

The State of Arab Education from a Foresight-Based Perspective in the Era of Artificial Intelligence

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HOW TO CITE:

Amer Shehadeh, Enas Alzain, Raja Sweidan, Mohammad Dabous, Zahra Mohammad Odah Brijiah, Latifa Emad Shatat⁶, Haia Mohammed Hassan Safi, Qusai A. Ibrahim (2026). The State of Arab Education from a Foresight-Based Perspective in the Era of Artificial Intelligence. International Journal of Special Education, 41(4s), 180-192.

ABSTRACT:

Education in the Arab world is currently undergoing a pivotal phase characterized by rapidly accelerating challenges arising from technological, social, and economic transformations driven by the era of artificial intelligence. These transformations require a comprehensive reconstruction of educational systems that goes beyond traditional concepts and moves toward forward-looking approaches that place creativity and innovation at the core of the educational process.

This study aims to examine the reality of Arab education from a foresight perspective and analyze the structural challenges that hinder its development in light of the growing role of artificial intelligence technologies and their impact on teaching, learning, and assessment methods.

The study argues that artificial intelligence holds significant potential for advancing Arab education, provided it is employed within a clear educational framework that balances technology with the human dimension of the educational process. The researcher believes that the primary challenge lies not in the availability of technology, but in preparing teachers, developing curricula, and building smart and flexible learning environments that respond to future demands.

This research adopts a critical analytical approach based on modern educational literature and successful global experiences. It reviews practical models that can be adapted to the cultural and social

COPYRIGHT STATEMENT: Copyright: © 2026 Authors. Open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).	specificities of the Arab world. This perspective constitutes a call to rethink the philosophy, objectives, and functions of education in light of digital transformations and to present a comprehensive vision for a more flexible and future-responsive educational system capable of strengthening knowledge societies and achieving sustainable development in the Arab world. Keywords: Artificial Intelligence, Arab Education, Digital Transformation, Educational Innovation, Future Skills, Smart Learning Environments, Sustainable Development
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INTRODUCTION

Over the past two decades, the world has witnessed an unprecedented technological revolution, driven primarily by artificial intelligence as the main engine of digital transformation across various fields, foremost among them the education sector. In the Arab world, it has become necessary to reevaluate educational systems and structures in line with global changes and the requirements of the Fourth Industrial Revolution, given the growing need to prepare a generation equipped with critical thinking, analytical, and innovative skills, as well as expertise in technology and its modern applications (Al-Rasbi, 2021).

Today, artificial intelligence has become an effective tool in reshaping the educational infrastructure, as it is used to design smart curricula and develop interactive platforms for distance learning, including the creation of precise assessment tools based on the immediate analysis and interpretation of student performance. The significance of these tools lies in their ability to deliver personalised content tailored to learners' abilities and needs, thereby enhancing the efficiency of the educational process and achieving equity in access to knowledge (Al-Haddadi and Ibrahim, 2023).

In the Arab context, despite notable progress in introducing technology into some educational institutions, the actual utilisation of artificial intelligence applications remains limited. These efforts are hampered by weak infrastructure, a lack of adequate training for educational staff, and educational policies that fail to incorporate an integrated digital vision (Jabali and Al-Qahtani, 2022).

The researchers maintain that employing artificial intelligence in Arab education is no longer merely a technical option; rather, it has become an educational and strategic necessity amid accelerating digital transformations. Education no longer relies solely on the transfer of knowledge but on intelligent interaction and the customisation of content to suit diverse learning styles. Consequently, AI presents opportunities to reshape educational environments to be more flexible and adaptable to the needs of Arab learners, provided it is adopted within an innovative educational vision based on the integration of educational technology (EdTech), rather than the aimless use of digital tools. The researchers emphasize that the success of this vision depends on teacher awareness, institutional support, infrastructure enhancement, and the cultivation of an educational culture that embraces smart transformation as a strategic approach to improving education. In this context, this paper seeks to analyse the reality of Arab education and explore future visions that promote the building of innovative learning communities capable of addressing the challenges of our time and contributing to the achievement of comprehensive development.

