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# The impact of AI-Based educational counseling on teaching effectiveness

## El impacto del asesoramiento educativo basado en IA en la eficacia de la enseñanza

**Abdulhameed Alenezi**

PhD in Educational Technology. Professor, Jouf University, Jouf, Saudi Arabia.

<https://orcid.org/0000-0003-3801-5294>  
[ar.alenezi@ju.edu.sa](mailto:ar.alenezi@ju.edu.sa)**Abdullah Alenezi**

Doctor of Philosophy in Educational Research. Professor, Northern Border University, Arar, Saudi Arabia.

<https://orcid.org/0000-0003-0233-6838>  
[Abdullah.AIAsmar@nbu.edu.sa](mailto:Abdullah.AIAsmar@nbu.edu.sa)

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### Abstract

This paper aims to review the efficiency of Artificial Intelligence educational counseling systems regarding teaching practices and the role of these technologies in changing educational interactions and personalization. AI has improved the efficiency of several domains of education in terms of how learning and teaching interact with students. To comprehensively evaluate the contribution of AI systems in the future, the study employs quantitative and qualitative research approaches. This strategy helps to make a considerable evaluation of AI's influence on teaching practices by not only the number of changes but also by the secondary qualitative data of witnesses. According to the presented research, introducing and using AI in education has numerous benefits, including delivering individualized feedback and handling educational resources more efficiently than traditional approaches. Nevertheless, it also outlines significant risks, such as ethical concerns regarding data protection, data bias, and learning technologies not adequately preparing educators to utilize these tools.

**Keywords:** Artificial intelligence, educational counseling, efficiency, teaching practices, personalization.

### Resumen

Este artículo tiene como objetivo revisar la eficiencia de los sistemas de asesoramiento educativo de Inteligencia Artificial con respecto a las prácticas de enseñanza y el papel de estas tecnologías en el cambio de las interacciones educativas y la personalización. La IA ha mejorado la eficiencia de varios dominios de la educación en términos de cómo el aprendizaje y la enseñanza interactúan con los estudiantes. Para evaluar integralmente la contribución de los sistemas de IA en el futuro, el estudio emplea enfoques de investigación cuantitativos y cualitativos. Esta estrategia ayuda a realizar una evaluación considerable de la influencia de la IA en las prácticas de enseñanza, no solo por el número de cambios, sino también por los datos cualitativos secundarios de los testigos. Según la investigación presentada, la introducción y el uso de la IA en la educación tiene numerosos beneficios, incluyendo la



entrega de retroalimentación individualizada y el manejo de recursos educativos de manera más eficiente que los enfoques tradicionales. Sin embargo, también describe riesgos significativos, como preocupaciones éticas con respecto a la protección de datos, el sesgo de datos y las tecnologías de aprendizaje que no preparan adecuadamente a los educadores para utilizar estas herramientas.

**Palabras clave:** Inteligencia artificial, asesoría educativa, eficiencia, prácticas docentes, personalización.

## Introduction

Artificial Intelligence (AI) is quickly becoming integrated into multiple industries and is a significant factor in reshaping education, as it can increase the efficiency of the teaching process and enhance teachers' performances through innovative technologies and the implementation of professional decision-supporting systems. Once exclusive to human counselors, educational counseling is now complemented or fully migrated to AI systems aimed at effective resource distribution, students' motivational promotion, and teachers' and learners' facilitation. The importance of AI-based educational counseling systems: Hence, there is a need to understand the prospects and consequences of incorporating such technologies in academic institutions.

This study aims to determine the integrative educational uses of AI-enabled counseling systems with an emphasis on teaching efficiency. Hoping for AI as a powerful tool to improve various aspects of education, the importance of appreciating its potential in the educational sphere should be highlighted. This research will analyze potential frameworks for implementing AI-based systems in teaching practices with a focus on customized and immediate feedback and better resource utilization. Thus, apart from identifying the benefits of integrating AI into the educational process, the potential challenges will also be discussed in the research. Some of these challenges may encompass technical problems, Ethical issues, and Teacher training. In highlighting these difficulties, the study aims to give possible intervention approaches towards those challenges. This extensive study will aid educators, policymakers, and institutions to be aware of how AI-based systems can be adopted to boost performance, yet it will also help them know about the challenges or issues arising while implementing AI-based systems. Therefore, detecting AI in education provides a comprehensive perspective of the positive impacts and the measures required to mitigate the negative. The research questions are the impact of these systems on teaching and learning and the associated challenges that contribute to their use.

## Theoretical Framework or Literature Review

This section examines the current state of research on AI-based educational counseling systems and their impact on teaching effectiveness. The literature review is organized around four key themes: (1) the pedagogical impact of AI in educational counseling, (2) ethical considerations in AI implementation, (3) challenges in AI integration, and (4) strategic approaches to optimize AI use in education.

