The impact of artificial intelligence techniques in developing basic and motor skills for students through the Physical Education lesson

El impacto de las técnicas de inteligencia artificial en el desarrollo de las habilidades básicas y motoras de los estudiantes a través de la lección de Educación Física

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Abstract

Objective: Analyze the impact of artificial intelligence techniques on developing basic and motor skills of students in physical education lessons, in terms of accuracy in assessment, training customization, and performance improvement, and identify the challenges facing the application of artificial intelligence techniques in the field of physical education, such as cost, teacher acceptance, and privacy.
Research methodology: The community was determined from physical education teachers in primary schools in Basra Education Directorate and the study sample was determined (100) teachers working in those schools after it was confirmed that they use blended education with their students and use artificial intelligence techniques to develop the basic and motor skills of their students, as the researchers had (confirmed information) about this because the same teachers were a previous sample for one of the experimental researches to use blended education for (teaching skills practically in the schoolyard and then taking a virtual lesson through the Telegram program via smartphones) to achieve the desired purpose, which is to use artificial intelligence through digital technology.
Results: The results showed that teachers see significant benefits in using AI technologies in physical education lessons, especially in improving accuracy and providing immediate feedback
Conclusions: The importance of using AI technologies in improving multiple aspects of physical education lessons, including performance assessment, enhancing interaction, providing immediate feedback, and designing personalized training programs, and students clearly see the benefits associated with using AI, suggesting that integrating these technologies can have a significant positive impact on their learning experiences and skill development.

Keywords

AI techniques; basic skills; children's motor skills; Physical Education lesson.

Resumen

Objetivo: Analizar el impacto de las técnicas de inteligencia artificial en el desarrollo de las habilidades básicas y motoras del alumnado en educación física, en términos de precisión en la evaluación, personalización del entrenamiento y mejora del rendimiento, e identificar los retos que enfrenta la aplicación de técnicas de inteligencia artificial en el ámbito de la educación física, como el coste, la aceptación del profesorado y la privacidad.
Metodología de la investigación: La comunidad se constituyó a partir del profesorado de educación física de las escuelas primarias de la Dirección de Educación de Basora. La muestra del estudio se constituyó a partir de 100 profesores que trabajan en dichas escuelas tras confirmarse que utilizan la educación semipresencial con su alumnado y emplean técnicas de inteligencia artificial para desarrollar las habilidades básicas y motoras de sus alumnos. Los investigadores contaban con información confirmada al respecto, ya que estos mismos profesores formaban parte de una muestra previa de una investigación experimental sobre el uso de la educación semipresencial (enseñanza de habilidades de forma práctica en el patio de la escuela y posterior asistencia a una clase virtual a través de Telegram a través de teléfonos inteligentes) para lograr el objetivo deseado: utilizar la inteligencia artificial a través de la tecnología digital.
Resultados: Los resultados mostraron que los docentes ven beneficios significativos en el uso de tecnologías de IA en las clases de educación física, especialmente en la mejora de la precisión y la retroalimentación inmediata.
Conclusiones: La importancia del uso de tecnologías de IA para mejorar múltiples aspectos de las clases de educación física, incluyendo la evaluación del rendimiento, la mejora de la interacción, la retroalimentación inmediata y el diseño de programas de entrenamiento personalizados, y los estudiantes ven claramente los beneficios asociados con el uso de IA, lo que sugiere que la integración de estas tecnologías puede tener un impacto positivo significativo en sus experiencias de aprendizaje y el desarrollo de habilidades.

Palabras clave

Técnicas de IA; habilidades básicas; habilidades motoras infantiles; lección de Educación Física.

Introduction

Physical education is a fundamental pillar in developing students' physical and mental health, and enhances their basic, motor and social skills. With the rapid development in the field of technology, artificial intelligence has begun to play a pivotal role in various fields, including education (Hummadi et al., 2024). This study seeks to explore the impact of artificial intelligence technologies in developing the teaching of basic and motor skills to students through the physical education lesson, and to identify the mechanisms through which these technologies can be used to improve the learning experience and achieve better results(Asim Ghazi, 2023: Cui et al., 2025: Wu, 2025: Kaya, 2025). The physical education lesson is the basis of every physical education curriculum, and the success of the plan depends on it and achieving the purpose of the general program for physical education at school on good preparation, preparation, and production and taking into account the needs, tendencies and desires of students, and this goes beyond the method of production and implementation(Hasan Aldewan & Ali AL Sheikh, 2016).

