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THE EFFECT OF A TRAINING PROGRAM FOR PHYSICS TEACHERS ON ARTIFICIAL INTELLIGENCE APPLICATIONS ON THEIR ATTITUDES TOWARDS ITS USE IN EDUCATION AND THEIR TEACHING PERFORMANCE

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Abstract:
The study indicated(Maher & Singer, 2007) pointed to the deficiency in the level of performance of pre-service science teachers in using educational technologies as one of the national standards for their preparation, and stressed the need for the teacher preparation program to pay attention to and train them on how to use educational technology to ensure the achievement of quality teacher performance..
The results of a number of studies, such as the study by Hero (2019), have shown thatHero) The positive impact of integrating technology into teaching on teacher performance, and that it plays a vital role in improving his productivity and performance inside the classroom, and that the better technology is integrated into teaching, the better his performance will be, and vice versa.

Keywords:

Research problem:

In light of the rapid development, successive change and growth of knowledge at rapid rates, which resulted in the information revolution that we are living now, the world has experienced a major scientific and technological revolution that has had an impact on various aspects of life, and education is part of these aspects. Therefore, demands have emerged to search for new educational methods and models to confront many challenges at the global level, including the increased demand for learning, with the decrease in the number of educational institutions, and the increase in the amount of information in all different branches of knowledge, in addition to employing technological development in education.Integrating technology into teaching helps teachers[1] In supporting weak traditional teaching methods by using technology-based learning and teaching tools, because traditional teaching based on textbooks only may be a cause of the spread of digital illiteracy in some societies.

andIf educational institutions do not prepare themselves and their capabilities to deal with modern scientific and technological developments, including e-learning and artificial intelligence, which are accelerating at a great rate that cannot be ignored or delayed in thinking about the necessity of benefiting from their capabilities, then they will find themselves backward and lagging behind the train of civilization and scientific and technological progress, and thus unable to graduate individuals capable of dealing with them efficiently and effectively for the purpose of developing society..

There is no doubt thatEducational institutions wishing to introduce e-learning must prepare the necessary requirements for this, such as the infrastructure represented by providing technological devices and equipment and connecting them to the Internet, in addition to providing a learner who is able to use this technology and who is willing to use it. Therefore, we have becomeTeacher awareness requiredThe necessity and importance of using e-learning and artificial intelligence applications in an integrated, parallel manner, accompanying regular education in our educational institutions, and the importance of this type of education in overcoming the limits of time and place and reducing costs, in addition to achieving the principle of education democracy by providing the opportunity for education for all segments of society..

Because scientific and technological developments are accelerating, no teacher preparation program within educational institutions such as teachers' institutes or colleges of education can keep up with them and provide them to students on a regular basis. Therefore, the need for post-graduation and in-service training has emerged to provide teachers with all scientific developments, whether in the field of specialization or in the field of teaching and evaluation methods, after determining their training and cognitive needs.

The importance of the teacher acquiring digital skills and using artificial intelligence tools in teaching does not negate the importance of his need to acquire digital culture and a positive attitude towards using artificial intelligence in his

[1]A teacher is anyone who carries out the education process, from primary school to university.

daily work with his students. He may learn all the digital tools, but he does not know how to use them and when to use them (Abdul Aziz, 2021).

Through a questionnaire directed to a group of secondary school physics teachers, it was found that only 50% of teachers support the use of e-learning in schools, while 85% of them confirmed shortcomings and weaknesses in the requirements for using e-learning in teaching physics in their schools, and that 90% of them do not have any information about artificial intelligence applications in education.

Hence, the problem of the current research emerged in the necessity of training secondary school physics teachers on various artificial intelligence applications in teaching and developing their teaching skills, and developing trends towards using e-learning in general and using artificial intelligence applications in education in particular.

Thus, the research problem is defined by answering the following question:

What is the impact of a training program for physics teachers on artificial intelligence applications on their attitudes towards using it in education and their teaching performance?

❖ Importance of research

The teacher is the most important pillar of the educational process, and the basic element in achieving the desired goals and turning them into a tangible reality. Hence, interest in preparing, qualifying and training the teacher has become one of the most important topics that have occupied educators by searching for methods to develop him and provide him with skills to improve his level of teaching performance, and that good preparation for the teacher is the real development of the educational process, because it is a main condition in it (Amer (2019) Al-Ajaji (2016) stated that standing on the positions of weakness and strength in the teacher raises his efficiency and achieves creativity, and accordingly it is necessary to strive for renewal and keep pace with modern technological developments, and use teaching methods and methods supported by modern technologies in the classroom in a creative and innovative way so that the educational environment is attractive to students. He uses the Internet and presents his lessons using different technologies, urges his students to solve assignments and do research using technology, encourages them to interact and communicate with each other, and gains them critical thinking skills (Ali, 2019), thus being an active user of digital technologies in order to benefit from them and activate them in the learning environment 2021Pratolo & Solikhati). Instead of practicing the usual methods, and keeping pace with modern trends in learning and teaching based on integrating technology into the educational process through educational applications of the communication theory in education (Al-Bawi and Karim 2022, 84).

