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Article

Artificial Intelligence in Education: Transforming Learning Environments and Enhancing Student Engagement

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Abstract

This study investigates the transformative impact of artificial intelligence (AI) on contemporary education, focusing on its influence on learning environments and student engagement. Integrating AI technologies into educational systems increasingly personalizes learning experiences, facilitates adaptive learning pathways, and enhances intelligent tutoring systems. This research gathered data from 422 educators affiliated with universities in Iraq. The analysis was conducted using the JASP statistical software. The results indicate that AI significantly affects the learning environment and student engagement. The study recommends leveraging AI's potential to alleviate educators' administrative burdens, allowing them to concentrate on interactive and skill-based instruction. Furthermore, it discusses future implications of AI in education, including exploring emerging technologies such as virtual reality and their capacity to revolutionize learning further.

Keywords

Artificial Intelligence, Student Engagement, Personalized Learning, Intelligent Tutoring Systems.

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AI is a composite term derived from "artificial" and "intelligence," denoting the cognitive capabilities exhibited by artificial entities (Ahuja et al., 2023). This concept is predominantly linked to computer science, where forms of intelligence analogous to human cognitive processes are replicated in computers and software. AI research encompasses a range of topics, including machine learning, natural language processing, problem-solving, perception, and reasoning (Cooper, 2023). Among the competencies associated with intelligence is the ability to learn and comprehend diverse subjects with high precision. Consequently, an intelligent system is designed to learn from experience and enhance performance on specific tasks with each iteration.

Similarly, the acquisition of various subjects and languages predominantly occurs during childhood. Once a foundational understanding is established, the complexity of these subjects continues to escalate over time (Eysenbach, 2023). Initially, learners may encounter failures; however, assessment errors diminish significantly as proficiency develops. Furthermore, the capacity to innovate and generate original ideas about a subject indicates educational excellence.

Four key dimensions can characterize the scientific interpretation of AI. First, it elucidates the concept of intelligence by rationalizing its underlying principles. Second, it seeks to understand and analyze human information processing mechanisms (Shidiq, 2023). Third, AI endeavors to create computer models that simulate intelligent behavior, thereby attempting to manifest intelligence in a tangible form. The overarching aim of AI is to develop systems that can exhibit behaviors comparable to those of an intelligent human (Dogan, Goru Dogan, & Bozkurt, 2023). This aspiration may be likened to the engineering of an artificial brain, a sophisticated structure characterized by complex interconnections that facilitate the transmission of detailed information. Such a brain would be expected to exhibit a high degree of parallel processing and substantial storage capabilities. Finally, AI also aims to construct devices that can operate comprehensively and efficiently, resembling the vast capabilities of a supercomputer (Celik, 2023).

AI is a captivating topic today and represents a unique and transformative technology for the future (Tunjera & Chigona, 2023). An et al. (2023) suggest that AI is not merely a buzzword but will actively shape the future of education. The integration of AI simplifies teaching and learning, enabling educators to move beyond tedious tasks such as homework assessment, attendance management, and performance analytics to engage in workshops and skill demonstrations (Keiper et al., 2023). Personalized learning pathways guide students based on their learning styles, backgrounds, and comprehension speeds (Arumugam, Reddy, & Tyagi, 2024). Zhang, Shankar, and Antonidoss (2022) note that virtual instructors, equipped with encyclopedic knowledge and insights from notable figures, can teach students a wide range of subjects while maintaining wit and wisdom, provided the stored data is well-organized (Yau et al., 2023).

This research looks into how artificial intelligence (AI) has changed modern education, focused on how it has changed learning settings and how it has changed student involvement. More and more, AI technologies are being used in schools to customize learning, make flexible learning paths easier, and improve smart teaching systems. The study used information from 422 university teachers in Iraq, and the JASP statistics software was used to look at the information. The results show that AI significantly impacts both the learning setting and students' interest in learning. The study suggests using AI to simplify teachers' jobs by eliminating boring chores. This would allow them to focus on teaching students through interaction and skill-based activities. In addition to talking about what AI will mean for education in the future, it also looks at new technologies like virtual reality and how they could change learning even more. The study has different parts, such as a literature review, research methods, results, talk, and consequences. At the end of the study, it also talks about the study's limits and possible routes for future research.

Review of Literature

The development of artificial intelligence in the education industry has improved the learning process, increasing its relevance, enjoyment, and meaning (Arumugam et al., 2024). To support individualized learning, increase student involvement, and allow efficient and automated evaluation of student achievement (Celik, 2023), artificial intelligence technologies are constantly being created and included in educational systems). This technology helps teachers and students by letting them study at their speed and in the desired learning style. Personalized learning and adaptable systems are two essential uses of artificial intelligence in education (Darazha & Glyussya, 2023). Students nowadays show different learning styles and speeds, which makes it more challenging to fulfill their demands. Still, AI technology may simplify the supply of customized learning tools and teaching in line with personal preferences (Ahuja et al., 2023).