Research Problem

In light of the profound transformations generated by the Fourth Industrial Revolution, there is an urgent need to reconsider traditional educational systems in the Arab world, which still suffer from limited flexibility and weak responsiveness to the demands of the present age. Despite global technological advances, the integration of artificial intelligence technologies into Arab educational

institutions remains limited and faces several challenges, most notably weak digital infrastructure, inadequate teacher preparation, and the absence of clear educational policies. Based on the researchers' close observation of the reality of Arab education, a clear gap has emerged between the technical capabilities and resources available globally and their actual local applications, particularly in teaching, assessment, and educational interaction. This disparity constituted a major motivation for conducting the present study to help bridge that cognitive and practical gap and propose practical solutions that support innovation and enhance Arab education.

The problem of the study lies in the inadequate and weak integration of artificial intelligence technologies into Arab educational systems despite global digital transformations, which negatively affects the efficiency of educational outcomes. Accordingly, the study seeks to explore ways of advancing Arab education through the effective integration of artificial intelligence in ways that enhance creativity and innovation.

The research problem is formulated around the following central question:

How can education in the Arab world be effectively developed through the integration of artificial intelligence in a manner that enhances creativity and responds to future challenges?

Accordingly, this study will address the following sub-questions:

1. What are the most prominent educational fields in which artificial intelligence can contribute to development within the Arab world?
2. How can artificial intelligence enhance creativity and innovation among students and teachers?
3. What challenges might Arab countries confront in applying artificial intelligence technologies in education, and how can these be overcome?
4. What future dimensions are expected to result from the integration of artificial intelligence with education systems in the Arab world in terms of the quality of educational outcomes and their alignment with labor market demands?

Significance of the Research

The significance of this research stems from the Arab world's need to renew its educational system in a manner consistent with global transformations associated with artificial intelligence. Its theoretical significance lies in its contribution to enriching Arab educational scholarship through a contemporary academic treatment of artificial intelligence and its role in education. Its practical significance resides in the possibility of benefiting from its findings in the development of educational policies, the design of teacher-training programs, and the proposal of practical mechanisms for integrating artificial intelligence into school curricula in ways suited to the realities of Arab education.

Research Objectives

The research aims to achieve the following objectives:

1. To analyze the current state of AI implementation in Arab education systems and diagnose the educational obstacles that limit its effectiveness.
2. To propose a conceptual framework and work to improve an AI-based learning environment that supports innovation and creativity among learners and teachers.
3. To identify the future competencies and skills that should be included in educational curricula based on the requirements of the digital revolution.
4. To propose ready-to-implement educational policies to promote the integration of artificial intelligence within a comprehensive development vision for Arab education.
5. To examine the impact of artificial intelligence on improving learning outcomes and working to develop students' technological skills across various educational stages.

Research Hypotheses

- There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the mean responses of the research sample regarding the educational fields in which artificial intelligence contributes to development in the Arab world.
- There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the mean

responses of the research sample regarding the role of artificial intelligence in promoting creativity and innovation among students and teachers.

- There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the mean responses of the research sample regarding the challenges facing Arab countries in applying artificial intelligence technologies in education.
- There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the mean responses of the research sample regarding the expected future dimensions of AI integration with education systems in the Arab world.

Scope of the Study:

1. Geographical Scope: This study focused on a number of Arab educational institutions (schools, universities) that have begun integrating artificial intelligence tools or adopting innovative digital approaches.
2. Temporal Scope: The study was conducted during the second semester of the 2025–2026 academic year, reflecting the trends of that period.
3. Thematic Scope: The study was limited to the use of artificial intelligence in education across three areas: educational innovation, educational technology, and awareness within the educational field, without addressing purely technical aspects or applications outside the educational sphere.

