

The Reality of Using Artificial Intelligence Techniques in Teacher Preparation Programs in Light of the Opinions of Faculty Members: A Case Study in Saudi Qassim University

Ahmed Mohammed, Rabea Ali, Abdullah Abdulkareem B Alharbi

Article Info	Abstract
<p>Article History</p> <p>Received: November 14, 2020</p> <p>Accepted: January 02 , 2021</p> <hr/> <p>Keywords Artificial Intelligence Techniques, Teacher Preparation Program, Learning Outcomes</p> <p>DOI: 10.5281/zenodo.4410582</p>	<p><i>The study aimed to identify the reality of using artificial intelligence techniques in developing the teacher preparation program at Qassim University, the obstacles to activating these techniques, and the proposals to activate it. The researchers used the descriptive and analytical approach to determine the role of artificial intelligence techniques, and the obstacles to activating the reality of using its techniques in developing teacher preparation programs at Qassim University, Saudi Arabia. The study population consisted of faculty members in the western sector colleges of the University in the first semester of the academic year 2019/2020. The researchers prepared the research tool (a questionnaire) and they sent it to the study community (twenty faculty members) in a comprehensive inventory method.. The study results were using faculty members for artificial intelligence techniques in developing teacher preparation programs was with a medium degree, and the faculty members agreed strongly that there are obstacles to using artificial intelligence techniques in developing teacher preparation programs. Moreover, the faculty members agreed strongly with the proposals submitted to activate the reality of using artificial intelligence techniques in developing teacher preparation programs at Qassim University.</i></p>

1. Introduction

Our current era is characterized by the tremendous scientific and technical progress that has contributed to the creation of many changes in the various fields of life. These changes have cast a shadow on the structure of the educational system, and therefore there is a need to an unconventional education that contributes to the preparation of the human being able to address all these transformations and changes. Digital transformation is one of the necessities to keep pace with technological progress, which is an imperative for the development of education, and constitutes a challenge for those in charge of university education to improve the competitiveness of universities in the era of competitiveness, keep pace with human development and contribute to building the information society.

Artificial intelligence is considered one of the most important aspects of digital transformation, as it has great benefits in education. It provides opportunities to interact with the learner through educational dialogue, makes teaching and learning more enjoyable, and helps present scientific material in an interactive, tangible manner, and helps continuous evaluation processes, which are features that have brought the focus of attention towards him in developing educational programs, especially in higher education. (Abdulgawad& Sayed, 2019)

Teacher is considered one of the main pillars in the education system, and the success of educational systems is related to the excellence of his preparation. It has become necessary to pay attention to developing his preparation programs in order to keep pace with the transformations of the digital age and keep pace with modern educational trends in light of the future roles of the modern teacher (Awad Allah, 2019).

Ahmed, (2014) emphasized that teacher preparation institutions should employ the standards of the National Council for Accreditation of Teacher Preparation Programs (NCATE), which include the performance of graduates, their mastery of the specialized aspect, the ability to teach effectively and professionally, and the ability to design an appropriate learning environment that makes the learner the focus the educational process, employing learning techniques and working to integrate them effectively in teaching.

The Kingdom of Saudi Arabia undertakes great efforts in developing teacher preparation. Despite these efforts, the basic competencies of teachers are still weak as a result of weak teacher preparation programs that cannot produce highly qualified teachers, who lack many skills and their weak ability to deal with information technology (Al-Zahrani, 2017)

In recent years, the Ministry of Education and Higher Education in the Kingdom of Saudi Arabia has attached great importance to developing educational programs in public and higher education by integrating digital and communication technologies by encouraging the application of these technologies and providing the

infrastructure for them and providing financial resources for their application, especially in universities. The approach and began projects to integrate these technologies into teacher preparation programs to achieve the quality of these programs to produce a teacher capable of coping with the successive changes in the digital age. (Olayan, 2019).

In his study, Pence (2019) aimed to identify the reality of using artificial intelligence in higher education. The researcher concluded that despite the importance of employing artificial intelligence in higher education, the efforts made in this direction are not sufficient and not commensurate with the importance of The role of artificial intelligence in developing the higher education system, especially in light of the challenges facing these institutions and the roles expected of them in qualifying students for the labor market and the changing roles of faculty members. Haseski , (2019) found that student teachers have different orientations about artificial intelligence, as they feel negative feelings towards it, and do not want to live using artificial intelligence where human feelings disappear.

