Research Article

Section: Digital Humanities

Check for updates

AI-powered education: Revolutionizing teaching and learning through artificial intelligence in Jordan

Zakaryia Almahasees[1]*, Ahmad Al-Harahsheh[2], Yousef Albudairi[3]
[1]Associate Professor, Department of English Language and Translation, Applied Science Private University, Jordan
[2]Professor, Department of Translation, Faculty of Arts, Yarmouk University, Irbid, Jordan
[3]College of Languages and Translation, Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia
*Corresponding Author: zmhases@hotmail.com
https://orcid.org/0000-0002-4035-7165

Abstract
This paper examines the integration of AI-powered tools in educational settings and focuses on teacher satisfaction, perceived effectiveness, and problems with adopting AI. It used a mixed methodology; it combined a quantitative structured survey with closed-ended and five open-ended questions to check the educators' views on this issue.-. The survey was created online using Google Forms. It was disseminated online, such as Facebook, LinkedIn, and Twitter. The survey received 300 respondents; the closed questions were statistically analyzed, while the open-ended questions were thematically analyzed. The results reflect a notable discrepancy in the satisfaction level; however, almost half of the respondents are dissatisfied with the integration of AI, while two-thirds recognize the benefits of its use in improving efficiency in teaching and personalized learning. The paper also unearths significant challenges, such as a steep learning curve and ethical issues like bias and privacy concerns. However, most educators believe in AI's possibilities, especially changing the whole phase of education through personalization and automation. Consequently, the debate emphasizes the issues of continuous training, transparency, and participation in the argument of AI in Education. The paper concludes with a final plea: balance the advanced integration of AI with inclusiveness, transparency, and alignment with educational goals to realize the maximal potential of these tools for revolutionizing teaching and learning.

Keywords: AI-enabled education, ethical Considerations in AI, integration of educational technology, personalized learning, teacher satisfaction

1. Introduction

Jordan, a country enriched with history and culture, is also known for being keen on developing education and trying to be abreast of innovation. Through the years, the Jordanian government has focused mainly on education as the pedestal of national development, realizing that economic growth and social development are just a function of a well-educated population. All schools, universities, and professional institutions work together in Jordan to provide students with the necessary skills and knowledge to compete in the ever-increasing competitive global market (Abuhmaid, 2013).

Over the years, the Jordanian government has given special attention to education as the cornerstone for national development. There is a belief that without an educated population, there can be no economic growth or social progress. According to the (Saymeh, Ariqat, & Aqel, 2014) The Jordanian government has given education special attention over the years as a cornerstone for national development. On the educational scene of Jordan, one finds an established network of schools, universities, and vocational institutions designed to ensure that students have the right mix of skills and knowledge to compete successfully in the global marketplace.

In the past few years, Jordan has tried integrating information and communication technology into its educational system. This has been part of the country's national strategy aimed at transiting it to a knowledge-based economy where technology is considered to play an important role in driving innovation and productivity. The government of Jordan has invested equally in digital infrastructure through various programs and partnerships, ensuring that all its schools and universities are well-equipped with cutting-edge technological tools and resources. This has been coupled with an increasing focus on digital literacy in the curricula of Jordan, with technology-related subjects being incorporated to help students meet modern workforce demands (UNESCO, 2022).

With the backdrop of technological progress, artificial intelligence brings a huge power and potential for change to education in Jordan. AI technologies open up new possibilities for improving the teaching and learning processes and provide solutions to some of the more critical problems the educational system has long faced (Ng, Wong, & Liu, 2020). For instance, AI-driven platforms can offer an individualized learning experience for every student's best needs and learning styles, as Luckin et al. (2016) argued. This is particularly important to be applied in the Jordanian educational environment because of the diversity that comes from different socioeconomic backgrounds for these learners, which requires different strategies for managing them for optimal performance.

AI integration into education doesn't simply mean using new tools; it means a basic change in how education will be delivered and consumed. Now, since educational resources in Jordan, especially in remote and underserved areas, can sometimes be lacking, the potential of AI to help bridge this gap is huge. AI-driven systems can provide high-quality educational content and individualized tutoring to students, no matter where they might be. This goes to help level the playing field by putting all students, whether in urban centers or rural communities, on an equal footing for succeeding in their own right. Moreover, AI can reinforce teachers' instructional role by giving insights into student performance and picking up red flags when students begin to go off track. Regarding this aspect, AI could alleviate some of the burden on teachers by automating routine tasks, particularly grading and administrative chores, thus saving time for more important tasks, such as lesson planning and student interaction. A country like Jordan—where educators care a lot about their students' success—could make AI a valuable ally in enhancing their teaching effectiveness and improving results. In Jordan, the integration of AI within the process of teaching and learning is imperative. Concurrently, with the country's vision to become one of the regional leaders in technology and innovation, the educational sector as a whole must be upgraded. AI becomes instrumental with its potential tools and capacity to change education into a more efficient, inclusive, and responsive education for the 21st century. In this direction, embracing AI in Jordan will be

apt not just for the future preparedness of students but also for providing leadership in the increasingly digitalized world (van der Vlies, 2020).

The study aims to identify the potential that AI-powered education in Jordan is likely yield and how AI technologies can be integrated effectively into the Jordanian educational system. The current study evaluates the readiness of technology adoption in schools and universities in Jordan, defines the challenges and opportunities for integration into AI, and proposes recommendations for how AI could effectively enhance students' learning outcomes. It hopes to contribute to the new wave of modernizing education in Jordan by providing insights that will inform the country's future of teaching and learning. Artificial intelligence, if integrated into education, becomes a step toward actualization in attaining the ambitious goals that the country has set for its future, as Jordan stands at this crossroads of tradition and innovation.