The science teacher in general bears a great responsibility in preparing the learner and acquiring the skills of the twenty-first century because science is one of the important fields on which the knowledge economy is based, as the economic progress of countries and their ability to compete globally depends on the strength of the workforce in the fields of science. The physics teacher in particular bears great burdens in preparing the person capable of dealing with new knowledge and benefiting from it to confront the problems of the present and the challenges of the future (Al-Anzi, 2020, 436; Abdel Salam, 190, 2023).

The study indicated(Maher & Singer, 2007) pointed to the deficiency in the level of performance of pre-service science teachers in using educational technologies as one of the national standards for their preparation, and stressed the need for the teacher preparation program to pay attention to and train them on how to use educational technology to ensure the achievement of quality teacher performance..

The results of a number of studies, such as the study by Hero (2019), have shown thatHero) The positive impact of integrating technology into teaching on teacher performance, and that it plays a vital role in improving his productivity and performance inside the classroom, and that the better technology is integrated into teaching, the better his performance will be, and vice versa.

Al-Bawi and others (2017) recommended the necessity ofHolding and organizing training seminars and workshops for science teachers to employ electronic teaching media in teaching science in virtual learning environments as a technological innovation. And emphasizing the necessity ofhThe educational leadership is fully committed to introducing the e-learning method in all stages of education, especially theWorkersComputer and Internet in science education.

Al-Surur's study (2018) confirmed that employing modern technologies and methods plays a major role in improving teacher performance in the educational process. Al-Naqah's study (2019) showed that integrating technology into teaching plays a role in developing the cognitive and skill competencies of faculty members. UNESCO emphasizes the dissemination of artificial intelligence technologies in education to increase human intelligence, protect human rights, and promote sustainable development through effective cooperation between humans and machines in life, learning, and work. The "Beijing Consensus" on artificial intelligence and education, at the International Conference on Artificial Intelligence and Education held in Beijing in May 2019, also emphasizes that artificial intelligence can be used in education in five areas: (education management and delivery, empowering teaching and teachers, evaluating learning and teaching, developing values and skills necessary for life and work in the era of artificial intelligence, and providing lifelong learning opportunities for all (Al-Muslim, 2023, 2)..

The importance of AI in education stems from its ability to provide personalized learning experiences for each student. By analyzing learning data and student performance, AI-based systems can deliver educational content that is tailored to the student's level of understanding, learning speed, and individual interests. This contributes to improving the effectiveness of the educational process, in addition to enhancing student motivation and engagement..

AI can also facilitate the teaching process itself through smart systems and virtual assistants, thus reducing the administrative and routine burden on teachers, allowing them to focus more on direct interaction with students and meeting their educational needs more effectively. Moreover, AI contributes to the development of assessment and evaluation methods, so that immediate and objective feedback can be provided to students about their performance.

TrainingThe in-service teacher works to consolidate the knowledge and skills acquired in the preparation stage, enhance them, renew their scope, and expand them, while providing opportunities for further specialization (Al-Abd, 1977: 13).

And in a wayThe importance of in-service teacher training is due to several reasons, the most important of which is keeping pace with:

1. revolutionInformation and Communications.
2. Speed of change of systemsEducational.
3. DevelopmentsScientific and technological.
4. The development of educational and psychological sciences.
5. continuationActivation and activation for teachers.

(Hathnawi, 2009: 57)

The importance of the current research lies in the importance of:

1. Training and training programs for in-service teachers, which contribute to developing their field performance.Then it contributes to their professional growth and diagnosing the negative and positive aspects of their performance for the purpose of developing them, which is reflected in the academic achievement of their students.

2.Physics is considered one of the most abundant and richest subjects in terms of concepts.Theories, facts and applications that can be presented in more exciting and interesting ways, andIts study contributes to changing the cognitive and mental structure of the learner and its contribution to cognitive development and the acquisition of the scientific methodology that uses all scientific thinking skills.

3. The importance of the physics teacher, who is the cornerstone of the educational process, and his role and skills in employing teaching methods and educational technologies to improve the educational process.

4. Using artificial intelligence applications to support and develop the educational process.

Research objectives and hypotheses

The current research aims to:

First: Building a training programFor physics teachers on artificial intelligence applicationsIn education.

Second: DisclosureThe effect of a training program for physics teachers on artificial intelligence applications on their attitudes towards its use in education and their teaching performanceBy verifying the two hypotheses:

1- There is no statistically significant difference at a significance level of 0.05 between the average scores of physics teachers on the scale of attitudes towards using artificial intelligence applications in pre- and post-education.

2- There is no statistically significant difference at the significance level (0.05).) For teaching performance between the average scores of the group trained according to the proposed training program and the hypothetical average of the scores of the teaching performance card prepared for this purpose.

❖ Research limits

1- The research community is determined by all physics teachers in middle, secondary and secondary schools for boys and girls affiliated with the General Directorate of Education in Fallujah for the academic year 2024-2025.

2- Some artificial intelligence applications used in learning and education.

❖ Define terms

A. Training program: and define it

1. **(Nasr and Hamadi, 1995): It is "a number of educational/learning activities proposed in a way that allows the targeted people the opportunity to receive intensive training in a number of skills."**

(Nasrouhmadi, 1995: 259).

