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THE EFFECTIVENESS OF USING ARTIFICIAL INTELLIGENCE TECHNIQUES TO IMPROVE SOME TEACHING METHODS OF PHYSICAL EDUCATION TEACHERS IN THE INTERMEDIATE STAGE

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Abstract

The importance of the research lies in the use of artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage. Therefore, the research problem revolves around the effectiveness of using artificial intelligence in improving these methods and techniques, and the extent of its contribution to developing athletic performance and motivating students. The objectives of the research were to explore the potential of artificial intelligence techniques in supporting and improving the methods and techniques of teaching physical education in the intermediate stage, and to identify the ways through which artificial intelligence can be integrated into the educational sports process to achieve better results, as the research hypotheses were built on the existence of a positive relationship between the employment of artificial intelligence techniques and the improvement of the effectiveness of teaching methods and techniques in physical education, the researcher used the descriptive approach with the survey method for its suitability to the nature of the research and its problem, the researcher identified the research population as a group of (250) schools from the schools in the General Directorate of Education of Babylon, while the research sample reached (150) teachers who were selected randomly, the research population consisted of physical education teachers for the intermediate stage, as for the conclusions of the research. It was reached to build a scale of artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage, and the ease of the possibility of applying artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage.

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INTRODUCTION

Education has witnessed significant changes in recent years as a result of rapid technological development, especially in the field of artificial intelligence, which has become a key tool for improving the quality of education and developing its methods (Athaya et al., 2023; Ebrahim & Hussein, 2025; Yusroni, 2024). Physical education acquires special importance at this educational stage due to its applied nature that requires physical and motor skills, as well as motivating students to adopt an active and healthy lifestyle (Jumiyati et al., 2023; Reviyanti & Reza, 2023; Samodra et al., 2023). The integration of artificial intelligence techniques in teaching physical education may contribute to developing traditional teaching methods, allowing for more accurate monitoring and analysis of students' performance, and providing interactive and customized learning environments that meet the needs of each student, which constitutes a main motive for research in these topics (Hefniy et al., 2022; Pelana et al., 2021).

The importance of the research is highlighted in that it sheds light on the potential of artificial intelligence in raising the quality of sports education in the intermediate stage, through improving teaching tools and methods, in a way that achieves the development of students' physical and motor performance and increases their participation and motivation (Dewi & Faridah, 2022; Welis et al., 2022). The research also enhances the understanding of the role of smart technologies in providing directed education that takes into account individual differences, and raises teachers' efficiency through the use of accurate data to continuously monitor and evaluate students, which is consistent with modern educational trends and achieves balanced physical and psychological development for students, and from here the importance of the research is manifested in the use of artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage (Donie et al., 2023; Hardinata et al., 2023; Rozi et al., 2023).

Research Problem: Traditional teaching methods in physical education face several challenges, including weak student interaction and the difficulty of accurately monitoring the development of their physical skills, in addition to the lack of objective and continuous evaluation methods. This deficiency is negatively reflected in the quality of students' athletic performance and their ability to benefit from educational lessons (Rahmadi et al., 2023; Suryadi et al., 2024, 2025). Therefore, the research problem revolves around the effectiveness of using artificial intelligence in improving these methods and techniques, and the extent of its contribution to developing athletic performance and motivating students (Bedford et al., 2024; Chan & Wong, 2025; P. He et al., 2025; Xiang et al., 2025). Therefore, the researchers decided to study this problem using artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage.

Research Objectives:

1. To explore the potential of artificial intelligence techniques in supporting and improving the methods and approaches of teaching physical education in the intermediate stage.
2. To identify the methods through which artificial intelligence can be integrated into the sports educational process to achieve better results.
3. To measure the effect of using artificial intelligence techniques on the level of students' performance and interaction during physical education classes.
4. To propose an integrated instructional model directed to physical education teachers that uses artificial intelligence tools to improve the quality of teaching.

RESEARCH METHODS

Study design

The researchers used the descriptive method with the survey approach for its suitability to the nature of the research and its problem.

Participants

The researchers identified their research population as a group of (250) schools from the schools in the General Directorate of Education of Babylon, while the research sample reached (150) teachers who were selected randomly, the research population consisted of physical education teachers for the intermediate stage, and Table (1) shows the details of the research population, as for the research sample, it consisted of (130) teachers, in order to estimate the effort exerted in achieving objective results, in addition to that the researchers took into account the scientific conditions for selecting the sample, as it was divided into (pilot experimental sample, scale construction sample, application sample), and Table (1) shows the details of the sample and its distribution across the directorate sections in the governorate.