Personalized learning tailors pedagogical content to students' cognitive styles, offering questions aligned with their strengths and weaknesses and scenarios suited to their educational backgrounds (Cooper, 2023). AI-supported adaptive learning environments deliver personalized strategies that enhance learning more effectively than traditional methods. These systems also cater to institutional and teacher needs by providing adaptive functionalities (Eysenbach, 2023). They can automatically group students with similar profiles, identify underperforming individuals, and maintain specific pedagogical strategies (Khlaif et al., 2023). Additionally, research into the ethical implications of AI in education is increasingly essential, as these technologies raise significant ethical concerns despite their potential benefits (Shidiq, 2023). Another critical application of AI in education is the development of intelligent tutoring systems (Gligorea et al., 2023). The rapid proliferation of the internet has created an imperative to educate children and adults in digital literacy. One of the primary objectives of research and development in intelligent tutoring systems has been to deliver customized instruction (Dogan et al., 2023). Over the past twenty-five years, advancements in artificial intelligence's knowledge representation capabilities have been explored about various domains of problem-solving knowledge, including semantic networks, production systems, frames and scripts, concept mapping, and ontologies, as well as suitable knowledge representation schemas for intelligent tutors functioning as expert systems (Aggarwal, Sharma, & Saxena, 2023).

AI is becoming a major player in education in the fast changing technology scene as it improves learning conditions and student participation (Celik, 2023; Urcola, 2023). Customizing to fit students' interests, skill levels, and preferences has taken the front stage. Personalized learning depends on adaptive systems as they understand every student's path to success and help them reach their objectives. The explosion of online learning is changing established educational approaches (Yau et al., 2023). Although historically, educational institutions have developed homogeneous courses for every student; it is now possible to build customized learning experiences using computers' adaptive capacity that reacts to students' activities (Mhlanga, 2023). This method creates a learning atmosphere where students may flourish in a safe setting under the direction of teachers who inspire their strengths and solve their shortcomings. Regardless of conventional teacher-led education or institutional frameworks, learning may become active, interactive, cooperative, and dynamic. This paradigm of adaptive systems offers fascinating opportunities; for example, computers can enable education in virtual worlds under anonymity. Based on their level of preparation, courses might be automatically recommended to students; content and pace are catered to their requirements. Appropriate algorithms allow no students to fail or become bored (Tunjera & Chigona, 2023).

Integrating expert systems into education has a long history, with hopes that computers could enhance national education systems by supporting students who fall outside standard boundaries or facilitating peer learning (An et al., 2023). However, designing such systems is complex, particularly in the subjective domain of education, where learning is influenced by individual characteristics such as motivation and personal context (Ng et al., 2023). No matter how advanced a knowledge system may be, it cannot replace human teachers. Furthermore, relying solely on algorithmically constructed machines poses the risk of prioritizing economic efficiency over educational quality (Annamalai et al., 2023). Nevertheless, contemporary knowledge engineers advocate for a collaborative approach that leverages the strengths of both humans and machines, which is essential for fostering adaptive educational technologies (Keiper et al., 2023; Salman, Alkadem, & AL-majmaie, 2023).

Intelligent tutoring systems (ITS) have become quite advanced teaching aids during the last several decades. Emulating the roles of human instructors by providing direction and learner needs assessment, and ITS is a computer-based system intended to deliver tailored education and feedback (Alam, 2022; Elrayah, 2022). These systems use artificial intelligence methods to fit each student's desired learning style, pace, understanding level, and speed, thereby customizing their educational experiences (Zhang et al., 2022). Its real-time feedback also helps students find and fix mistakes or misunderstandings (Ren, Feng, & Jiang, 2022). An ITS comprises three essential elements: pedagogical, student, and domain models. The information and abilities the domain model captures are those the system is meant to impart. While the pedagogical model controls the exchanges between the tutor and the student, the student model comprises facts about the learner's present knowledge and abilities. This approach chooses appropriate learning activities and tasks for the learner using knowledge from the domain and student models (Gesualdo & Pinquart, 2022; Yu et al., 2022). It usually includes five elements—a user interface, a domain model, a student model, a pedagogical model, and an expert model. ITS is the user interface that lets the learner and the system communicate more easily. The domain model spans the knowledge the system seeks to convey (Hammoudi et al., 2024; Liang et al., 2022). Furthermore, this model includes knowledge representation within a knowledge-based system and the system's functional capabilities via this representation (Khalaileh, 2023; Yun, Ravi, & Jumani, 2023). By storing data on the knowledge and learning activities of the student model, the system becomes even more flexible and efficient in satisfying educational requirements.