2. **(Shahata and others, 2003):** That he is"A type of program that aims to prepare and train individuals in a specific field and develop their knowledge and attitudes in a manner consistent with the trainees' educational experiences, growth, and needs to develop a certain skill." (Shahata and others, 2003: 77).

3. **(Amira, 2001):**"A planned and organized program according to scientific and educational foundations based on the principles of learning theory to provide direct services and training in a group manner through a number of sessions that aim to influence the trainees" (Amira: 222:2001).

The researcher defines it procedurally as:(A set of organized scientific activities prepared by the researcher to provide secondary school physics teachers with multiple training sessions on the use of artificial intelligence applications in education).

B-Artificial Intelligence:

Artificial intelligence is defined as:thatA science concerned with creating machines that perform actions that humans consider intelligent.It is also defined as: "the part of computer science that deals with intelligent computer systems, those systems that possess characteristics associated with intelligence and decision-making and that are similar to some degree to human behavior with respect to language, learning, thinking, and problem solving."**(Thursday 9 2022)**

The researcher defines it procedurally as "a group of electronic applications that can be used through computers and smart phones connected to the Internet and work to assist the student and teacher in the learning and teaching process.""

C- Teaching performance:

Al-Janabi and Bushra, 2011 defined it as "the teacher's daily performance with all his movements inside the classroom to achieve interaction with his students to provide them with knowledge and skills and master them to reach the desired goals of education." (Al-Janabi: 2011, 10)

Definition of teaching performance procedurally:

It is the process of measuring and determining what the trainee physics teacher performs in an educational situation that requires the use of one of the artificial intelligence applications, and it is measured through an observation form prepared by the researcher for this purpose.

د- Directions towardsAttitude:-

Attitude is defined in the Encyclopedia of Psychology (1972) as "a cognitive tendency, disposition, and readiness to respond to a particular subject or subjects."Eysenck & et. Al, 1972, p. 95)

Webster's Dictionary (1978) defines it as "a way of behaving, feeling, and thinking that expresses an individual's inclinations and opinions."Webster, 1978, p. 122).

Either the direction towards a specific thing:

Nashwan (1989) defined it as special feelings that arise in a person as a result of his experiences in the form of a desire or unwillingness to study a certain topic. These feelings are characterized by rejection or acceptance, love or hatred, and can be called attitudes toward a topic (Nashwani, 1989, 268).

- And he defined it (Al-Hila, 2003) as tendencies that qualify the individual to respond with specific behavioral patterns towards certain people, ideas, incidents, situations, or things, and together they form a complex system in which a large group of variables interact. (Al-Hila, Muhammad Mahmoud, 2003, 367)

-The operational definition of the trend towards using artificial intelligence applications in education:-

It is the feeling of acceptance or rejection of the physics teacher undergoing the training program towards the use of artificial intelligence applications in education, measured by the degree he obtains on the attitude scale prepared for this purpose.

❖ **Theoretical background and previous studies**

1-Training

Training is workThe organized and planned program enables its participants to develop their profession by providing them with the latest cultural, professional and specialized experiences and everything that would raise the level of the trainees' productive energies within a well-thought-out plan, within a social framework and in accordance with a clear philosophy and specific goals. And trainingIn general, it is a continuous and integrated process that includes different parts and elements, each of which plays a distinct role. However, the effectiveness and efficiency of training in achieving its objectives depends on the extent of integration and interconnection between its parts and elements, which together constitute the training process. The organized process of linking the parts is what makes it a system, and an open system in particular. It consists of the following elements:

1- Inputs It consists of:

A-Human inputs**:**It is represented byIn the individuals working in the institution who are exposed to a specific training program, as represented by the trainers, lecturers and their assistants.

for-Non-human inputsIt represents the money spent on training, equipment, means, halls and other requirements, and includes the ideas and theories presented by trainers and trainees, the methods adopted in training, and the political, economic, social and technical environment related to training.

2Operations: include:

A- Research, identify and define needs.

for- Setting goals.

T- Design the training program.

Th- Implementation of the training program.

G- Evaluation and follow-up.

3**- Outputs :**It is represented byIn all the results that result from the training system, they are in the form of improvement or non-improvement in the performance of individuals, growth and improvement in the organization's activities, or general benefits that accrue to society as a whole.

4- Feedback: It is corrective information that comes from the outputs to the inputs or processes and monitors the training activity.

(Dura, 1991: 45) **.**

GoalsIn-service training:

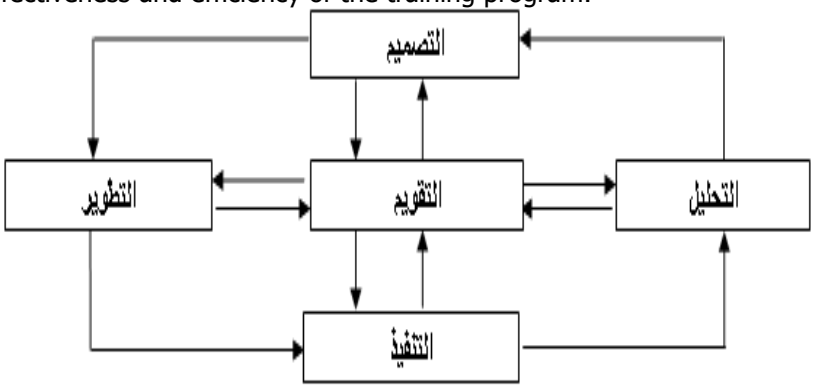
thatTraining in its scientific concept aims primarily to achieve continuous self-growth for those involved in the education process at all levels, especially the performance of the teacher, principal and trainee employee. Therefore, we need a teacher's performance that keeps pace with the developments of the era and benefits from everything new in self-growth or in-service training. (Muhammad: 1973) and (Al-Duwaik: 1985) agree that in-service training aims to:

1.Raising the level of teachers' performance in the subject, developing their teaching skills and knowledge, and increasing their ability to innovate and innovate.
2.Changing teachers' attitudes and behaviour for the better, defining their role and responsibilities in the educational process, and learning about modern, advanced trends and methods in education.
3.Increase the teacher's productive efficiency and help him perform his work in a better way and with less effort.
4.Addressing the shortcomings of those who have not received good preparation in their involvement in the profession and training in scientific research.
5. EnhancementTeachers' expertise in the field of specialization and their insight into educational problems and means of solving them.
6.Developing the concept of continuing education and contributing to seminars, field studies, etc.
7. HelpNewly graduated teachers should be aware of the systems and laws that enable them to face new situations in the field of work (Al-Duwaik: 1985: 40) (Muhammad: 1973: 39).

The training program that will be prepared by the researcher aims to provide physics laboratory instructors at the College of Education / Ibn Al-Haitham with information and skills for using virtual laboratories in line with modern developments in educational technology and teaching methods and techniques.

Numberstraining Programs:

thatThe main stages of the general model for preparing training programs go through the following steps:
1- AnalysisIt is the assessment of training needs, their analysis and the determination of priorities.
2- Design**:**designThe solution to the training problem, i.e. determining the educational and technical specifications of the training program.
3- Development Producing the training programme with all its printed and non-printed materials and sources, formatively evaluating and revising them, and producing the final version of the programme.
4- Implementation Use of training materials by trainees, implementation of the program in the training environment, and collection of evaluation data.
5- Calendar Analyzing the evaluation data and preparing the evaluation report for the training program, in other words, a report on the effectiveness and efficiency of the training program.



Scheme (1)Key elements of preparing a training program
(Al-Rashidi, 2004: 27).

The researcher will prepare his own training program based on the previous stages, with the additions imposed by the special goal of the program, as will be mentioned in Chapter Three later.

FoundationsPrinciples for educational and training programs in the field of educational technologies:

TrainingIn general, and training in the field of educational technology in particular, is not done randomly, but is based on foundations and principles that must be taken into account when planning and implementing training programs in order to achieve their goals and increase their effectiveness. Many researchers in the field of educational technology have worked hard to identify the foundations and principles that can be focused on when planning, implementing and evaluating educational and training programs in the field of educational technology. These principles can be summarized as follows:
1The objectives of the training program should be clear, specific, and appropriate to the content and trainees. They should be procedurally formulated in the language of the behavior expected of the trainees, while specifying the level of performance that the students should reach after completing the program.
2The program meets the actual needs of trainees.
3The program is characterized by flexibility and multiple tests that allow for different activities that are consistent with inclinations and trends.
4- The program is based on specific skills required in the educational situation.
5- We apply in training programs the foundations of educational theories, especially those foundations related to reinforcement and feedback.
6-The program applies appropriate training methods.
(to open(The door, 1994: 224).

2-The concept of artificial intelligenceAI (Intelligence Artificia)I:)

Introducing the concept of artificial intelligence By John McCarty at a conference held at Dartmouth College in 1956, artificial intelligence is defined as "a method of helping the computer to represent human activities that require special skills and experience and to make intelligent decisions, or it is a computer programming process that makes the computer capable of logical learning and carrying out operations that require a high level of intelligence" (Qusi, 2010, 37).

Or it is a branch of computer science through which computer programs can be created and designed that simulate the style of human intelligence; so that the computer can perform some tasks instead of the human being, requiring thinking, understanding, hearing, speaking, and movement in a logical and organized manner (Abu Zaid, 2017, 19)

Thus, it becomes clear that the concept of artificial intelligence is divided into two parts: the first simulates human behavior and the second solves complex problems and issues using machines.

Features of Artificial Intelligence Technology

Researchers believe that artificial intelligence technology has the following characteristics:

- Use a comparative approach to the human method in solving complex problems.
-Dealing with hypotheses simultaneously, accurately and quickly.
-The existence of a specialized solution for each problem and for each homogeneous category of problems.
-Works at a stable scientific and advisory level without fluctuation.
-Its construction requires the representation of vast amounts of domain-specific knowledge.
-Processes non-numeric symbolic data through logical analysis and comparison operations.

There are many characteristics and features that intelligent software systems must have, such as:

Ability to infer and deduce, ability to deduce and perceive, non-reliance on algorithmic method in solving problems, symbolic representation and processing, embracing and representing knowledge, ability to deal with incomplete, uncertain and conflicting data, ability to learn and add to the knowledge base

(Al-Atal and others, 2021, 38)

- The role of artificial intelligence in education

Specialized literature indicates that the use of artificial intelligence applications in education leads to:

- Developing educational materials: It helps teachers in developing and improving various educational materials, such as interactive games and active learning programs.