## Pedagogical Impact of AI in Educational Counseling

There is a wide range of ways in which artificial intelligence has changed education, including automated grading to predictive analytics for student success (Alam, 2021; Maurya, 2023). Also within this continuum, AI-based educational counseling systems represent a tremendous leap whereby individualised advice is offered to students based on their academic performance, behavior and socio-emotional indicators. Such systems can detect students who are likely to fall behind, suggest remedial actions, and assist teachers in comprehending dynamics in the classroom better (Garg & Sharma, 2020; Bhutoria, 2022).

AI increases teaching effectiveness through learning analytics by equipping educators with tools to optimize their learning strategies to learners more effectively (Lee et al., 2022). Studies show that AI systems can contribute to differentiated instruction by providing recommendations that are congruent with the learner's learning styles, which would assist teachers in better filling learning gaps (Bilquise & Shaalan, 2022). For example, Chen et al. (2023) discovered that AI platforms can deliver useful information concerning student



learning routes, detect typical errors, and propose specific solutions. These capabilities allow for better teaching because the interventions are targeted to weaknesses and learning is supported throughout the learning process.

Several studies' empirical evidence supports the benefits of AI-integrated counseling systems on student engagement and learning outcomes. Students in a South Korean study said that AI counseling systems increased their engagement and learning effectiveness due to personalized support (Latif et al., 2021). In a similar vein, studies in Indian secondary schools showed that AI-based systems enhanced teacher-student contacts by enabling teachers to gain actionable information related to student behaviors and learning processes (Aristanto et al., 2023). These findings indicate that AI can be a powerful instrument of improved teaching practices and student learning experiences if utilized correctly.

### **Ethical Considerations in AI Implementation**

Although AI has numerous advantages in educational counseling, some serious ethical issues must be considered. The main problem is algorithmic fairness which questions the possibility of race, gender, or the socioeconomic status bias (Dai & Ke, 2022; Tapalova & Zhiyenbayeva, 2022). Proper access and treatment in AI-based educational systems will call for a careful consideration of how they are designed tested and distributed.

The other important ethical issue is the threat of teacher autonomy erosion. Even though AI support may improve teaching potential, excessive reliance on algorithmic suggestions might reduce educators' professional opinion and decision-making power (Guleria & Sood, 2023). There is a risk that educators may rely on what AI recommends without questioning them to the detriment of their professional discretion and creativity in dealing with student needs. Educational institutions therefore need to find a balance between the use of AI capabilities and teacher autonomy.

Privacy and data confidentiality are other ethical issues concerned in AI implementation. The gathering and analyzing of large quantities of information about the students cause questions regarding the consent, security and proper way of using the personal information. As indicated by Ahmad et al. (2022), educational organizations need to define clear guidelines for handling data to ensure that student's privacy rights are protected while using the AI systems productively.

### **Challenges in AI Integration**

Several implementation challenges are faced in the integration of AI based educational counseling systems. Wang et al. (2021) recognised insufficient teacher preparation as one of the main barriers, stating that lack of technical knowledge can make teachers resistant or misuse AI tools. This finding is corroborated by the findings made by Dahri et al. (2024) as they underlined that educators often lack the required skills to be able to use the AI systems in their teaching practice. The comprehensive training programs are therefore, crucial in empowering educators with requisite knowledge and competencies required in AI implementation.

Also, institutional and infrastructural challenges hinder AI acceptance in educational settings. Financial constraints, lack of technical support, and organizational cultures that are resistant to innovation can make the integration process highly slow (Ajlouni et al., 2023). Other concerns include the preservation of valuable human aspects of education including teacher-student relations and the growth of critical thinking where too much dependence on technology is likely to undermine the same.

Another challenge is given by the accuracy and reliability of AI recommendations. Researches have shown that some AI systems give out recommendations that are not congruent with curriculum objectives, or teacher's expectations (Aristanto et al., 2023). This limitation requires continuous human monitoring to ensure that the suggestions created by AI are suitable, realistic and in line with the objectives of education.

According to Kamalov et al. (2023), the educational institutions should develop systems for assessment and improvement of AI systems to improve their accuracy and relevance.

### **Strategic Approaches to Optimize AI Use in Education**

To maximize the benefits of AI-based educational counseling systems while addressing potential challenges, educational institutions should adopt strategic approaches encompassing professional development, ethical guidelines, collaborative decision-making, and continuous improvement.

#### **Professional Development**

Continuous professional learning is important for teachers to be able to use AI systems in their teaching practice. Lee et al. (2022) and Stepanyuk et al. (2022) stressed that teacher training needs to include both technical aspects of AI tools and pedagogical knowledge about how to incorporate these technologies into classroom instruction. Professional development initiatives should emphasize the development of the educators' ability to use AI as a supplement that augments rather than replaces their professional expertise.

Nguyen et al. (2023) also recommended that training programs should focus on the wider implications of AI implementation, including ethical considerations and student learning experience. By gaining a holistic understanding of what AI can and cannot do, educators can make informed decisions about integrating these technologies into their teaching practices.

