AMERICAN UNIVERSITY OF BEIRUT

READINESS AND PERCEPTIONS OF HIGH SCHOOL TEACHERS TOWARDS AI IN EDUCATION: A CASE STUDY IN JEDDAH PRIVATE SCHOOLS

by
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The study followed ethical guidelines for educational research, adhering to principles such as the use of survey with informed consent, voluntary participation, and confidentiality of participants' information. Additionally, the research aimed to enhance the educational process and was committed to accurately presenting all findings.

ABSTRACT
OF THE RESEARCH PROJECT OF

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The integration of artificial intelligence (AI) in any field is gaining traction, including the education sector (Celik, 2022). However, the potential of AI in education has not been fully realized yet (Luckin et al., 2022; Celik 2022). Seufert et al. (2021) claimed that one main reason for that is overlooking teachers' role and readiness to integrate AI into their teaching practices.

Several studies addressed the growing interest in the topic of acknowledging teachers' perceptions regarding artificial intelligence in education (AIEd) (Cabero-Almenara et al., 2024). This study aims to explore teachers' perceptions of integrating educational AI-based tools, with a particular focus on their readiness to utilize these technologies in their teaching practices and to support the achievement of learning outcomes. To address these objectives, a mixed approach is adopted. A survey is used to gather quantitative and qualitative data from high school teachers across grades nine to twelve in two private schools in Jeddah, Saudi Arabia.

The frequency distribution of participants' beliefs and perceptions is presented. The findings of this study help identify gaps in teachers' knowledge and readiness, as well as the perceived benefits and barriers in integrating AI. These insights highlight the need for better training and support to ensure the responsible and effective implementation of AI in schools.

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ABBREVIATIONS

AI	Artificial Intelligence
AIEd	Artificial Intelligence in Education
BI	Behavioral Intentions
EE	Effort Expectancy
FC	Facilitating Conditions
GAI	Generative Artificial Intelligence
GCC	Gulf Cooperation Council
ICT	Information and Communication Technology
ITS	Intelligent Tutoring System
LMS	Learning Management System
SI	Social Influence
TAM	Technology Acceptance Model
UB	Usage Behavior
UTAUT	Unified Theory of Acceptance and Use of Technology

CHAPTER 1
INTRODUCTION

Artificial intelligence has evolved over the last few decades, gradually reaching larger areas and industries. It was first defined as “the science and engineering of making intelligent machines” in 1956 (McCarthy, 2007; Ng et al., 2021). This concept was later broadened into the intelligent machines and algorithms that mimic human intelligence by performing cognitive tasks (McCarthy, 2007; Ng et al., 2021). According to Kim and Lee (2020), the swift advancement of technologies was predicted to bring substantial changes to both the industrial framework and the overall social system.

Due to AI’s efficiency in enhancing users’ experiences, increasing productivity, and growing the economy, studies show that the rise in people’s AI knowledge and usage will open many job opportunities in various industries in the modern digital world. According to the World Economic Forum’s 2020 Future Jobs Report, it was estimated that by 2025, a shift in the division of labor between humans and machines could lead to the displacement of 85 million jobs, while 97 million new roles will be automated that require AI skills. AI is expected to impact 40% of jobs worldwide, either by replacing or augmenting human roles. While this shift may lead to significant disruptions, it paves the way for new opportunities across fields such as STEM, healthcare, finance, entertainment, manufacturing, and energy (Rubin, 2024). For instance, AI offers opportunities, including enhancing logistics and public transport, aiding in disaster prediction or response, and supporting precision agriculture. It also strengthens cybersecurity and is used in human resources management for automating recruitments and assessing employee performance (Ivanashko et al., 2024). Therefore, it is declared that people with AI knowledge will replace those that do not in the future

(Ng et al., 2021). Consequently, technological skills, particularly AI skills, have been highly emphasized and recognized as a fundamental right to education in the twenty-first century education, as industries continue to prioritize roles that utilize automation and advanced technologies. This highlights the need for well-trained and prepared educators who can effectively integrate AI into their teaching practices, enabling students to acquire the essential AI skills required for the future.

