O R I G I N A L   A R T I C L E

Research Synthesis of the Effects of Artificial Intelligence (AI) on Sports and Physical Education

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A B S T R A C T

Background: This research aimed to systematically review the effects of artificial intelligence (AI) on sports and physical education. In this research synthesis, the impacts of artificial intelligence on sports and physical education were investigated from different aspects.

Methods: The current research approach was qualitative and used a meta-synthesis strategy. The synthesis and content analysis techniques were used to explain the topic under investigation. MAXQDA software was also used for the analysis of the data. In order to find the effects of artificial intelligence on sports and physical education, recent research studies and documents were systematically selected, analyzed, and categorized. The study population was from the researches of the last few years, which were categorized and screened during the content analysis, and about 10 studies that met the conditions and criteria were selected purposefully. So that it was then coded and classified, and on this basis, theoretical foundations and main themes were extracted.

Results: Then, using content analysis, about 5 subcategories were identified, which were the general effects of artificial intelligence on physical education, improvement and reform of physical education, the effect of artificial intelligence on physical education learners, the effect of artificial intelligence on physical education instructors, and the challenges and limitations of artificial intelligence in sports and physical education.

Conclusions: The findings indicate that artificial intelligence plays a significant role in transforming various aspects of physical education, including improving the quality of instruction, enhancing learners' performance, and facilitating the educational processes for instructors. However, addressing the existing challenges and limitations in the implementation of this technology is essential for its effective and sustainable use in the field of sports and physical education.

K E Y W O R D S

Sports, physical education, artificial intelligence, research synthesis

Introduction

Looking at today's technology in the realm of individual life and pondering the positive and negative effects of technology in this field, one can feel the process of growing changes in the way of human life. With the ever-increasing expansion of technology and its deep penetration into all aspects of human life, various systems and structures of society have been significantly affected. Technology products that enter the consumer market daily bring a new culture. As a mere consumer of technology's material and spiritual products, individual accepts it and considers himself/herself dependent on it [1]. One of the areas where these effects are evident is the educational system [2]. The development of knowledge about technology, the global movement to change the educational structure, changing societies from traditional to modern, and the use of new communication conditions caused the national authorities of Iran to understand this important matter and think about using modern educational tools in schools [3]. The entry of modern technologies into education and learning has led policymakers to think and believe in the need for significant changes in educational and teaching structures and approaches [2]. For the first time, the project of innovative schools was proposed in 2003 by the Ministry of Education of Iran; with the advancement of technology, different branches of technology emerged; one of these branches is artificial intelligence (AI), which is usually defined as "the ability of a system to process external data correctly, learning from the same data and using that knowledge through adaptability and flexibility to achieve specific goals and tasks" [4]. AI, as one of the advanced technologies, can analyze many data, and artificial intelligence algorithms can be used to improve educational processes and optimize the educational experience [5]. Artificial intelligence and machine learning technologies can significantly improve the quality of education because these technologies can improve students' experiences and educational processes [6]. Naturally, physical education and sports, the important branches of education in schools, are not exempt from this rule and will be influenced by artificial intelligence. The applications of artificial intelligence are diverse and very different. Technology was first used in computer-related technologies, web-based and online intelligent learning systems, but eventually expanded to using embedded computer systems and other technologies, such as humanoid robots and web-based chatbots. Using such new approaches creates innovative opportunities to improve all aspects and methods of education, including physical education [6].

As an essential and effective educational tool, technological education has been the most powerful tool for improving education quality and students' educational process [7]. This influence also includes physical education and sports instruction. One of the ways to improve people's sports conditions is to increase motivation, which can be enhanced by using new technologies [8]. The effects of AI in the world of sports can be significant, as it can increase the attractiveness of physical activities and sports competitions [9]. The results of the studies have shown that different senses do not have the same role in learning, and the most important reason for using educational technology can be for this reason. Because it can engage several senses and increase the degree of effectiveness [10, 11]. Among the effects of AI in sports and education are attracting students' attention, providing personalized educational opportunities, and increasing education quality and efficiency. Therefore, considering the impact of AI and new educational technologies on education in the modern world, these technologies can play an important role in improving the quality and effectiveness of educational processes [5]. Technologies and educational aids, in terms of combining theory and practice, make learning lasting and diversifying in the classroom setting [10]. Therefore, the combination of practice and theory of sports can positively affect physical education lessons and make students more aware of sports. The use of new educational technologies affects students and sports teachers significantly. The use of such technology by teachers can create double dynamism and activity in students, and also, by using this technology, teachers can increase their experiences in

the field of teaching and teach more creatively [12]. Research shows that AI can be used as an assistant coach in sports [13, 14]. When using technology in education, the teacher's role will change as a guide and not a knowledge transfer, and the student's role will be as an active member, critic, and participant instead of a passive member and consumer of knowledge. Also, the evaluation system will change from result-oriented to process-oriented [15]. Technology is considered an educational aid that helps restore the role and value of the teachers [16]. Also, AI, with its algorithms, predicts muscle injuries and possible injuries in sports [14]. In general, using such an approach not only helps improve the quality of education but can also help develop students' skills and preparation for the digital and technology-based society [10]. It can be inferred that considering that the physical education lesson is activity-oriented and the student learns the necessary skills through activity and practice, it seems very necessary to pay attention to the use of artificial intelligence to raise successful students.