Hinojo-Lucena, et al., (2019) observed that despite of the global interest in the subject of artificial intelligence, this interest is in the early stages and needs many advanced stages. Sangapu (2018) study was about teachers 'and students' perceptions towards the use of artificial intelligence in the classroom. The study found that teachers and students alike realize that artificial intelligence has become the backbone of any successful educational system in the future, and that there are positive trends for scientists towards using it as an educational technology in teaching and learning.

Popenici ' & Kerr (2017) aimed to explore the use of artificial intelligence in the development of teaching and learning processes in higher education in light of the adoption by universities of technological innovations and the integration of artificial intelligence within the higher education system. The study concluded that it is time for higher education institutions to reformulate their educational and functional philosophy and the role of artificial intelligence solutions in higher education, education and learning, and identify the limitations, opportunities and possibilities for the development of lifelong learning and the future roles of teaching and learning.

Many previous studies have indicated in their findings and recommendations the important role of artificial intelligence technologies and the need to benefit from it in the higher education system. Popenici ' ; & Kerr, (2017) indicated that the time has come for higher education institutions to reformulate its educational and career philosophy and the role of artificial intelligence solutions in higher education, education and learning, and to identify the limitations, opportunities and possibilities. Pence (2019) concluded that the efforts made in this direction are not sufficient and do not match the importance of artificial intelligence in developing the higher education system.

Haseski (2019) indicated that there is a positive trend among student teachers towards artificial intelligence because of its great advantages especially in education. In the same direction, Sangapu (2018) concluded that there are positive trends for teachers towards using it as an educational technique in teaching and learning. Hinojo-Lucena, et al., (2019) emphasized that despite global interest in the topic of artificial intelligence in higher education, there is a dearth of research on this topic.

Despite the importance of artificial intelligence techniques in developing teaching and learning processes in teacher preparation programs, the researchers noted that there is a lack of interest in employing artificial intelligence techniques in teacher preparation programs at Qassim University. This lack includes the courses and the expected educational outcomes from the teacher preparation program. From all the above, the question was: How can using artificial intelligence techniques be activated in the teacher preparation program at Qassim University?

Research Questions

- 1)What is the reality of using artificial intelligence techniques in developing teacher preparation programs at Qassim University?
- 2) What are the obstacles to activate the reality of using artificial intelligence techniques in developing teacher preparation programs at Qassim University?
- 3) What are the proposals to activate the reality of using artificial intelligence techniques in developing the teacher preparation program at Qassim University?
- 4) What is the proposed vision to activate the use of artificial intelligence techniques in developing the teacher preparation program at Qassim University?

1. Literature Review

Despite of the importance of employing artificial intelligence in higher education, the efforts made in this direction are not sufficient and not commensurate with the importance of the role of artificial intelligence in developing the higher education system, especially in light of the challenges facing these institutions and the roles expected of them in qualifying students for the labor market and the changing roles of faculty members. (Pence, 2019)

Haseski (2019) aimed to identify the viewpoint of student teachers in colleges of education on artificial intelligence. The study found that student teachers have different orientations about artificial intelligence, as they feel negative feelings towards it, and do not want to live using artificial intelligence where human feelings disappear. However, student teachers tend to believe that artificial intelligence has great advantages, especially in education.

Hinojo-Lucena, et al., (2019) found that despite the global interest in the topic of artificial intelligence, this interest is in the early stages and needs many advanced stages.

Sangapu ,(2018) added that teachers and students alike are aware that artificial intelligence has become the backbone of any successful educational system in the future, and that there are positive trends for scientists towards using it as an educational technology in teaching and learning.

Buenici 'and Kerr, (2017) concluded that it is time for higher education institutions to reformulate their educational and functional philosophy and the role of artificial intelligence solutions in higher education, education and learning, and identify the challenges, opportunities and possibilities for the development of lifelong learning and the future roles of teaching and learning.

Al-Ruwaili study, (2018) aimed to identify the effect of using an educational program using an automated robot in developing mathematics achievement among gifted and talented students, and the results showed that there are statistically significant differences between the mean students' performance in favor of the experimental group, and the presence of statistically significant differences between the averages of female students' performance. (Outstanding talents, talents) on the post-test are attributed to the variable of the gifted student category, and the presence of statistically significant differences in the post-achievement attributable to the interaction of the teaching method (the educational program using the robotic method and the regular method), the student group (superior, talented), and in favor of the gifted sample in the group Experimental who used the robot tutorial method.