The profound impact of AI is not only present in business and health sectors as stated by Lin et al. (2021), but also in the education field lately (Montebello, 2018; Wang & Zhao, 2020; Celik, 2022). Artificial intelligence in education highlights the potential of dramatically transforming pedagogical opportunities for learning and teaching purposes, as it has proven to foster learner-centered approaches (Luan et al., 2020) and personalized learning (Shum & Luckin, 2019; Hwang et al., 2020).

Moreover, they have a significant role in offering on-time feedback (Zawacki-Richter et al., 2019), facilitating effective assessment of students' complex knowledge (Chen et al., 2021), evaluating the teaching process, and facilitating lesson planning and implementation (Zawacki-Richter et al., 2019; Celik et al., 2022). However, Cavalcanti et al. (2021) claimed that AI technology can only be effectively adopted in teaching when educators possess adequate knowledge to integrate AI tools in their instruction.

1.1 Statement of the Problem

Despite the rapid advancement of AI in recent years, researchers noted that the utilization of AI tools in educational settings lags significantly behind other sectors, such as the business sector (Celik, 2022). Kaplan-Rakowski et al. (2023) emphasized that if the initial step of assessing teachers' attitude toward technology is overlooked, integrating this technology into education is more likely to fail. Therefore, successful adoption of any technology into education greatly depends on exploring and understanding teachers' knowledge, perceptions, and readiness, which is a topic of growing interest (Cabero-Almenara et al., 2024). Continued research in this area can shed light on the various factors that influence teachers' preparedness and implementation of AI tools across different educational settings.

Worldwide governments, earlier, have made significant investments in equipping schools with modern technologies and infrastructure, specificallyinformation and communication technology (ICT) systems, encouraging teachers to integrate ICT tools and adopt ICT-based teaching methods (Kim & Lee, 2020). The effectiveness of these worldwide investments in educational technology remains unanswered, if not thoroughly examined by exploring teachers' attitudes and thoughts towards AIEd and the factors affecting their acceptance or rejection for its integration (Bennett, Maton & Carrington, 2011; Kim & Lee, 2020). On the other hand, the Gulf Cooperation Council (GCC) countries have recently expanded research on AI in higher education and remarked on its potential to positively transform teaching and learning practices, creating new opportunities to enhance educational quality across the region.

GCC countries continue to invest greatly in educational innovation, however, there remains a lack of investigation into their evolving role within the higher education sector (Ekundayo et al., 2024). One reason is the lack of comprehensive research on teachers' perceptions toward AI which presents a challenge for educational institutions that aim to facilitate AI adoption in understanding the external and internal barriers they may face. Various external barriers can hinder teachers' readiness to integrate AI in their teaching practices, such as lack of financial resources, insufficient IT support, and limited professional development opportunities (Kaplan-Rakowski et al., 2023). Internal challenges would also pose significant hurdles, such as teachers' reluctance to embrace new technology in education (Celik et al., 2022; Kaplan- Rakowski et al., 2023) and a lack of necessary competencies like confidence and open-mindedness (Ally, 2019; Kaplan-Rakowski et al., 2023). Understanding teachers' insights into these factors is crucial in developing targeted strategies that promote AI literacy and ensure meaningful integration into educational environments (Zawacki- Richter et al., 2019).

This study aims to explore teachers' perceptions of AI in education, identifying barriers to AI adoption, and exploring the level of institutional support available to teachers. By doing so, the study contributes to the continuous research on AIEd and provides insights for educators, administrators and policymakers to enhance AI adoption in schools.

1.2 Rationale of the Study

Today, AI is offering various features in education, from intelligent tutoring systems (ITS) to automated grading and data-driven instructional strategies. Linder and Romeike (2019) underscored the scarcity of research on teachers' perspectives regarding AI, which led to a study that indicated teachers only have superficial understanding of AI, including terms such as simulations, cloud computing, sorting algorithms, and Turing machines. Their knowledge is largely shaped by the latest AI trends, rather than encompassing a broader understanding of the field, concluding that many educators remain unaware of the foundational principles and full scope of AI (Linder & Romeike, 2019). Given the rapid advancement of AI technologies, there is a significant need to bridge the knowledge gap regarding teachers' readiness and acceptance of AI in educational settings, as they play a critical role in the adoption and success of AI in classrooms, which is considered as the major reason for conducting this study.