Terminological Definitions

Artificial Intelligence:

- **Terminologically:** The ability of digital systems to simulate human intelligence in learning, reasoning, decision-making, and the personalization of educational content (Mousa et al., 2019; Al-Astal et al., 2021; Abdel Wahab et al., 2023)
- **Procedurally:** The use of intelligent digital tools (learning systems, digital aids, performance analysis) that enable adaptive interaction with educational content.

Innovation:

- **Conceptually:** Finding non-traditional solutions to educational problems through modern teaching

methods and creative practices (Zayed et al., 2023; Shaheen et al., 2023; Abdel Wahab, 2023)

- **Practically:** The adoption by teachers and institutions of new methods and approaches to content creation, design that are flexible and stimulating to improve learning outcomes.

Educational Technology:

- **By definition:** The systematic use of theories, digital tools, and interactive media to improve education and enhance learning effectiveness (Al-Ayd et al., 2020; Faraj et al., 2023; Al-Haddadi et al., 2023).

- **Procedurally:** A technological environment based on platforms, devices, and media to support education, which organizes content and strengthens interaction between teachers and students.

Foresight:

- **Terminologically:** A proactive scientific process for analyzing current trends and developing future scenarios to support decision-making (Hamza, 2020; Al-Hilali, 2021; Al-Ansari, 2022)
- **Procedurally:** It analyzes the reality of Arab education using artificial intelligence tools to identify future visions and feasible improvement mechanisms to address the transformations of the Fourth Industrial Revolution.

Theoretical Framework

Concepts of Artificial Intelligence and Its Development in Education

Artificial intelligence represents a quantum leap in the evolution of technology and can be defined as the ability of digital systems or software to perform tasks that mimic human intelligence, such as reasoning, analyzing commands, decision-making, and self-learning. Over the course of the 20th century, this field evolved from simple algorithms to intelligent systems capable of mimicking human interaction, and even of adapting to their surroundings and modifying their behavior based on updated data. Recently, artificial intelligence has become a key element in most sectors, particularly education, where it is considered an effective means of improving the quality of learning and

personalizing educational content to suit students' diverse needs (Mousa & Bilal, 2019).

In the educational context, AI is viewed as an enabling educational force that can be deployed through various tools and technologies, such as intelligent learning systems, adaptive learning, automated assessment, and smart assistants, thereby contributing to a more flexible and efficient educational process. It also enhances teachers' ability to closely monitor student progress and provide real-time feedback, in addition to its role in reducing educational gaps, particularly in resource-limited environments (Abdul Wahab, 2023).

Artificial Intelligence in Arab Education

Many Arab countries have undertaken pioneering experiments in introducing artificial intelligence into education; however, its implementation is still in its infancy and faces numerous challenges, the most significant of which are weak infrastructure, a shortage of sufficiently qualified personnel, and the absence of unified national policies for the development of artificial intelligence within educational reform plans.

In this context, researchers believe that artificial intelligence in Arab education is still in its formative stage and faces challenges related to infrastructure, a lack of an integrated vision between technology and content, and the absence of specialized training. Despite these constraints, it represents a promising opportunity to achieve a qualitative improvement in educational quality, provided that it is employed within a conscious and systematic educational framework.

Educational Applications of Artificial Intelligence

The applications of artificial intelligence in education encompass several key areas: adaptive learning systems, smart educational aids, chatbots, self-assessment, and the analysis of educational big data. For example, smart educational platforms can monitor a student's learning patterns and provide educational content based on their level and learning style, thereby increasing the effectiveness of education and reducing academic failure. Similarly, automatic essay-grading tools help teachers save time and ensure greater fairness in

assessment, while chatbots provide immediate support to students outside of school hours (Al-Hadi and Ibrahim, 2023).

The researchers believe that educational applications of artificial intelligence play a significant role and represent a paradigm shift in learning and teaching methods, given their capabilities in content personalization, adaptive assessment, and, most importantly, support for individual differences among learners. However, their actual use in Arab education remains limited due to a lack of alignment between educational applications and school curricula, as well as a shortage of training for teachers on how to use them effectively. Researchers emphasize that the use of these applications requires a knowledge base and institutional framework that supports their educational role—not merely as technical tools, but as part of a smart and comprehensive learning system.