Artificial intelligence is a comprehensive advanced system and an important research trend in the fields of technology sciences in which the principles and methods of artificial intelligence are used on the basis of describing the concept and research areas of artificial intelligence and in-depth analysis and discussion of applicable information through the use of technology in order to provide theoretical support for creating and developing modern methods of physical education and moving towards a hybrid education perspective (Khudhair, 2024: Al-Hasnawi et al., 2025: He et al., 2024)

Integrating technologies with physical education to have a profound and significant impact on developing the teaching of basic and motor skills for students through the physical education lesson is done by integrating artificial intelligence and physical education perspectives with modern technology(Ali, 2022), studying the relationship between development and application prospects and focusing on analyzing problems by conducting research based on introducing artificial intelligence and strategic thinking and focus to develop virtual reality for physical education and diagnose shortcomings in the educational process, and research and development directed towards applying physical education in artificial intelligence, and current educational systems have not yet achieved major breakthroughs in teaching physical education teachers and teachers to understand and master the ability of artificial intelligence, to fill the relative deficiency in the lesson and other issues that affect the reality of education (Ghazi et al., 2024: Bellod et al., 2021: Ghazi et al., 2024) . Despite the great development that has occurred in the field of artificial intelligence and its multiple applications and its entry into educational institutions, there are few studies that focus on the impact of these technologies in developing the teaching of basic and motor skills for students through physical education lessons. This lack of research makes it difficult to assess the full potential of AI in this field and determine the best ways to benefit from it. Therefore, the researchers, as curriculum specialists, sought to study the subject to reach solutions that serve educational administrations in planning to introduce AI technologies in physical education lessons. The importance of this research lies in highlighting the growing role of AI in the field of physical education and providing new insights on how to benefit from these technologies to enhance students' learning of the basic and motor skills they need in their lives and to achieve educational goals. The research also seeks to bridge the knowledge gap in this field, and to provide an information base for researchers and practitioners interested in developing education in primary schools.

This research aims to achieve the following objectives:

- Analyze the impact of artificial intelligence techniques on developing basic and motor skills of students in physical education lessons, in terms of accuracy in assessment, training customization, and performance improvement.
- Identify the challenges facing the application of artificial intelligence techniques in the field of physical education, such as cost, teacher acceptance, and privacy.
- Propose a framework for applying artificial intelligence techniques in developing basic and motor skills of students

Research hypotheses

- There is a correlation between artificial intelligence techniques in developing basic and motor skills through physical education lessons.

Previous studies

Study (Mao & Chen, 2024) entitled "Applications of Artificial Intelligence Technology in the College of Physical Education and Training". This paper highlights the widespread adoption of artificial intelligence in sports and delves into its specific applications in this field. The results show that the algorithm used in this context excels in identifying the features of sports movement, outperforming the comparison algorithm by 27.65%. Moreover, it accurately identifies the boundaries of human movement. Compared with the use of traditional support means (SVM), neural networks (CNN) show clear advantages during the later stages of operation, reducing errors by 36.69%. The experimental results confirm the importance of comprehensive human body detection in ensuring stable and accurate sports movement tracking).

Study (Zhao et al., 2024) entitled "Artificial Intelligence for Enhancing Physical Education" This study aims to systematically review the application of artificial intelligence (AI) technology to enhance physical education (PE). To this end, 104 journals in the Baidu Scholar, Google Scholar and Ladkrabang Library databases of King Mongkut Institute of Technology were selected. The results of the studies revealed that AI technology in physical education can improve students' physical achievement, cognition and learning habits through the use of AI technology, and it can enhance the effect of physical education so that students have greater interest in learning sports. Some suggestions for future research were put forward.