Therefore, although AI has the potential to enhance learning experiences, its effectiveness depends on teachers' ability and willingness to integrate AI tools into their teaching methodologies. By addressing teachers' perceptions and readiness, it is possible to indicate key factors that influence AI adoption. Understanding theseinsights help policymakers and school leaders develop more targeted, culturally, and socioeconomically relevant strategies for their teachers to integrate AI educational technologies. Alongside, this leads to better enhancement of students' AI literacy, enabling them to adopt intelligent technologies effectively, ethically, and responsiblyin their future.

1.3 Research Questions

In summary, it is evident that a deeper understanding of teachers' perceptions and readiness to integrate AI into education is essential, particularly in light of their current level of AI understanding and utilization. Specifically, this study addresses the following research questions:

1. How do high school teachers in Jeddah private schools perceive AI tools in classrooms for their teaching job?
2. How do high school teachers in Jeddah private schools perceive AI tools in classrooms for their student's learning?

The first question focuses on how teachers perceive their knowledge and abilities in using AI tools for teaching practices such as grading, preparing and planning lessons, creating assessments, and other tasks. The second question focuseson how teachers' think AI tools can be used in classroom instructions for enhancing students' learning environment and performance. These questions open doors to gaining opinions on how effective, efficient, and beneficial AI tools are in accomplishing their tasks and achieving students' learning goals. On the other side, they provide insights into the negative impact of AI on students' learning, as well as teachers' concerns of adopting AI in the educational setting.

1.4 Significance of the Study

The GCC countries have been at the forefront of integrating AI in education to enhance accessibility and promote inclusivity (Ekundayo et al., 2024). The aim of this research study is to explore educators' readiness and understandings concerning the integration of AIEd into the rapidly evolving digital landscape. The significance of AI integration lies in its potential to address major challenges faced by teachers while facilitating their teaching practices, especially through the provision of personalized learning experiences.

AI tools have a great potential to help teachers gain a comprehensive and more precise understanding of their students' needs (Fitria, 2021). These tools can analyze individual student data to accommodate various learning styles, preferences, and abilities. Additionally, AI plays a crucial role in creating interactive and adaptive learning resources, such as virtual labs, simulations, and educational games, which enhance students' engagement and make learning more enjoyable. AI tools also facilitate collaboration and teamwork by promoting interactive discussions and projects among students (eSchool News, 2024).

This study seeks to highlight teachers' preparedness and perceptions towards utilizing and integrating AI tools in different educational settings to achieve teaching and learning goals. Particularly, this study has the following objectives:

1. To explore teachers' perceptions on how AI can facilitate and enhance their teaching practices in a classroom environment.
2. To investigate teachers' perceptions on how AI helps achieving learning goalsthrough students' engagement, motivation, grades, and performance.

Overall, the literature on AI in education grows by offering the findings on teachers' perceptions, showing the impact of AI on teaching and learning, as well as the development of AI-driven pedagogical strategies (Zawacki-Richter et al., 2019). The findings of this study provide valuable insights into identifying the key steps necessary to enhance teachers' understanding, application, and confidence in using advanced technology efficiently and effectively in educational settings. Understanding teachers' perceptions and experiences with AI helps identify gaps in knowledge and training, highlighting the need for professional development programs and resources that equip teachers with AI practical skills for effective integration and improve the overall learning experience. Additionally, the study pinpoints to developing policies and frameworks that facilitate AI adoption. This includes technical support and administrative support that encourage teachers to incorporate AI into their teaching practices.

CHAPTER 2
LITERATURE REVIEW

2.1 AI Literacy

The evolution of technological competencies began in the 1970s with the emergence of digital literacy, focusing on fundamental computer-related skills as computer applications gained widespread popularity across various industries. Building upon this foundation, AI literacy has developed, referring to the essential skills individuals need to succeed, learn, and work effectively with AI-driven technologies in today's digital world (Steinbauer et al., 2021; Ayanwale et al., 2024). The term AI literacy branches from various forms of literacies and extends beyond traditional literacies, such as information literacy, computer literacy, and digital literacy. It emphasizes AI's application in education and its direct impact on four key dimensions: AI knowledge, understanding, evaluation, and ethical considerations.