1.1 State of Technology Adoption in Jordan

Observable improvements characterize the adoption of technology in Jordanian schools and universities, but huge challenges also characterize it. Successive Jordanian governments have emphasized, over the past decade, digital transformation in education by introducing such programs as the "Jordan Education Initiative" and "Education Reform for the Knowledge Economy" (ERfKE). The programs have tried to incorporate information and communication technology in classrooms to improve the standard of education and enable the students to compete in a knowledge-based economy. Nowadays, most schools, particularly in urban areas, have smart boards, computer labs, and internet facilities (UNESCO, 2020). However, this has not been the case all over the country. While universities in larger cities, like Amman, quickly adopt advanced educational technologies, including e-learning platforms and digital libraries, problems in the rural schools and those in less well-off areas of this country remain unchanged, with limited access to the core digital infrastructure. Further, the digital divide has been exacerbated by issues like inadequate training of teachers in ICT and lack of continuous professional development opportunities, which are essential in effectively infusing technology into education (Al-Zaidiyeen et al., 2010). Moreover, the COVID-19 pandemic has emphasized the digital divide because most rural students cannot access education online due to poor connectivity and limited digital devices.

2. Literature Review

Yang (2023) estimated the effectiveness of AI assessment tools in enhancing student assessment accuracy and alleviating teachers' workload. It is an experimental study in which the workload of teachers in middle school and the accuracy of assessments were evaluated before and after the use of AI-powered tools that the teachers used to grade students' assignments and provide feedback. The findings showed that using AI-powered assessment tools significantly improved the accuracy of assessment among the students, with a concomitant reduction in teacher workload from automating repetitive grading tasks, hence giving teachers time to be involved in instructional activities.

Sharma and Kumar (2024) studied the implementation and impact of AI-powered personalized learning systems within a K-12 educational setting. The research was conducted in a K12 school with an AI-powered personalized learning platform at every grade level. Data collection involved interviews with teachers and surveys of students, with the inclusion of academic performance records. The results indicated that the AI-powered, personalized learning system contributed to significant gains in school engagement and academic achievement, as revealed by teachers who reported being able to satisfy most individual requirements of each student with the system. In contrast, students expressed high satisfaction with their learning experience.

Kim (2024) researched the role AI could play in teacher professional development, investigating the opportunities to promote teaching practices and challenges related to its implementation. The qualitative study relied on interviews with teachers who had completed AI-powered professional development programs. The results indicated that AI provided valuable opportunities for individualization of professional development, enabling teachers to focus on areas where AI is used to alleviate teachers' awareness.

Wang et al. (2024) studied the influence AI-driven tutoring systems have on students' engagement and learning outcomes in higher education. The authors conducted an experimental study involving 200 undergraduate students divided into two groups: using an AI-driven tutoring system and receiving traditional tutoring. Student engagement and learning outcomes were measured using the responses to the survey and through standardized achievement tests at the end. The results showed that students receiving AI-powered tutoring systems were far more engaged and had better learning outcomes than students receiving traditional tutoring, probably because of AI systems' very personalized and interactive nature.

Garcia and Torres (2022) evaluated accuracy and fairness in AI-based AES systems for assessing student writing. In this study, the performance of three commonly used AI-based essay scoring systems was assessed by comparing their scores against those made by human graders. 500 high school students wrote essays on different topics. The findings indicated that AI-powered essay scoring systems generally hold high accuracy and consistency with human grading. However, the researchers also found bias cases, particularly in scoring essays from students with different linguistic backgrounds, recommending continued human oversight to mitigate these biases.

In the research, Baker and Smith (2022) estimated the efficiency of AI-powered predictive analytics in identifying students at risk of failing their academics. In one large university, the researchers assessed data from over 10,000 students with an AI-driven predictive analytics system, integrating student demographics, data on academic performance, and engagement to identify at-risk students. The study's findings were that the AI-powered system satisfactorily identified students who were in danger of failing their courses so that timely interventions significantly improved the academic outcomes for the student group in jeopardy.

Smithand Johnson. (2023) researched how AI-powered adaptive learning systems effectively enhanced performance amongst modeling students in various learning setups. The scholars undertook a meta-analytical analysis of 50 published papers between 2018 and 2022. The queries of the analysis focus were based on AI-supported adaptive setups and the consequent empirical relationship with student performance. The performance of the modeling students was significantly enhanced using AI-powered adaptive learning systems in the personalized learning environment. The study further indicated that these systems were most useful when applied following the students' individuality and as a follow-up to traditional teaching methods.

Aijun (2024) studied how AI-powered virtual assistants can improve language proficiency for non-native speakers. The researchers conducted a six-month longitudinal study with 150 English as a second language learners at the university level, providing an AI-powered virtual assistant for practice. Checking language proficiency by pre-and post-tests showed that using AI-powered virtual assistants in studying a language proved that students improved their language ability drastically in speaking and listening. The researchers attributed such improvement to these AI tools' interactive and immersive nature.

In this regard, Zhang and Li (2023) researched the effectiveness of AI-based tools that would upgrade learning experiences among students with disabilities. The study was based on mixed

methodologies, using 50 special education teachers and 200 students with disabilities to collect data: surveys, interviews, classroom observations, and other data to gauge the effect of the AI-powered tools on students' learning. In the work carried out, it was found that learners with disabilities showed tremendous improvement in learning with the use of AI tools, including speech recognition software and adaptive learning techniques that personalized the instruction and gave students more independence while learning.