So far, the changes caused by introducing technology into the educational system have led to many challenges and opportunities. While these technologies can improve learning processes, promote teaching, and provide new facilities, new challenges and problems have also arisen in Iran [2]. In order to create positive effects caused by technology in the realm of education, including physical education, two things should be occurred. First, the perspective of the classroom should be changed to become learner-centered. Second, students and educators should collaborate with technology to create a community that nurtures, encourages, and supports the learning process [17]. In the progress of society towards the future, education must adapt to new changes and benefit from modern technologies in a way that provides more opportunities for learning on the one hand and preserves humanity and social cohesion on the other hand [2]. Information technology in education is a culture, a plan, and an educational flow that requires a cultural foundation. Based on this, efforts should be made regarding its establishment in the educational system by removing the obstacles to acceptance and application by teachers [18]. Electronic education in the educational system, including physical education, is inevitable. This educational method provides the necessary infrastructure and foundation and has many positive consequences that will bring scientific and cultural progress and development to our beloved country [19]. The research conducted in this area indicated the existence of weaknesses and deficiencies in the use and application of AI in the country. Mosleh et al. (2016) showed that the assistants of information technology in schools have fulfilled their duties in the field of administration, software, and hardware to a great extent [20]. Finally, according to Ghanbari Kordijani et al. (2022) five issues were identified as obstacles to developing physical education lessons in schools through modern technologies, including economic, cultural, facility, human, and managerial obstacles [21]. According to the results of their study, it was suggested that teachers and physical education trainers learn new technologies before using them in the classroom. On the other hand, because technological devices are affordable, accessible, and portable, school managers should allocate a part of their budget to provide technological equipment. This work causes the formation of internal motivation for both the teachers and the learners [21]. Therefore, based on the research, it seems that artificial intelligence in Iran's educational system has not yet found its place in education. Therefore, the tools and resources needed to use AI in different dimensions are insufficient in schools and universities. In other words, artificial intelligence has not been used as expected in Iranian schools, and in all dimensions and subjects, including physical education, suitable platforms for its use have not been created.

By examining the literature of the research, it can be said that in line with the current study, related research studies have been carried out, some of which we will mention. Genç (2023), in research entitled The Role of Artificial Intelligence in Sports and Physical Training, found that ChatGPT can be widely used in many fields, such as creating personalized training programs to analyze athletes' performance and summarize and report sports events [22]. Dai and Li's (2021) concluded that with the advancement of innovative technology, smart technology and equipment can be used in volleyball to better diagnose sports fatigue. This means that this algorithm has a good detection performance, can evaluate the exercise conditions in real-time, and prevents fatigue and

injury during exercise [23]. Marttinen et al. (2019) investigated sports coaches' understanding of the combination of digital technologies in physical education and its impact on educational practices. The results showed that sports trainers believe that AI and wearable digital tools should not replace local training methods but instead strengthen them. In addition, teachers were more interested in using such tools to control and monitor students in sports lessons, which naturally have adverse effects [24].

Considering the above-mentioned points, information and communication technology has played a significant role in efficient education, among which physical and sports education are not excluded and are very effective. So, AI can provide much necessary information in every field, including physical education and sports, and significantly affects the direction of efficient physical education. Therefore, this makes us pay more attention to AI and its impacts on physical education. On the other hand, the existing research studies in this realm indicate that the effect of AI has been investigated in physical education and sports. However, it has not been investigated in the form of a research synthesis method. Therefore, the present research tried to show a pattern and a desirable procedure for employing AI in physical education by analyzing related research findings and investigating the impact of AI on physical education through a research synthesis method.