Table 1.

Details of the Research Population

Name of the Directorate	Teacher	School Principal	Total Number of Schools	Total Number of Teachers and Principals (Physical Education Specialization)
Al-Musayyib Education Department	100	50	150	150
Al-Qasim Education Department	50	10	60	60
Al-Kufa Education Department	35	5	40	40

Table 2.

Details of the Sample Distribution

No.	Name of the Directorate	Total	Exploratory Experiment Sample	Scale Construction Sample	Application Sample
1	Al-Musayyib Education Department	150	50	30	45

2	Al-Qasim Education Department	60	40	30	40
3	Al-Kufa Education Department	40	30	30	30
Total					
Sample Total			20	90	130
Percentage of the population			3,83	19,15	24,90
Percentage of the sample			8	40	52

Research Procedures

Identification of the Research Variable:

After the researchers sensed the existence of the problem, they conducted investigation and inquiry in scientific sources and previous studies until they reached the idea of preparing special scales using artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage, as it consisted of (32) items and included three axes (the first axis: educational package, the second axis: brainstorming, the third axis: cooperative learning), the teacher answers the items of the scale according to a scale consisting of three alternatives, and weights were given to the alternatives from (3-1), and the alternatives are (Yes, To some extent, No).

After that, (3) axes of the scale were identified and proposed through the questionnaire, and they were presented to a number of experts and specialists in the field of sports management and measurement and evaluation, whose number reached (4) experts, as they were asked to express their opinions about the validity of the fields and the possibility of adding or merging any field they consider appropriate and deleting or modifying inappropriate fields, and according to the opinions of the experts, the researcher accepted all the fields, and the Chi-square (Chi-2) value was adopted to accept the fields of the scale, under the level of significance (0.05), as shown in Table (2).

Table 3.

Agreement of Experts and Specialists on the Axes of Using Artificial Intelligence Techniques to Improve Some Teaching Methods of Physical Education Teachers in the Intermediate Stage

No	Proposed Fields	Agree	Disagree	Calculated Chi-square (Chi-2) Value	Level of Sig	Sig
1	Educational Package Axis	17	0	17	0.000	Sig
2	Cooperative Learning Axis	17	0	17	0,000	Sig
3	Brainstorming Axis	17	0	17	0,000	Sig

Construction of the Axes of Artificial Intelligence Techniques for Physical Education Teachers in the Intermediate Stage:

After the axes of the scale were identified by the concerned parties, the researchers prepared a questionnaire for the fields and items of the scale, as the questionnaire contains selected items for the fields, provided that these items are

distributed within the axes (fields), and each item expresses the field in which it was placed, with determining the proposed response alternatives, as the number of the scale items reached (32) items, and the researchers used the method of selection from three alternatives (Likert), as a scale was set (Yes, To some extent, No), and the scoring scale was arranged starting from (3–1), and accordingly the researchers took into account the following aspects when formulating the scale:

1. That each field has its own items.
2. That the items of each field express the theoretical definition of the field.
3. That each item has only one specific and clear meaning.
4. That the items are clear in meaning and understandable in wording.
5. Avoiding unclear items.

Determining the Validity of the Items

The researchers presented the scale to a group of experts and specialists, whose number reached (4) in the field of sports management and testing and measurement in the sports field, for the purpose of reviewing the items of the scale, their suitability and validity, and providing observations, as well as modifying or deleting inappropriate items, and through the Chi-square, all items were approved with making some modifications, and the researchers adopted all of them for the scale of constructing the axes of artificial intelligence techniques for physical education teachers in the intermediate stage, and Table (4) shows the Chi-square value of the scale, noting that the level of significance is considered significant when it is < 0.05 .