Davis and Brown (2023) explored the potential of AI-driven learning analytics implementation in higher education to contribute to student success. The authors conducted a case study for this analysis at a large university that recently adopted an AI-driven learning analytics platform. The data was analyzed, faculty interviews were conducted, and student success metrics were measured before and after the implementation of this platform. The study results showed meaningful insights about student behavior and performance, which were derived from AI-driven learning analytics to assist faculty in driving data-driven decisions toward improving student success rates, specifically in identifying students who needed additional support and personalized feedback.

Patel Gupta (2023) examined the ethical concerns of AI in education, with a primary focus on bias and fairness driven by AI within educational tools. In their qualitative study, the authors surveyed a group of AI developers, educators, and ethicists, along with case studies related to instances of reported bias in AI-powered educational tools. There were major concerns about ethics concerning bias and fairness; many examples showed that AI algorithms produced biased outcomes, particularly within standardized testing and grading systems. Fairness and transparency in AI-powered education are needed to develop guidelines and supervision mechanisms.

Singh and Jain (2023) reviewed the role of AI-powered gamification in education, especially its effect on student motivation levels and learning outcomes. It was an experimental study in which children in a middle school were engaged in gamified learning activities, powered by AI. Surveys were used as a tool to measure the level of motivation while learning outcomes were assessed by using standardized test results. Results indicated that AI-driven gamification motivated students to a greater extent and helped bring about better learning outcomes; these were aspects in which students usually felt less interested.

3. Methodology

The study is quantitative and focuses on the integration of AI in Jordan educational system. It applies a structured survey with both close-ended and open-ended questions. This questionnaire elicits comprehensive data about the usages, effectiveness, and ethical implications of these AI tools within educational settings in Jordan.

3.1 Survey Design

The principal aim of the survey will be to quantify the effects of AI-powered tools on many educational outcomes related to student engagement, academic performance, and cognitive skill development. Further, it is proposed that the ethical concerns of AI concerning bias and fairness be examined using a set of structured questions.

3.2 Participants

It is aimed at a widely representative sample of higher education institutions' students, teachers, and administrators. Therefore, a sample size of about 300 respondents was collected to ensure the adequacy of statistical analysis. The number of respondents deemed significant reflects the perceptions of educators

and university students reading about the integration of AI technology in Jordan.

3.3 Questionnaire Design

The questionnaire uses both closed-ended questions and open-ended questions. Closed-ended questions are based on the Likert scale, multiple choices, and binary (yes/no) to assess the use of AI-enabled education for each respondent. Specific areas of interest include how often they used AI tools, what types of AI tools they used, such as adaptive learning platforms or AI-based tutors, whether AI tools are considered to be effective in improving learning outcomes, concerns with fairness and bias of AI in assessment and level of teacher job satisfaction with AI implementation.

3.4 Data Collection

The survey is conducted on online platforms, such as Facebook, LinkedIn, and Twitter, to ensure wide coverage and convenience for participants. Data collection took one month, allowing all participants from different educational institutions to complete the survey. For clarity, the study chose five responses for each open-ended question.

3.5 Data Analysis

The quantitative data extracted from close-ended questions was analyzed using statistical techniques, such as descriptive statistics and the SPSS statistical tool, for patterns and relationships in AI usage and educational outcomes. Open-ended responses were analyzed thematically by examining recurring themes and emerging patterns and their identification and coding to complement the quantitative findings.

4. Analysis and findings

4.1 Demographic information

Category	Item	Percentage
Education	Bachelor's degree	28.88%
	Master's degree	18.41%
	Doctoral degree	5.42%
Age	18-24	31.05%
	25-34	20.94%
	35-44	20.58%
	45-54	11.91%
	55-64	4.69%
	65 or older	4.69%
Gender	Male	46.21%
	Female	53.79%
Occupation	Student	38.63%
	Teacher/Professor	29.60%
	Administrator	8.66%
	Educational Technologist	12.27%
	Other	10.83%

Field of Study/Work	Sciences	31.05%
	Humanities	13.36%
	Social Sciences	13.00%
	Education	23.10%
	Business	10.11%
	Other	9.39%

The relationship of demographic categories to the usage of AI technology describes various trends in education, age, sex, occupation, and field of study or work. Since this would be people with a higher level of education—bachelor's, 28.88%, or master's degree holders, 18.41%—who would be more familiar with AI technologies (having been taught about this in academic and professional settings), the relationships found were as follows: They are, in general, more open to the infusion of AI into their practices, and further use these tools to increase productivity and innovativeness. Even while a lesser percentage comes from those with Doctoral degrees, 5.42%, they would probably engage at deeper levels with AI, especially in research or development roles.

The other dimension is how young a demographic is and how comfortable they are with adopting new technologies. This includes AI; 31.05% fall under this age bracket of 18-24, and 20.94% are 25-34. This segment is usually more adaptive and open to using AI tools in education and work. In comparison, the least considered were the older age brackets (45-54: 11.91%, 55-64: 4.69%, 65 or older: 4.69%), indicating that these could have potential impacts on their usage or acceptance of those technologies, being less informed or at ease with AI. This could be said from the gender distribution, which marginally favored females at 53.79% compared to males at 46.21%, suggesting the broad applicability of AI technology across the two genders. However, specific trends could emerge based on occupational roles. Occupation has been a major determinant of how AI is being used today. Students (38.63%) are expected to use AI for learning and research tools within educational institutions. The Teachers/Professors (29.60%) would need AI to enhance pedagogical techniques and apply the technology to a more effective administration. The educational technologist (12.27%) is tasked with implementing AI within the educational setting, which influences the practice by determining the adoption and implementation of the tools. The broad category of "Other" occupations, 10.83%, allows for the supposition that the applicability of AI extends to other professional domains beyond traditional education.