Material and Methods

The current research method is research synthesis, after which the findings of the researches that answer the research question are combined. The current research approach is of a qualitative type and is based on the synthesis of theoretical frameworks and previous related research, which is accompanied by content analysis and then synthesis of the analyzes performed [25]. The study population also includes articles and theses related to the topic of the impact factors of artificial intelligence on sports and physical education, which were published quantitatively or qualitatively between 2010 and 2024 and were presented descriptively or by presenting a model. On the other hand, it should be noted that the samples were selected using the snowball method and reached the point of information saturation. In such a way that first the research question was raised, what exactly should be studied and what concept should be studied; then in the next stage, the literature aligned with the present study was discussed and examined, so that all the sources and references related to the subject of the present study were discussed and examined. Then, the documents that are to be used at the research level were evaluated, which have the necessary credibility and quality; so that an attempt was made to use reliable sources and documents such as published scientific research articles, etc.; because most studies using the synthesis research method use studies published in peer-reviewed journals, and few use unpublished studies, the so-called gray literature [26]. Also, in the next stage, an attempt was made to use an approach without considering a conceptual framework to synthesize and combine research findings in line with the research subject; in this method, the data analysis process begins with reviewing the findings from each study and gradually moves towards synthesizing and interpreting the findings throughout the studies. In the presentation of the results, an attempt was made to display what was obtained in the form of tables; because it must be said that in many meta-synthesis methods, a visual display such as graphs, images, and tables is used to show the findings. Finally, an attempt was made to review the inclusion and exclusion criteria of the studies in the present study; so that the present matter can be examined with the question "Is the present topic fully covered or not" [27].
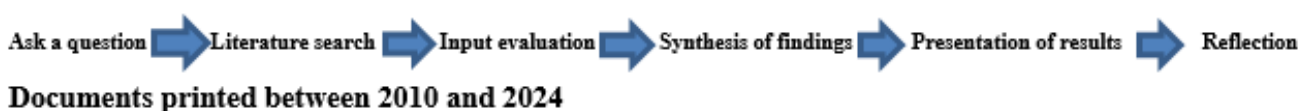
Ask a question ➡ Literature search ➡ Input evaluation ➡ Synthesis of findings ➡ Presentation of results ➡ Reflection

Documents printed between 2010 and 2024

Chart 1. Research workflow

It should be noted that, first, we selected the relevant studies and documents whose findings we intended to use, taking into account the publication date and type of research, and based on the selection criteria and determining the document search strategies in the databases. In the next step, the abstracts of the documents and their results were studied, and then screening was performed based on the quality of the articles and their relevance. Finally, out of about 30 articles, 10 were selected as research samples, which are given in Table 1. Maxqda software was also used for analysis.

Table 1. Research under review

Row	Names of authors and date of publication	The title of the research
1	Su, Ge, Li & Su [28]	Review Study Of Integrating Ai Technology Into Sports Training System
2	Keiper, Fried G, Lupinek & Nordstrom [29]	Artificial intelligence in sport management education: Playing the AI game with Chat GPT
3	Zhou [30]	[Retracted] Methods to Improve the Efficiency of Rural Physical Education Teaching Resources Allocation and Utilization in the Context of Artificial Intelligence
4	Zhang, Jin & Duan [31]	Physical education movement and comprehensive health quality intervention under the background of artificial intelligence
5	Hao & Zhou [32]	Evaluation index of school sports resources based on artificial intelligence and edge computing
6	Wei, Huang, Liu & Zou [33]	Exploring the application of artificial intelligence in sports training: a case study approach
7	Li & Wang [34]	The effectiveness of physical education teaching in college based on Artificial intelligence methods
8	Lee & Lee [35]	Applying artificial intelligence in physical education and future perspectives
9	Yang, Oh & Wang [36]	Hybrid physical education teaching and curriculum design based on a voice interactive artificial intelligence educational robot
10	Turkle [37]	Life on the Screen. Simon and Schuster

At the level of the present study, four review methods were used to assess validity: quality of primary studies, independent analysts, transparency, and validation by primary researchers; Accordingly, since reviewers must review all stages of the synthesis study and have access to all available data and all primary analyses [38]. Accordingly, the works of the present study were available to them to be examined in detail. On the other hand, considering that in discussing the quality of primary studies, researchers must judge the quality of their research study in the synthesis study [27]. Therefore, at the level of the present study, in order to achieve the present goal, certain and defensible indicators such as the use of published scientific research articles, the absence of use of invalid research and documents, etc. were considered for selecting input studies and the breadth of the search to find qualitative studies on the research topic. In the discussion of independent analysts, since the data obtained should be made available to them and at the end of each stage of their analysis they should meet and reach an agreement [39]. Therefore, the data of the present study were made available to the analysts in such a way that they unanimously acknowledged the validity of the research data. Also, transparency was also desired at the research level, so that on this basis the process and procedure of conducting the research should be stated so that the steps taken and the selection of studies used in the research and the reasons for excluding some studies should also be explained [40]; therefore, at the level of the present study, an attempt was made to refer to the process of conducting the research and the steps taken.

Results

In this section, it is tried to display the data obtained from the level of research related to the present research in the form of a table in line with the title of the research, which is the role of artificial intelligence in sports and physical education. Based on this, in the present section, the effects of artificial intelligence on sports and physical education are investigated and reported from the perspective of the conducted.