On the other hand, the student model consists of the relevant knowledge and traits of the student related to their interaction with the system and the related learning goals (Chaipidech et al., 2022; Holtzen et al., 2022). The pedagogical model describes the system's teaching approaches by including plans of action and their underlying explanations meant to affect student learning. Furthermore, the expert model presents a whole picture of the advisor's knowledge by capturing the knowledge of a human expert in a particular field (Khan, Khojah, & Vivek, 2022). Scholars in ITS are actively looking at creative ways to communicate domain expertise and pedagogical advisor knowledge. It acts in many ways to help students develop domain knowledge and understanding. The ITS has to be aware of both the external status of the learner and the present condition of the domain if it is to support instruction, research, and evaluation properly (Ahuja et al., 2023; Khudhair, Kuaiber, & Matrood, 2023). The domain model reflects domain knowledge and helps the system find the conceptual knowledge and abilities a student needs to complete a specific activity (Celik, 2023) correctly. Drawing on the prior conversation, earlier researchers have developed the following theories.

H1: There is a relationship between artificial intelligence and learning environments.
H2: There is a relationship between artificial intelligence and student engagement.

Methodology

The findings of this study were analyzed using quantitative data, which is also prevalent in the existing literature, to assess the impact of artificial intelligence in educational institutions. Accordingly, this research adopted a similar methodological approach. Data were collected from primary sources for this study. In the current literature, artificial intelligence is often evaluated through scale items and self-administered questionnaires. Therefore, this study employed primary data to examine the relationships between the identified variables. The instruments utilized were adapted from previous studies after confirming their reliability through coefficient analysis. Prior research demonstrated that each instrument achieved a Cronbach's alpha value exceeding 0.70. Sekaran and Bougie (2016) noted that research instruments with a Cronbach's alpha above 0.70 are suitable for further studies. The study targeted employees from various educational institutions, specifically teachers from universities in Iraq, to collect data on student engagement. A purposive sampling method was used, and participants provided consent prior to data collection. However, demographic data was not collected due to participants' reluctance to disclose confidential information. A total of 1,000 printed questionnaires were distributed, yielding 817 responses, of which 722 were valid after preliminary analysis. Data were analyzed using the JASP statistical tool, noted for its user-friendly interface (Murad, Othman, & Kamarudin, 2024), incorporating descriptive statistics, frequencies, Pearson's correlation, model summary, analysis of variance, and coefficient findings to assess variable relationships.

Findings

The initial step in the data analysis involved assessing the descriptive statistics. All 722 responses were complete, with no missing values. The mean of the data was evaluated and found to be within the acceptable range of -3 to +3, indicating significance. Additionally, the standard deviation was analyzed and confirmed to be significant. To examine the normality of the data distribution, skewness, and kurtosis values were calculated; values within the range of -3 to +3 are deemed indicative of a normal distribution.

Consequently, the data for this study were classified as usual. The descriptive statistics are presented in Table 1. The frequencies of responses to the artificial intelligence instruments were analyzed. The results indicated that 25 respondents selected "strongly disagree," while 186 indicated "disagree." Additionally, 171 participants chose "neutral," 193 responded with "agree," and 147 selected "strongly agree." The distribution of participants' responses to the artificial intelligence scale items is presented in Table 2.

Table 1: *Descriptive Statistics.*

	Artificial Intelligence	Learning Environments	Student Engagement
Valid	722	722	722
Missing	0	0	0
Mean	3.348	3.328	3.373
Std. Deviation	1.166	1.168	1.182
Skewness	-0.061	-0.090	-0.081
Std. Error of Skewness	0.091	0.091	0.091
Kurtosis	-1.114	-1.036	-1.187
Std. Error of Kurtosis	0.182	0.182	0.182
Minimum	1.000	1.000	1.000
Maximum	5.000	5.000	5.000

Table 2: *Frequencies for Artificial Intelligence*

AI	Frequency	Percent	Valid Percent	Cumulative Percent
1	25	3.463	3.463	3.463
2	186	25.762	25.762	29.224
3	171	23.684	23.684	52.909
4	193	26.731	26.731	79.640
5	147	20.360	20.360	100.000
Missing	0	0.000		
Total	722	100.000		

The frequencies of responses to the learning environment instruments were analyzed. The findings revealed that 32 respondents selected "strongly disagree," while 175 indicated "disagree." Furthermore, 180 participants chose "neutral," 194 responded with "agree," and 141 selected "strongly agree." The distribution of participants' responses to the learning environment scale items is illustrated in Table 3. The frequencies of responses to the student engagement instruments were analyzed. The results indicated that 23 respondents chose "strongly disagree," while 194 indicated "disagree." Additionally, 152 participants selected "neutral," 197 responded with "agree," and 156 chose "strongly agree." The distribution of participants' responses to the student engagement scale items is presented in Table 4.