A study (Liu, 2023) titled "Design and Evaluation of an Intelligent Teaching System for Basic Movements in Physical Education", an intelligent teaching system for basic movements in physical education was designed. First, information was collected according to the model in which the teaching was conducted, and the students' level was estimated. Second, the overall structure and functional modules of the system were designed. The deviations affecting the level of comprehensive movements were identified through the matching algorithm, which realized the evaluation and feedback of basic movements. Through this teaching system, teachers can obtain the teaching status of students' movements, and students can adjust their movements through feedback, which realizes the comfortable interaction of physical education teaching).

As for the extent of benefit from previous studies: The studies provide insights into the potential of artificial intelligence to enhance physical education learning. We will include details of the results and applications that confirmed that artificial intelligence was effective. This was shown in studies conducted by (Xiaodi, 2022) that artificial intelligence algorithms outperform traditional methods in analyzing movement patterns in sports. This can lead to more accurate assessments and personalized feedback for students. It highlights the positive impact of artificial intelligence on students' physical fitness, cognitive development, and learning in physical education. Artificial intelligence can make physical education more engaging and motivating for students, which may lead to better educational outcomes. The studies also explore various artificial intelligence techniques that apply to PE, including neural networks to accurately track movement, and artificial intelligence-based systems had the ability to assess posture and provide real-time feedback.

Method

Material y methods

Suitability to the nature of the research sample (Saeed, Sabti, et al., 2024: Mousa et al., 2019).

Participants

The community was determined from physical education teachers in primary schools in Basra Education Directorate and the study sample was determined (100) teachers working in those schools after it was confirmed that they use blended education with their students and use artificial intelligence techniques to develop the basic and motor skills of their students, as the researchers had (confirmed information) about this because the same teachers were a previous sample for one of the experimental researches to use blended education for (teaching skills practically in the schoolyard and then taking a

virtual lesson through the Telegram program via smartphones) to achieve the desired purpose, which is to use artificial intelligence through digital technology.

As for the research variables: The independent variable: Artificial intelligence techniques and the dependent variable: Developing the teaching of basic and motor skills for students through the physical education lesson.

Data collection tools

Previous studies, Questionnaires, Sources and references, Information network, Observation(Awad et al., 2024: Gao et al., 2025).

Methods

The questionnaire is one of the most important tools used by researchers to collect data and information from the examinees on the subject.

Defining and formulating paragraphs

Considering the research objectives and by reviewing scientific references and relying on the results of related studies and research, we reached the formulation of (10) paragraphs as shown in Table (1), We asked a question with (4) options to list the main benefits that they believe AI technologies offer as shown in Table (2).

There are important conditions in formulating paragraphs, including. The paragraphs should be simple and measurable. The words of the questions should not be complex and tiring for the examinee and avoid double questions, i.e. those that contain two questions in the same question.

Table 1. Paragraphs of applying artificial intelligence technologies to develop basic and motor skills for students

Paragraph	Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	Artificial intelligence techniques help improve the teaching of basic motor skills to students.					
2.	The use of artificial intelligence makes the physical education lesson more interactive and enjoyable.					
3.	Evaluating motor performance using artificial intelligence is more accurate and objective.					
4.	Artificial intelligence provides immediate feedback that helps students improve their performance.					
5.	The use of artificial intelligence helps in designing customized training programs for each student.					
6.	Artificial intelligence techniques require high technical skills from teachers and students.					
7.	I feel comfortable using artificial intelligence techniques in physical education lessons.					
8.	I believe that the use of artificial intelligence in physical education has long-term benefits.					
9.	Artificial intelligence techniques help improve students' interaction with sports activities.					
10.	I would like to see more applications of artificial intelligence in physical education lessons.					

Table 2. Shows the main benefits they believe AI technologies offer

	Paragraphs	Yes	No
1	Do you think that using artificial intelligence helps improve the accuracy of your motor performance assessment?		
2	Do you think that using artificial intelligence enhances interaction and enjoyment in physical education lessons?		
3	Do you think that artificial intelligence provides immediate and effective feedback that helps you improve your performance?		
4	Do you think that artificial intelligence technologies help design customized training programs that meet your individual needs?		

Statistical methods

We used the statistical package (SPSS(Saeed, Khalaf, et al., 2024).