#### **Ethical Guidelines**

The creation of transparent ethical frameworks is essential to the responsible use of AI in education. Nazaretsky et al. (2022) called for setting guidelines that could cover such issues as algorithmic bias, data privacy, and the proper use of AI-driven recommendations. These guidelines should give specific criteria for evaluating AI systems and protocols for addressing ethical issues that might come up during implementation.

Garg & Sharma (2020) stressed the need for formal monitoring processes in order to ensure that AI systems are used fairly and equitably for a wide range of student populations. Such processes should involve periodic evaluation of AI recommendations and their effects on student outcomes, with special attention to the possible disparities across various demographic groups.

#### **Collaborative Decision-Making**

Engaging stakeholders in AI implementation decisions promotes more responsive and equitable educational technologies. Ahmad et al. (2022) recommended involving educators, students, and other relevant parties in discussions about AI integration to ensure that these systems align with the needs and values of the educational community. This collaborative approach can help identify potential concerns and develop strategies for addressing them before widespread implementation.

By fostering inclusive dialogue about AI use in education, institutions can build trust and support among stakeholders while ensuring that diverse perspectives inform technology decisions. This approach also helps establish a shared understanding of how AI tools should complement rather than replace human expertise in educational settings.

#### **Continuous Improvement**

Regular evaluation and refinement of AI systems are essential for maintaining their relevance and effectiveness in dynamic educational environments. Bilquise & Shaalan (2022) advocated for continuous monitoring of AI performance and updating algorithms based on emerging research and feedback from



users. This iterative approach enables educational institutions to address limitations, enhance capabilities, and adapt to evolving educational needs over time.

Kamalov et al. (2023) further emphasized the importance of staying informed about advancements in AI technology and educational research to ensure that implementation strategies remain current and effective. By fostering a culture of continuous learning and improvement, institutions can maximize the benefits of AI while mitigating potential risks.

### **Future Directions and Implications**

As AI technology continues to evolve, its applications in educational counseling are likely to become more sophisticated and comprehensive. Chou et al. (2023) projected that future AI systems would offer enhanced levels of personalization and support for both students and teachers. These advancements may include more accurate predictive analytics, more nuanced understanding of student learning patterns, and more seamless integration with existing educational practices.

However, the successful integration of AI in education depends on addressing current challenges and maintaining a balanced perspective on technology's role. Rather than viewing AI as a replacement for human educators, it should be conceptualized as a complement to human expertise that enhances teaching capabilities while preserving the essential human elements of education. As noted by Guleria & Sood (2023), educational institutions must cultivate an approach that values both technological innovation and human connection in the learning process.

### **Conclusion**

The literature reveals that AI-based educational counseling systems offer significant potential for enhancing teaching effectiveness through personalized learning support, data-driven insights, and efficient resource allocation. However, realizing these benefits requires careful attention to ethical considerations, implementation challenges, and the preservation of teacher autonomy and human connection in education. By adopting strategic approaches focused on professional development, ethical guidelines, collaborative decision-making, and continuous improvement, educational institutions can harness the power of AI while ensuring that technology serves as a tool for enhancing rather than replacing human expertise in the educational process.

### **Methodology**

This study employs an explanatory sequential mixed-methods design to comprehensively assess the impact of AI-based educational counseling systems on teaching effectiveness. The research was conducted across various schools and higher education institutions in Saudi Arabia during the 2023-2024 academic year, involving teachers, faculty members and students from diverse disciplines.

### **Research Design**

This study employed an explanatory sequential mixed-methods design to comprehensively examine the impact of AI-based educational counseling systems on teaching effectiveness. The quantitative phase was conducted first to establish broad patterns and statistical relationships, followed by a qualitative phase to explore these findings in depth and provide contextual understanding of participants' experiences. This design allowed for integration of data at the interpretation phase, where qualitative findings helped explain and elaborate on quantitative results.

### **Context and Participants**

The study was conducted across five secondary schools and three higher education institution in Saudi

Arabia, during the 2023-2024 academic year. All participating institutions had planned or implemented AI-based educational counseling systems for at least one full academic year. The research focused on STEM subject areas where AI implementation was most prevalent.

### Sampling Methods

A stratified purposive sampling technique was employed to ensure diverse representation across different educational levels, subject areas, and technological proficiency levels. The quantitative sample consisted of 100 teachers including higher education faculties' members (55% secondary, 45% higher education) and 100 students (60% secondary, 40% higher education) who regularly used AI-based educational counseling systems. For the qualitative phase, 10 teachers and 10 students were selected from the quantitative sample using maximum variation sampling to capture diverse perspectives and experiences.

### Instrumentation and Data Collection

Quantitative data were collected through validated questionnaires adapted from the Educational Technology Integration Scale ( $\alpha = 0.89$ ) and the AI Perception in Education Inventory ( $\alpha = 0.92$ ). The instruments underwent pilot testing with 15 participants and expert validation by three educational technology specialists. Semi-structured interview protocols were developed based on preliminary quantitative findings and validated through expert review. Interviews lasted 45-60 minutes and were audio-recorded with participant consent.