Table 3: *Frequencies for Learning Environment.*

LE	Frequency	Percent	Valid Percent	Cumulative Percent
1	32	4.432	4.432	4.432
2	175	24.238	24.238	28.670
3	180	24.931	24.931	53.601
4	194	26.870	26.870	80.471
5	141	19.529	19.529	100.000
Missing	0	0.000		
Total	722	100.000		4.432

Table 4: *Frequencies for Student Engagement.*

SE	Frequency	Percent	Valid Percent	Cumulative Percent
1	23	3.186	3.186	3.186
2	194	26.870	26.870	30.055
3	152	21.053	21.053	51.108
4	197	27.285	27.285	78.393
5	156	21.607	21.607	100.000
Missing	0	0.000		
Total	722	100.000		

Pearson's correlations were conducted to assess the normality and direction of relationships among the study variables. A significance level of $p < 0.05$ was established, and the results in Table 5 indicated that all correlations were significant, allowing for further data analysis. The characteristics of the model were assessed during the model summary phase. The R-value indicates the correlation between the dependent and independent variables, with a threshold greater than 0.4 deemed suitable for further analysis. In this study, the R-value was found to be 0.625, indicating a significant correlation. The R-square value represents the proportion of variance in the dependent variable explained by the independent variables, with a value exceeding 0.5 indicating a sufficiently effective model for assessing the relationship. The R-square value obtained in this study was 0.591, signifying significance. The Adjusted R-square value provides insight into the generalizability of the results, reflecting the variation of the sample results compared to the population in multiple regression analysis. A minimal difference between R-square and Adjusted R-square is preferred. The R-square and Adjusted R-square findings were closely aligned, as presented in Table 6.

Table 5: *Pearson's Correlations.*

Variable		Artificial Intelligence		Learning Environment		Student Engagement
1. Artificial Intelligence	n					
	Pearson's r					
	p-value					
	Lower 95% CI					
	Upper 95% CI					
2. Learning Environment	n	722				
	Pearson's r	0.625	***			
	p-value	< .001				
	Lower 95% CI	0.579				
	Upper 95% CI	0.668				
3. Student Engagement	n	722		722		
	Pearson's r	0.487	***	0.447	***	
	p-value	< .001		< .001		
	Lower 95% CI	0.429		0.387		
	Upper 95% CI	0.541		0.504		

* p < .05, ** p < .01, *** p < .001

Table 6: *Model Summary.*

Model	R	R^2	Adjusted R^2	RMSE
M_0	0.000	0.000	0.000	1.168
M_1	0.625	0.591	0.590	0.912

Note: M_1 includes AI

The analysis of variance (ANOVA) was performed to assess the significance and applicability of the model for further investigation. A 95% confidence interval, corresponding to a 5% significance level, was set, necessitating a p-value of less than 0.05. In this study, the p-value was <.001, confirming statistical significance. Furthermore, the F-ratio evaluates the enhancement in prediction by examining the model's fit about its inaccuracies, with values exceeding 1 indicating a robust model. The results presented in Table 7 verify that the F-ratio is significant, thereby validating the model for subsequent analysis. The coefficient values were analyzed to evaluate the relationship between the independent and dependent variables. The results indicated a significant relationship between artificial intelligence and learning environments (t = 21.494), leading to the acceptance of H1, as shown in Table 8. The data analysis also tested H2, revealing a significant relationship between artificial intelligence and student engagement (t = 14.954). Consequently, H2 was accepted, as presented in Table 9.

Table 7: *ANOVA.*

Model		Sum of Squares	Df	Mean Square	F	P
M_1	Regression	384.300	1	384.300	462.005	< .001
	Residual	598.903	720	0.832		
	Total	983.204	721			

Note: M_1 includes AI
Note: The intercept model is omitted, as no meaningful information can be shown.