Table 2. The role of artificial intelligence in sports and physical education

Selective coding	Axial coding	Open coding
The role of artificial intelligence in sports and physical education	The general impact of artificial intelligence in physical education	Aggregating sports data with artificial intelligence [26]. Feedback on sports data with AI [26]. Artificial intelligence enriches sports education [26]. Artificial intelligence is a factor in improving the understanding of physical education. [32]. Evolution in traditional sports training models with artificial intelligence [26]. Creating practical exercise effects with artificial intelligence [26]. Continuous development of physical education with artificial intelligence [26]. Restructuring physical education with artificial intelligence [26]. Artificial intelligence is the key to modernizing physical education [26]. Artificial intelligence as a foundation for developing sports education [30]. Artificial intelligence to prevent sports injuries [26]. The impact of artificial intelligence on sports with speech recognition system [36]. Generating correct answers to sports questions with artificial intelligence [29]. Intelligent development of physical education with artificial intelligence [34]. Enhancing traditional exercise training with artificial intelligence [33]. Improving the efficiency of sports training with artificial intelligence [33]. Creating a virtual training environment with artificial intelligence [33]. Creating simulated sports scenarios with artificial intelligence [28]. I Optimizing sports results with artificial intelligence [28]. The role of artificial intelligence in improving the effectiveness of physical education [34]. Making physical education more scientific with artificial intelligence [28]. Making physical education more efficient with artificial intelligence [28].
	Reforming and improving physical education	Personalizing physical education with artificial intelligence [28]. Renewing the educational philosophy of physical education with artificial intelligence [31]. Changing the way we think about the nature of physical education with artificial intelligence [28]. More practical evaluation of sports with artificial intelligence [28]. More accurate evaluation of sports with artificial intelligence [28]. Identifying students' sports learning ability [28]. Cultivating more sports talent with artificial intelligence [28]. The high potential of artificial intelligence in improving sports teaching [30]. The high potential of artificial intelligence in improving the effectiveness of sports teaching [30]. Artificial intelligence is the key to developing outstanding sports talents [30]. Artificial intelligence answers students' sports questions [36]. Physical condition detection by artificial intelligence [35]. Quickly connecting students with artificial intelligence [36].
	The impact of artificial intelligence on sports learners	The impact of artificial intelligence in sports on the all-encompassing human imagination [35]. Enhancing creative thinking and human ability in sports with artificial intelligence [35]. Reflecting creative thinking and human ability in physical education with artificial intelligence [35]. Removing the limitations of physical education with artificial intelligence [35]. Removing the limitations of in-person physical education classes [35]. Artificial intelligence as a factor in improving sports performance [35]. Improving the quality of physical strength with artificial intelligence [34]. Improving the quality of physical speed with artificial intelligence [34]. Improving the quality of physical endurance with artificial intelligence [34]. Improving the quality of physical agility with artificial intelligence [35]. Providing sports advice [28]. Individual and customized sports learning [35]. Identifying a student's athletic ability [35].

The role of artificial intelligence in helping sports coaches		Developing quality and innovative sports talents [35].
		Proper use of time for physical activities [35].
		Identifying students' sports interests [28].
		Identifying students' athletic potential [28].
		Simple student monitoring using artificial intelligence [28].
		Creating practical and virtual experiences in interaction between instructors and learners [35].
		Send quick and immediate reports of class status to instructors [35].
		Solving learners' sports problems by providing diverse solutions [35].
		Making the right decisions for physical education instructors [35].
		Sports learning assessment and management [35].
		Increasing time to improve the quality of sports teaching and learning [35].
		Widespread use of artificial intelligence-based physical education technology [35].
		The possibility of sports coaches using active development based on artificial intelligence [35].
		Possibility of using information sources based on artificial intelligence [35].
		Creating detailed action plans for sports coaches [28].
Challenges and limitations of artificial intelligence in physical education		Time constraints are a challenge in physical education practice training [30].
		Technology limitations are a challenge in training practice [30].
		High cost of technology [28].
		Lack of familiarity of sports coaches with artificial intelligence [28].
		The importance of data security in the use of artificial intelligence in sports [28].
		Educators' privacy at risk [28].
		High costs of artificial intelligence [28].
		The importance of protecting student sports data [28].
		Integrating artificial intelligence with teaching methods [28].
		A comprehensible combination of artificial intelligence and physical education [28].

As can be seen in Table 2, the role of artificial intelligence in sports and physical education has been reported.

It should be noted that there are many studies that have acknowledged the role of artificial intelligence in sports, so that they have examined the role of artificial intelligence from various dimensions and perspectives. Thus, the findings obtained from the research level indicate that artificial intelligence in general has an impact on sports and physical education and facilitating its affairs. On the other hand, research conducted in this regard indicates that artificial intelligence also has an impact on learners in the field of physical education and is also helpful to coaches in this regard. It should be noted that artificial intelligence in the field of physical education also has challenges and limitations, considering the research conducted, which is discussed in Table 2.