Some previous studies agreed that there is a need for teaching and learning in higher education to employ artificial intelligence techniques to catch up with the technological revolution, as emphasized by: (Haseski, 2019), (Hinojo-Lucena, et al., 2019) ,, and (Popenici '; & Kerr) , 2017). The research gap in previous studies appears in the absence of studies that dealt with employing artificial intelligence techniques in developing teacher preparation programs despite the importance of these technologies in developing higher education and teaching and learning in particular, which is covered by the current study, as it introduces the use of artificial intelligence techniques in Teacher preparation programs at Qassim University in light of the opinions of faculty members. The researchers benefited from previous studies to sense the study problem, formulate the proposed visualization, and build the study tool.

Education in the Kingdom of Saudi Arabia faces a tremendous number of challenges that drive researchers to start looking for technical solutions, and artificial intelligence is one of the most prominent proposed solutions that are receiving great attention in recent times. However, its accreditation in education is still low due to limitations such as the lack of sound experiments, testing and recommending its application in education and taking the quality of the basic structure of educational institutions (Sorani, 2018). Therefore, the current study is concerned with studying this important topic by reviewing the literature and studies that can be used in answering the study's questions; this is done through the following aspects:

2. The concept of artificial intelligence:

Artificial intelligence consists of two words: Intelligence, which means the ability to understand or think, and the word artificial (artificial) as it refers to something made or not natural, and artificial intelligence can be defined as a scientific system that includes manufacturing and engineering methods for so-called smart devices and software. To the production of autonomous machines capable of performing complex tasks using reflexive processes similar to those of humans (Habib & Bilal, 2019). Artificial intelligence can be defined as the behavior and certain characteristics of computer programs that make them simulate human mental capabilities and patterns of work, and the most important of these characteristics is the ability to learn, conclude and react to situations not programmed into the machine (Afifi, 2015). Artificial intelligence is also a science concerned with defining and making machines (computer systems) work according to instructions provided by humans, things that need human intelligence if they are dealt with in performance and action (Al-Hawassi and Al-Zarnaji, 2013).

Based on the above definitions, artificial intelligence in general gives the characteristic of intelligence (perception, understanding and learning) that humans make in machines (private computers). It is the process of simulating the human mind with machines to accomplish specific operations and goals.

2.1. The importance of integrating artificial intelligence techniques in education:

According to, Ibn Nafleh, (2019), the integration of artificial intelligence techniques in education is of great importance for the following reasons:

1. Containing the element of suspense stimulates students' learning and helps them to academic integration and enjoyable learning.

2. Artificial intelligence techniques allow learners to learn according to their own desire, so that weak students can correct their mistakes without shame.
3. Artificial intelligence techniques help to take into account the conditions of people with special needs from the disabled and help them to learn.
4. Artificial intelligence technologies provide opportunities for active learning through an educational environment based on interaction between students and these technologies.
5. Artificial intelligence technologies provide opportunities for innovation and the development of high-ranking thinking skills.
6. Artificial intelligence techniques integrate and overlap the sciences and school subjects, leading to integrated knowledge.
7. Social intelligence techniques link theoretical knowledge with practical applications so that there is no gap between theory and practice.
8. Artificial intelligence techniques address the multiple intelligences of students, including sensory, kinesthetic, abstract, visual, and so on.

3.2. Objectives of using artificial intelligence techniques in education:

The use of artificial intelligence techniques in education aims to achieve the following: (Al-Jaddabi, 2011)