Findings

Table 3 presents the main findings:

Table 3. Shows the Paragraphs of applying artificial intelligence technologies to develop basic and motor skills for students

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1- Artificial intelligence techniques help improve the teaching of basic motor skills to students.	5%	10%	20%	40%	25%
2- The use of artificial intelligence makes the physical education lesson more interactive and enjoyable.	4%	12%	18%	35%	31%
3- Evaluating motor performance using artificial intelligence is more accurate and objective.	6%	9%	25%	30%	30%
4- Artificial intelligence provides immediate feedback that helps students improve their performance.	3%	8%	22%	37%	30%
5- The use of artificial intelligence helps in designing customized training programs for each student.	7%	10%	19%	32%	32%
6- Artificial intelligence techniques require high technical skills from teachers and students.	10%	15%	30%	25%	20%
7- I feel comfortable using artificial intelligence techniques in physical education lessons.	8%	12%	28%	30%	22%
8- I believe that the use of artificial intelligence in physical education has long-term benefits.	4%	11%	24%	36%	25%
9- Artificial intelligence techniques help improve students' interaction with sports activities.	5%	9%	20%	38%	28%
10- I would like to see more applications of artificial intelligence in physical education lessons.	3%	7%	21%	40%	29%

Figure 1.shows the paragraphs of the artificial intelligence questionnaire.

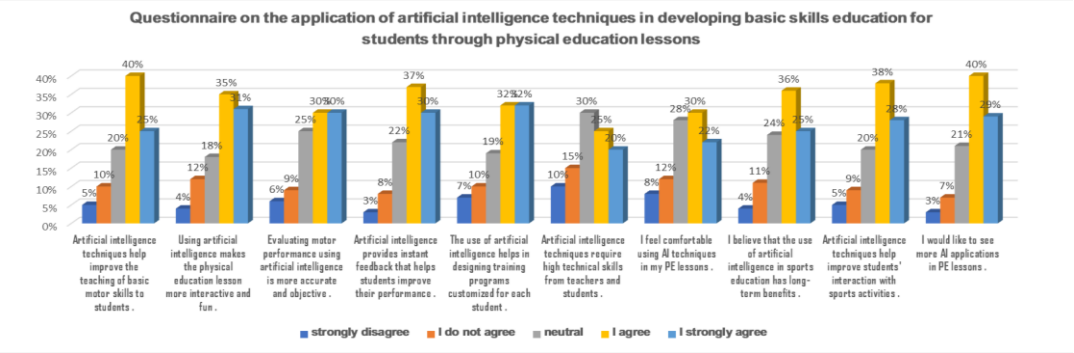

Table 4. Shows the main benefits they believe AI technologies offer

Paragraphs	Yes	No	Percentage (Yes)	Percentage (No)
1- Do you think that using artificial intelligence helps improve the accuracy of your motor performance assessment?	85	15	85%	15%
2- Do you think that using artificial intelligence enhances interaction and enjoyment in physical education lessons?	90	10	90%	10%
3- Do you think that artificial intelligence provides immediate and effective feedback that helps you improve your performance?	88	12	88%	12%
4- Do you think that artificial intelligence technologies help design customized training programs that meet your individual needs?	80	20	80%	20%

Discussion

The results showed that teachers see significant benefits in using AI technologies in physical education lessons, especially in improving accuracy and providing immediate feedback. However, there are challenges related to teacher skills and cost that need to be addressed to fully benefit from these technologies, and providing training and financial support have been suggested as key solutions to improve the effective use of AI. AI technologies can revolutionize the teaching of basic and motor skills by providing accurate diagnosis, monitoring, providing personalized experiences and intelligent decision-making (Ma & Chen, 2024: Wibowo et al., 2025:Mamani-Jilaja et al., 2025)

. By integrating deep learning frameworks and technology, AI can enhance teaching efficiency through intelligent computer-aided assessment models that improve performance(Haolin Ma, 2024: Manescu, 2025: Vasco Delgado et al., 2025). In addition, AI technology can enhance students' physical achievement, cognition and learning habits, and increase their interest in sports through personalized services and decision-making. The implementation of an audio-visual framework, which combines computer vision, speech recognition, motion estimation and neural networks, can serve and enhance the teaching of basic movements and contribute to providing accurate feedback and assessment of students' performance by teachers(O. Ali et al., 2024). The integration of wearable devices powered by artificial intelligence, motion capture systems and virtual display technology in sports training can significantly improve the accuracy and effectiveness of physical education, ensuring stable and accurate tracking of sports movement(Abdulrasool et al., 2024: Ahn & Lim, 2025).