### Data Analysis Procedures

Quantitative data were analyzed using SPSS v27, employing descriptive statistics, frequency distributions, and ANOVA to identify significant relationships between variables. For qualitative data, thematic analysis following Braun and Clarke's six-step approach was used, with NVivo 14 software facilitating the coding process. Data integration occurred through a joint display approach, where quantitative results were mapped to qualitative themes to provide a comprehensive understanding of the phenomenon.

### Validity, Reliability, and Bias Control

Several measures were implemented to ensure methodological rigor: (1) instrument validation through pilot testing and expert review; (2) triangulation of data sources and methods; (3) member checking of interview transcripts and preliminary findings; (4) peer debriefing sessions with colleagues not involved in the research; and (5) maintaining an audit trail documenting all methodological decisions. Two independent researchers coded 25% of the qualitative data to establish intercoder reliability (Cohen's  $\kappa = 0.87$ ).

### Ethical Considerations

The study received approval from the Institutional Review Board of Northern Border University. Informed consent was obtained from all participants, with additional parental consent for students under 18 years of age. Confidentiality was maintained through data anonymization, and participants were informed of their right to withdraw at any point without consequences.

### Limitations

Despite methodological rigor, several limitations should be acknowledged: (1) the purposive sampling approach limits generalizability beyond similar educational contexts; (2) self-reporting may introduce social desirability bias, particularly regarding attitudes toward AI technologies; (3) the cross-sectional nature of the study cannot capture long-term impacts of AI implementation; and (4) findings may not be directly applicable to educational settings with significantly different technological infrastructure or cultural contexts.





## Results and Discussion

This section presents and analyzes the findings from both quantitative and qualitative phases of the research, examining the impact of AI-based educational counseling systems on teaching effectiveness. The results reveal significant insights into how these technologies are transforming educational practices, while also highlighting important challenges that need to be addressed for optimal implementation.

### Quantitative Findings

#### The impact of AI-based educational Counseling systems on teaching effectiveness

**Table 1.**

*The impact of artificial intelligence on teaching*

Impact	Number of Teachers	Percentage (%)
Notice a significant improvement in teaching	40	40%
Notice a moderate improvement in teaching	35	35%
Notice no significant change	15	15%
See a negative impact	10	10%
Total	100	100%

The findings presented in Table 1 reveal that a substantial majority (75%) of teachers perceived improvements in their teaching practice through the integration of AI-based educational counseling systems. This positive response aligns with the growing evidence of AI's transformative potential in educational settings as documented by Salas-Pilco & Yang (2022), who found similar patterns of improved instructional quality through AI-enhanced personalization. The 40% of teachers reporting significant improvement particularly noted AI's contribution to personalized learning recommendations and performance analytics that enabled more tailored instructional approaches.

However, a notable minority of teachers reported either no significant change (15%) or negative impacts (10%). These findings echo concerns identified by Selwyn (2019), who cautioned that technological integration in education often produces varied outcomes based on implementation quality, institutional support, and alignment with pedagogical goals. Teachers reporting negative impacts frequently cited concerns about inaccurate recommendations and the potential diminishment of their professional role—issues that require careful consideration as AI systems continue to evolve.

#### Challenges of applying artificial intelligence in educational guidance

**Table 2.**

*Teachers' challenges*

Challenge	Number of Teachers	Percentage (%)
Fear of diminishing the teacher's role	30	30%
Need for additional training	25	25%
Problems with the accuracy of recommendations	20	20%
Lack of technical resources	15	15%
Privacy concerns	10	10%
Total	100	100%

The distribution of challenges illustrated in Table 2 reveals significant concerns about the integration of AI technologies into educational practice. The predominant concern about diminishing the teacher's role (30%) reflects broader tensions in the educational technology literature. Chan and Tsi (2024) similarly

identified professional identity concerns among educators, who feared that AI might eventually supplant rather than supplement human instruction. This anxiety suggests the need for implementation approaches that explicitly position AI as a tool to enhance rather than replace teacher expertise.

The substantial need for additional training (25%) corresponds with findings from Zawacki-Richter et al. (2019), who identified inadequate professional development as a critical barrier to effective AI integration. This challenge intersects with concerns about recommendation accuracy (20%), as teachers without sufficient understanding of AI systems may struggle to effectively interpret, contextualize, and override algorithmic suggestions when necessary.

Infrastructure limitations (15%) and privacy concerns (10%) represent additional barriers that align with the digital equity issues identified by Maurya (2023), who emphasized the importance of addressing technological access gaps to avoid exacerbating educational disparities through AI implementation.

**Table 3.**  
*Students' challenges*

Challenge	Number of Students	Percentage (%)
Lack of confidence in the accuracy of recommendations	55	55%
Difficulty interacting with the system	20	20%
Lack of knowledge of how to use it	15	15%
Privacy concerns	10	10%
Total	100	100%

Student perspectives on AI challenges reveal notable differences from teacher concerns, with a pronounced emphasis on recommendation accuracy (55%). This marked skepticism about AI reliability confirms observations by Yola et al. (2024), who found that students often question AI-generated content that contradicts information provided by human instructors. This lack of confidence represents a significant barrier to adoption that could undermine the potential benefits of AI systems if not addressed through improved algorithms and transparent explanation of AI reasoning.