In the contemporary digital era, imparting AI literacy within education systems is crucial for equipping educators with key competencies for effective AI utilization and fostering their confidence in integrating AI into their teaching practices. Ayanwale et al. (2024) claimed that individuals with sufficient AI literacy are more likely to pursue further AI knowledge, approach the subject topic positively, and develop confidence in applying AI effectively. Nevertheless, there are some challenges to AI literacy at schools. Studies highlighted that gaining AI knowledge comes with significant educational challenges for both experts and teachers, as well as cognitive challenges for students (Micheuz, 2020; Casal-Otero et al., 2023).

Several countries, including the United States, China, Hong Kong, Spain, and Austria, are conceptualizing AI literacy across various educational levels after recognizing its importance. Research showed that when teachers acknowledge how to use AI with equity, accountability, transparency, and ethics, it encourages creative and responsible adoption of such technologies into teaching and learning (Zhao et al., 2022). A study involving 318 K-12 teachers across China investigated factors that influence teachers' intentions to learn about AI. It was found that teachers who recognized the societal benefits of AI were more likely to engage in AI learning. Their confidence in their ability to learn AI concepts positively impacted their intention to use AIEd. Additionally, teachers' awareness of AI ethics and existing AI literacy indirectly influenced their learning intentions (Du et al., 2024).

A comprehensive review examined how AI is integrated into K-12 education globally. The study analyzed 179 documents and identified two main approaches focusing on teaching technical, conceptual, and applied AI skills within specific subjects and efforts to design models that frame AI literacy initiatives. It underscored a significant need for structured AI literacy programs to prepare students for AI-driven society (Casal-Otero et al., 2023). Such studies mark the importance of teachers' AI literacy that passes to and impacts students' AI literacy. Overall, the importance of AI literacy for educators highlights the need for professional development, supportive resources, and thoughtful integration of AI into educational settings to enhance teaching and learning outcomes.

2.2 Teachers' Perceptions towards Technology Integration

Successful technology integration necessitates a deep understanding of teachers' perspectives on its role in the classroom. Watson and Rockinson-Szapkiw (2021) claimed that technology can only be effectively adopted when teachers' beliefs are considered. Teachers' pedagogical beliefs strongly influence their instructional methods (Taimalu & Luik, 2019; Akram et al., 2022). Moreover, they tend to use technology that aligns best with their teaching strategies and views on education.

A systematic review examining teachers' perceptions of technology integration in teaching and learning practices revealed that teachers generally have positive perceptions, believing that technology incorporated teaching enhances instructional practices and boosts students' motivation and engagement. Liu et al. (2022) found that utilizing technology into learning environments improves students' cognitive understanding and academic performance. Additionally, ICT-based teaching, for instance, fosters connections between students and teachers, as well as among peers, through platforms like social media, helping learners in overcoming academic challenges and maintaining active participation in learning (Liu Z. et al., 2021; Akram, 2022).

Other studies exploring teachers' perceptions evidenced that the integration of technology in schools offers various benefits. Technology has been shown to enhance student learning outcomes and engagement, facilitate personalized learning experiences (John, 2015), and increase accessibility and flexibility in education (Joshi & Khatiwada, 2024). Research published in Frontiers in Education in 2022 investigated teachers' perceptions of using an AI based tool for scientific writing. The findings indicated that most STEM teachers had positive experiences with AI, viewing it as an effective scaffolding tool for supporting students' scientific writing (Kim & Kim, 2022).

On the other hand, barriers to technology adoption persist, including lack of infrastructure, inadequate teacher training, technological incompetence, and limited accessibility to resources. Addressing these challenges requires the development of effective policies and the allocation of sufficient resources to support technology integration in teaching practices. More barriers hindering successful adoption of technology in schools include limited technological infrastructure and support, insufficient training and professional development (Yuting et al., 2022), and resistance to change or lack of motivation among educators. Teachers also expressed concerns about potential change in their classroom roles and the transparency of AI decision-making processes (Kim & Kim, 2022). These findings suggest that educators require training and support to acknowledge the importance of AI and its capabilities in instruction, promoting openness to integrating AI into their teaching practices.