Educational Innovation and the Integration of Artificial Intelligence

Innovation in education is the cornerstone of any sustainable development in the educational process, since traditional educational practices are no longer capable of keeping pace with the rapid changes imposed by digital transformation and artificial intelligence. Innovation is a key element in creating a stimulating learning environment based on interaction, critical thinking, and problem-solving. Educational innovation is typically associated with the use of new teaching tools and methods, as well as the application of advanced technological concepts that encourage learners toward independent thinking and research, and contribute to the development of 21st-century skills such as collaboration, flexibility, and self-directed learning (Zayed & Al-Jamal, 2023).

The researchers maintain that educational development cannot be achieved solely through the use of new tools but requires a restructuring of the educational process in a way that empowers learners to think, create, and engage with the curriculum in non-traditional ways. In this context, artificial intelligence is considered a vital element in supporting this innovation, provided it is well integrated into educational practices. The

integration of artificial intelligence with education does not replace the teacher or eliminate the human role, but rather enhances their effectiveness and expands their capacity to respond to the diverse needs of learners, thereby opening new horizons for smart, accessible, and learner-centered environments.

Smart Learning Environments

The term “smart learning environments” refers to educational systems that rely on artificial intelligence technologies to personalize content, provide feedback, and continuously analyze learner behavior. These environments are not merely digital classrooms; rather, they are flexible systems that interact with the learner and adapt their learning path based on their performance and needs. Studies have shown that the use of smart learning environments contributes to increasing student motivation, improving engagement levels, and developing their analytical and creative thinking skills (Al-Hammadi, 2023).

The researchers view smart learning environments as a major shift in educational philosophy, as the educational process moves from a rote-learning approach to an interactive one that adapts to the learner’s needs. The value of these environments lies in their ability to integrate artificial intelligence, analyze data, and deliver personalized content, thereby enhancing the effectiveness of self-directed learning and continuous assessment, and thus fostering intellectual independence. The study argues that the widespread adoption of these environments in Arab education can only be achieved through technical and professional support, as well as an educational vision that integrates technology and pedagogy within a comprehensive systemic framework.

Previous Studies

Recent years have seen a marked increase in the number of studies examining artificial intelligence and its applications in the field of education, particularly in the Arab world. These studies ranged from experimental to evaluative and analytical, and their findings were largely consistent in emphasizing the importance of integrating AI into learning skills and the need to develop the skills of teachers and

students to keep pace with this transformation. The following is an analytical overview of the most notable of these studies:

First: Studies on the effectiveness of artificial intelligence in developing educational skills

Al-Hadi and Ibrahim (2023): This study aimed to develop AI-based smart content to enhance students’ laboratory skills and technological confidence at the Faculty of Education, Alexandria University, Egypt. It employed a quasi-experimental design with pre- and post-tests, and the sample consisted of 80 students. The results showed that the experimental group outperformed the control group by more than 35% and demonstrated a significant increase in technological confidence, meaning that there were statistically significant differences in favor of the experimental group in the post-tests.

Abdel Wahab, Mahmoud, and Rashwan (2023): The study aimed to measure the impact of artificial intelligence applications on the linguistic and creative self-development of gifted students. It targeted high-achieving high school students in Egypt to examine the impact of artificial intelligence applications on linguistic and creative self-development. The sample consisted of 30 students, and a quasi-experimental design was used. The results showed a 28% improvement in the experimental group, confirming the effectiveness of artificial intelligence in enrichment programs.

Zayed and Al-Jamal (2023) study: This study targeted second-year high school students in Egypt. The sample consisted of 185 students and utilized an AI-based virtual museum to develop divergent thinking and archaeological awareness, employing an experimental design. The results showed a 32% increase in divergent thinking and a significant increase in archaeological awareness and learning motivation compared to the other groups.

