., Anguera, M. T., & Castañer, M. (2022). LINCE PLUS software for systematic observational studies in sports and health. *Behavior research methods*, 2022, 54, 1263–1271.
31. Trequattrini, R., Del Giudice, M., Cuzzo, B., & Palmaccio, M. (2016). Does sport innovation create value? The case of professional football clubs. *Technology, Innovation and Education*, 2016, 2, 1–15.
32. Tua Hutajulu, T., Soniawan, V., Akbar, M. A., & Mangolo, E. (2022). Comparison of perspective passing performance in football games for persipura u-16 players pro academy elite league. *JIPES-JOURNAL OF INDONESIAN PHYSICAL EDUCATION AND SPORT*, 2022, 8(2), 39–45.
33. Wein, H. (2000). *Developing youth soccer players*. Champaign, IL: Human Kinetics.
34. Wu, Y., Xia, Z., Wu, T., Yi, Q., Yu, R., & Wang, J. (2020). Characteristics and optimization of core local network: Big data analysis of football matches. *Chaos, Solitons & Fractals*, 2020, 138(110136), 1–7.
35. You, J. (2017). Influence of rules change on football. In 2nd International Conference on Judicial, Administrative and Humanitarian Problems of State Structures and Economic Subjects, *Atlantis Press*, 2017, 30–32.

36. Краунык, У. В., Мулик, В. В., Коваль, С. С., & Федорина, Т. Е. (2019). Analysis of the technical and tactical actions performed by 13–14-year-old football players in different playing roles during the game. *Scientific Journal of the NPU Named After M.P. Drahomanov*, 12(120), 77–81. (Краунык, Я. Б., Мулик, В. В., Коваль, С. С., Федорина, Т. Е. (2019). Аналіз виконання техніко-тактичних дій юних футболістів 13–14 років різних ігрових амплуа під час гри. *Науковий часопис НПУ імені М.П. Драгоманова*, 2019, 12(120), 77–81.)
37. Platonov, V. N., & Bolshakova, I. V. (2013). Long-term training of athletes and the Youth Olympic Games. *Science and Sport: Modern Trends*, 1, 22–29. (Платонов, В. Н., & Большакова, И. В. (2013). Многолетняя подготовка спортсменов и юношеские олимпийские игры. *НАУКА И СПОРТ: современные тенденции*, 2013, 1, 22–29.)