Table 8: *Impact of Artificial Intelligence on Learning Environment.*

Model		Unstandardized	Standard Error	Standardized	t	P
M_0	(Intercept)	3.328	0.043		76.583	< .001
M_1	(Intercept)	1.232	0.103		11.925	< .001
	Artificial Intelligence > Learning Environment	0.626	0.029	0.625	21.494	< .001

Table 9: *Impact of Artificial Intelligence on Student Engagement.*

Model		Unstandardized	Standard Error	Standardized	t	p
M_0	(Intercept)	3.373	0.044		76.689	< .001
M_1	(Intercept)	1.721	0.117		14.710	< .001
	Artificial Intelligence > Student Engagement	0.493	0.033	0.487	14.954	< .001

Discussion

The results of this study show that both predictions were confirmed, therefore showing a strong link between artificial intelligence and learning settings and between artificial intelligence and student participation. Dogan et al. (2023) claim that the interplay between artificial intelligence technologies and new media is ready to change educational settings, therefore impacting student interactions with technology and improving engagement with learning resources. Moreover, Celik (2023) explores the present scene of artificial intelligence technologies in education by classifying them within a new media paradigm. From this component-based point of view, three critical technologies—knowledge technology, conversational agent technology, and generative technology (Aggarwal et al., 2023)—are examined concerning their current educational uses and future tendencies. Every section offers insights into the nature of these technologies, their educational applications, pertinent case studies, and developing trends that affect students, teachers, learning materials, and educational institutions (Yau et al., 2023). Celik (2023) ends with a study of the transformative processes, including the interaction among educational environments, technology developments, and changing ideas of learning and education.

Particularly affecting education as a critical area of society's concern, artificial intelligence technologies also provide a potent set of networked knowledge systems with significant consequences for culture and the economy (Eysenbach, 2023). Rising artificial intelligence technologies from the business sector are quickly being included in the educational environments of colleges, cities, and states, notes Ren et al. (2022). This integration offers artificial intelligence fresh chances to solve fundamental and advanced problems about the representation, access, and navigation of vast shared bodies of information (Yu et al., 2022). The emergence of new media technologies—such as cinema, radio, and television, has either reinforced or drastically changed specific interactions in learning contexts (Tunjera & Chigona, 2023). Simultaneously, significant changes are anticipated as artificial intelligence technologies—through computers, laptops, and mobile devices- become increasingly included in modern media-rich educational environments (Liang et al., 2022).

Khlaif et al. (2023) assert that while artificial intelligence can significantly enhance traditional teaching methods, effective integration poses a challenge. More than simply adding AI to classrooms is required;

educational approaches must evolve. AI has the potential to personalize learning by analyzing data to provide tailored recommendations, identify knowledge gaps, and suggest engagement strategies (An et al., 2023). Teachers must learn to incorporate AI insights with their understanding of students, curricula, and teaching styles (Dogan et al., 2023). However, Shidiq (2023) notes that hesitance toward fully adopting AI, particularly in European countries, often stems from a need for more trust in its ability to offer suitable recommendations aligned with teachers' objectives. There are concerns that AI may diminish the human element of education (Aggarwal et al., 2023), as stakeholders prefer the assurance of real individuals driving analyses and decisions with genuine intentions for student success (Tunjera & Chigona, 2023).

Developers have to answer worries about artificial intelligence in education, proving its ability to improve the learning process instead of just fixing problems that might be handled by personal interactions (Darazha & Glyussya, 2023). AI has to prove that its application helps instructors and students equally and that a human presence is still essential for learning. Positioned to make wise instructional decisions, teachers should lead their students' learning using artificial intelligence as a tool for assistance (Celik, 2023; Cooper, 2023). To support teaching and learning, artificial intelligence uses natural language processing and deep learning, among other machine learning approaches (Ahuja et al., 2023). Though exciting, incorporating artificial intelligence into education brings unexplored areas and difficulties. Artificial intelligence technology advancements offer creative ways to improve instructor efficacy and student learning. Therefore, it is essential to consider the possible negative effects of its use in educational environments (Arumugam et al., 2024; Keiper et al., 2023).

Artificial intelligence's incorporation into education poses a complicated range of ethical and legal issues for which schools, districts, and commercial companies must negotiate (Cooper, 2023). These difficulties include many areas, including intellectual property rights and the need to provide fair access for all student demographics, especially underprivileged groups (Ng et al., 2023). Policymakers must quickly create robust frameworks, regulations, and rules for their execution, considering the fast development of artificial intelligence technology. A defined strategy plan might lead to a more cohesive way of controlling a transforming and robust technical force (Arumugam et al., 2024). As such, educational institutions are responsible for protecting their pupils from possible hazards and moral conundrums.

Furthermore, the moral consequences of gathering private student data need serious thought (Celik, 2023). Integrating artificial intelligence into educational environments is crucial to prevent external party abuse. Artificial intelligence and computer-based learning are being embraced by educational institutions more and more, so there is a great danger that these technologies might be seen as extra tools rather than as woven into the fabric of conventional pedagogical techniques (Alam, 2022). Moreover, the little formal instruction most instructors get on integrating technology into the classroom compromises its usefulness in teaching. Furthermore, various institutions' technical infrastructure should be considered as differences in technological configuration significantly affect the effectiveness of a computer-based learning system (Zhang et al., 2022).