Table 4.

show Validity of the Items for Constructing the Axes of Artificial Intelligence Techniques for Physical Education Teachers in the Intermediate Stage

No	Items	Valid	Not Valid	Calculated Chi-square (Chi-2) Value	Level of Sig	Sig
1	1	17	0	17	0,000	Sig
2	2	13	4	4,765	0,029	Sig
3	3	17	0	17	0,000	Sig
4	4	17	0	17	0,000	Sig
5	5	17	0	17	0,000	Sig
6	6	13	4	4,765	0,029	Sig
7	7	15	2	9,941	0,001	Sig
8	8	17	0	17	0,000	Sig
9	9	13	4	4,765	0,029	Sig
10	10	17	0	17	0,000	Sig
11	11	17	0	17	0,000	Sig
12	12	13	4	4,765	0,029	Sig
13	13	13	4	4,765	0,029	Sig
14	14	17	0	17	0,000	Sig
15	15	17	0	17	0,000	Sig
16	16	17	0	17	0,000	Sig
17	17	17	0	17	0,000	Sig
18	18	17	0	17	0,000	Sig

19	19	17	0	17	0,000	Sig
20	20	17	0	17	0,000	Sig
21	21	17	0	17	0,000	Sig
22	17	17	0	17	0,000	Sig
23	18	17	0	17	0,000	Sig
24	19	17	0	17	0,000	Sig
25	20	17	0	17	0,000	Sig
26	21	16	1	12.454	0,000	Sig
27	17	17	0	17	0,000	Sig
28	18	17	0	17	0,000	Sig
29	19	17	0	17	0,000	Sig
30	20	14	3	14.455	0,000	Sig
31	21	17	0	17	0,000	Sig
32	21	17	0	17	0,000	Sig

Exploratory Experiment

The researchers applied the exploratory experiment to a group of intermediate stage teachers in the Directorate of Education of Babylon, whose number reached (30) teachers at their workplace, and it was found that the sample accepted the scale through the clarity of the instructions, the ease of understanding the items and their clarity, and the researchers or the assisting work team did not face any negatives or obstacles.

Application of the Scale of Using Artificial Intelligence Techniques to Improve Some Teaching Methods of Physical Education Teachers in the Intermediate Stage on the Scale Construction Sample:

After the fields and items were tested by the experts, it became ready for application, as it was applied, corrected, and the results were recorded in preparation for statistical analysis, and some descriptive statistics related to the sample were obtained, and Table (5) shows that.

Table 5.

Shows the Descriptive Characteristics of the Scale of Using Artificial Intelligence Techniques to Improve Some Teaching Methods of Physical Education Teachers in the Intermediate Stage

Arithmetic Mean	90.3501
Median	80.0022
Standard Deviation	8.04871
Skewness	0.025
Standard Error	0.241
Minimum Score	64.00
Maximum Score	98.00

Psychometric Properties of the Scale of Using Artificial Intelligence Techniques to Improve Some Teaching Methods of Physical Education Teachers in the Intermediate Stage:

The psychometric properties of the scale include the ability of the scale to measure what it was prepared to measure, and also include the ability of the scale to

measure the phenomenon with an acceptable degree of accuracy or with the least possible errors (1:335).

Scale Validity: Validity is considered one of the most important factors for identifying the quality of tests and scales. A test or scale is characterized by validity when it actually measures the trait or characteristic for which it was designed. Validity is a standardized test set by researchers to verify the extent of the test validity and the consistency of the apparent and internal aspects as a valid means of measurement.

Content Validity: The researchers verified this type through the rational analysis of the content of the scale and its determination based on subjective judgments, and there are two types of validity, namely face validity and construct validity.

Face Validity: This type of validity was achieved, and the items of the scale were determined with the assistance of a group of experts in sports management and testing and measurement, and each evaluator was asked to determine the validity of each statement (valid, not valid, and suitability for modification of the items in accordance with the used sample), as previously explained.

Discriminative Power of the Items: It is also called the extreme comparison or the two extreme groups in the total score, which gives an important indicator for constructing scales or tests, and it is evidence of discrimination (Khiykan & Al-Jubouri, 2016). To verify the discriminative power of the items whose items are leading, the value of (T) must be significant between the results of the upper and lower groups from the statistical analysis sample. Accordingly, the scores of each item were arranged in ascending order from the lowest score to the highest score, and (27%) of the lowest scores and the same percentage of the highest scores were selected, and the 27% of the upper group and the 27% of the lower group are the best percentage through which we obtain the highest discrimination coefficients. After processing the results statistically, it was found that the items are valid as the (Sig) values are smaller than the level of significance (0.05), as shown in Table (6).

Table 6.