1. Encouraging cooperative learning and teamwork by encouraging and developing social relations between students and making them feel responsible and developing leadership skills by assigning different roles to students that differ with each project such as (group leader, programmer, designer, notary, subordinate ... etc)
2. Enhancing and developing the skills of manual labor through the project's focus on the direct application of education, in which students need to use tools and parts to design the body of the robot, which deepens their knowledge, in addition to learning the mechanism and how mechanical and electronic machines work through their actual practice of installing various machines.
3. Encouraging the project-based learning strategy, as most of the educational sessions for students in the Robot Laboratory focus on the students' implementation of a project such as: (producing a car that drives in a specific shape, designing a robot, designing a robot capable of detecting and avoiding foreign objects, producing a robot capable of conducting Chemical experiments ... etc)
4. It develops students' higher thinking skills, such as creative, critical and emotional thinking, multiple intelligences in addition to problem-solving skills, as well as developing habits of mind and scientific research. The program's axes usually revolve around these concepts through time management, time management, resource analysis, systems analysis, project management, etc. Towards creativity and innovation in design and programming and to benefit from what they have learned to address some of the challenges.
5. It realizes the concept of integration between sciences such as physics, mathematics, electronics, programming and general sciences. This contributes to providing an integrated understanding of science, empowering students and giving them a practical idea of how to integrate cognitive, human and scientific sciences in order to produce a useful device.
6. Learning supports student-centeredness, so it encourages self-learning among students by involving them in projects that are implemented based on their previous knowledge and what they obtain from the resources available in their hands, as robot education requires the student to obtain one of the lowest education and one of the highest learning.
7. Learning is linked to practical life because most of the educational projects and applications presented in the robot laboratories are real examples that the student lives in his daily life, such as (the smart doors project, the cash withdrawal mechanism, the washing machine project ... etc) which makes the student learn more through his understanding and application of the mechanism The work of the machines and devices that he uses daily, and linking them with what he learns while in the robotic laboratory.

3.3. Challenges of integrating artificial intelligence technologies into education:

There are many challenges that hinder the integration of artificial intelligence technologies into the education system, including: (UNESCO, 2019)

1. The lack of a clear and structured policy for applying artificial intelligence in the teaching and learning processes.
2. Inequality of opportunities and problems of integrating groups of marginalized students: The application of artificial intelligence techniques without equality may create an educational gap as these technologies may be available to private schools and universities without the official due to the cost of these technologies, and this requires attention to providing the necessary financial resources for these technologies in all institutions. Without exception and in urban, rural and Bedouin environments without discrimination.
3. Teachers not being prepared for these technologies: Teachers suffer from poor knowledge of artificial intelligence techniques, and this weakness leads to either rejecting or resisting its application or negative trends towards it.

4. Weak applications of artificial intelligence in education: Education lags far behind other fields such as industrial fields in applications of artificial intelligence, and this leads to the difficulty of its application in universities, schools and teacher preparation institutions, and the urgent need for research that enriches the applications of social intelligence in developing solutions to educational problems.

5. Poor quality of data systems: The application of artificial intelligence in education requires a high-level data system, and without this system, no artificial intelligence technology can be built in education.

6. The weakness of scientific research in the field of integrating and developing artificial intelligence techniques in education: As a result of poor funding for educational research, it leads to ambiguity about the importance and reality of using artificial intelligence techniques in education.

3. Methods

3.1. Research Community and Sample:

The study community consists of all faculty members specializing in curricula and teaching methods in the Faculties of Science and Arts in the Western Sector of the University of Qassim, in the first semester of the academic year 2019/2020, and the tool was sent to all of the study community's terms in a comprehensive inventory method, and a response to the tool was obtained (20) Faculty member.

4.2. Study tool:

The researchers prepared a questionnaire using the opinions of experts and specialists in this field, where a questionnaire was built and judged as a tool to collect data and information from the study sample used. A questionnaire was developed by the researcher to collect data of the type of Likert five-point scale. The educational literature and previous studies related to the subject of the study have been viewed and used in building the questionnaire and drafting its paragraphs. This questionnaire consisted of two parts, as shown by the following:

Section One: Demographic data

It reviews the personal characteristics of the respondents represented in the data of the study sample and included variables (gender - academic degree).

The second section: The questionnaire axes and it consists of three axes:

1. The reality of using artificial intelligence techniques in developing teacher preparation programs at Qassim University.
2. Obstacles to activating the reality of using artificial intelligence techniques in developing teacher preparation programs at Qassim University.
3. The most important proposals to activate the reality of using artificial intelligence techniques in developing teacher preparation programs at Qassim University.

Method of calculating and commenting on the arithmetic mean of Likert scale

1. The arithmetic mean of (1-1.8) means the strong disapproval of the study members.
2. The arithmetic mean greater than (1.8-2.6) means that the study individuals do not agree.
3. An arithmetic average greater than (2.6-3.4) means the approval of the study members with a moderate degree.
4. Arithmetic mean greater than (3.4-4.2) means approval of the study members.
5. The arithmetic mean greater than (4.2-5) means the strong approval of the study members.