Field of study or work also impacts AI technology usage. People in the science fields, 31.05%, are likely to be the most involved with AI technologies, given their broad applicability in computer science, engineering, and data analytics. Humanitarian and social science representatives are 13.36% and 13%, respectively, who might resort to AI for research, data analysis, and elaboration of new teaching methods. The ones in education, 23.10%, would be interested in how AI improves teaching and engages students. Those in business—10.11% will use AI for analytics, decision-making, and operational efficiency. In general, this analysis shows that AI technology is most actively engaged with by young people with higher levels of education and working in Science and Education. Their occupation and field of study heavily influenced how they interacted with the tools of AI.

4.2   AI Usage Frequency

AI Tool Usage Frequency	Number of Responses	Percentage
Never	6	2.00%
Rarely	15	5.00%

Always	103	34.44%
Often	95	31.57%
Sometimes	81	26.99%

The table analysis provides valuable insights into the frequency at which the respondents utilize AI products. Most participants reported using AI tools frequently, with 34.44% stating that they utilize AI-powered tools "Always" in their educational activities. The individuals frequently utilizing AI products are followed closely, accounting for 31.57% of the total. This indicates that most participants have readily adopted AI technology, as it is integrated into their regular educational practices. On the other hand, a small percentage of individuals use AI tools less frequently. Specifically, just 26.99% stated that they use AI products "Sometimes," while an even smaller proportion of 2.00% and 5.00% reported "Never" or "Rarely" using AI tools. The results unequivocally demonstrate a clear difference among respondents: the majority either utilize AI tools regularly or to a limited extent. At the same time, a minuscule minority abstain from employing AI technology altogether in their educational endeavors. This implies that while AI tools are being integrated into education, a segment of the population is still not actively involved with these technologies.

4.3 AI-Powered Tools Usage

AI Tool	Number of Responses	Percentage
Predictive analytics tools (e.g., identifying at-risk students)	91	18.02%
Automated grading systems	87	17.23%
AI tutors (e.g., virtual teaching assistants)	84	16.63%
AI-powered content recommendation systems	84	16.63%
Adaptive learning platforms	80	15.84%
Virtual classrooms with AI integration	79	15.64%

The above table displays AI tools in educational settings, showing that 18.02% of survey respondents used predictive analytics tools to identify at-risk students the most. This could be a sign of placing more value on early detection of students who might have academic problems so educators can use AI to help make changes to ensure timely interventions.

Other AI tools that are in the wide application include automated grading systems, 17.23%, and AI tutors, 16.63%. Both of these tools facilitate the education process by lessening the manual workload on the teachers and providing personalized support to the students. Following these, AI-powered content recommendation systems and adaptive learning platforms were used by 16.63% and 15.84% of the respondents, respectively. These tools enhance learning by Tailoring content based on individual students' needs and styles of learning. Finally, 15.64% respond with virtual classrooms with AI integration, pointing out a clear tendency towards the application of AI in remote and hybrid learning environments. Once more, this general distribution shows that AI achieves wide acceptance and integration across different aspects of education, focusing on personalization, efficiency, and student support.

4.4   The Effectiveness of CHATGPT_

How effective are AI-powered tools in enhancing your learning or teaching outcomes?	Perceived Effectiveness	Number of Responses	Percentage
	Very effective	77	25.67%
	Extremely effective	77	25.67%
	Slightly effective	76	25.33%
	Moderately effective	70	23.33%
	Total	300	100%

The data in the table shows that an appreciable part of respondents believes AI-supported tools, used for learning or teaching purposes, to be effective to enhance their output. Especially, 51.34% of respondents evaluated these tools as "Very effective" or "Extremely effective"; at the same time, both the segments took 25.67% of the answers. An index displays rather high positive perception of the AI tools from users' side, and those are significantly enhancing educational activity. On the other hand, 23.33% of the sample believed AI tools to be "Moderately effective," indicating that though these tools lend a hand, either the implementation could be done better, or the effect could vary with context. Further, 25.33% of the respondents found AI tools "Slightly effective," indicating that while AI definitely makes an impact, it may not be as transformative for all users or across all contexts. As can be seen, most viewers acknowledge the role of artificial intelligence in education, while a significant portion considers such tools very effective if they are to secure the intended educational results.

In which areas have you noticed improvements due to the use of AI-powered tools?	Improvement Area	Number of Responses	Percentage
	Student engagement	95	15.7%
	Academic performance	88	14.55%
	Creativity	88	14.55%
	Efficiency in completing tasks	86	14.21%
	Problem-solving abilities	86	14.21%
	Critical thinking skills	83	13.72%

The table provides an understanding as to what areas respondents have reported to improve due to AI-powered tools usage in education. Student Engagement tops the chart, with a difference of 95 responses at 15.7%. This thus indicates that AI tools are excellent at keeping students engaged through continuous activity, most likely brought about by personalized learning experiences, interactive content, and real-time feedback. Engagement is important in learning because it improves motivation, participation, and, finally, the general success of students. That student engagement comes first means AI tools captured and held students' attention—a first step toward deeper learning and retention.