Shows the Discriminative Power of Each Item of the Scale of Using Artificial Intelligence Techniques to Improve Some Teaching Methods of Physical Education Teachers in the Intermediate Stage

Items	Lower Group		Upper Group		Value(T)	Level of Sig	Result
	Arithmetic Mean	Standard Deviation	Arithmetic Mean	Standard Deviation			
1	1.2539	.44658	5.0000	.00000	-43.526	0,000	Sig
2	1.1852	.39585	4.7407	.44658	-30.959	0,000	Sig
3	1.2593	.44658	4.8889	.32026	-34.320	0,000	Sig
4	1.3704	.62929	4.9259	.26688	-27.028	0,000	Sig
5	1.0000	.00000a	5.0000	.00000a	-28.339	0,000	Sig
6	1.3704	.49210	4.8148	.39585	-33.844	0,000	Sig
7	1.1481	.36201	4.7778	.42366	-28.747	0,000	Sig
8	1.2963	.46532	4.7778	.42366	-39.576	0,000	Sig
9	1.2593	.44658	4.9630	.19245	-27.943	0,000	Sig

10	1.2222	.42366	4.6667	.48038	-27.266	0,000	Sig
11	1.2222	.42366	4.6296	.49210	-28.967	0,000	Sig
12	1.1481	.42366	4.5926	.50071	-41.359	0,000	Sig
13	1.0000	.00000	4.7037	.46532	-35.907	0,000	Sig
14	1.4815	.50918	5.0000	.00000	-32.222	0,000	Sig
15	1.0741	.26688	4.5926	.50071	-29.612	0,000	Sig
16	1.1481	.36201	4.6296	.49210	-25.574	0,000	Sig
17	1.3704	.49210	4.7037	.46532	-29.701	0,000	Sig
18	1.2593	.44658	4.7778	.42366	-31.337	0,000	Sig
19	1.2963	.46532	4.8519	.48038	-24.407	0,000	Sig
20	1.4074	.50071	4.6667	.49210	-26.206	0,000	Sig
21	1.2593	.44658	4.7778	42366	31.337	0,000	Sig
22	1.2593	.44658	4.9630	.19245	-27.943	0,000	Sig
23	1.2222	.42366	4.6667	.48038	-27.266	0,000	Sig
24	1.2222	.42366	4.6296	.49210	-28.967	0,000	Sig
25	1.1481	.42366	4.5926	.50071	41.359	0,000	Sig
26	1.0000	.00000	4.7037	.46532	-35.907	0,000	Sig
25	1.4815	.50918	5.0000	.00000	32.222	0,000	Sig
26	1.0741	.26688	4.5926	.50071	29.612	0,000	Sig
27	1.1481	.36201	4.6296	.49210	25.574	0,000	Sig
28	1.3704	.49210	4.7037	.46532	29.701	0,000	Sig
29	1.2593	.44658	4.7778	.42366	31.337	0,000	Sig
30	1.2963	.46532	4.8519	.48038	24.407	0,000	Sig
31	1.4074	.50071	4.6667	.49210	26.206	0,000	Sig
32	1.2593	.44658	4.7778	42366	31.337	0,000	Sig

The level of significance is considered significant when it is < 0.05 at a degree of freedom (52).

It is shown from Table (5) that all items of the scale have the ability to discriminate between the upper and lower levels, therefore no item was deleted from the items of the scale.

Internal Consistency of the Scale

The researchers calculated the internal consistency of the scale by extracting Pearson's correlation coefficient between the score of each item of the scale and the total score of the scale on the construction sample, and Table (7) shows the internal consistency of the scale of using artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage.

Table 7.

Shows the Internal Consistency of the Scale of Using Artificial Intelligence Techniques to Improve Some Teaching Methods of Physical Education Teachers in the Intermediate Stage

Item	Simple Correlation Coefficient	Level of Sig	Result	Item	Simple Correlation Coefficient	Level of Sig	Result
1	0.393**	0.000	Sig	15	.203*	0.009	Sig
2	0.424**	0.000	Sig	16	.238**	0.009	Sig
3	0.240*	0.016	Sig	17	.240**	0.001	Sig
4	0.346**	0.000	Sig	18	.306**	0.000	Sig
5	0.322**	0.001	Sig	19	.498**	0.000	Sig
6	0.312**	0.002	Sig	20	.452**	0.000	Sig
7	0.270**	0.007	Sig	21	.352**	6.000	Sig
8	0.443**	0.000	Sig	22	.402**	0.000	Sig

9	0.231*	0.021	Sig	23	.342**	0.017	Sig
10	0.418**	0.000	Sig	24	.219*	0.000	Sig
11	0.279**	0.005	Sig	25	.363**	0.000	Sig
12	0.268**	0.007	Sig	26	.394**	0.017	Sig
13	0.259**	0.009	Sig				
14	0.304**	0.002	Sig				

Significant at < 0.05 and degree of freedom $n-1 = 99$.