Research on teachers' perceptions of specifically AI integration in education still requires greater exploration. Kaplan-Rakowski et al. (2023) note that studies on educators' attitudes toward the integration of AIEd were limited up to 2023 and it is still an emerging topic. Current literature primarily focuses on acknowledging and assessing teachers' readiness and acceptance of AI integration in their classrooms. Various approaches have been employed to gather information on this topic, including interviews, classroom observations, semi-structured interviews, and questionnaires.

The advancement of AI, particularly following the introduction of ChatGPT3 in education, has prompted research into attitudes, acceptance levels, available training, and how teachers' beliefs about teaching influence students' adoption or rejection of AI in educational practices (Cabero-Almenara et al., 2024). Cabero- Almenara et al. (2024) found a high level of acceptance by teachers, with a significant intention to use AI, which in turn would determine and influence its adoption in educational settings. The results of another study conducted by Ayanwale et al. (2022) revealed that teachers' intention to integrate AI into their teaching practices is significantly related to their confidence in their ability to teach AI.

In the psychoeducational field, the applied learning theories such as behaviorism and constructivism, implemented by teachers, offer new perspectives on AI incorporation in education. Teachers with a constructivist mindset were found to integrate AI into education more readily and easily than those who follow more traditional approaches (Choi, Jang & Kim, 2023; Cabero-Almenara et al., 2024). Additionally, younger teachers reported that the use of AI in teaching practices requires less effort and increases enjoyment among students. Teachers with prior AI experience emphasized its great usefulness and ease in professional activities. Also teachers' acceptance of AI varied according to disciplines, with teachers in Social and Legal Sciences showing higher acceptance of AI use in classrooms (Cabero-Almenara et al., 2024).

A case study conducted by Wang and Cheng (2021) involving two public K-12 schools in Hong Kong identified barriers to AI integration into instructional programs. Internal obstacles included a lack of understanding of AI and its pedagogical applications, lack of teacher confidence in using AI, as well as disagreements on AI integration methods. The researchers suggested that the main internal barrier is lack of awareness, which could be mitigated through professional development for teachers. Subsequently, Kaplan-Rakowski et al. (2023) reported positive perceptions of teachers towards the implementation of AI in education, with 54% reporting that they are likely or very likely to incorporate AI in their teaching.

In summary, multiple aspects influence teachers' negative and positive perceptions toward integrating AI into teaching practices and achieving learning objectives. Understanding these factors is crucial for assessing and understanding educators' readiness for effectively adopting new technologies in education.

2.3 Benefits of AI in Education

In recent years, AI has advanced significantly, greatly impacting many aspects of human life, including education. The integration of AI into educational settings is bringing a transformative shift, reshaping traditional learning approaches. Ivanashko et al. (2024) claimed that the significance of AI in education is recognized today, transforming traditional teaching and learning. It offers numerous benefits including increased flexibility, rapid responsiveness, affordability, and accessibility. The potential of AI to make positive contributions in education, such as reducing educational inequalities and optimizing classroom resources, appears to be evident (Ray, 2023).

Studies identified several positive impacts of AI in education, including the facilitation of personalized and adaptive learning, automation of administrative tasks, improved learner support, enhanced e-learning experiences, greater inclusivity, data-driven decision-making, gamification, increased engagement, and the application of behavioral and predictive analytics to enhance assessment practices (Ivanashko et al., 2024). AI tools have a great potential to take over part of teachers' tasks and responsibilities, reducing their workload while allowing them to increase insights into students' learning. These efforts focus on preparing for the evolving challenges in 21st century education, fostering environments that promote not only academic proficiency but also critical thinking, personalized learning, and digital fluency among students (Inspired Schools, 2023).