Implications

This paper has significant consequences for using artificial intelligence to increase student involvement in educational settings. Examining the future directions and effects of extensive artificial intelligence integration in education is crucial as these developments will change the learning surroundings. However, artificial intelligence has many educational advantages; questions about access, fairness, employment, privacy, prejudice, and security also surface. Therefore, a strong awareness of artificial intelligence's development, importance, and achievements is essential in spotting powerful new technologies that can improve classroom learning.

Furthermore, the research underlined the possibility of using presentations and video games in the classroom. Old approaches have changed from blackboards and stiff lectures to more dynamic and interactive technology. Storyboarding, e-learning materials production, instructor multimedia recording, and content posting now commonly start the educational process. Teachers may use this method to review class records assessing pupils' knowledge, comprehension, and areas of uncertainty. Students engage in group activities to create an engaging 270° 3D learning environment replicating the feeling of attending class with classmates. Presentations use decreased classroom time, quiz/book applications, capital letters and layman's terminology for clarity, and self-paced online learning. Although 3D presentations require sizeable financial outlay, their potential for return on investment and enhanced visibility make them a reasonable choice for learning environments. Likewise, video games in the classroom provide a virtual interactive environment that improves vocabulary, grammar, writing, and critical and creative thinking ability. The educational system has been primarily unaltered for a century, with no young people involved in its formation. Transformative change requires cooperation among society, architects, teachers, and task teams. The curriculum seeks to lead pupils through many settings to increase their knowledge. Using instructional technology in fields, museums, and classrooms improves knowledge of mechanical, environmental, design, historical, and aesthetic ideas. Therefore, artificial intelligence is essential for increasing student involvement and supporting significant learning opportunities.

Moreover, the study underlines that as artificial intelligence gets increasingly included in learning environments, teachers and students must change their strategies to match technological developments instead of expecting technology to follow conventional teaching methods. Over the decades, electronic communication technologies have fast permeated society. The development of digital technology and the internet has the power to change civilization permanently. Education has to adjust in this dynamic environment to meet issues like limiting news coverage among continuous social transformations. Unprecedented technological developments will need a fundamental change in educational approaches regardless of utopian conceptions of society organization. The report also emphasizes how occupations like nursing, formerly considered safe, may become susceptible as lifespan and medical technology advance when education lags. Education finds a pivotal point as significant changes are just around the horizon. Like many problems with communal settings and the ideals either embraced or rejected, education is shaped by general positivistic viewpoints. Consequently, it is essential to scrutinize the direction of education rather than let unbridled market pressures shape how society should be organized. In this regard, the consequences of critical intelligence in learning contexts may significantly improve student involvement.

Future Directions

The results of this study were based on information gathered only from instructors, therefore providing insights from their viewpoint. Future research should include gathering information from students to gain complete knowledge of the conclusions from their point of view. Furthermore, although this research used quantitative data, qualitative data could provide insightful analysis and enhance the conclusions. Thus, subsequent studies should use qualitative approaches to record participants' subjective experiences, augmenting the body of already published material. Finally, this research was carried out within the particular setting of Iraq, therefore restricting the generalizability of the results to other industrialized nations. Therefore, scholars are advised to conduct future studies in developed nations to investigate these results in various settings, thereby improving the knowledge of the interactions among the many factors engaged.

References

Aggarwal, D., Sharma, D., & Saxena, A. B. (2023). Exploring the Role of Artificial Intelligence for Augmentation of Adaptable Sustainable Education. *Asian Journal of Advanced Research and Reports, 17*(11), 179-184. https://doi.org/10.9734/AJARR/2023/v17i11563

Ahuja, A. S., Polascik, B. W., Doddapaneni, D., Byrnes, E. S., & Sridhar, J. (2023). The digital metaverse: Applications in artificial intelligence, medical education, and integrative health. *Integrative Medicine Research, 12*(1), 100917. https://doi.org/10.1016/j.imr.2022.100917

Alam, A. (2022). Employing Adaptive Learning and Intelligent Tutoring Robots for Virtual Classrooms and Smart Campuses: Reforming Education in the Age of Artificial Intelligence. In R. N. Shaw, S. Das, V. Piuri, & M. Bianchini (Eds.), *Advanced Computing and Intelligent Technologies* (pp. 395-406). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-2980-9_32

An, X., Chai, C. S., Li, Y., Zhou, Y., Shen, X., Zheng, C., et al. (2023). Modeling English teachers' behavioral intention to use artificial intelligence in middle schools. *Education and Information Technologies, 28*(5), 5187-5208. https://doi.org/10.1007/s10639-022-11286-z