User experience challenges (20%) and knowledge gaps (15%) further impede effective student engagement with AI systems. These findings align with research by Seo et al. (2021), which demonstrated that non-intuitive interfaces can significantly impact student willingness to engage with educational technologies. Interestingly, privacy concerns were less prominent among students (10%) than might be expected given the extensive data collection involved in personalized AI systems, suggesting the need for greater awareness of data protection issues among learners.

### Improving the use of artificial intelligence in teaching practices

**Table 4.**  
*Ways that may improve the use of artificial intelligence in teaching*

Proposal	Number of Teachers	Percentage (%)
Provide training courses for teachers	45	45%
Improve the accuracy of recommendations	30	30%
Enhance integration with curricula	15	15%
Provide ongoing technical support	10	10%
Total	100	100%

Teachers' recommendations for improving AI implementation demonstrate a clear prioritization of professional development (45%), closely followed by algorithmic enhancement (30%). The strong



emphasis on training aligns with findings from Hazzan-Bishara et al. (2024), who identified teacher preparation as the most significant factor in successful educational technology integration. This suggests that technical solutions alone are insufficient without corresponding investment in human capacity building. The substantial concern with recommendation accuracy (30%) reflects a critical tension in AI educational applications: systems must provide reliable guidance to maintain credibility while acknowledging the inherent complexity and contextual nature of educational processes. This challenge was similarly documented by Kasztelnik (2024), who found that AI algorithms often struggled to fully align with curriculum objectives and pedagogical intentions.

The identified need for better curriculum alignment (15%) and ongoing technical support (10%) further underscores the importance of embedding AI within existing educational structures rather than imposing it as a separate or parallel system. These findings echo the recommendations of Kour et al. (2021), who advocated for collaborative approaches to AI implementation that involve educators in system design and continuous improvement processes.

Synthesis of Quantitative Findings

The quantitative data reveals a complex implementation landscape for AI-based educational counseling systems. While a majority of educators perceive positive impacts, significant challenges persist related to professional roles, technical capacity, algorithmic accuracy, and system integration. These findings align with the broader literature on educational technology adoption, which consistently identifies the need for balanced approaches that address both technical and human dimensions of innovation.

A particularly noteworthy pattern in the data is the apparent disconnect between students' and teachers' perceptions of AI systems. Teachers demonstrate greater concern about professional role displacement, while students focus more intensely on the practical reliability of AI recommendations. This divergence suggests the need for implementation strategies that address the distinct needs and concerns of different stakeholder groups.

Qualitative Findings

The impact of AI-based educational guidance systems on teaching effectiveness

Table 5.  
Teacher interviews

Emergед themes	Number of teachers	Quote
Improved planning and teaching	6	"I have a clearer view of students' levels, as the system suggests study plans tailored to each student's needs, which has made teaching more effective."
Increased student engagement	4	"Students are more engaged in lessons, especially when they receive personalized recommendations that help them understand the material at their level."
Reduced administrative burden	3	"I used to spend long hours grading tests, but now I can invest that time in delivering more interactive teaching experiences."



**Table 6.**  
*Student interviews*

Emergед themes	Number of Students	Quote
Enhancing personal understanding	7	"When I don't understand a particular lesson, the AI provides me with a simplified explanation in different ways, which makes the subject much easier."
Motivation to Learn	5	"I like using educational apps because they make studying feel like a fun game, which motivates me to study for longer periods."
Overreliance	3	"When I have homework, I sometimes resort to AI to solve it quickly instead of trying to solve it myself, and this makes me less diligent."

The qualitative data provides rich contextual understanding of how AI systems influence teaching practices and learning experiences. Teachers' narratives emphasize AI's facilitative role in instructional planning, with six educators specifically highlighting the value of data-driven insights for personalizing instruction. This finding aligns with research by Rizvi (2023), who documented how AI-enhanced analytics can significantly improve teachers' ability to respond to diverse learning needs through more targeted interventions.

The theme of increased student engagement (reported by four teachers) corresponds with findings from Huang et al. (2021), who found that personalized learning experiences generated by AI systems often produce greater student interest and participation. This engagement effect appears to operate through mechanisms of appropriate challenge and cognitive scaffolding, as AI systems can match content difficulty to individual readiness levels more precisely than standardized approaches.

Teachers' appreciation of reduced administrative burden reflects the potential of AI to address a persistent challenge in education: balancing instructional quality with workload manageability. By automating routine assessment tasks, AI systems allow teachers to redirect time toward higher-value pedagogical activities—a benefit documented by Bahroun et al. (2023) in their analysis of AI effects on teacher workload distribution.