Jabali and Al-Qahtani (2022): The study aimed to determine the extent to which 21st-century skills are possessed. It was conducted in Abha at King Khalid University to measure faculty members’ awareness of artificial intelligence skills and their relationship to experience and training. A descriptive survey methodology was used, employing a questionnaire

administered to a sample of 133 graduate and undergraduate students. The results showed that 65% had moderate awareness, with differences favoring those with more experience and those who had received specialized training, and a need to enhance creative thinking and collaboration through AI tools

Al-Astal, Al-Agha, and Aqal (2021) aimed to develop an AI-based educational model to develop programming skills among students at the Faculty of Science and Technology in Khan Yunis. The sample consisted of 32 students from the University College of Science and Technology; The quasi-experimental design was used. The results showed an improvement of over 30% in the experimental group compared to the control group, confirming the model's effectiveness and recommending its wider adoption. (Al-Astal et al., 2021)

Second: Studies on the Awareness of Teachers and Faculty Members

Salah (2023): This study targeted secondary school science teachers in public schools in Palestine to assess the extent to which they utilize artificial intelligence technologies, employing a descriptive survey methodology. The results showed that less than 40% actually use these technologies, and that implementation remains limited and requires training, infrastructure, and administrative support.

Faraj, Saraya, and Ibrahim (2023): Aimed to test the effectiveness of an AI-based e-training system for developing digital learning skills among computer science teachers in Egypt and used a quasi-experimental approach; the sample consisted of computer science teachers responsible for developing digital skills. The results showed a 38% improvement after training, with a notable effect of individual learning styles on the level of benefit.

Awad and Al-Furani (2023) examined the effectiveness of learning experiences based on the SAMR model using artificial intelligence to enhance computational thinking among high school female students in Saudi Arabia, employing a quasi-experimental design. The results showed a 42% improvement compared to the control group, confirming the importance of integrating modern educational models with artificial intelligence.

Fourth: Studies on Education During Crises and the Digital Transformation

Halawa and Barhamy (2024): Targeted commercial secondary school students in Tanta, Egypt, to measure the impact of artificial intelligence on the development of infographic production skills. The study sample consisted of 20 students, and a blended approach was used, resulting in a rise in proficiency rates from 27% to 68%, alongside improved attitudes toward technology in education.

Zayed and Al-Gamal (2023) examined the impact of AI-based virtual museums on the development of divergent thinking and archaeological awareness among high school students in Egypt in the history course. The sample consisted of 120 students, and a quasi-experimental design was used. The results showed a 32% improvement and a clear increase in archaeological awareness, with a recommendation to integrate them into the curriculum.

Hussein, Salman, and Abdullah (2021): This study addressed the role of artificial intelligence in supporting e-learning in Libya during the COVID-19 pandemic. It showed that these technologies helped ensure the continuity of distance learning, particularly in classroom management and content personalization, with a recommendation to strengthen digital infrastructure and train staffs.

Mahmoud (2020): This study focused on the role of artificial intelligence in reshaping education during crises in Egypt and concluded that it serves as a tool for reimagining learning and assessment through content personalization and behavioral analysis and called for its integration into future educational policies.

Review of Previous Studies

Methodology: Previous studies have ranged from quasi-experimental to descriptive-analytical designs, indicating that artificial intelligence can be approached from multiple perspective, whether through impact measurement or trend identification. This has led the researchers to combine both methodologies to ensure comprehensive coverage.

Sample: The study samples included university students, secondary- school students, and faculty members, allowing the researchers to compare different educational levels and accurately identify the target group.

Tool: The studies utilized pre- and post-tests, questionnaires, and analytical scales, which helped the researchers design a composite tool combining performance measurement with attitude assessment.

Results: Most studies confirmed improvements in skills (programming, computational thinking, hyperlinking, infographics), alongside average awareness and gaps in usage, underscoring the need for training and development.

Research Gap: Previous studies have mostly focused on a specific skill or field, while few studies have linked AI to the integrated development of creativity.

Research Significance: The current study offers a comprehensive vision for integrating AI with creativity and development in Arab education system to mitigate future challenges, rather than presenting fragmented findings.