Next in order of response come improvements in academic performance and creativity, with 88 responses each, that is, 14.55%. These are very pivotal areas because they note down core educational outcomes improved by AI. AI tools can help improve academic performance through tailored study plans, identification of knowledge gaps, and practice exercises attuned to each individual's learning style. Creativity, rated as highly as academic performance, suggests AI's role in promoting innovative thinking and problem-solving, probably through tools that allow experimentation and exploration beyond traditional methods. Efficiency in Completing Tasks and Problem-Solving Abilities are also important, each eliciting 86 responses, 14.21%, which suggests AI helps in smoothing out tasks and

enhancing cognitive skills to negotiate complex problems. Critical Thinking Skills are a bit lower, with 83 responses at 13.72 percent—a very good impact that does tend to point at AI-inducing analysis; it just might have a little room for further improvement.

This is a distribution of the improvements across key areas, underlining the broad and transformative impact of AI-powered tools in education. By enhancing student engagement, AI tools directly affect the levels of motivation and participation, which become high enough to ensure effective learning. It is equally true that substantial improvements in academic performance and creativity underline AI's dual role in strengthening the foundation of knowledge and promoting innovative thinking. That means AI tools are holistic in their benefits because of the close percentage ranges, from task efficiency to cognitive development. Meanwhile, the slightly lower percentage in critical thinking skills alludes to the possibility that, although AI is already doing much in this area, it could be further leveraged to build deeper analytical skills. The table indicates that AI-powered tools are making an important contribution to education in different ways by enhancing the quality of the learning experience and learning outcomes for a whole range of basic skills.

4.5 Fairness and Bias

Perceptions of Fairness and Bias in AI-Powered Assessments	AI Assessment Fairness	Number of Responses	Percentage
	Unsure	111	37.00%
	No	104	34.67%
	Yes	84	28.33%

The table indicates that almost one-third of the respondents, 37.00%, are "Unsure" about the fairness of AI-powered assessments. This returns a high degree of uncertainty. This uncertainty may spring from ignorance of how AI systems work, limited exposure to AI assessments, or concerns over the transparency of AI decision-making. Moreover, 34.67% of the surveyed population believe AI-powered assessments are unfair. There has to be a concern about biases or discriminatory practices within those. This could be due to some observed outcomes or general distrust in AI's ability to make impartial decisions. Contrarily, 28.33% of the respondents answered that AI-based assessments are fair, clearly bringing out the point that there is a minority group who support the objectivity and consistency of AI over human graders. However, the aggregate data supports that trust in AI-based assessment is yet to be achieved. The effort called for in this regard should emanate from the institution and artificial intelligence developers to make it more transparent, let users understand how AI works, and actively deal with possible biases within the AI system to build confidence and promote the broader adoption of AI in educational assessments.

Noticed Biases in AI-Powered Educational Tools	Bias Noticed	Number of Responses	Percentage
	Socioeconomic bias	176	25.62%
	Gender bias	175	25.47%
	Ethnic bias	171	24.89%
	No biases	165	24.02%

The table presents highly remarkable concerns, whereby many respondents reported its presence in AI-powered education tools. The most common bias found was socioeconomic bias, reported by 25.62% of the respondents. This would signify that AI tools favor a section of students coming from some

homogeneous socioeconomic backgrounds, leading to disparities in educational outcomes. As many as 25.47% of the respondents also noted the issue of gender bias, where artificial intelligence tools will not be equally effective or fair between both genders. On a follow-up, 24.89% of the respondents observed ethnic bias, raised through the question of when the AI systems should be inclusive or fair to the different ethnic groups. These findings emphasize that if such biases are not mitigated, these AI tools carry the potential to strengthen further inequalities rather than reduce them.

On the flip side of the coin, 24.02% of the participants reported not observing any biases in the education tools powered by AI, which is high as per the users' understanding. Yet nearly three-quarters of respondents still identified some form of bias signals that AI technologies for learning deserve more scrutiny and fine-tuning. The ramifications of these biases could potentially manifest as inequitable access to educational resources, inequitable support, and inequitable learning outcomes based on socioeconomic status, gender, and race. It is, therefore, important to look into these AI technology biases so that tools advance educational impacts positively rather than sustain already-existing disparities.

4.6 Teacher Satisfaction with AI Integration and Recommendation of AI Tools in Education

Question	Response	Number of Responses	Percentage
Teacher Satisfaction	Very dissatisfied	70	23.33%
	Dissatisfied	68	22.67%
	Very satisfied	60	20.0%
	Satisfied	55	18.33%
	Neutral	47	15.67%
Recommendation	Unsure	106	35.33%
	Yes	97	32.33%
	No	97	32.33%

The table reveals a significant division in teacher satisfaction with AI integration in education, with nearly half of the respondents expressing dissatisfaction. Specifically, 23.33% of teachers are "Very dissatisfied," and 22.67% are "Dissatisfied," indicating notable concerns about how AI tools are being implemented. On the positive side, 20.0% of teachers are "Very satisfied," and 18.33% are "Satisfied," showing that nearly 40% of respondents appreciate AI's benefits to their educational practices. The 15.67% who feel "Neutral" suggest a group that may have mixed or limited experiences with AI. Opinions are equally divided when recommending the continued or increased use of AI tools in education. 35.33% of respondents are "Unsure," reflecting uncertainty about AI's future role in education. Meanwhile, 32.33% support further AI integration, while another 32.33% oppose it, highlighting the polarizing nature of AI in educational settings. This mixed response emphasizes the need to address the concerns of dissatisfied or uncertain teachers, possibly through improved training, more effective AI tools, or better communication about AI's benefits.