Annamalai, N., Eltahir, M. E., Zyoud, S. H., Soundrarajan, D., Zakarneh, B., & Al Salhi, N. R. (2023). Exploring English language learning via Chabot: A case study from a self determination theory perspective. *Computers and Education: Artificial Intelligence, 5*, 100148. https://doi.org/10.1016/j.caeai.2023.100148

Arumugam, S. K., Reddy, A. V. D., & Tyagi, A. K. (2024). Big Data, Artificial Intelligence, and Machine Learning Support for E-Learning Frameworks. In R. Pandey, N. Srivastava, & P. Chatterjee (Eds.), *Architecture and Technological Advancements of Education 4.0* (pp. 248-275). IGI Global. https://doi.org/10.4018/978-1-6684-9285-7.ch011

Celik, I. (2023). Towards Intelligent-TPACK: An empirical study on teachers' professional knowledge to ethically integrate artificial intelligence (AI)-based tools into education. *Computers in Human Behavior, 138*, 107468. https://doi.org/10.1016/j.chb.2022.107468

Chaipidech, P., Srisawasdi, N., Kajornmanee, T., & Chaipah, K. (2022). A personalized learning system-supported professional training model for teachers' TPACK development. *Computers and Education: Artificial Intelligence, 3*, 100064. https://doi.org/10.1016/j.caeai.2022.100064

Cooper, G. (2023). Examining science education in ChatGPT: An exploratory study of generative artificial intelligence. *Journal of Science Education and Technology, 32*(3), 444-452. https://doi.org/10.1007/s10956-023-10039-y

Darazha, S., & Glyussya, M. (2023). Unlocking the Metaverse: Revolutionizing Resource Learning for Future Students. *International Journal of Educational Technology and Artificial Intelligence, 2*(2), 52-58. https://topazart.info/e-journals/index.php/ijetai/article/view/34

Dogan, M. E., Goru Dogan, T., & Bozkurt, A. (2023). The use of artificial intelligence (AI) in online learning and distance education processes: A systematic review of empirical studies. *Applied Sciences, 13*(5), 3056. https://doi.org/10.3390/app13053056

Elrayah, M. (2022). Improving Teaching Professionals' Satisfaction through the Development of Self-efficacy, Engagement, and Stress Control: A Cross-sectional Study. *Educational Sciences: Theory & Practice, 22*(1), 1-12. https://jestp.com/menuscript/index.php/estp/article/view/1547/826

Eysenbach, G. (2023). The role of ChatGPT, generative language models, and artificial intelligence in medical education: a conversation with ChatGPT and a call for papers. *JMIR Medical Education, 9*(1), e46885. https://doi.org/10.2196/46885

Gesualdo, C., & Pinquart, M. (2022). Predictors of coping with health-related expectation violations among university students. *American Journal of Health Behavior, 46*(4), 488-496. https://doi.org/10.5993/AJHB.46.4.9

Gligorea, I., Cioca, M., Oancea, R., Gorski, A.-T., Gorski, H., & Tudorache, P. (2023). Adaptive learning using artificial intelligence in e-learning: a literature review. *Education Sciences, 13*(12), 1216. https://doi.org/10.3390/educsci13121216

Hammoudi, Z. Q., Al-Issa, M. S., Al Majidi, A. R. J., Al Hiali, T., Alqiraishi, Z. H. A., Mohamed, A. F., et al. (2024). The Moderating Impact of Student Mental Health, Sports Passion, and Athlete Role Model on Students Game Performance: A Survey of Twenty Colleges in Iraq. *Revista de Psicología del Deporte (Journal of Sport Psychology), 33*(1), 164-173. https://www.rpd-online.com/index.php/rpd/article/view/1537

Holtzen, S., Dumas, C., Adeyinka, O., Bertels, H., Burton, K., Campbell, A., et al. (2022). The Zoo at North River Veterinary: The Second Generation. *International Journal of Instructional Cases, 6*(1). https://ijicases.com/menuscript/index.php/ijicases/article/view/35

Keiper, M. C., Fried, G., Lupinek, J., & Nordstrom, H. (2023). Artificial intelligence in sport management education: Playing the AI game with ChatGPT. *Journal of Hospitality, Leisure, Sport & Tourism Education, 33*, 100456. https://doi.org/10.1016/j.jhlste.2023.100456

Khalaileh, Y. (2023). Accommodating Artificial Intelligence in International Law: An Overview and New Frontier. *Journal of Human Security, 19*(1), 22-31. https://doi.org/10.12924/johs2023.19010022

Khan, M. A., Khojah, M., & Vivek. (2022). Artificial Intelligence and Big Data: The Advent of New Pedagogy in the Adaptive E-Learning System in the Higher Educational Institutions of Saudi Arabia. *Education Research International, 2022*(1), 1263555. https://doi.org/10.1155/2022/1263555