AI technologies facilitate personalized learning by tailoring educational experiences to individual student needs and accommodating diverse cognitive abilities, backgrounds, and learning paces, as it allows teachers to generate customized learning materials, activities, and assessment sheets (Sidiropoulos & Anagnostopoulos, 2024). These technologies encourage interactive learning environments and foster inclusivity within diverse educational settings, ensuring that students' individual needs are met (Ivanashko et al., 2024). Chen et al. (2021) proved that AI tools can be utilized to support higher education students enhance their writing skills and provide educational content, leading to improved academic performance. Additionally, AI-powered learning management systems (LMS) help streamline administrative tasks, generate personalized learning pathways, and provide immediate feedback to learners (Firat, 2023; George & Wooden, 2023; Ivanashko, 2024). Also, ITS, automated grading tools, and other AI-driven tools exemplify personalized learning applications. For instance, ITS offers real-time assistance (Lin et al., 2023; Ivanashko et al., 2024), customized instruction, and support to learners (Sidiropoulos & Anagnostopoulos, 2024). Such AI tools facilitate enriching students' learning experience and guiding them to make continuous improvements (Gligorea et al., 2023, Ivanashko et al., 2024).

ChatGPT has become a valuable tool that augmented educational practices, promoting students' active engagement and supporting their cognitive development (Montenegro-Rueda et al., 2023; Ivanashko et al., 2024). It is utilized in designing curriculum, creating advisory reports, analyzing information, offering insightful evaluations, detecting plagiarism, and promoting innovation. ChatGPT is also used as a virtual tutor that provides instant assistance on a wide range of subjects (Memarian & Doleck, 2023; Ivanashko et al., 2024). Moreover, it assists teachers for lesson planning and content creation (Ivanashko et al., 2024). While ChatGPT is seen as a valuable educational tool, it serves as a complement to traditional teaching methods and not as a replacement for humans (Memarian & Doleck, 2023; Yu, 2024; Ivanashko et al., 2024).

Other AI-based tools can reduce educators' workloads by providing real-time feedback tailored to individual student needs and automating routine tasks, allowing more focus on student engagement and effective instructional strategies (Holmes et al., 2019). AI also facilitates virtual classrooms by enabling attendance tracking, personalized content delivery, and fostering active engagement of the students with the learning material (Ruiz-Rojas et al., 2023; Ivanashko et al., 2024). More innovative AI tools such as AI speakers incorporated as peers are used to facilitate small group learning. Implemented with pre-service elementary science teachers, the study found that participants experienced significant gains in their technological pedagogical content knowledge. It was evidenced that AI can serve as a collaborative partner in educational settings, potentially transforming traditional classroom dynamics (Lee et al., 2023).

The integration of AI in classrooms directs students towards the adoption of such technological tools in beneficial ways that improve their learning. Recent studies have explored various dimensions and advantages of AI in education. A quasi-experimental study across three urban, low-income middle schools investigated the impact of combining human and AI tutoring on student learning outcomes. The research found that this hybrid approach led to significant improvements in student proficiency and engagement, particularly among lower-achieving students. It was suggested that integrating AI into tutoring can enhance educational outcomes in under resourced settings (Thomas et al., 2023). In another study, the application of AI methods in education by teachers was examined, categorizing them into proactive, like student admissions and course scheduling, and reactive, like knowledge delivery and performance assessment phases. The study highlighted that AI can provide support in improving administrative efficiency and personalizing learning experiences. Other studies revealed AI's significant positive impact on gamification as it enhances students' personalized learning and encourages them to participate and engage. However, it also emphasized the need to address challenges such as ethical considerations and data privacy to ensure sustainable AI integration in education. Therefore, balancing human control with automation was recommended (Mallik & Gangopadhyay, 2023).

2.4 Concerns and Challenges of AI in Education

Despite the development of AI and its transformative potential it has to offer, many teachers remain wary about incorporating AI into their teaching practices. It is essential to consider the concerns and challenges in response to its application raised by the education community. Fears of job displacement and the potential for AI to undermine the teacher-student relationship contribute to this reluctance. Additionally, AI systems can bring risks such as algorithmic bias and potentially malicious applications, which undermines fairness and integrity of educational processes (Nguyen et al., 2023; Ivanashko et al., 2024). The challenges primarily revolved around data privacy and security, algorithmic bias, lack of understanding of AI, insufficient transparency, and need for additional training for effective implementation (Ivanashko et al., 2024).