The data underscores the need for a more tailored approach to AI integration in education, taking into account teachers' diverse perspectives and experiences. While there is a notable group of educators who are satisfied and supportive of AI tools, there is also a significant portion who are dissatisfied or unsure about their use. Addressing the concerns of these groups, perhaps through better training, more effective AI tools, or clearer communication about the benefits, could help to improve satisfaction and increase support for AI in education

4.7 Open Ended Questions

For this part, the researchers have chosen five responses that have significantly addressed the questions.

Question One: How do you believe AI-powered tools can be further enhanced to better support personalized learning experiences for students?

N	Responses
1	AI tools could use more advanced data analytics to better understand student learning patterns, and provide more targeted interventions.
2	Integrating AI with adaptive learning platforms that consider emotional and social factors could greatly enhance personalized learning.
3	AI-powered tools need to include more diverse data sets to ensure that personalized learning is truly inclusive and reflective of all students' needs.
4	Incorporating student feedback directly into AI algorithms could help refine how these tools personalize learning experiences.
5	AI tools should offer more customization options for teachers, allowing them to adjust the AI's suggestions based on their unique classroom context.

The responses show that although AI-powered tools already play a big role in personalizing learning, several areas must be optimized. Informed responders say more advanced data analytics will give way to targeted interventions tailored to unique learning patterns for learners. That is, while AI tools are powerful in personalization, they really can't utilize vast reams of data that might have been used to further guarantee any particular intervention. This finds correspondence in the suggestion that emotional and social factors should be incorporated within an AI system, which would work on the very tenet that education is holistic and not only concerned with cognitive development. Such improvements might allow an AI tool to become more empathetic to the many dimensions of the needs of students.

Again, the call for diverse data sets underscores that inclusivity is key to AI-powered education. Here, personalized learning must work for all students from any background, while broad data sets could reduce biases. Implementing student feedback into AI algorithms implicates a participatory approach in AI development, guaranteeing the evolution of the tools by real user experiences. As a final note, giving teachers more freedom regarding AI suggestions would equalize using AI with human insight, which would generate more contextually relevant educational strategies. These suggestions, taken as a whole, also reflect the vision of AI-driven education: focused on tools that are both technologically sophisticated and inclusive, responsive, and adaptable to various educational contexts.

Question Two: *What challenges have you faced when integrating AI tools into your teaching practices, and how have you addressed them?*

N	Responses
1	One of the biggest challenges is the steep learning curve for both teachers and students; I addressed this by implementing gradual training sessions.
2	Integrating AI into the existing curriculum without it feeling like an add-on was difficult, so I started by aligning AI tools with specific learning objectives.
3	Technical issues, such as unreliable internet or software glitches, have been a major barrier; I now always have a backup plan to ensure smooth lessons.
4	There was initial resistance from students who were unfamiliar with AI tools; I overcame this by demonstrating the benefits of AI through real-life examples.

5	Balancing AI tool usage with traditional teaching methods was challenging, so I've focused on blending AI seamlessly with conventional techniques to enrich learning.

The responses highlight several practical challenges teachers face when integrating AI tools into their classrooms. As some respondents indicated, this has a steep learning curve, so introducing AI tools requires large amounts of time and effort invested in mastering the tools themselves and changing pedagogies to incorporate them effectively. Gradual training sessions for both teachers and students using AI are pragmatic and can be more widely adopted to facilitate smoother integration.

Another of the other major difficulties identified relates to the real challenge of aligning AI tools to the existing curricula. When this happens, the meaning made by the respondents stresses the importance of integrating AI tools in a way that complements and improves, not disrupts, the curriculum. One major challenge, however, is that these AI tools will have to be aligned with learning goals so that such technologies would be an aid rather than a burden. Other challenges relate to technical issues about the reliability of the Internet and glitches in software. The strategy of having backup plans suggests a proactive approach toward ensuring continuity of education when technology fails. Overcoming student resistance by showing them the practical benefits of the AI tools proves that buy-in on the part of the students is necessary. At the very least, effectively balancing artificial intelligence with pedagogy shows that a blended approach is needed, one that can take advantage of both. Therefore, these responses emphasize that forethought flexibility, and flexibility are required in plenty if AI is to be successfully integrated into educational practice.

Question Three: *In what ways do you think AI can contribute to reducing educational inequalities across different socioeconomic backgrounds?*

N	Responses
1	AI can offer personalized learning resources to students who may not have access to private tutoring, helping level the playing field.
2	By providing free or low-cost AI-powered educational tools, students from low-income families can access quality education that would otherwise be unavailable to them.
3	AI can help identify students who are falling behind, and provide early interventions, which is particularly beneficial in underfunded schools with fewer resources.
4	AI could automate administrative tasks, allowing teachers in underserved areas to focus more on direct instruction and student support.
5	Through AI, educational content can be translated and localized, ensuring that students in non-English speaking regions have access to the same quality of education as their peers.

These responses underpin AI's potential to drive a sea change in access to education, especially at the socioeconomic level of educational inequality. One of the most prominent themes was how AI could give students individualized learning experiences where they might otherwise not have access to private tutoring or other ways in which children from better socioeconomic backgrounds could augment their learning. It may level the playing field significantly and offer every student, regardless of their economic status, the opportunity to succeed in their academic efforts. More importantly, the suggestion that AI

offers zero- or low-cost educational tools underlines the accessibility factor of AI solutions, especially for those who hail from families with low economic means to afford quality education.