Discussion the hypothesis that there is a correlation between "artificial intelligence techniques in developing basic skills education through a physical education lesson"

The Pearson correlation coefficient was calculated, as we used the data provided to see the relationship between the use of artificial intelligence techniques and the development of basic and motor skills for students to calculate the Pearson correlation coefficient, to see the relationship between the use of artificial intelligence techniques and the development of skills for students, and the Pearson correlation coefficient was (1), indicating the presence of a complete and positive correlation between the use of artificial intelligence techniques and the development of basic and motor skills for students in physical education lessons.

Discussion of the results of paragraphs

Table (4) Improving the accuracy of motor performance evaluation: (85) teachers out of 100, at a rate of (85%), supported the idea that the use of artificial intelligence helps improve the accuracy of motor performance evaluation, while 15 teachers, representing a percentage of (15%), do not see this. This indicates that the vast majority of teachers see great benefit in using artificial intelligence to evaluate the accuracy of motor performance, which enhances confidence in the ability of technology to provide accurate evaluations(Adham Ali et al., 2022a).

As for the paragraph on enhancing interaction and enjoyment in physical education lessons, 90 of the sample members, representing a percentage of (90%) of teachers, believe that artificial intelligence enhances interaction and enjoyment in physical education lessons, while (10%) do not They agree with this result, indicating that students find that modern technologies make lessons more exciting and engaging, which can increase their engagement and desire to learn.(Ghazi et al., 2024) agree with us.

The results of the paragraph on providing immediate and effective feedback showed that 88 teachers (88%) confirm that artificial intelligence provides immediate and effective feedback that helps them improve their performance, while 12 teachers (12%) do not believe so. This result indicates that students appreciate the ability to obtain quick feedback that helps them develop their skills quickly and efficiently(Abd Ali Kadhim, 2020: Ghazi et al., 2024: Asal et al., 2025: Asdar et al., 2025).

As for designing customized training programs, 80 teachers (80%) believe that artificial intelligence helps in designing customized training programs that meet their individual needs, while (20) of them do not agree and constitute 20%). This indicates that the majority of students notice a great benefit in personalizing training, which can enhance the effectiveness of training and increase individual performance. This was confirmed by (Ahmed Othman et al., 2023).

As for the interpretation of the Pearson correlation coefficient: The calculated Pearson correlation coefficient is (1), indicating a positive correlation between the use of artificial intelligence technologies and the development of basic skills. This means that there is a strong correlation between the use of these technologies and the improvement of basic skills, which reinforces the hypothesis that artificial intelligence can have a significant positive impact on students' motor education in physical education lessons(Adham Ali et al., 2022b). The research results support the hypothesis that the use of artificial intelligence (AI) technologies can significantly enhance basic and motor skills (Botagariyev et al., 2023). Studies have shown that integrating artificial intelligence into motor skills learning leads to improved academic performance among students, emphasizing the importance of artificial intelligence technology

in teaching teachers to develop motor skills. In addition, the application of artificial intelligence in physical education provides benefits such as accurate diagnosis, process monitoring, personal service, and intelligent decision-making, which enhances the positive impact of artificial intelligence on skill development. It was also found that artificial intelligence in education affects critical thinking skills, creativity, collaboration, and communication. It presents the broader benefits of integrating AI into educational settings(Sanabria Navarro et al., 2024).

Conclusions

- The importance of using AI technologies in improving multiple aspects of physical education lessons, including performance assessment, enhancing interaction, providing immediate feedback, and designing personalized training programs.
- Students clearly see the benefits associated with using AI, suggesting that integrating these technologies can have a significant positive impact on their learning experiences and skill development.
- The use of technology increases student interaction and engagement in lessons, leading to a more vibrant and effective learning environment.
- There is strong support from students for using AI technologies in developing basic skills in physical education lessons, and these technologies play a vital role in improving teaching and learning in this area.

Recommendations

- Integrating AI technologies into physical education curricula:
- Improving interaction and enjoyment in lessons
- Providing training and support for teachers

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