Improving teachers' AI application skills and interests is not the only priority in AIEd but also prioritizing AI ethics to ensure sustainable and responsible use of AI tools in education for a long term (Dai et al., 2020; Cetindamar et al., 2022; Carolus et al., 2023; Ayanwale et al., 2024). The adoption of AI in educational settings Qnecessitates the collection and processing of personal data, raising significant concerns about data privacy and security (Sidiropoulos & Anagnostopoulos, 2024). For instance, several universities have banned ChatGPT, and some countries even temporarily restricted its use. In 2023, Italy became the first country to ban ChatGPT due to data privacy concerns (McCallum, 2023; Reuters, 2023; Kaplan-Rakowski et al., 2023).

Incidents such as Italy's ban on ChatGPT highlight the potential risks associated with AI applications that may not adequately protect user data. A comprehensive review highlighted the potential ethical and societal risks of AI integration in K-12 education, focusing on issues such as privacy concerns and bias. The study emphasized the necessity for instructional strategies and resources to help educators navigate these challenges (Akgun & Greenhow, 2021). Additional concerns include the digital divide between AI-enhanced learning experiences and resource-limited classroom (Kamalov et al., 2023; Ivanashko et al., 2023), as well as challenges in assessing students' emotions and behaviors (Gonzalez-Calatayud at al., 2021; Leon et al., 2023; Ivanashko et al., 2024)

The use of AI tools, such as ChatGPT, in academic settings has sparked debates over academic integrity. Students using ChatGPT, for instance, without proper attribution raises concerns about plagiarism, diminishing the integrity of the educational process (Ekundayo et al., 2024). Additionally, studies highlighted educators' concerns regarding the authenticity of student work and the potential decline in critical thinking skills when students rely too heavily on AI-generated content rather than actively engaging with the material themselves. Understanding teachers' insights into the adoption of AI in teaching and learning can shed light on the importance of educating both students and educators on its ethical and appropriate use, supported by clear guidelines to monitor and maintain the authenticity of students' work.

A systematic review of AI applications in higher education revealed a significant deficiency in critical reflection on the pedagogical and ethical implications of AI implementation. It was found that many AI applications are adopted without thoroughly considering their impact on teaching methodologies, data privacy, and potential biases, underscoring the need for more reflective practices in AI integration (Zawacki-Richter et al., 2019). The implementation of AI tools in education calls for necessary changes, including trained and acknowledged teachers, for a seamless transition and minimal negative effects. By promoting a balanced approach that upholds academic integrity while leveraging AI for educational support, institutions seek to maximize the benefits of AI tools such as ChatGPT while mitigating potential risks (Luckin et al., 2016; Holmes et al., 2019).

2.5 AI in Education around the World

Studies showed a significant increase in AI-related publications in 2021 and 2022, with research conducted across six continents. This surge indicated a growing global interest in leveraging AI to enhance educational practices and outcomes (Crompton & Burke, 2023). Countries worldwide, such as the United States, China, and Australia, initiated programs to promote AI integration into education, reflecting a vision for a future increasingly driven by AI. For example, Inspired Education Group, a globally renowned network of premium schools, developed an AI platform that personalized learning by integrating classwork and homework while providing real-time feedback in subjects like English, Math, and Science. This platform showed notable improvements in student performance (Inspired Schools, 2023).

In the United States, AI adoption in education is progressing, though at a measured pace (Lake, 2024). A notable finding from Lake (2024) report revealed that only about 18% of K-12 teachers in fall 2023 reported using AI in their teaching practices. Within this group, 8% were identified as early adopters, primarily middle and high school teachers specializing in English language arts and social studies. These educators are enthusiastic about AI's potential in classrooms and actively exploring AI's applications to enhance their teaching methods. Additionally, by fall 2023, 23% of schools provided AI training, with another 37% planning to do so during 2023-2024 academic year, reflecting a growing interest in AI's potential benefits.

Another study conducted in the United States, which included 500 educators at all career stages, indicated that 55% of the participants believe AI has a positive impact on the teaching and learning process (Hamilton, 2024). This study also revealed that younger teachers are the ones who are more likely to adopt AI tools in their teaching, especially through the use of AI-driven educational games. In response to the growing integration of AI in education, the US Department of Education and UNESCO emphasized the need for a transparent and human-centered approach to these technologies, along with promoting AI policies that focus on equity in education to bridge technological divides both locally and globally.