Table 2. Frequency of the role of artificial intelligence in sports and physical education in research

Code System	Frequency
The Role of Artificial Intelligence in Sports and Physical Education (+)	74
Challenges and Limitations of Artificial Intelligence in Physical Education	10
The role of artificial intelligence in helping sports coaches	14
The impact of artificial intelligence on sports learners	18
Reforming and improving physical education	17
The overall impact of artificial intelligence in physical education	15

As can be seen in Figure 2, 74 findings related to the role of artificial intelligence in sports and physical education was identified from the research studies examined. It should be noted that 10 findings related to the role of artificial intelligence were related to the challenges and limitations of artificial intelligence in physical education, 14 to the role of artificial intelligence in assisting sports coaches, 18 to the effect of artificial intelligence on sports learners, 17 to the reform and improvement of physical education, and 15 to the overall impact of artificial intelligence in physical education.
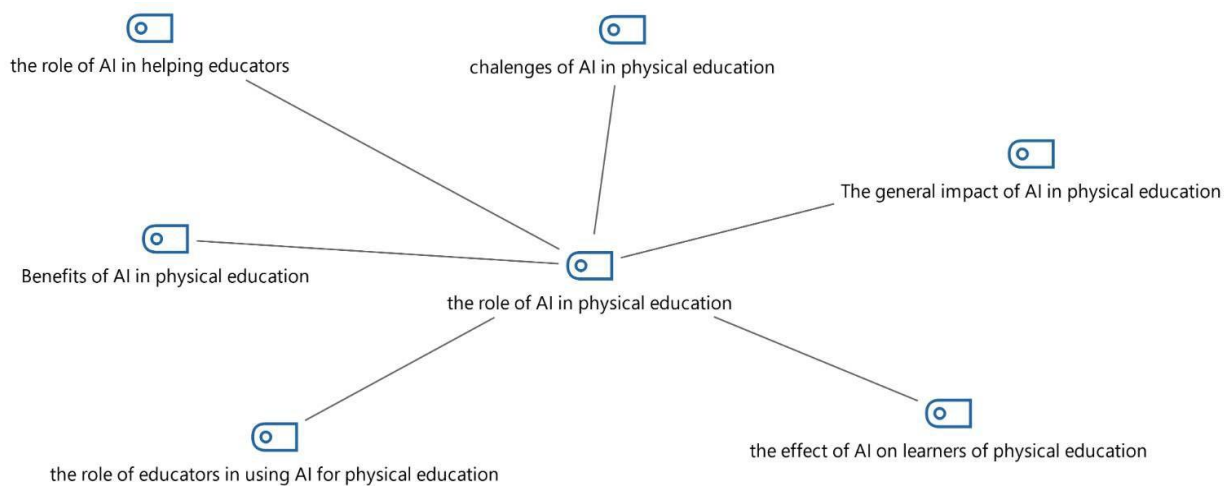
Figure 1. The role of artificial intelligence in sports and physical education

Conclusion

According to what has been said, it should be noted that in today's era, especially in the last two centuries, information and communication technology has penetrated various dimensions and components of human life, affecting almost every dimension of human life. In this way, one of the dimensions of human life, education, is also affected by information and communication technology, and based on this; it is used in various types and dimensions of education. It is important to state that information technology is gradually becoming more updated, and various cases have emerged in the present era, among which AI can be mentioned. So, with the emergence of AI in human life, a new field of learning information and facilitating its process has changed lives, incredibly modern and advanced human societies, to take its direction and move in this direction. Therefore, in today's era, we should not lag behind the global movement; we should also move towards this emerging technology and use it favorably. As mentioned, education as an important aspect of human life has been influenced by information technology, and indeed, among these, physical education has also been influenced by AI. Since one of the most important educations needed by humans is sports and physical education, it is very important that the role of artificial intelligence in the realm of physical education and sports is also investigated. Based on this, the role of artificial intelligence in physical education and sports was considered and investigated in the current research. So, at the current research level, efforts were made to gather the necessary data from research studies and analyze and categorize them. Therefore, in the following section, an attempt is made to explain the findings obtained and compare them with the research conducted.

Research studies showed the general impact of artificial intelligence on the sports and physical education. AI, with the vast amount of information it has in every field, especially in physical education, can provide much information to trainers in order to implement physical education more efficiently. Therefore, with much more information, artificial intelligence is invaluable in this regard. On the other hand, the researchers indicate that AI has many advantages for improving the quality of physical education and the state of physical education. Therefore, in this regard, it can be said that artificial intelligence can be effective in promoting physical education by providing various and diverse exercises personally and collectively, and change the negative view and thinking of some students about physical education and its effects. So, AI can help students and trainers recognize their talents, guide them in this direction, and provide suitable assessment capability. Accordingly, the existing research studies show that artificial intelligence has much potential in teaching physical education. AI significantly impacts the desired procedure and trend of trainers. It enables trainers to provide the desired procedure and physical education training. In addition, AI can be helpful in this realm by providing the best methods of physical education training. Hence, it can guide them in making the right decisions and help them interact with trainers.