Student perspectives reveal complementary themes, with a majority (7) valuing AI's role in providing alternative explanations that enhance comprehension. This finding supports the concept of AI as a "cognitive scaffold" that can adapt explanatory approaches to individual learning preferences. The gamification elements noted by five students align with research by Joshi et al. (2021) on motivational aspects of educational technology, suggesting that AI systems can harness engagement mechanisms from game design to sustain learning effort.

However, the theme of overreliance identified by three students raises an important concern about potential negative impacts on independent learning skills. This tension between helpful support and dependency echoes Selwyn's (2019) cautionary analysis of educational technology's dual potential to both enhance and undermine student agency. As one student noted, the convenience of AI assistance sometimes displaces the productive struggle that builds deeper understanding and self-reliance—a consideration that must inform implementation approaches.

## Challenges of applying artificial intelligence in educational guidance

**Table 7.**

*Results of interviews with teachers*

Emergед themes	Number of teachers	Quote
Inaccuracy in recommendations (teachers)	5	"Sometimes the system suggests learning plans that don't match the students' actual level, which makes me rely on it with caution."
Need for additional training	4	"Technology is great, but I find it difficult to use it to its full potential. We need dedicated workshops to learn how to apply it in teaching."
Concern about performance evaluation	3	"I fear that some may think that AI can replace us as teachers, when in fact it should be a supportive tool, not a substitute."

**Table 8.**

*Student Interviews*

Emergед themes	Number of students	Quote
Distrust of AI	6	"Sometimes I get a completely different answer than what the teacher explains in class, which makes me question the validity of the information."
Lack of access to technology	4	"Not all students have tablets or fast internet, which makes some unable to benefit from smart tools in the same way we do."
Boredom from robotic systems	3	"When I use AI for a long time, I feel like I'm learning from a soulless robot. I miss the interactive style of teachers."

The qualitative analysis of the implementation challenges identifies subtle concerns that build on the quantitative findings. The teachers' reports of recommendation inaccuracy (5 participants) can be seen to identify the underlying limitation of the existing AI systems: the difference between algorithmic predictions and the intricate reality of student learning requirements. This challenge is congruent with findings of Slimi (2021), who reported that AI recommendations did not take into consideration key contextual factors which seasoned educators were aware of. The precise nature of these inaccuracies usually entails a gap between what is anticipated to be the capabilities of the students and actual preparedness for performance—a gap that calls for teacher intervention and correction.

The stated need by teachers for more training (4 participants) provides a glimpse of what type of professional development is necessary. While general technology orientation was not discussed, participants specifically mentioned the need for "dedicated workshops" for pedagogical application, a finding in line with Salas-Pilco & Yang (2022), who found that effective AI integration was not possible without development approaches that place technology within teachers' instructional practice rather than as a separate technical skill.

The issues of performance evaluation and professional identity (3 teachers) point to the psychological dimension of the implementation of AI. Apart from practical issues, such systems bring about questions regarding how teaching effectiveness will be defined and measured in technology-enhanced settings. This anxiety captures a broader set of professional concerns, as noted by Guleria & Sood (2023) on the issue of teacher autonomy amidst growing algorithmic influence on educational decision making.

Student opinions regarding challenges identify significant implementation barriers, with distrust of AI (6 participants) being the foremost issue. Such skepticism is often caused by contradictions between AI-

provided information and teacher instruction, leading to cognitive dissonance among the learners. The quote “Sometimes I get a completely different answer than what the teacher explains in class” serves as a good example of this conflict which Maghsudi et al. (2021) described as a major obstacle to the acceptance of AI educational tools by students.

The ethical dimension of AI implementation, which goes beyond technical issues, is highlighted by the concern expressed by four students regarding the digital divide. As Limna et al. (2022) state, unequal access to technology may worsen pre-existing inequalities in education if digital tools become a key part of the learning process. This discovery highlights the need for inclusive implementation strategies that promote equitable access to AI resources.

The topic “boredom from robotic systems” (3 students) describes an affective limitation of current AI systems, which is less discussed in the literature on implementation (earlier, this issue was discussed in the literature on design). With all its increasing capacities, AI interfaces still are devoid of the emotional intelligence and interpersonal warmth of effective human teaching – qualities that Algahtani (2024) identified as especially influencing student involvement with educational technologies. This finding implies that effective implementation of AI must supplement but not replace human interaction in learning environments.

### How to improve the use of artificial intelligence in teaching

**Table 9.**

*Teachers interview results*

Emergед themes	Number of teachers	Quote
Provide specialized training for teachers	6	"If we could get hands-on training on AI tools, we could greatly improve the learning experience for students."
Improve the accuracy of educational recommendations	4	"Sometimes, AI systems provide general recommendations that don't suit all students. We need to improve these systems to provide more personalized content."
Integrate AI in a complementary way	3	"AI should be an assistant to the teacher, not a replacement. Technology cannot replace human interaction between teacher and student."