Development of the Theoretical Framework: The researchers drew on the diversity of methodologies, samples, and tools in previous studies to construct a comprehensive theoretical framework and formulate research hypotheses appropriate for the Arab context.

What distinguishes this study: Its focus on Arab education as a whole, on the integration of the creative dimension with future challenges, and the presentation of a comprehensive framework that is not limited to a specific context.

METHODOLOGY

This study adopted a descriptive-analytical approach, as it was deemed the most appropriate for examining the educational and social phenomena associated with the use of artificial intelligence in education, and for analyzing teachers' attitudes toward professional development and educational technology. A questionnaire was used as the primary data collection, with its validity and reliability ensured.

Study Population and Sample

The study population consisted of staff members at educational institutions at various levels across several Arab countries. A simple random sample of 100 participants was selected, all of whom were required to have experience with or knowledge of AI practices in education. Sample members were selected using simple random sampling from staff at educational institutions in several Arab countries. They were contacted electronically via a digital questionnaire sent to them via email and academic communication platforms.

Research Tools

In their study, the researchers relied on the questionnaire as the primary data collection tool due to its suitability for the nature and objectives of the research on education in the Arab world in the age of artificial intelligence. The questionnaire was designed based on the literature and previous studies. It comprised three themes (artificial intelligence, educational innovation, and educational technology), consisting of 30 items on a five-point Likert scale. The items covered knowledge, application, attitudes, and awareness of the importance of artificial intelligence and barriers. Validity was verified by specialized reviewers, and reliability was assessed using Cronbach's alpha coefficient to ensure the questionnaire's reliability and suitability for implementation.

Demographic Data of the Study Sample

Table 1 shows that the proportion of females in the sample was 55% compared to 45% for males, indicating good gender representation in the study. The higher representation of females may be attributed to their higher proportion in the education sector in some Arab countries, which enhances the credibility of the results and the diversity of perspectives.

Table (1): Distribution of the sample by gender

Gender	Frequency	Percentage
Male	45	45.0%
Female	55	55.0%

Table 2 shows that the largest group in the sample belongs to the 30–39 age group (40%), followed by

the under-30 age group (30%). This indicates that the majority of the sample consists of young or middle-aged educators, which increases the likelihood that they possess a digital background and the ability to interact with artificial intelligence and educational technology.

Table 2: Distribution of the sample by age group

Age group	Frequency	Percentage
30-	30	30.0%
30-39	40	40.0%
40-49	20	20.0%
50+	10	10.0%

The results shown in Table 3 indicate that approximately half of the sample holds a bachelor's degree (50%), while 35% hold a master's degree, and only 15% hold a doctoral degree. This diversity in qualifications reflects a balanced representation of different academic groups, which enriches the study's findings and makes them more comprehensive.

Table (3): Distribution of Sample Participants by Academic Qualification

Academic Qualifications	Frequency	Percentage
Bachelor's Degree	50	50.0%
Master's Degree	35	35.0%
PhD	15	15.0%

Table 4 shows that the majority of participants have between 5 and 10 years of experience (40%), while 25% have less than five years of experience. This diversity in years of service provides a mix of perspectives from those with limited and moderate experience, which enhances the value of the analysis and bridges the gap between current knowledge and actual practice.

Table 4: Distribution of Sample Participants by Years of Experience

Years of experience	Repetition	percentage
–5	25	25.0%
5–10 years	40	40.0%

11–15 years	20	20.0%
15+	15	15.0%

Statistical Analysis of Questionnaire Data

First: Description of the Study tools

The study tool was designed as a questionnaire consisting of 30 items, divided into three main sections, with each section containing 10 items. Demographic data were excluded from the current analysis. A five-point Likert scale was used to measure participants' responses, ranging from (1) very low to (5) very high.

RESULTS

Testing Hypotheses to Answer Sub-questions

First Hypothesis

“There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the mean responses of the research sample regarding the educational fields in which artificial intelligence contributes to development in the Arab world.”