On the other hand, AI, with its capabilities, can help educators plan efficient and desirable plans and help them adopt the optimal procedure for planning desirable programs. Accordingly, AI will have a tremendous impact on trainers' performance. AI has had significant effects on trainers and students, so it can improve their thinking and insight into the direction of physical education and its learning and be a guide in making their thinking in the direction of physical education desirable. In this way, while strengthening the thinking of teachers and students, AI can train them to be creative people by providing them with massive information to use their creativity in learning and applying physical education.

AI can transform the physical quality of trainers. While improving and strengthening them, it can attract the satisfaction of trainers and students in this field. Moreover, the capabilities of this technology increase the participation of teachers and students in physical education. AI helps identify their physical education capabilities and abilities. Therefore, artificial intelligence will have a significant impact on teachers' learning. In this regard, researchers have stated that teachers and trainers should recognize AI as a suitable tool for optimal physical education and consider it necessary to use it.

On the other hand, teachers and trainers should also improve their attitude in this area and consider using artificial intelligence technology as a desirable and beneficial method to improve the quality of physical education. Therefore, it is essential to modify the attitude toward artificial intelligence to use it in physical training and education. In other words, because AI has much relevant information and is one of the most comprehensive and complete information available in every educational aspect, including physical education, teachers and trainers should consider its capabilities and adopt the desired and valuable methods to promote physical education. Therefore, trainers and teachers should use and apply AI technology in every aspect of education, especially in physical education and its various aspects. Also, the research findings showed challenges and limitations in employing AI technology in physical education. The high cost of providing technological tools and devices is one of the challenges in this regard that challenges people. On the one hand, since people's privacy is paramount and sensitive, protecting the privacy of people and trainers is necessary for this technology, and it is a challenge for trainers and users.

On the other hand, preserving students' data to protect their privacy is also considered in this direction and is considered a challenge to using this technology. Therefore, researchers have also listed challenges and limitations in this regard. AI has significantly impacted physical education and its training, so it can facilitate the necessary conditions for improving this matter and help trainers achieve a desirable result in this regard.

According to the findings obtained in the present research, it is tried to address some of the existing suggestions as follows:

1. It is suggested to the Ministry of Education to provide the necessary ground for the training and learning of artificial intelligence for trainers and physical education teachers in most types of workshops and during service.

2. It is recommended to the Ministry of Education to familiarize students and teachers with artificial intelligence technology and its application in sports by providing the necessary background for justifying and teaching this technology.

3. It is suggested that teachers and trainers be provided with the tools and equipment needed to use AI in sports.

4. Researchers are advised to examine the role of artificial intelligence exclusively in any sport.

5. It is recommended to conduct a comparative study with other successful countries in this regard in order to use the experience of successful countries.

References

1. Suherlan M.O.O.Technological Innovation in Marketing and its Effect on Consumer Behaviour. Technology and Society Perspectives (TACIT). 2023; 1(2): 94–103. DOI:10.61100/tacit.v1i2.57

2. Mansouri R, Ali A, Yousefian N, Mansouri-Ejdanaki S. The impact of modern technologies on the future education system. Strategic Research in Education. 2023; 4(1): 129-142. DOI: 10.3390/buildings14092769

3. Zerghi M, Hosseini-Jonbzi S.A. Tomorrow's technology and schools (innovative schools). Sixth national conference of interdisciplinary research in management and humanities. Tehran; (2023). https://www.en.symposia.ir/IRCMHS06

4. Hajivand, A., Khosh Manzar, A., Sayari Zuhan, S. A Brief History of Artificial Intelligence: On the Past, Present, and Future of Artificial Intelligence. Fares Law Research, 2024; 6(18): 73-90. doi: 10.22034/lc.2024.409037.1379

5. Hanifezade, F. The impact of artificial intelligence and new educational technologies on modern education. International conference on management, education and training researches in education; (2023). DOI: 10.13140/RG.2.2.21373.99048

6. Parsarad F, Ferdosipour Z, Rafiei Vardanjani Z, Sarvestan S. A survey of new approaches in education with a focus on artificial intelligence and machine learning technologies, the first international conference on management, education and training research in Education, Tehran; (2023). DOI: 10.59400/fes.v2i3.1379

7. Dadvar H. The role of technological education for students is to support their academics. Education management research conference in education. Proceedings of the second international conference on educational management research in education (2023).