Another important contribution of AI lies in identifying and supporting students who might fall behind. In poorly funded schools, where resources are minimal, AI can be a great tool for timely intervention and targeted support to those in need. According to the responses, AI's automation of administrative tasks reduces disparities in areas where teachers' time is now available for more instruction and student support. Another key potential of AI in helping bridge this gap is the translation and localization of educational content that helps bridge the gap, thereby allowing regions that do not speak English to catch up and provide inclusivity in access to quality education worldwide. Taken together, these responses have shown myriad ways in which AI can help bridge the gap between students of different socioeconomic backgrounds to an educationally fair playing field.

Question Four: *How do you see the role of teachers evolving as AI becomes more integrated into the classroom?*

N	Responses
1	Teachers will become more like facilitators, guiding students in how to use AI tools effectively rather than just delivering content.
2	With AI handling routine tasks like grading, teachers will have more time to focus on creative and critical thinking activities.
3	AI will enable teachers to provide more individualized attention, as they can use AI-generated data to better understand and support each student's needs.
4	Teachers will need to become lifelong learners, constantly updating their skills to keep up with advancements in AI technology.
5	The teacher's role will shift from being the primary source of knowledge to becoming a coach or mentor who helps students navigate information and develop skills.

One potential way in which AI will transform the role of the teacher is away from a more traditionalist paradigm of the delivery of content to more dynamic and facilitative roles. One of the major themes across the response was emphasizing the teacher as a facilitator who would help students use AI tools effectively. This would indicate that teachers in the future will be able to work on a much higher order of thinking to foster creativity and critical thinking in their students. At the same time, AI takes over the rest of the content delivery and routine grading tasks. In that sense, the students will have a much more enriched experience of education, not just being the passive receivers of information but actively participating in this whole learning process.

It will also bring about another major change, restoring power in the hands of the teacher to give personal attention to the students. The AI can generate details about the students' advancement, which enables a teacher to support them in meeting the needs of a single learner. However, this evolution in the teacher's role also comes with the challenge of continuous professional development. With AI technology progressing quickly and continually being improved, teachers must also be lifelong learners who upgrade their skills from time to time to remain relevant with evolving tools and methodologies. The shift from being a primary source of knowledge to acting as a coach or mentor finally represents a bigger shift in general education, where it has become a teacher's role to help the student become skillful in navigating and making critical judgments about all the information that is available to them, rather than just dispensing knowledge. This may result in a more collaborative, student-centered approach in education, with teachers and AI working in tandem to support student growth.

Question Five: *What ethical considerations should be prioritized when developing and deploying AI tools in educational settings?*

N	Responses
1	Ensuring that AI tools do not perpetuate existing biases should be a top priority, as these could exacerbate educational inequalities.
2	Protecting student data and privacy is critical, especially given the sensitive nature of the information that AI tools may collect and analyze.
3	Transparency in how AI algorithms make decisions is essential to build trust among educators, students, and parents.
4	AI tools should be designed to complement, not replace, the role of teachers, preserving the human element in education.
5	It's important to involve a diverse group of stakeholders, including teachers, students, and parents, in the development process to ensure the tools meet ethical standards and practical needs.

The answers show several important ethical concerns that must be considered for responsible development and deployment of AI tools in educational settings. Among these would be bias harbored within AI tools, which can perpetuate rather than alleviate educational inequalities. There is a risk that AI systems may inherit and compound biases from historical data that result in unfair outcomes for groups of students. The issue thus calls on the developers of such systems to identify and reduce biases in AI algorithms so that such tools promote equality rather than perpetuate inequality in education.

Another important dimension of ethics is protecting student data and privacy. AI tools tend to gather and analyze sensitive information about a student, including his/her academic performance, learning behaviors, and even personal data. This information has to be securely stored and used to enhance and retain the trust of students, parents, and the education community as a whole. Such transparency in AI decision-making processes is also important; stakeholders must understand how AI algorithms arrive at their conclusions to build trust and effectively function with such tools. Without transparency, trust in AI systems may be eroded, eventually leading to resistant behavior or misuse. Moreover, the tools, according to the respondents, have to complement—not substitute for—the role of the teacher. This need to preserve the humans in education will help ensure that AI will improve and not worsen the quality of teaching and learning. Last, but not least, it is also vital to include a multidisciplinary set of stakeholders within the development process for these AI tools to be ethically correct, practical, and responsive to the needs of the educational community. These considerations all point toward an ethical landscape of high complexity, which must be successfully navigated for AI to have a place in education.

4.8 Discussion

The responses to the closed-ended questions reflect both positive and negative attitudes that teachers hold toward integrating AI in education. Indeed, as shown by the data, there is a great divide in terms of satisfaction, where nearly half of the respondents are not satisfied with the way AI tools are being integrated into their educational practice. Specifically, 23.33% of teachers were "Very dissatisfied," while 22.67% were "Dissatisfied," which may convey concern about the effectiveness of AI tools and their use. This could result from the difficulty involved in using AI technologies, from an insufficient amount of training provided to the educators, or through the poor adjustment of AI tools for a given set of educational targets.

On the other hand, almost 40% of those who responded to the survey were satisfied; 20.0% said they were "Very satisfied," and 18.33% were "Satisfied." Teachers can probably see the value of AI

in complementing practices, especially for tasks like automating some of their grading, personalizing learning, and handling administrative tasks. On the other hand, positive responses indicate that if the integration and alignment of AI tools are proper in terms of educational objectives, such interventions can immensely gain the teaching outcome. At the same time, this dichotomy of satisfaction levels underscores the requirement for a much more sophisticated way of AI integration—one that is sensitive to educators' diverse experiences and needs.