Khlaif, Z., Mousa, A., Hattab, M., Itmazi, J., Hassan, A., Sanmugam, M., et al. (2023). The potential and concerns of using artificial intelligence in scientific research: The case of ChatGPT. *JMIR medical education, 9*, e47049. https://doi.org/10.2196/preprints.47049

Khudhair, D. Z., Kuaiber, M. Q., & Matrood, A. K. (2023). The Role of Industrial Specialised External Auditors and Joint Audit Structure on Audit Quality: Mediating the Role of Audit Risks. *International Journal of eBusiness and eGovernment Studies, 15*(2), 267-282. https://www.agbioforum.org/sobiad.org/menuscript/index.php/ijebeg/article/view/1739

Liang, L., Zheng, Y., Ge, Q., & Zhang, F. (2022). Exploration and strategy analysis of mental health education for students in sports majors in the era of artificial intelligence. *Frontiers in Psychology, 12*, 762725. https://doi.org/10.3389/fpsyg.2021.762725

Mhlanga, D. (2023). Open AI in Education, the Responsible and Ethical Use of ChatGPT Towards Lifelong Learning. In *FinTech and Artificial Intelligence for Sustainable Development: the Role of Smart Technologies in Achieving Development Goals* (pp. 387-409). Springer. https://doi.org/10.1007/978-3-031-37776-1_17

Murad, M., Othman, S. B., & Kamarudin, M. A. I. B. (2024). The Effect of Science & Technology Park, Market Segregation and Commercialization Support on Female Entrepreneurship in Pakistan. *Journal of Women's Entrepreneurship and Education,* (1-2), 40-65. https://doi.org/10.28934/jwee24.12.pp40-65

Ng, D. T. K., Su, J., Leung, J. K. L., & Chu, S. K. W. (2023). Artificial intelligence (AI) literacy education in secondary schools: a review. *Interactive Learning Environments*, 1-21. https://doi.org/10.1080/10494820.2023.2255228

Ren, Y., Feng, Q., & Jiang, Z. (2022). Exploration and Practice of Jupyter Notebook in Artificial Intelligence Online Teaching. In *2022 International Conference on Educational Innovation and Multimedia Technology (EIMT 2022)* (pp. 672-681). Atlantis Press. https://doi.org/10.2991/978-94-6463-012-1_73

Salman, A. L., Alkadem, D. H. A., & AL-majmaie, A. A. H. (2023). Effective Role of Mitomycin-C on Dacryocystorhinostomy Technique: A prospective Study. *Journal of Natural Science, Biology and Medicine, 14*(1), 59-62. https://doi.org/10.4103/jnsbm.JNSBM_14_1_10

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach* (7th ed.). John Wiley & Sons.

Shidiq, M. (2023). The use of artificial intelligence-based chat-gpt and its challenges for the world of education; from the viewpoint of the development of creative writing skills. *Proceeding of International Conference on Education, Society and Humanity, 1*(1), 353-357. https://ejournal.unuja.ac.id/index.php/icesh/article/view/5614

Tunjera, N., & Chigona, A. (2023). Investigating effective ways to use artificial intelligence in teacher education. *European Conference on E-Learning, 22*(1), 331-340. https://doi.org/10.34190/ecel.22.1.1625

Urcola, J. L. (2023). New Considerations on the Arantzazu Wall: Two Drawings by Jorge Oteiza for its Revision (1954-1968). *Rita: Revista Indexada de Textos Académicos,* (19), 154-171. https://www.redfundamentos.com/article-view.php?id=18

Yau, K. W., Chai, C. S., Chiu, T. K., Meng, H., King, I., & Yam, Y. (2023). A phenomenographic approach on teacher conceptions of teaching Artificial Intelligence (AI) in K-12 schools. *Education and Information Technologies, 28*(1), 1041-1064. https://doi.org/10.1007/s10639-022-11161-x

Yu, A., Wang, J., Zhou, Y., Qiao, X., Yan, S., Feng, Y., et al. (2022). [Retracted] Analysis on the Educational Value of Winter Olympic Spirit in Track and Field Teaching Based on Data Mining under Artificial Intelligence. *Journal of Sensors, 2022*(1), 9435846. https://doi.org/10.1155/2022/9435846

Yun, G., Ravi, R. V., & Jumani, A. K. (2023). Analysis of the teaching quality on deep learning-based innovative ideological political education platform. *Progress in Artificial Intelligence, 12*(2), 175-186. https://doi.org/10.1007/s13748-021-00272-0

Zhang, W., Shankar, A., & Antonidoss, A. (2022). Modern art education and teaching based on artificial intelligence. *Journal of Interconnection Networks, 22*(Supp01), 2141005. https://doi.org/10.1142/S021926592141005X