**Table 10.**

*Students interview*

Emergед themes	Number of students	Quote
Developing the user experience	5	"Some smart tools are too complex. If they were simplified, it would be more beneficial for us to use them."
Making AI accessible to everyone	4	"Not all students have the same access to technology. There must be support to ensure equality in education."
Balancing AI and human interaction	3	"AI can be useful, but nothing replaces the presence of a teacher in the classroom and direct interaction with them."

Teachers' recommendations for improvement focus on practical suggestions for improving AI integration. The main recommendation for professional training (6 participants) is more than a general introduction to technology and it is about the utilization of AI tools in the pedagogical setting. This particular focus on “hands-on training” corresponds with Hazzan-Bishara et al.'s (2024) finding that experiential professional development is more effective in integrating technology than theoretical training alone. The quote “improve the learning experience for students” further shows that teachers conceptualize AI training as being

pedagogically driven, rather than technologically driven.

The recommendation to enhance recommendation accuracy (4 teachers) reveals various algorithmic limitations that are of concern to practitioners. The fact that the AI systems “offer general recommendations that do not fit all students” points to the conflict between algorithmic standardization and contextualized nature of effective teaching. This critique chimes with Kasztelnik’s (2024) analysis of the gap between algorithmic patterns and pedagogical nuance in current AI education.

The theme of complementary integration (3 teachers) represents a subtle insight into AI’s correct use as a learning aid. Instead of framing technology and human instruction as antagonistic methods, these teachers imagine a complementary dynamic where the AI complements rather than replaces the expertise of the teacher. This view corresponds to the notion of “augmented teaching” (Guleria & Sood, 2023), where the distinct contributions of human and artificial intelligence to the educational process are highlighted.

Student recommendations show different priorities, while improvement of user experience (5 participants) is the main concern. The fact that “some smart tools are too complex” points to usability as a major barrier to effective use of AI systems. This finding corroborates the research of Seo et al. (2021), who showed that the design of interfaces plays a decisive role in influencing student readiness to use educational technologies.

The theme of equitable access (4 students) shows the understanding of digital divide problems within learners. This concern overflows the individual experience to acknowledge systemic inequities as seen in the observation that “there must be support to ensure equality in education”. This line of thought concurs with the ethics of educational technology proposed by Maurya (2023) and Funa & Gabay (2025) with access equity as a core implementation principle.

The interest in balanced human-AI interaction (3 students) indicates that even digital natives want human connections in educational experiences. The claim that “nothing replaces the presence of a teacher in the classroom” undermines the implementation approaches based solely on efficiency and agrees with the finding by Bahroun et al. (2023) that effective educational technologies supplement human interaction in the learning environment instead of replacing it.

### **Integrated Discussion and Implications**

The combination of the quantitative and qualitative findings exposes several crucial patterns with profound implications for the implementation of AI-based educational counseling systems. First of all, while AI technologies provide great advantages for teaching effectiveness through personalization, analytics, and administrative efficiency, all these advantages depend on proper implementation conditions such as sufficient training, technical support, and careful integration with the existing pedagogical practices.

Second, the findings identify key differences of stakeholders in perception and priority when it comes to AI systems. Teachers are more concerned about professional role implications and implementation support, in contrast to students who concentrate more on usability, reliability, and sustaining meaningful human connection in learning experience. The varied views indicated above point to the requirement of implementation strategies that would accommodate the varied concerns of various stakeholders in the education system.

Third, the research determines key ethical aspects of AI implementation outside of technical functionality. Data privacy, algorithmic bias, digital equity, and professional autonomy become key concerns that must guide the responsible integration of AI in the educational context. According to Dai & Ke (2022) and Funa & Gabay (2025), ethical frameworks and technical capabilities should be designed hand in hand so that AI can support rather than undermine the values of education.



Fourth, both quantitative and qualitative findings emphasize the need for human-AI collaboration as opposed to technological replacement. The best practice models of implementation frame AI as complementing rather than replacing the teacher's expertise-a supplementary tool that augments human abilities without sacrificing the core relational aspects of effective education. This finding also concurs with Guleria & Sood's (2023) conceptualization of "augmented teaching" as a joint venture between human discretion and algorithmic ability.

The implications of the study's findings are profound for educational practice and policy. In the institutional sphere, successful AI implementation entails significant investment in professional development, technical infrastructure, and continued support systems. The high percentage (45%) of teachers identifying training needs highlights the role of capacity building as a pre-requisite for successful technology integration.

At the pedagogical level, the evidence points to the necessity of reflective implementation strategies which allow teachers to exercise agency in educational decision-making. The concern about a reduction of professional roles (30% of teachers) suggests that the implementation models should specifically maintain room for teacher judgment and creativity in AI-aided learning environments.

At the policy level, the noted challenges of technical access and data privacy indicate the need for regulatory frameworks that guarantee equitable implementation and prevent the leakage of student information. The concerns over the digital divide brought up by the students point to the danger that AI implementation might not help but rather worsen the educational inequalities if access policies are not regulated.