8. Amkhani Samadi A, Semsarpoor M.H. Sports knowledge management for increasing motivation. 3r. International Conference on Physical Education and Sports Sciences (2016). https://en.civilica.com/l/152226/pgn-2/

9. Rouholamin S.M, Rezaeemanesh A.A. The role of artificial intelligence in sports. The 6th International Conference on Management, Humanities and Behavioral Sciences in Iran and the Islamic World; (2023). https://www.en.symposia.ir/ListScience/HS0250/2

10. Haleem A, Javaid M, Qadri MA, Suman R. Understanding the role of digital technologies in education: A review. Sustainable operations and computers. 2022;3:275-85. https://doi.org/10.1016/j.susoc.2022.05.004

11. Fernández-Batanero JM, Román-Graván P, Reyes-Rebollo MM, Montenegro-Rueda M. Impact of Educational Technology on Teacher Stress and Anxiety: A Literature Review. Int J Environ Res Public Health. 2021;18(2):548. doi: 10.3390/ijerph18020548

12. Ghaznavi M.R., Najari M., Rahimi A.M. Investigating the role of new educational technologies in teachers' teaching efficiency. National Conference of New Psychology, emphasizing its applications in work and life (2017). https://en.civilica.com/l/9773/

13. Pan H. Research on assistant application of artificial intelligence robot coach in university sports courses. In Proceedings of the 11th International Conference on Computer Engineering and Networks 2022 (pp. 229-237). Springer Singapore.

14. Rahmani M, Majedi N, Hemmatinejad M, Jamshidi A. Application of Artificial Intelligence in the Sports Industry: A Review Article. AI and Tech in Behavioral and Social Sciences. 2024;2(2):14-21. DOI: 10.61838/kman.aitech.2.2.4

15. Bower M, Torrington J, Lai JW, Petocz P, Alfano M. How should we change teaching and assessment in response to increasingly powerful generative Artificial Intelligence? Outcomes of the ChatGPT teacher survey. Education and Information Technologies. 2024 Jan 26:1-37. DOI: 10.1007/s10639-023-12405-0

16. Ahmed V, Opoku A. Technology supported learning and pedagogy in times of crisis: the COVID-19 pandemic. Education and information technologies. 2022;27(1):365-405. https://doi.org/10.1007/s10639-021-10706-w

17. Muhammad I, Reskiawan B, Arsyad M. Technology Integration in Education Curriculum. Journal of Education Global. 20240;2(1):1-9. DOI: 10.25215/9141001117

18. Azizi M, Yazidi S, Babaian F. Investigating barriers to adopting and using information and communication technology in elementary schools. Bimonthly scientific-research journal of a new approach in educational management. 2019;11(41): 117-134. DOI: https://doi.org/10.1186/2036-7902-5-6

19. Sarmalek S.A. Educational technology in schools. Journal of Science and Engineering. 2019; 4(6): 164-168.

20. Mosleh Amirdehi H, Amiri A, Yagobizad Gervi E, Casoli A. Compare the performance of IT school assistants with their approved and expected outcomes in schools of Zarrinshahr City. *Quarterly Journal of Education Studies*, 2018; 3(12): 89-109. https://researchbt.cfu.ac.ir/article_641.html?lang=en

21. Ghanbari Kordijani Z, Mahmoudi A, Alidoust Ghahfarokhi E. Identifying Obstacles to the Development of Physical Education in Schools through New Technologies. *Research on Educational Sport*, 2023; (2): 20-.31. https://doi.org/10.22089/res.2023.14719.2378

22. Genç N. Artificial Intelligence in Physical Education and Sports: New Horizons with ChatGPT. Akdeniz Spor Bilimleri Dergisi, 6(1-Cumhuriyet'in 100. Yılı Özel Sayısı), 2023; 17-32. DOI: 10.38021/asbid.1291604

23. Dai X, & Li S. [Retracted] Application Analysis of Wearable Technology and Equipment Based on Artificial Intelligence in Volleyball. *Mathematical Problems in Engineering*. 2021; 3(1), 23-41. https://doi.org/10.1155/2021/5572389

24. Marttinen R, Landi D, Fredrick R.N, Silverman S. Wearable digital technology in PE: advantages, barriers, and teachers' ideologies. Journal of Teaching in Physical Education. 2019; 39(2): 227-235. DOI: 10.1123/jtpe.2018-0240

25. Cooper H, Hedges LV, Valentine J.C. (Eds.). *The Handbook of Research Synthesis and Meta-analysis* (2nd ed.). Russell Sage Foundation; (2009). https://psycnet.apa.org/record/2009-05060-000

26. Su Z, Ge S, Li L, Su Y. Review Study Of Integrating AI Technology Into Sports Training System. *Educational Administration: Theory and Practice*, 2024; 30(5): 7134-7140. DOI: 10.53555/kuey.v30i5.1649

27. Keiper M.C, Fried G, Lupinek J, Nordstrom H. Artificial intelligence in sport management education: Playing the AI game with Chat GPT. *Journal of Hospitality, Leisure, Sport & Tourism Education*. 2023; 33, 100456. DOI: 10.1016/j.jhlste.2023.100456