- Personalization of education: Applications can study and analyze all student data, to understand their needs and then customize appropriate educational materials for them in a better way.
- Providing immediate feedback: everything related to providing advice and correcting exercises, which is what all educational systems that use artificial intelligence tools provide.
- Supporting distance learning methods by creating live video clips, improving sound and image quality, and other matters related to improving the distance learning process.
- Studying student performance: by analyzing and studying student data, level and performance, with the aim of understanding their academic tendencies and inclinations, and all of this of course helps in making the best educational decisions.
- Improving interactive learning: Interactive learning can be improved by creating diverse and interesting learning experiences that increase the extent to which students interact with their teachers.
- Automated assessment: AI applications help correct tests and assignments faster and more accurately, allowing teachers to focus on student development rather than routine work.

Artificial intelligence applications used in education:

Among the most important applications of artificial intelligence that can be used in the educational process are:

A.Smart educational platformsThese are techniques used to analyze student performance and suggest educational courses that suit them, such as applying:*Khan Academy*and Coursera, as well as suggesting educational content that suits the student's needs, such as the ALEKS system..

b. Virtual AssistantsThese are programs used: To analyze the way students learn and customize language teaching methods for them such as the program*Duolingo*Or like the ChatGPT program, which works as a virtual assistant that can answer students' questions around the clock.

C. Interactive educational gamesGames are built through it. Educational helps students learn math, science, and languages in fun ways, enhancing their engagement and understanding..

3-: Directions

The word direction is the Arabic translation of the termAttitude in English means readiness and preparation. Several definitions of attitude have been developed according to psychological approaches and theories.

One of the definitions according to the experience approach is the definition of the port.Allport (1954) who states that attitude is "a state of readiness or disposition, organized through the person's experience, which exerts a directive and dynamic influence on his response to all objects and situations connected with that response" (Allport, 1954, p. 49). Rokeach (1968) defines attitude according to the cognitive approach as: "a relatively stable organization of beliefs

about a given object, physical or social, concrete or abstract, which leads the person to respond in a preferential manner" (P112) (Rokeach, 1968

One of the definitions that tried to combine these two approaches is Green's definition.Green, who defines it as "a concept that expresses a system or organization of a person's feelings, knowledge, and behavior, and is represented by degrees of acceptance or rejection of the topics of the attitude." (Sayed, 1989, 46).

Although there is no complete agreement among psychology researchers about the concept of attitude, most of those interested in this field consider attitude to be a complex concept consisting of three integrated and intertwined components, which are: the cognitive component, the emotional component, and the behavioral component. (Zaitoun, 1988, 14). Most of those interested in measuring attitude agree that attitude is a process of linking emotions, knowledge, and behaviors together in an organized structure, although these three components are not completely consistent with each other. The importance of the emotional component is increasingly emphasized, because it is the strongest among the components of psychological attitude; because it provides the attitude with the emotional charge necessary to move behavior and push it to work. (Belkhayr, 2000, p. 28).

Since attitudes are learned, they represent a complex product of concepts, beliefs and feelings that generate in the individual a certain tendency and readiness to respond to the subject of the attitude in a certain way. Therefore, we find educators giving importance to it as one of the most important goals of modern education. Learning that leads to the student gaining positive attitudes is more beneficial than education that leads to merely acquiring information because it is constantly exposed to factors of forgetting, while the effect of attitudes remains continuous.

Attitudes make the learner behave in a certain way that is characterized by stability and continuity towards certain things or situations and differ in intensity or generality according to the differences in the things or situations associated with them. Psychologists believe that experiences that achieve satisfaction for the individual and make him feel satisfied, comfortable and happy make him develop attitudes towards the content of the experience and vice versa. (Kazem Weiss, 1973, 167). Positive reinforcements also increase the likelihood of responses appearing and being maintained, while negative reinforcements lead to the weakening of undesirable attitudes.

Al-Moussawi (2001) concluded in her study in 2001 that the experimental group that studied using the computer as an illustrative tool developed a tendency towards physics compared to the control group that studied using the traditional method, as well as making educational experiences using the computer more effective, more lasting in impact, and less likely to be forgotten (Al-Moussawi, 2001: 82-84).

4-Teaching performance

The goal of teaching performance is to achieve a positive interaction between the teacher and the student that takes place daily, through which the teacher presents the content of the scientific material after having planned it in advance. Hence, the researcher sees that the content of the scientific material is an important area that the teacher must be able to master in addition to the other three main areas of performance, which are (planning, implementation, and evaluation).

Al-Tahhan (2013) pointed out that teaching performance is measured from three aspects:

1. The cognitive aspect is measured in writing through tests and questionnaires that measure information and direct experiences (concepts, generalizations, skills, issues).
2. The performance aspect, in which the student's skills are measured – applied through the observation card.
3. Performance output: The final output of the work is estimated through its correctness, accuracy and speed of performance.

Performance observation is considered one of the most important methods of evaluating it, as observation shows the extent of improvement and progress in acquiring skills, in addition to a questionnaire or test to measure the cognitive aspect (Al-Tahhan, 2013: 558).