Written responses shed more light on the challenges and potential benefits of AI in education. Many respondents to the survey echoed that there is a steep learning curve in adopting AI tools, suggesting that early complexity and unfamiliarity with this range of technologies may well be a barrier to effective use. At the same time, those who did manage to negotiate this learning curve said that it would enhance the personalization of learning experiences and increase efficiencies in their teaching practices. It suggests that by following good practice in training and support, educators can overcome initial difficulties and exploit the full potential of AI technologies.

Second, open-ended responses enlightened concerns regarding ethical issues with AI in education. The respondents placed emphasis on the need to deal with biases in AI algorithms, protect student data privacy, and ensure transparency in AI-based decision-making processes. Of essence are the concerns herein in ensuring that, if not checked, such deployment shall perpetuate inequalities in the education sector, especially for those from marginalized backgrounds. The value placed on transparency and stakeholder involvement mirrors a broader call for accountability and inclusivity in developing and deploying AI tools within learning environments.

The discussion also underlines to a great degree the huge uncertainty concerning the future role of AI in education reflected in 35.33% of the respondents who were "Unsure" about recommending continued use of AI tools. This may be the case due to mixed experiences educator reports, where some find AI beneficial, and others incur considerable challenges. The split opinions on whether to recommend AI (with 32.33% saying "Yes" and 32.33% saying "No") further illustrate that continuous evaluation and fine-tuning are needed for the AI tools if they are to answer the diversified needs of educators and students alike.

Finally, the responses to the section on teachers' roles in an AI-integrated classroom foreshadow an evolving dynamic in which educators transform from traditional content delivery into more facilitative and mentoring roles. As AI assumes routine tasks, it frees the teacher to focus on higher-order thinking skills, creativity, and other individualized support for students. Such change does, however, also mandate continuous professional development on the part of educators to keep up with technological advancement and learn how to integrate AI effectively into their teaching strategies.

5. Conclusions

The survey results and open-ended responses pointed out the potential but also challenges for AI integration in education. While AI tools bring enormous efficiency, personalization, and support to educators, potential ethical issues, careful training, and educational goals need to be considered while implementing these in the classroom. Mixed satisfaction levels and uncertain views on the future of AI in education underline the relevance of a balanced approach to the benefits and challenges these technologies create.

Therefore, we must design and deploy AI tools that are inclusive, transparent, and responsive to the needs and interests of all stakeholders within the educational community. AI can revolutionize teaching and learning, making the education system more accessible, equitable, and effective for diverse students. Of course, it will continue demanding collaboration, creativity, and dedication to addressing emergent ethical and practical challenges as AI integrates into educational environments.

References

Abuhmaid, A. (2013). ICT for Educational Excellence in Jordan: An Elusive Objective. In *Information Systems Applications in the Arab Education Sector* (pp. 119-135): IGI Global.

Aijun, Y. (2024). On the Influence of Artificial Intelligence on Foreign Language Learning and Suggested Learning Strategies. *4*(2), 107-120.

Al-Zaidiyeen, N. J., Mei, L. L., & Fook, F. S. (2010). Teachers' Attitudes and Levels of Technology Use in Classrooms: The Case of Jordan Schools. International Education Studies, 3(2), 211-218.

Chen, Z., Hirsh-Pasek, K., Golinkoff, R. M., & Evers, L. (2020). The AI Revolution in Education: AI-powered learning experiences in the classroom. Educational Technology Research and Development, 68(1), 139-162.

Kim, J. (2024). Leading teachers' perspective on teacher-AI collaboration in education. *29*(7), 8693-8724.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence Unleashed: An argument for AI in education. London: Pearson.

Ng, D. F. S., Wong, C. P., & Liu, S. (2020). Future-ready learners: Learning, lifework, living, and habits of practices.

Roll, I., & Wylie, R. (2016). Evolution and revolution in artificial intelligence in education. International Journal of Artificial Intelligence in Education, 26(2), 582-599.

Saymeh, A. A. F., Ariqat, H., & Aqel, S. (2014). Higher education and scientific research of third world countries need professional support: Case of Jordan. *3*(4), 245-255.

Sharma, S., & Kumar, N. (2024). NAVIGATING THE ETHICAL LANDSCAPE OF AI-BASED RESOURCES IN EDUCATION: IMPLICATIONS FOR LEARNING, PROPER USAGE, AND COURSE DESIGN ENHANCEMENT. *12*(2), 92.

UNESCO. (2020). Jordan: ICT in Education. Retrieved from https://www.unesco.org/en

UNICEF. (2021). Education during COVID-19 and Beyond The Impact on Jordan. Available at: https://inee.org/sites/default/files/resources/Understanding%20the%20Impact%20of%20Covid-19%20on%20Education%20in%20Jordan%20Final%20Soft%20Copy%20-%20with%20Annex.pdf

van der Vlies, R. (2020). Digital strategies in education across OECD countries: Exploring education policies on digital technologies.

Wang, S., Wang, F., Zhu, Z., Wang, J., Tran, T., & Du, Z. (2024). Artificial intelligence in education: A systematic literature review. *252*, 124167.

Yang, T.-C. (2023). Application of artificial intelligence techniques in university courses' analysis and assessment of digital competence. *26*(1), 232-243.