From the previous table, it is shown that the number of the scale items is (32) items, and it is shown that all items are statistically significant in the consistency of the item with the total score of the field (6).

Table 8.

Shows the correlation coefficient between the item score and the total score of the field for the scale of using artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage

Item	Simple Correlation Coefficient	Level of Sig	Result	Item	Simple Correlation Coefficient	Level of Sig	Result
First Field: Educational Package				12	.407**	0.000	Sig
1	.484**	0.000	Sig	Third Field: Cooperative Learning			
2	.479**	0.000	Sig	13	.460**	0.000	Sig
3	.380**	0.000	Sig	14	.294**	0.000	Sig
4	.484**	0.000	Sig	15	.401**	0.000	Sig
5	.370**	0.000	Sig	16	.408**	0.000	Sig
6	.427**	0.000	Sig	17	.420**	0.000	Sig
Second Field: Brainstorming				18	.454**	0.000	Sig
7	.425**	0.000	Sig				
8	.380**	0.000	Sig	19	.284**	0.900	Sig
9	.400**	0.000	Sig	20	.480**	0.000	Sig
10	.396**	0.000	Sig	21	.234**	0.300	Sig
11	.380**	0.000	Sig	22	.419**	0.000	Sig
				23	.419**	0.000	Sig
				24	.207*	0.400	Sig
				25	.285**	0.000	Sig
26	.284**	0.900	Sig				
27	.480**	0.000	Sig	30	.419**	0.000	Sig
28	.234**	0.300	Sig	31	.284**	0.900	Sig
29	.419**	0.000	Sig	32	.480**	0.000	Sig

Significant at < 0.05 and degree of freedom ($n-1 = 99$).

It is shown from the above table that the items of the scale are acceptable in terms of the correlation of the field score with the total score of the scale.

Table 9.

Shows the Correlation Coefficient between the Field Score and the Total Score of the Scale of Using Artificial Intelligence Techniques to Improve Some Teaching Methods of Physical Education Teachers in the Intermediate Stage

Field Name	Correlation	Level of Sig	Result
Educational Package	.543**	0,000	Sig
Brainstorming	.444*	.015	Sig
Cooperative Learning	.500**	0.000	Sig

Reliability of the Scale

Split-half Method: This method measures the internal consistency of the items of the scale, as this consistency indicates the extent of performance consistency and stability when answering all items. This method is based on calculating the correlation coefficient between the scores of individuals on the two halves of the test and correcting the calculated coefficient using the (Spearman-Brown) formula. The researchers relied on the data of the main experimental sample for construction, whose number reached (130) individuals from physical education teachers, in calculating reliability using this method. The Statistical Package for the Social Sciences (SPSS) was used, and the items of using artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage were divided into two parts. Then, the correlation coefficient between the total scores was extracted, representing the reliability of half of the test, which was (0.443). To obtain the reliability coefficient for the whole test, the (Spearman-Brown) formula was used to correct the correlation coefficient, and after correction, the reliability coefficient became (0.605), which is a high reliability coefficient that can be relied upon to estimate the reliability of the scale.

Cronbach's Alpha Coefficient: The researchers extracted reliability using Cronbach's alpha coefficient based on the data of the construction sample, and by extracting the reliability coefficient whose value for the scale was (0.488), which is a high reliability coefficient that can be trusted in estimating the reliability of the test.

Objectivity: If the questionnaire is properly controlled, it will be characterized by objectivity as it is free from the researchers' personal interference and their opinions, and this is confirmed by a number of specialists regarding the extent to which the examiner is free from subjective factors. Therefore, the two scales of the method under study are characterized by objectivity due to the presence of an answer key for the response alternatives.

Main Experiment for the Application of the Scale of Using Artificial Intelligence Techniques to Improve Some Teaching Methods of Physical Education Teachers in the Intermediate Stage:

After the scale became ready for application in its final form (Appendix 1), the researchers, with the assistance of the supporting work team, applied the scale to the application sample, whose number reached (130) teachers and school principals specialized in physical education in the Directorate of Education of Babylon. After completion, the researchers recorded the results in preparation for processing them.