Previous studies

Al-Muslim Study 2023: The study aimed to reveal the attitudes of science teachers towards using artificial intelligence applications in the educational process for the primary stage in the Jazan region, and their relationship to variables (academic qualification, years of experience, and use of devices). Through a questionnaire applied to a sample of (92) teachers randomly selected from the research community, the results of the study showed that science teachers for the primary stage have a positive attitude towards using artificial intelligence applications in the educational process and there are some obstacles that prevent their use in the educational process, in addition to the existence of some shortcomings in providing incentives that encourage the use of artificial intelligence applications in the educational process.

The study of Al-Atal et al. (2021) aimed to identify the importance of artificial intelligence technology in the educational process and the challenges facing its use in education from the point of view of students of the College of Basic Education in the State of Kuwait, and the impact of gender variables, academic year, and cumulative average on that. The study used the descriptive approach, and the study sample consisted of (229) - and students studying the Computer Teaching Methods course at the College of Basic Education. A questionnaire was applied to them that included (31) paragraphs. The results showed the presence of statistically significant differences at a significance level of (0.05) between the averages of the study individuals regarding the importance of artificial intelligence technology in the educational process according to the variable of the academic year, while there are no differences regarding the challenges facing its use in education. The results also indicated the presence of differences regarding the challenges

facing the use of artificial intelligence technology in education according to the variables of gender and cumulative average, while there are no differences regarding its importance in the educational process (Al-Atal et al. 2021, 30).

❖ **Search procedures**

1- Research Methodology: Since the research studies the effect of an independent variable, which is the proposed program, on dependent variables, the appropriate method for it is the quasi-experimental method with a single group and a post-test, as is clear below.

Measuring tools	Dependent variable	independent variable	The group
- Teaching Performance Observation Form - Scale of attitudes towards the use of artificial intelligence applications in education	-The trend towards using artificial intelligence applications in education -Teaching performance	Proposed training program	empiricism

(2) Research Design Scheme

2- Research community and sample

The research community is determined by all physics teachers in middle, secondary and secondary schools for boys and girls affiliated with the General Directorate of Education in Fallujah for the academic year 2024-2025.
The research sample is as shown in Table (1).

Table (1)
Research sample data

Subject to the attitude scale	Subjects to the test of teaching performance	For training participants	Certificate
40	17	40	Bachelor's
12	6	12	Master's
2	-	2	PhD
54	23	54	the total

3- Research Supplies

The current research requires building a training program for physics teachers on the use of artificial intelligence applications in education. The program was built: It was done through the following steps:

First: Planning

1. Analysis step: Its aim is to reveal the basic needs of the programme and its basic paths. It was carried out in two stages:

- The first step is the training needs analysis:

Through the researcher's experience in the field of training and through her review of the work of physics teachers in secondary school classes and the training programs of some Iraqi, Arab and foreign studies in this field, she reached the most important training needs that the trainee physics teacher needs, which are:

- The need for information about e-learning.
- The need for information and training on digital educational technologies and their use in education.
- The need for information about artificial intelligence applications and training on their use in education.

- The second is the analysis of trainee teachers:

Before implementing the program, any training program, the characteristics of the target sample must be determined. Their characteristics were investigated by collecting information from them personally, and it became clear that they are:

- Holders of a degree not less than a Bachelor's degree in Physics from colleges of education.
- Have at least two years of experience teaching physics.
- They did not participate in training courses on artificial intelligence.
- They did not use any AI application in teaching or assessment.

Second: Design

It included three stages:

❖ The first stage is to set general objectives for the program and objectives for each workshop, andProgram implementation methods and evaluation methods.

❖ The second stage is determining the training program material, which includes theoretical material on the following:

– E-learning, its types and advantages.

- Educational technologies, their types and how to use them.
- Introduction to Artificial Intelligence Basic Concepts: Definition of Artificial Intelligence, Types of Artificial Intelligence, Applications and Importance.
- Virtual Reality Applications
- Virtual Labs
- / Ghat gpt office applications
- PowerPoint of all kinds
- -Canvas
- Gomaa
- Niro

❖ The third stage is preparing the working papers for each training session.
❖ Number of measurement tools represented by the observation card to measure teaching performance, and the scale of the trend towards using artificial intelligence applications in teaching, and this will be detailed in a later section.

Third: Implementation:

- The first: is to determine the educational activities. The activities followed in the program differed, and because the scientific material of the program requires training and application by the trainee, the educational activities as a whole were carried out in the form of small cooperative groups and individual educational activities.
- The second is preparing the teaching plans: Teaching plans were prepared for each of the training sessions that were implemented.

The third is the implementation of the program, which was done as follows:

- Distributing the program plan and guide to the trainees.
- Forming groups.
- Introducing them to the work and evaluation mechanism.
- Implementation of training sessions.

Fourth: Evaluation

It was done in three stages:
- The first: In it, the program was evaluated by specialists in physics teaching methods with the aim of completing all its requirements. Their opinions were also taken on the suitability of the program components and the extent of its suitability for the time specified for the program, its details, and the adequacy of the activities.
-Second: In which the trainees' teaching performance was evaluated according to the teaching performance evaluation form prepared for this purpose.
-The third: In it, the trainees' attitudes towards using artificial intelligence applications in education were measured by applying the attitude scale that was prepared for this purpose. (Appendix 2)

4- Search Tools

The current research required the preparation of two tools:

First: A scale of attitudes towards artificial intelligence applications in education.