Distribution of paragraphs in light of the axes of the resolution

The expressions representing each axis of the questionnaire were distributed as shown in the following table:

Table (1) Distribution of the paragraphs in light of the axes of the questionnaire

Themes	Item numbers	Numbers
1. The first axis: the reality of using artificial intelligence techniques in developing teacher preparation programs at Qassim University	1-16	16
2. The second axis: Obstacles to activating the reality of using artificial intelligence techniques in developing teacher preparation programs at Qassim University	17-26	11
3. The third axis: the most important proposals to activate the reality of using artificial intelligence techniques in developing teacher preparation programs at Qassim University	27-38	12
Total		38

Stability of the Questionnaire:

Stability is intended to give almost the same results if it is repeated more than once on the same people in similar circumstances, and the stability of the questionnaire was calculated using each of Cronbach's Alpha coefficient, where the researcher took an exploratory random sample from the research community, and from outside the research sample, consisting of Of the number of (25) student teachers from the basic education departments in the Faculties of the Western Sector at Qassim University, as shown in the following table:

Table No. (2) A reliability coefficient using Cronbach's alpha for the dimensions of the questionnaire

Scale dimensions	Number of Items	Stability coefficient
The first axis: the reality of using artificial intelligence techniques in developing the teacher preparation program at Qassim University	16	0.744
The second axis: Obstacles to activating the reality of using artificial intelligence techniques in developing the teacher preparation program at Qassim University	10	0.732
The third axis: the most important proposals to activate the reality of using artificial intelligence techniques in developing the teacher preparation program at Qassim University	12	0.723
Overall stability of scale		0.733

It is clear from Table No. (2) that the reliability coefficient for the fields of study is high. Where it ranged between (0.723-0.744) and the total stability coefficient of the questionnaire according to Fakronbach was (0.733), and this indicates that the questionnaire has a high degree of stability that can be relied upon in the field application of the study.

Statistical treatment methods:

To achieve the goals of the study and analyze the collected data, the data was entered after coding for the computer and processing it using the Statistical Package for Social Sciences, which is symbolized by an acronym (SPSS). Then the researchers analyzed the data and extracted the results, and the following methods were used:

- Frequencies, percentages, arithmetic means, and standard deviations to answer the study questions.
- Pearson correlation coefficient: to find the validity coefficient of the questionnaire.
- Alpha Cronbach coefficient to find the stability coefficients and axes of the resolution.

4. Results:

The results of the study were reached by reviewing the study questions and the most important results that were reached in each of the questions.

The answer of the first research question:

What is the reality of using artificial intelligence techniques in developing teacher preparation programs at Qassim University?

Table (3) the reality of using artificial intelligence techniques in developing teacher preparation program at the University

The Statements	Numbers	Average	standard deviation
1. I can run artificial intelligence devices and software.	20	3.0500	1.05006
2. Motivate students to participate in conducting their activities through artificial intelligence techniques	20	3.3500	.98809
3. I use artificial intelligence techniques to diversify teaching methods.	20	2.8500	1.08942
4. Use artificial intelligence techniques to enrich academic content.	20	2.8000	.83351
5. We use artificial intelligence techniques to provide educational activities accompanying the course.	20	2.9000	.96791
6. I can easily deal with faults in AI technologies.	20	3.2000	.95145
7. I strive to develop students' capabilities in using artificial intelligence techniques in the learning	20	2.8500	.98809

process.			
8. Possess the necessary skills to use artificial intelligence techniques in teaching.	20	2.9500	1.09904
9. The college administration provides the necessary capabilities to use artificial intelligence techniques.	20	2.5500	.99868
10. I have a constant desire to employ artificial intelligence techniques in the teaching process	20	3.0500	1.05006
11. Artificial intelligence techniques can be used in all academic courses	20	3.0500	.99868
12. I use artificial intelligence techniques to evaluate students' performance.	20	2.8000	1.00525
13. I use artificial intelligence techniques to develop my teaching and academic performance.	20	2.6000	.88258
Total	20	38.0000	2.33959
Average	-	2.9230	-

It is clear from Table (3) that the reality of using faculty members for artificial intelligence techniques in developing the teacher preparation program at Qassim University came with a moderate degree as with the general average for the paragraphs of the axis (2.92), and the top five practices came in descending order as follows:

1. I motivate students to participate in conducting their activities through artificial intelligence techniques, with a mean of (3.35).
2. I can easily deal with faults in artificial intelligence techniques, with my average calculation reaching (3.20).
3. I can operate artificial intelligence devices and their software, with a mean of (3.05).
4. I have a constant desire to employ artificial intelligence techniques in the teaching process, with a mean of (3.05).
5. Artificial intelligence techniques can be used in all academic courses, with a mean of (3.05).