Statistical analysis

The researchers used the Statistical Package for the Social Sciences (SPSS), Arithmetic Mean, Standard Deviation, (T) test for independent samples, Simple Correlation Coefficient, Skewness Coefficient, Cronbach's Alpha Coefficient, Spearman-Brown Formula, Hypothetical Mean.

RESULTS AND DISCUSSION

Results

Table 10.

Shows the Arithmetic Mean, Standard Deviation, (T) Value, and Hypothetical Mean for the Scale of Artificial Intelligence Techniques

No	Arithmetic Mean of the Sample	Standard Deviation	Hypothetical Mean	Calculated (T) Value	Error Level	Sig
130	78.4231	4.93346	78	0.978	0.330	Sig

Significant at $< (0.05)$ with a degree of freedom (129).

Through table (10), it is shown to the researchers that the responses of the research sample are significant, as the researchers attribute this to the fact that the use of artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage was good, since artificial intelligence techniques had a major role in developing the students' level in various fields.

Discussion

Artificial intelligence works to improve the educational process and enhance students' level, as well as the ability to bring about change and improvement in the educational process through the use of teaching methods and approaches, including cooperative learning (Caracuel-Cáliz et al., 2025; Fernandez-Rio & Iglesias, 2024; Hadi, 2023; Zhang, 2022). The use of smart teaching methods such as training using brainstorming, educational package, cooperative learning, smart computer systems, and multimedia education has been recognized.

Artificial intelligence technology also brings many benefits in various fields, including education, as many researchers indicate that artificial intelligence and machine learning can raise the level of education (Bedford et al., 2024; Chan & Wong, 2025; P. He et al., 2025). While students' learning and teaching methods are constantly changing, artificial intelligence instructors and chatbots can also do an excellent job in helping students deal with various aspects of learning outside the classroom (M. He et al., 2025; Lai & HE, 2025; Sanz-Tejeda et al., 2026).

Despite the continuous need for teachers, artificial intelligence tools can help students work on their weaknesses (Khmelnitska et al., 2025; Pietraszewski et al., 2025). There are many success stories that demonstrate the value of artificial intelligence, as companies that add machine learning and cognitive interaction to traditional business processes and applications can significantly improve user experience and enhance productivity (Mohsen Sadr et al., 2024).

Artificial intelligence and its applications provide various options according to students' needs, as AI-based solutions can adapt to enable helping students in their areas of weakness and provide educational materials based on their weaknesses. For example, the student may take a test before starting to use the application; the

application analyzes it and provides appropriate tasks and courses, as well as providing virtual mentors to follow up students (Kim et al., 2025; Lu et al., 2024).

This age stage also represents an educational and developmental transitional period characterized by important biological and psychological transformations. It represents the transition between early childhood and the beginning of adolescence, and requires taking into account developmental characteristics such as rapid growth in mental and physical abilities, changes in interests, and increased levels of independence among students. Teaching at this stage requires educational structures and teaching strategies characterized by specialization and flexibility, and consideration of individual differences among students in learning speed, psychological needs, and motor skills (Khmelnitska et al., 2025; Pietraszewski et al., 2025).

Artificial intelligence techniques can provide an individualized learning experience for the student without the need for the presence of a teacher to answer questions throughout the day. In fact, an AI-supported Chabot can answer students' questions with a response time of 2.7 seconds. It can also answer frequently asked questions by accessing the full knowledge base of the school through AI-supported chat programs that can respond to a wide range of general and repeated questions typically asked by students without involving any faculty member (Dindorf et al., 2023; İnce Yenilmez & Ersöz, 2025; Li & Xu, 2021).

Through what has been addressed, the researchers believe that the use of artificial intelligence techniques has great importance in the field of teaching methods and approaches for physical education teachers in the intermediate stage, as well as great importance in enhancing the spirit of education in all aspects, in addition to reducing effort and time, avoiding boredom, and creating an appropriate educational environment.