Due to the lack of a ready scale to measure the trend towards artificial intelligence applications in education
The researcher prepared the appropriate scale for the research objectives according to the following steps:

1. Reviewing the literature and previous studies in the field of preparing scales, especially attitude scales towards different variables.
2. Formulating 35 paragraphs measuring the objective of the scale, part of which is (30) positive paragraphs and (5) negative paragraphs. The answer was determined with three alternatives (agree, don't know, disagree). The alternatives were given scores (2, 1, 0) for the positive paragraphs, and scores (2, 1, 0) for the negative paragraphs, respectively.
3. The scale was presented to the referees in the field of psychology, measurement and evaluation, and physics teaching methods, and they made their comments on it. Based on this, two positive paragraphs and one negative paragraph were deleted due to their inappropriateness to the characteristics of the research sample, and two paragraphs were merged together.
4. The scale was applied to a survey sample of (20) teachers from the research community, not from its sample, for the purpose of ensuring the clarity of the paragraphs and calculating the time required to answer, which was (10-15) minutes. It was found that the paragraphs were clear, and the obtained data were used to find the scale's reliability coefficient. Using the Alpha-Cronbach equation, the reliability coefficient was 79%, which is a good reliability coefficient. After this stage, the scale became ready for application. It consists of (31) paragraphs, and the response scores range between (0-62) with a hypothetical average of (31).

5. After verifying the psychometric properties of the scale, it was converted into an electronic test by Google forms)) for the purpose of distributing it to the research sample. (Appendix 3)

Second: Teaching Performance Evaluation Form

It was built after reviewing the literature and previous studies in this field. It became clear to the researcher through her readings in the field of performance measurement that it includes measuring two important aspects of the teacher, which are his mastery of the content of the scientific material he teaches and the basic areas of performance, which are planning, implementation and evaluation with their sub-skills with the help of artificial intelligence applications.

Therefore, it was:

1- Preparing a preliminary form for performance evaluation that included (10) paragraphs formulated in declarative phrases describing the various aspects of performance, starting from planning the lecture and selecting activities that are implemented using techniques based on artificial intelligence applications, and the possibility of using these techniques in implementing the lesson and evaluating students' performance, through preparing the appropriate classroom environment and taking into account individual differences between students. The appearance and personality of the trainee were also taken into consideration, and each paragraph was given a score of (0,1) according to the expected performance.

2- The form was presented to specialists in physics and computer science teaching methods to provide their comments. Some of them made comments regarding modifying the order of some skills and reducing the intensity of some of them. The experts suggested adding a paragraph regarding the possibility of the trainee to mention an introduction to each of the artificial intelligence applications used in each lecture.

With this step, the apparent validity of the tool was established.

To find the reliability of the teaching performance evaluation form, five teachers were evaluated - by the researcher and another professor specializing in computer science. After quantifying the results and using Pearson's correlation coefficient between the trainees' scores in the two evaluations, the reliability coefficient was (0.82), which is a good reliability coefficient.

Thus, the card is ready for application. It consists of (11) paragraphs, and its scores range between (0-11) with a hypothetical average performance of (5.5). (Appendix 1)

5-Experiment implementation procedures:

The research experiment was implemented according to the following procedures:

- The training location was determined in cooperation with the General Directorate of Education in Fallujah in a hall affiliated with the Directorate's Preparation and Training Center.
- The hall was checked for equipment, including computers, a projector, and good lighting and ventilation.
- The trainees were informed of the date and location of the course by the directorate in sufficient time, and they were also informed to bring their own computers.
- The link to the Attitude Scale towards AI Applications in Education was sent through social media (WhatsApp and Telegram) using the trainees' phone numbers.
- Distributing copies of the proposed program to trainees and introducing them to the program and its implementation mechanism.
- Implementing workshops on the topics included in the training program through training sessions that included two theoretical aspects in which the prepared and planned content is presented in advance with teaching plans, and a practical aspect that includes trainees applying theoretical information by working in small groups, or individually, during which feedback is provided and their performance is evaluated by the trainees themselves and by the researcher as well.
- Showing videos (Iraqi, Arab and foreign) of actual physics lessons and educational films on how to use artificial intelligence applications in teaching and evaluation. After showing each video, the door is opened for dialogue between the researcher and the trainees to discuss the classroom situations, teaching method and presentation of content that were observed.
- The performance of (23) male and female trainee teachers was evaluated only due to the limited time allocated for the experiment, after they were asked to give a model lecture for a quarter of an hour, to be implemented using one of the artificial intelligence applications. The researcher used the teaching performance evaluation form that was prepared for this purpose.
- Resend the trend meter link after completing all training sessions and performance tests.
- The training program took five days to implement, with two training sessions per day, with a break in between. The teaching performance test took four separate days after the training sessions were completed, as the researcher tested the performance of five trainees per day.

6- Statistical methods:Using statistical packageSPSS The appropriate methods for analyzing the data were determined, including: Pearson's correlation coefficient, t-test for two related samples, t-test for one sample, and Cronbach's alpha equation.