The findings are consistent with the study of (Hinojo-Lucena, et al., 2019), (Pence, 2019) and (Haseski , 2019) in terms of indicating that the reality of using artificial intelligence in teaching and learning is a limited use. These results also show that there is an urgent need to use artificial intelligence techniques in the learning and teaching processes to develop any educational process.

Results of the answer to the second research question:

What are the obstacles to activate the reality of using artificial intelligence techniques in developing teacher preparation programs at Qassim University?

Table (4) Frequencies, arithmetic averages, and percentages of the axis of obstacles to activate the role of artificial intelligence techniques

The Statements	Numbers	Average	standard deviation
1.The lack of interest of the college administration in applying artificial intelligence techniques in the teaching and learning process.	20	4.5000	.76089
2.The scarcity of the college's specialists in applying artificial intelligence techniques.	20	4.2000	1.00525
3. The scarcity of training programs that develop the skills of the faculty member in using artificial intelligence techniques.	20	4.0500	.82558
4. Lack of knowledge of successful experiences in the field of using artificial intelligence techniques to encourage their application.	20	4.5000	.76089
5. Lack of awareness among faculty members of the importance of using artificial intelligence.	20	4.3500	.67082
6. Lack of resources available to finance the application of artificial intelligence techniques.	20	4.5500	.75915
7. The lack of a vision and strategy to warrant the use of artificial intelligence applications in teacher preparation programs.	20	4.3000	.86450
8. Exaggerated attention to the theoretical side in preparing the teacher at the expense of the practical side.	20	4.2000	.76777

9. The high cost of using AI applications.	20	4.1500	.87509
10. The lack of Arab studies that dealt with applications of artificial intelligence in education.	20	4.4500	.68633
Total	20	43.2500	2.63329
Average	-	4.325	-

Table (4) shows the approval of the faculty members at Qassim University that there are obstacles to activate the reality of using artificial intelligence techniques in developing the teacher preparation program at Qassim University. They agreed strongly as the general average for the paragraphs of the axis was (4.32), and the top five roles came in descending order as follows:

1. The scarcity of resources available to finance the application of artificial intelligence techniques, with a mean of (4.55).
2. The lack of interest of the college administration in applying artificial intelligence techniques in the teaching and learning process, with a mean of (4.50).
3. Lack of knowledge of successful experiences in the field of using artificial intelligence techniques to encourage their application, with a mean of (4.45).
4. The lack of Arab studies that dealt with applications of artificial intelligence in education, with a mean of (4.45).
5. The lack of awareness of faculty members of the importance of using artificial intelligence, with a mean of (4.35).

Interpretation of the results in light of the literature and previous studies:

The findings are consistent with the study of (UNESCO, 2019), (Duan, Y &etal, 2019) and (Alam, A. ,2020).) in terms of referring to the obstacles to activating the role of artificial intelligence techniques in teaching and learning. These results indicate that there is an urgent need to overcome the obstacles associated with the use of artificial intelligence techniques in the learning and teaching processes, as it mentioned in the literature related to the importance of these technologies in the development of the educational process.

Results of answering the third research question:

What are the proposals to activate the reality of using artificial intelligence techniques in developing teacher preparation programs at Qassim University?