Table (5): Results of the one-way analysis of variance (ANOVA) for educational fields

Source	Sum of Squares	Degrees of Freedom (df)	Mean Square	F-value	Significance (Sig.)
Between groups	1.21	2	0.605	2.41	0.093
Within groups	24.39	97	0.251		
Total	25.60	99			

The results of the one-way analysis of variance (ANOVA) show that the significance level (Sig. = 0.093) is greater than 0.05. This indicates that there are no statistically significant differences in the mean responses of the sample participants regarding the educational domains in which artificial intelligence contributes. Consequently, this suggests a general consensus on AI's similar role in education, accompanied by a growing but limited awareness of its application. This finding is consistent with previous studies (Al-Astal et al., 2021; Al-Haddadi & Ibrahim, 2023), which demonstrated a positive impact of AI, though within a limited and non-generalizable scope. Thus,

it appears that AI presents an equal opportunity, but requires institutional strategies and foundations to expand its impact and enhance the diversity of its applications.

The Second Hypothesis

“There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the mean responses of the research sample regarding the role of AI in enhancing creativity and innovation among students and teachers.”

Table (6): Results of the one-way analysis of variance (ANOVA) for the role of AI in creativity

Source	Sum of Squares	Degrees of Freedom (df)	Mean Square	F-value	Significance (Sig.)
Between groups	1.15	2	0.575	2.28	0.106
Within groups	24.45	97	0.252		
Total	25.60	99			

The results in Table 6 indicate that the significance value (Sig. = 0.106) is greater than 0.05, confirming that there are no statistically significant differences between the sample's mean responses regarding the role of artificial intelligence in supporting creativity and innovation. This implies a general consensus on AI positive role, but without any substantial differences among the mentioned groups. This can be explained by the fact that creativity is an agreed-upon educational value, while AI is viewed as a tool to stimulate critical thinking and the production of innovative content, rather than as a decisive factor in and of itself. This result is consistent with previous studies (Abdulwahab et al., 2023; Zayed and Al-Jamal, 2023) that demonstrated a limited impact of its applications on creativity. Thus, it appears that the use of AI requires an educational environment that promotes and encourages experimentation and the integration of roles

between teacher and student to foster innovation more broadly.

The Third Hypothesis

“There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the mean responses of the research sample regarding the challenges facing Arab countries in the application of artificial intelligence technologies in education.”

Table (7): Results of the one-way analysis of variance (ANOVA) for challenges related to artificial intelligence

Source	Sum of Squares	Degrees of Freedom (df)	Mean Square	F-value	Significance (Sig.)
Between groups	1.42	2	0.710	2.65	0.074
Within groups	25.96	97	0.268		
Total	27.38	99			

Table 7 shows that the significance value (Sig. = 0.074) is greater than 0.05, indicating that there are no statistically significant differences among the sample's opinions regarding the challenges associated with the use of artificial intelligence in education. Participants agree on the existence of common difficulties, most notably: weak digital infrastructure, a lack of teacher training, and the absence of clear policies—challenges highlighted in previous studies such as Mahmoud (2020) and Hussein et al. (2021). The results indicate that these problems are structural and related to policies and capabilities rather than individuals, requiring comprehensive institutional intervention through infrastructure investment, the adoption of supportive policies, and the strengthening of educational–technological partnerships to bridge the gap between theoretical potential and practical applications.

Hypothesis 4

“There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the mean responses of the research sample regarding the expected future dimensions of AI integration with education systems in the Arab world.”