❖ **Display and interpretation of results:**

The research objectives were achieved as follows:

-The first goal: This goal was verified by building a training program.For physics teachers on artificial intelligence applicationsIn education, as mentioned earlier.

-The second goal: It was revealedThe effect of the training program for physics teachers on artificial intelligence applications on their attitudes towards its use in education and their teaching performanceBy verifying the two hypotheses:

1- There is no statistically significant difference at a significance level of 0.05 between the average scores of physics teachers on the scale of attitudes towards using artificial intelligence applications in pre- and post-education.

After emptying the scores of the research sample on the pre- and post-test of the scale of attitudes towards using artificial intelligence applications in education, as in Table (2)

Table (2)

valuet and the significance level of the trend variable

Statistical significance at 0.05 level	Degree of freedom	valuet calculated		Standard deviation	Arithmetic mean	number	Test
		Tabular	Calculated				
Function	53	2.00	23.612	6,790	20.00	54	tribal
				3.326	41,781	54	The dimension

From the above, it is clear that there is a positive change in the trainees' attitudes towards using artificial intelligence applications in education through the difference in their average scores between the pre-test, which is equal to (20) and a standard deviation of (6.790), which is less than the average scores of the post-test (41.781) and a standard deviation of (3.326), which indicates that the trainees before training had contradictory and divergent attitudes towards using artificial intelligence applications in education, but their views became convergent, and thus the standard deviation of the scores in the post-test decreased by almost half, accompanied by an increase in the average scores. To confirm the significance of the difference between the averages of the pre- and post-test, the t-test was used for two related samples. It became clear that the calculated t-value equals (23.612) greater than the tabular t-value (2.00) at a significance level of 0.05 and a degree of freedom of 53, and thus the first null hypothesis is rejected.

Hence, we conclude that the difference between the two averages is significant and that the training program and the activities, discussions, and exchange of ideas among the trainees contributed to the positive change in the trend towards using artificial intelligence applications in education.

2- There is no statistically significant difference at the significance level (0.05).) For teaching performance between the average scores of the group trained according to the proposed training program and the hypothetical average scores of the teaching performance card prepared for this purpose.

After calculating the total scores of the trained group on the teaching performance form and extracting the arithmetic mean and standard deviation, and using the testt for one sample as in Table (3)

Table (3)

valuet and the significance level of the teaching performance variable

From

Statistical significance at 0.05 level	Degree of freedom	valuet calculated		Standard deviation	Arithmetic mean	number	The group
		Tabular	Calculated				
Function	22	2.069	9.104	1.591	8,521	23	empiricism

Table (3) it is clear that the arithmetic mean of the experimental group for the teaching performance variable was (8,521) with a standard deviation of (1.591), and the calculated T-value is equal to (9.104) It is greater than the tabular t-value at the significance level (0.05) and degree of freedom.(22(And thus the difference between the experimental average and the hypothetical average of the teaching performance of the research group is statistically significant, and there is a positive effect of the training program on the performance of the trained group. Thus, the second null hypothesis is rejected.

❖ CONCLUSIONS

Through the research results, we conclude that there is a positive impact of the training program used in changing the attitudes of trainees, the research sample of physics teachers in secondary, intermediate and preparatory schools affiliated with the General Directorate of Education in Fallujah for the academic year 2024-2025.

❖ RECOMMENDATIONS

1- The necessity of providing the necessary infrastructure to use artificial intelligence applications in education, such as equipping the classroom with devices, technologies, means and programs, and connecting it to the Internet.

2- The necessity of training teachers in general and science teachers in particular at all educational levels on the procedures for using artificial intelligence applications in education.

❖ SUGGESTIONS

The researcher proposes conducting the following research:

1- Discovering the impact of using artificial intelligence applications on the achievement and development of scientific thinking among students.

2- Discovering the impact of using artificial intelligence applications in treating learning difficulties in physics among learners.

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Appendix (1)
Note card

Observation card to evaluate the trainee's performance

Notes	**Degree**		**Paragraphs**	**T**
	1	**0**		
			The teacher's appearance and voice in terms of intensity and clarity	**1**
			The introduction of the lesson is appropriate for the topic of the lesson using one of the artificial intelligence applications.	**2**
			The presentation method using one of the artificial intelligence applications is suitable for the topic.	**3**
			Use an artificial intelligence application appropriate to the students' level.	**4**
			While using one of the AI applications in teaching, the process of self-control and self-discipline inside the classroom was good.	**5**
			The questions asked during the lesson were distributed equally among all students.	**6**
			The teacher takes into account individual differences between students during presentation and evaluation using one of the artificial intelligence applications.	**7**
			While using an AI application in teaching, the teacher adopted appropriate positive reinforcement.	**8**
			The teacher succeeded in motivating students to use an artificial intelligence application in learning and teaching.	**9**
			How was the natural classroom environment suitable for using an artificial intelligence application?	**10**
			Is the lesson duration sufficient to use one of the artificial intelligence applications in teaching, which shows that the teacher has prepared a prior plan for the lesson?	**11**
			Total score	
			Final grade	

Appendix (2) Training Program
Appendix (3) Attitude Scale