Table (5) the proposals to activate the role of artificial intelligence technologies

The Statements	Numbers	Average	standard deviation
1. Building a system for integrating artificial intelligence techniques into the teacher preparation program	20	4.4000	.82078
2. Integrating artificial intelligence techniques into the university's strategic planning.	20	4.4500	.75915
3. Using artificial intelligence solutions in developing student teacher preparation programs.	20	4.2500	.78640
4. Apply artificial intelligence techniques to represent scientific knowledge.	20	4.3000	.97872
5. Employing learning environments based on artificial intelligence in developing the teaching skills of student teachers.	20	4.4500	.60481
6. The use of gamification as an artificial intelligence technique in designing tutorials.	20	4.2500	.85070
7. Integrating artificial intelligence techniques with virtual education in conducting virtual scientific experiments.	20	4.3500	.74516
8. Using the educational robot in training student teachers and developing their teaching competencies.	20	4.3500	.93330
9. Employing expert systems in diagnosing students' learning difficulties.	20	4.4000	.88258
10. Incorporating educational robots in providing teachers with scientific concepts.	20	4.0500	.75915
11. Designing some teacher preparation courses through an educational robot project.	20	4.6000	.59824

12. Introducing the robot teacher to train student teachers in the skills of planning, implementing and evaluating lessons.	20	4.4000	.88258
20		52.2500	2.80741
		4.35	

Table (5) shows the approval of faculty members at Qassim University on the proposals submitted to activate the reality of using artificial intelligence techniques in developing the teacher preparation program at Qassim University. (4.35), and the top five roles came in descending order as follows:

1. Designing some teacher preparation courses through an educational robot project, with an arithmetic average of (4.60).
2. The integration of artificial intelligence techniques into the strategic planning of the university, with a mean of (4.45).
3. Employing learning environments based on artificial intelligence in developing the teaching skills of student teachers, with a mean of (4.45).
4. Building a system for integrating artificial intelligence techniques into the teacher preparation program, with an arithmetic average of (4.40).
5. Employing expert systems in diagnosing the difficulties that students face in their learning, with a mean of (4.40).
6. The introduction of the robot teacher to train student teachers on the skills of planning, implementing and evaluating lessons, with an arithmetic average of (4.40).

Interpretation of the results in light of the literature and previous studies:

The results obtained are consistent with the study of (Pence, 2019), (Buenici 'and Kerr, 2017)) and (Al-Ruwaili, (2018)) in terms of referring to the proposals to activate the role of artificial intelligence techniques in teaching and learning. These results indicate that there is an urgent need to overcome the obstacles associated with the use of artificial intelligence techniques in the learning and teaching processes, as it cited in the literature related to the importance of these technologies in the development of the educational process.

Results of the answer to the fourth research question:

What is the proposed vision to activate using the artificial intelligence techniques in developing teacher preparation programs at Qassim University?

The rationale for the proposed scenario:

- Political, social and economic transformations and their impacts on society.
- Rapid and changing progress in all aspects of life, including the information revolution, globalization, development in means of communication, and the transition to a knowledge society.
- The technological revolution that provided opportunities for communication in the community, and the need to invest them in developing teacher preparation programs.
- The need for society to enhance the contribution of technological innovations to the development of higher and public education, and the scientific and educational progress that reflects on them in line with society's plans and policies.
- The importance of developing study plans and programs in universities so that they are more responsive to modern educational trends.
- The possibility of benefiting from the international experiences of teacher preparation programs in developed countries.
- Competitiveness in the quality of academic programs between public universities, between public universities and private universities, and between local universities and international universities.
- What the current study revealed in the theoretical literature and field results, of obstacles to activating artificial intelligence techniques in the teacher preparation program at Qassim University, and the need to work to provide solutions and a vision to address them.

Mechanisms for implementing the proposed scenario:

First: General Mechanisms:

- Adopting the proposed vision to activate the use of artificial intelligence techniques in the teacher preparation program at Qassim University in light of the opinions of faculty members
- The development of regulations and systems in teacher preparation programs regarding the adoption of artificial intelligence and its incorporation into those programs.
- Apply governance principles and emphasize quality control during implementation phases.

Second: Special mechanisms:

- Developing an infrastructure that stimulates and supports artificial intelligence (learning resources, the Internet, a digital library, ...)
- Enhancing technological capabilities and competencies in teacher preparation programs.

Focusing on priority topics in applying artificial intelligence technologies

- Conducting research related to employing artificial intelligence techniques in teacher preparation programs.
- Encouraging initiatives and innovations in the field of artificial intelligence technologies in education.
- Encouraging faculty members to adopt the use of artificial intelligence techniques in teaching.
- Expanding the application of artificial intelligence techniques in teacher preparation programs according to a strategic plan.