Finally, the algorithmic limitations in the findings of the study – particularly the issues around the accuracy of recommendations – have implications for the technical development of educational AI systems. The high number of both teachers (20%) and students (55%) who are concerned about the quality of recommendations indicates that existing systems have not yet managed to generate adequate alignment with pedagogical needs and contexts. This finding points to the necessity for collaborative development approaches that integrate the expertise of educators into the design process of AI.

In conclusion, the combination of quantitative and qualitative findings shows that AI-based educational counseling systems have great potential for improving the effectiveness of teaching, but this potential needs to be developed with regard to human, ethical, and institutional aspects of implementation as well as technical functionality. Balancing technological improvements with preservation of the core human aspect of effective education is a difficult task that requires the collaboration of educators, technologists, and policymakers for its successful implementation.

## Conclusions

This explanatory sequential mixed-methods study investigated the effects of AI-based educational counseling systems on teaching effectiveness in educational institutions in Saudi Arabia. Using quantitative surveys of 100 teachers and 100 students and in-depth interviews of 10 members of each group, the research found that there are intricate patterns of benefits and challenges for utilization of AI in educational contexts.

The results show that AI-based educational counseling systems have great potential for improving teaching effectiveness through three main mechanisms: Personalized learning support according to the needs of individual students, (2) data-driven insights that guide instructional decision-making and (3) automation of routine administrative procedures that enable teachers to devote more attention to high-value pedagogical activities. Quantitatively 75% of teachers reported improvement in their teaching practice with the integration of AI, qualitatively there was a specific report of benefits in instructional planning, student engagement and workload management.

Nonetheless, the research also revealed significant implementation challenges that need to be overcome





to tap into the educational potential of AI. These are concerns about professional role displacement (reported by 30% of teachers), inadequate training and technical support (25% of teachers), algorithmic limitations in recommendation accuracy (20% of teachers and 55% of students) and ethical issues on privacy of data and equitable access. The qualitative findings further uncovered significant affective aspects of AI implementation, with some students expressing their reduced engagement with the “robotic” systems, as opposed to human instruction.

The study’s results place AI implementation in a wider discussion of technology’s role in educational change. Instead of presenting AI as a panacea or threat to quality education, the findings imply the necessity of a more complex approach with the use of technological capabilities, but with the preservation of the most important human aspects of the teaching and learning process. This balanced view is consistent with the idea of “augmented teaching” by Guleria & Sood (2023), which stresses the complementary nature of human expertise and algorithmic capabilities in the educational context.

### Limitations

Some limitations of the current study should be recognized. The purposive sampling approach reduces generalization outside similar educational contexts, especially to areas with markedly different technological infrastructure or attitudes towards AI. The cross-sectional design captures perceptions at a given point in AI’s fast-paced evolution rather than following change over time. Also, self-reported perceptions may not correspond to objective measures of teaching effectiveness – a relevant point for future research.

Based on the integrated findings, we propose four key recommendations for optimizing AI implementation in educational settings:

1. **Invest in Comprehensive Professional Development:** Educational institutions should prioritize hands-on, pedagogically-focused training that equips teachers to integrate AI tools effectively into their instructional practice. This training should address both technical competencies and critical evaluation of AI recommendations, positioning teachers as informed users rather than passive recipients of algorithmic guidance.
2. **Establish Ethical Guidelines and Governance Frameworks:** Clear standards for data privacy, algorithmic transparency, and equitable implementation should guide AI adoption in educational settings. These frameworks should be developed collaboratively with input from diverse stakeholders, including educators, students, technical experts, and privacy advocates.
3. **Foster Collaborative Human-AI Systems:** Implementation approaches should explicitly position AI as augmenting rather than replacing teacher expertise, with clear delineation of appropriate roles for human judgment and algorithmic analysis in educational decision-making. This collaborative model preserves teacher autonomy while leveraging AI capabilities for enhanced instructional effectiveness.
4. **Ensure Equitable Access and Support:** Educational institutions must address digital divide concerns through infrastructure investment, device access programs, and technical support systems that ensure all students can benefit from AI-enhanced learning opportunities regardless of socioeconomic status or geographic location.

### Future Research

Further research is needed to expand this inquiry in various directions. Longitudinal studies that follow the evolution of AI implementation over long periods would shed more light on sustainability and long-term impact. Comparative analysis in various cultural and institutional settings may identify contextual factors which affect implementation effectiveness. Furthermore, studies focusing on specific mechanisms through which AI systems affect teaching practices and student outcomes would aid in refining implementation strategies for optimal educational gains.

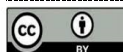
In conclusion, AI-based educational counseling systems are a powerful but a two-edged sword for improving the effectiveness of teaching. Their successful integration does not hinge on technological sophistication alone, but rather on thoughtful consideration of human, ethical, and institutional aspects of educational practice. Through balanced implementation strategies that marry technological innovation with preservation of important human connections, institutions of learning can leverage AI's potential while upholding relational underpinnings of effective teaching and learning.

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