28. Zhou F. [Retracted] Methods to Improve the Efficiency of Rural Physical Education Teaching Resources Allocation and Utilization in the Context of Artificial Intelligence. *Computational intelligence and neuroscience*, 2022; 2(1), 3226902. https://doi.org/10.1155/2023/9835659

29. Zhang B, Jin H, Duan X. Physical education movement and comprehensive health quality intervention under artificial intelligence. *Frontiers in Public Health*, 2022; 10, 947731. https://doi.org/10.3389/fpubh.2022.947731

30. Hao L, Zhou LM. Evaluation index of school sports resources based on artificial intelligence and edge computing. *Mobile Information Systems*. 2022(1), 9925930. DOI: 10.1155/2022/9925930

31. Wei S, Huang P, Li R, Liu Z, Zou Y. Exploring the application of artificial intelligence in sports training: a case study approach. *Complexity*, 2021; 2(1), 4658937. DOI: 10.1155/2021/4658937

32. Li Z, Wang H. The Effectiveness of physical education teaching in College is based on artificial intelligence methods. *Journal of Intelligent & Fuzzy Systems*. 2021; 40(2): 3301-3311. DOI: 10.3233/JIFS-189370

33. Lee HS, Lee J. Applying artificial intelligence in physical education and future perspectives. Sustainability. 2021;13(1):351-361. https://doi.org/10.3390/su13010351

34. Yang D, Oh ES, Wang Y. Hybrid physical education teaching and curriculum design based on a voice interactive artificial intelligence educational robot. *Sustainability*, 2020; 12(19), 8000. https://doi.org/10.3390/su12198000

35. Turkle S. *Life on the Screen*. Simon and Schuster; (2011). https://www.researchgate.net/publication/259823363_Life_on_the_Screen

36. Romiszowski A. Artificial intelligence and expert systems in education: Progress, promise, and problems. *Australasian Journal of Educational Technology*. 1987; 3(1), 12-23. DOI: https://doi.org/10.14742/ajet.2365

37. Wang S, Wang F, Zhu Z, Wang J, Tran T, Du Z. Artificial intelligence in education: A systematic literature review. Expert Systems with Applications. 2024;15;252:124167. https://doi.org/10.1016/j.eswa.2024.124167

«مقاله پژوهشی»

سنتزپژوهی تأثیرات هوش مصنوعی (AI) بر ورزش و تربیت بدنی

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	چکیده
نویسنده مسئول	**هدف:** هدف این پژوهش، مرور نظام‌مند تأثیرات هوش مصنوعی (AIبر ورزش و تربیت بدنی بود. در این سنتز پژوهشی، تأثیرات هوش مصنوعی بر ورزش و تربیت بدنی از جنبه‌های مختلف بررسی شد. **روش شناسی:** رویکرد پژوهش حاضر کیفی و با استفاده از استراتژی فراترکیب بود. برای تبیین موضوع مورد بررسی، از تکنیک‌های سنتز و تحلیل محتوا استفاده شد. همچنین برای تجزیه و تحلیل داده‌ها از نرم‌افزار MAXQDA استفاده شد. به منظور یافتن تأثیرات هوش مصنوعی بر ورزش و تربیت بدنی، مطالعات و اسناد پژوهشی اخیر به صورت نظام‌مند انتخاب، تحلیل و دسته‌بندی شدند. جامعه آماری پژوهش، پژوهش‌های چند سال اخیر بود که در طول تحلیل محتوا، دسته‌بندی و غربالگری شدند و حدود ۱۰ مطالعه که شرایط و ضوابط را داشتند، به صورت هدفمند انتخاب شدند. سپس کدگذاری و طبقه‌بندی شدند و بر این اساس، مبانی نظری و مضامین اصلی استخراج گردید. **نتایج:** سپس با استفاده از تحلیل محتوا، حدود ۵ زیرمقوله شناسایی شد که عبارت بودند از: تأثیرات کلی هوش مصنوعی بر تربیت بدنی، بهبود و اصلاح تربیت بدنی، تأثیر هوش مصنوعی بر فراگیران تربیت بدنی، تأثیر هوش مصنوعی بر مربیان تربیت بدنی و چالش‌ها و محدودیت‌های هوش مصنوعی در ورزش و تربیت بدنی. **نتیجه گیری:** یافته‌ها نشان می‌دهد که هوش مصنوعی نقش مهمی در متحول کردن جنبه‌های مختلف تربیت بدنی، از جمله بهبود کیفیت آموزش، افزایش عملکرد فراگیران و تسهیل فرآیندهای آموزشی برای مربیان، ایفا می‌کند. با این حال، پرداختن به چالش‌ها و محدودیت‌های موجود در پیاده‌سازی این فناوری برای استفاده مؤثر و پایدار از آن در حوزه ورزش و تربیت بدنی ضروری است.
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