Supporting the partnership and integration between the school and the teacher preparation program in the field of artificial intelligence technologies

- Establishing databases for research production related to artificial intelligence techniques in colleges of education.
- Linking research trends in the field of artificial intelligence technologies in education with field problems in education.

Requirements for applying the proposed visualization:

- Training student teachers on the use of artificial intelligence techniques in teaching.
- Conducting frequent self-evaluation processes for (programs / decisions) of Faculties of Education in light of learning outcomes and the extent of adoption of artificial intelligence techniques.
- Training of faculty members on the necessary technological skills.
- Update teacher preparation programs in line with technological innovations
- Building an information base on artificial intelligence research and its employment in education.
- Dispatching distinguished researchers to international universities; to benefit from global experiences in employing artificial intelligence technologies.
- Establishing an administrative unit to adopt artificial intelligence in teacher preparation programs.

Potential obstacles to implementing the proposed scenario:

- Poor training of student teachers in the necessary technological skills.
- Science teacher preparation programs in Saudi universities lag behind international standards.
- An increase in the ratio of students to faculty members (number of students per faculty member).
- The large number of administrative burdens placed on the shoulders of faculty members.
- The low culture of support for scientific research and the ambiguity of the university's research role in developing education.
- Insufficient preparation of highly qualified research cadres.
- Weakness of linking artificial intelligence techniques to real school problems.
- The weakness of the necessary infrastructure to apply artificial intelligence in teacher training programs.

Mechanisms for facing potential obstacles to applying the proposed scenario:

- Increase allocations for educational technologies in teacher preparation programs.
- Forming supervisory committees to monitor the quality of educational processes in those programs.
- Providing (material / moral) incentives for faculty members to employ artificial intelligence techniques in teaching.
- Providing specialized training courses to train faculty members to employ artificial intelligence techniques in teaching.

Entities to implement the proposed scenario:

Several parties participate in the implementation of this vision for the sake of the success of the program development process, among which are the following:

- Qassim University, represented by agencies, deanships and colleges that participate in the implementation of this vision
- University leadership from college deans, vice presidents, department heads, and faculty members.

Conclusion

The current study showed the reality of using artificial intelligence techniques in developing the teacher preparation programs, the obstacles to activate these techniques, and presented the proposals to activate it at Qassim University. Moreover, the study demonstrated the importance of employing artificial intelligence techniques in developing the teaching and learning processes. Also, the study clarified the need to work to provide solutions and a vision to avoid the obstacles. Also, the findings of the study showed mechanisms (specific & general mechanisms) for implementing the proposed scenario. The most important specific mechanisms were developing an infrastructure that stimulates and supports artificial intelligence (learning resources, the Internet, and a digital library), enhancing technological capabilities and competencies in teacher preparation programs, and encouraging faculty members to

adopt the use of artificial intelligence techniques in teaching. On the other hand, the general mechanisms were adopting the proposed vision to activate the use of artificial intelligence techniques in the teacher preparation program and developing regulations and systems in teacher preparation programs regarding the adoption of artificial intelligence and its incorporation into those programs.

Study recommendations:

In light of the results of the current research and the analysis of the results of previous studies, which have proven the importance of employing artificial intelligence techniques in developing the teaching and learning processes, the researchers recommends the following matters:

- Interest in producing smart teaching programs in teacher preparation courses, employing artificial intelligence techniques and making use of their tools.
- Spreading awareness among faculty members in the field of employing artificial intelligence techniques in developing the teaching and learning processes in the Faculties of Education to prepare a generation of teachers to cope with technological developments.
- Developing the skills of faculty members in the Faculties of Education in the field of dealing with artificial intelligence techniques through training courses.
- Training student teachers to employ artificial intelligence techniques in educational technology courses and linking them to academic subjects.
- Providing artificial intelligence techniques in colleges of education and training student teachers and faculty members to employ them in teaching.
- Designing enrichment programs for outstanding students that rely on artificial intelligence techniques to develop their scientific capabilities and satisfy their interests in exploration and the development of innovative thinking.

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Author Information

Ahmed Mohammed

Department of Basic Education, college of Science and Arts, Qassim University, ArRass, Saudi Arabia

Abdullah Abdulkareem B Alharbi

Department of Curriculum & Instructions, college of Education, Qassim University, ArRass, Saudi Arabia

Rabea Ali

Department of English and Translation, college of Science and Arts, Qassim University, ArRass, Saudi Arabia