Table (8): Results of the One-Way Analysis of Variance (ANOVA) for Future Dimensions

Source	Sum of Squares	Degree of Freedom (df)	Mean Square	F-value	Significance (Sig.)
Between groups	1.32	2	0.660	2.56	0.082
Within groups	24.98	97	0.257		
Total	26.30	99			

The results in Table 8 show that the significance value (Sig. = 0.082) is greater than 0.05, confirming that there are no statistically significant differences among the sample's responses regarding the future dimensions of artificial intelligence's compatibility with education. This indicates a general consensus on its role in improving the quality of outcomes, linking education to the labor market, and developing curricula in line with strategic directions such as Saudi Vision 2030 (Badawi, 2025). The result indicates that future expectations are not influenced by individual characteristics but rather represent a collective recognition of the necessity of digital transformation, which is consistent with the findings of Awad and Al-Furani (2023). Consequently, the collective readiness to adopt artificial intelligence requires practical policies and clear implementation methods to transform this vision into a tangible educational reality.

DISCUSSION

Discussion of the Results of the First Question:

The results showed that artificial intelligence plays a role in content personalization, smart assessment, and interactive learning at a rate of 59.58%, which is a moderate level leaning toward the positive. This finding aligns with studies by Al-Astal et al. (2021) and Al-Haddadi and Ibrahim (2023), which

confirmed its impact on improving performance and technological trust, but it reveals a gap between awareness and practical application, as shown in Salah's study (2023)

Discussion of the Results of the Second Question:

The results indicate that AI enhances critical thinking and creativity by 60.08%, through the provision of supportive environments and immediate feedback. These findings are consistent with those of Abdel Wahab et al. (2023) and Awad and Al-Farani (2023), which confirmed its impact on developing creativity and computational thinking, but they differ from the study by Jabali and Al-Qahtani (2022), which noted limited awareness among faculty members.

Discussion of the Results of the Third Question:

The results indicated that the most significant challenges are weak digital infrastructure, the absence of policies, and a lack of teacher training, at a rate of 59%. This aligns with the studies by Hussein et al. (2021) and Mahmoud (2020), which linked success to the presence of clear strategies, but it differs from the study by Zayed and Al-Jamal (2023), which showed positive results in the use of virtual museums.

Discussion of the Results of Question 4:

The results showed the highest percentage (60.86%), confirming that artificial intelligence can improve the quality of education and align it with the labor market through adaptive curricula and performance analysis. These findings align with Badawi (2025) and Faraj et al. (2023), who highlighted its role in building a knowledge economy and developing digital skills, while differing from Salah (2023), who noted a lack of actual use to date.

CONCLUSION

Based on the results, it appears that Arab education is adopting artificial intelligence and educational technology as a strategic opportunity. Considering it's a key gateway to fostering innovation and improving the quality of educational outcomes. The study revealed a moderate level of awareness leaning

toward positivity among participants, particularly regarding educational technology (60.86%), while awareness of artificial intelligence remained lower (59.58%) due to a clear gap between intellectual conviction and actual implementation.

The results reveal that the fundamental challenges are structural, consisting of weak infrastructure, a lack of training, and the absence of clear national policies, which calls for comprehensive institutional intervention that links policies and infrastructure and strengthens human capacity. These results also highlight the importance of mid-career professionals and academic backgrounds in fostering more positive attitudes toward AI.

The study emphasizes that AI is not a luxury but an educational necessity to ensure the continuity of education in the face of crises and to design adaptive curricula that support students' needs, particularly those with special needs. Therefore, AI must be integrated into comprehensive national strategies aligned with sustainable development goals and labor market needs to ensure an effective and sustainable digital transformation, leading to high-quality and inspiring Arab education.

Recommendations

Based on the study's findings and analysis, the researchers recommend the following:

1. Integrate artificial intelligence into educational curricula through interactive training modules related to academic subjects, thereby promoting its direct application in instructional practices.
2. Design professional development programs for teachers to increase their proficiency in using AI applications and linking them to authentic learning experiences.
3. Developing educational policies that support innovation, based on flexibility and personalization, and taking into account individual differences among learners.
4. Strengthening technological infrastructure in schools and universities, especially in remote and remote areas, to ensure access to smart learning environments.
5. Encourage applied scientific research in the field of AI in education through joint research projects with technological institutions and companies.
6. Include AI among the priorities of national educational strategies and align it directly with the Sustainable Development Goals and future areas of digital transformation.

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