CONCLUSION

It was reached to construct a scale of artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage. The ease of the possibility of applying artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage. Physical education teachers face significant difficulties in the possibility of applying artificial intelligence techniques within the school. Artificial intelligence techniques have a very large and effective role in improving some teaching methods of physical education teachers in the intermediate stage. Recommendations: The necessity of adopting the artificial intelligence scale within the school to improve some teaching methods of physical education teachers in the intermediate stage. Working on joint cooperation between the Ministry of Education and Higher Education, the Information Technology Department, to establish continuous training courses on the use of artificial intelligence techniques in general, in order to benefit from preparing

teachers who are proficient in applying artificial intelligence techniques. The use of artificial intelligence techniques and applications in developing modern teaching methods and improving the quality of education in general and the learner. The use of artificial intelligence techniques in developing teaching curricula and improving students' abilities in general. Working on establishing a technical support team from the Information Technology Department to assist teachers in facing the difficulties of using artificial intelligence techniques. Working on providing an interactive platform for exchanging experiences and information among teachers regarding the latest updates provided by artificial intelligence techniques. Working on conducting more research and studies on artificial intelligence techniques to improve some teaching methods of physical education teachers in the intermediate stage.

Conflict of interest

The authors declare no conflict of interest.

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Appendix (1)

Using Artificial Intelligence Techniques to Improve Some Teaching Methods of Physical Education Teachers in the Intermediate Stage

First Axis: Educational Package

No.	Item	Yes	To some extent	No
1	Do you have knowledge of using artificial intelligence in the educational package?			
2	Have you ever used the educational package in a physical education lesson for the intermediate stage?			
3	Do you find that the use of artificial intelligence in the educational package helps in developing the capabilities of physical education teachers?			
4	Do you think that using the educational package through artificial intelligence helps the teacher deliver an ideal lesson?			
5	Are there tools that assist the teacher when using the educational package in improving the quality of the lesson?			
6	Do you think that artificial intelligence helps make the educational package more attractive to intermediate stage students?			
7	Do you believe there are difficulties in using artificial intelligence through the educational package to improve the capabilities of physical education teachers?			
8	Does the teacher need training courses in modern teaching methods?			
9	Do you have sufficient information about artificial intelligence and how to use it?			
10	Is the school administration aware of the needs of the physical education teacher to improve his teaching methods?			
11	Do you think there is a positive effect on the student when the teacher uses artificial intelligence techniques in terms of comprehension and application?			
12	Does artificial intelligence help, through the use of the educational package, in reducing time and effort for the physical education teacher?			
13	Is there a pre-prepared plan by the physical education teacher using some teaching methods such as the educational package?			
14	Do you think that current technological development helps the physical education teacher in developing his teaching capabilities?			

Second Axis: Brainstorming

15	Have you ever used the brainstorming method in a physical education lesson?			
16	Do you have full knowledge of the uses of artificial intelligence and linking them with brainstorming?			
17	Does the brainstorming method help the physical education teacher in delivering information and exercises better to the student?			
18	Do you think that the use of artificial intelligence helps the physical education teacher in delivering a better lesson than before using the brainstorming method?			
19	Do you face difficulty in using brainstorming during teaching, and does it require many resources?			
20	Does brainstorming help in stimulating the student, creating excitement, and discovering talents?			
21	Do you think that brainstorming sessions help the teacher in attracting students' attention and increasing the speed of understanding the information?			

22	Do the currently available resources allow the teacher to use artificial intelligence techniques with more than one method such as brainstorming?			
23	Do you think that the brainstorming method is suitable for the intermediate stage?			

Third Axis: Cooperative Learning

24	Is it possible to use artificial intelligence in the cooperative learning method to develop the teacher's capabilities?			
25	Do you consider the cooperative learning method to be the best for teaching because it does not require many material resources?			
26	Do you think that artificial intelligence can make cooperative learning more effective and organized between the teacher and the student?			
27	Do you support conducting training courses for physical education teachers in modern teaching methods using learning technologies?			
28	Do you see acceptance and a positive spirit when using cooperative learning among students through the teacher's application?			
29	Do you see difficulties in using the cooperative learning method by the physical education teacher in the field?			
30	Is there cooperation between the school administration and the lesson through providing some explanatory and educational tools?			
31	Can artificial intelligence play an important role, through the use of the cooperative learning method, in discovering talents and distinguished students?			
32	Do you think that cooperative learning is the best method to make the student participate in the lesson and solve problems?			
33	Is it possible to integrate artificial intelligence with modern teaching methods, or are there difficulties due to the lack of technological resources?			