Higher education institutions are also embracing AI. For instance, Sam Houston State University is launching a new polytechnic college, SamPoly, in the fall of 2025 to offer certificates and associate degrees in fields such as artificial intelligence, information technology, and paralegal studies. This initiative addresses workforce gaps and evolving job markets in Texas, providing students with pathways to enter the workforce or pursue further education (Ketterer, 2025). In California State University campuses, OpenAI, supported by Microsoft, rolled out an education specific version of its ChatGPT Chabot to approximately 500,000 students and faculty members. This tool aims to provide personalized tutoring and study guides for students and assist faculty with administrative tasks. Despite initial concerns about academic integrity, this initiative reflects a growing trend of integrating AI into educational settings (Reuters, 2025).

Few years back, a case study in the Philippines examined the impact of ICT-based instruction, highlighting its potential to transform educational practices by fostering interactive and integrated learning environments. Key factors influencing the effectiveness of ICT in classrooms include the availability of educational software, teacher training, collaboration among educators, and self-efficacy. Despite government and international support for ICT initiatives, such as establishing computer laboratories, electronic library systems, and teacher training, barriers like inadequate infrastructure, limited access to technology, and funding constraints have affected implementation. Further concerns included unclear direction, poor coordination, and lack of monitoring teacher development and sustainable ICT use in classrooms, as one time training is insufficient for long-term success. Programs like Inter Teacher and Microsoft's Partner in Learning trained a large number of teachers but faced challenges due to lack of ongoing support. Overall, while ICT-based instruction held promise for improving education in the Philippines, substantial obstacles had to be addressed to fully leverage its benefits (Vergel de Dios, 2016; Kim & Lee, 2020).

China is making significant strides in AI in education. In February 2025, several Chinese universities began offering courses centered on DeepSeek, an AI platform, that aim to foster scientific and technological innovation by integrating advanced AI models into their curricula, covering key technologies, ethical norms, security, and privacy norms (Reuters, 2025). This initiative aligns with China's action plan to establish a high quality education system by 2035. Meanwhile, Australia is contributing to the global AI landscape through both educational initiatives and talent development. Notably, an Australian university student played a pivotal role in developing China's AI platform, DeepSeek. This student collaborated on the project as well as highlighted the country's influence in nurturing AI. Efforts between countries have been shown to enhance AI research outcomes. Studies indicated that joint research between China and the United States leads to more impactful AI advancements. These efforts aim to enhance learning outcomes, prepare students for future challenges, and foster AI application. However, the challenges and the need for teacher training to effectively integrate AI into educational practices remain.

2.6 AI in Education in the Arab Region

In recent years, Arab countries, including Saudi Arabia, UAE, Libya, Oman, Lebanon, Palestine, and Egypt started researching and implementing AI within the countries' educational systems and processes (Haneya et al. 2021, Al Zahrani, 2022). Studies demonstrated further advancement in the integration of AI in the more stable and wealthier Arab countries. The GCC countries have been at the forefront of adopting innovative educational technologies to enhance learning outcomes and promote educational efficiency (Alamri & Alsaleh, 2018; Ekundayo, 2024). It was found that Qatar and UAE, particularly, are making notable progress in adopting innovative technologies in education. Similarly, the governments of Egypt and UAE are leveraging AI to develop ITS for personalized student instruction (MICT, 2020).

A comprehensive review analyzed the role of AI in Arab education over the past five years, emphasizing its significance during the COVID-19 pandemic. The study indicated that AI technologies have been instrumental in facilitating remote learning and enhancing educational processes (Alzahrani, 2022). Another review focused on the application of AI and machine learning in Arab educational contexts. It highlighted AI's potential to offer innovative solutions to educational challenges. However, its adoption was hindered by issues like data privacy concerns, insufficient technological infrastructure, and a shortage of skilled personnel. This study advocated for comprehensive policies and investment in AI education to address these challenges (Rabie, 2023).

Saudi Arabia has made significant investments in AI, aligning with its vision of 2030 plan to diversify the economy and advance technological capabilities (Emkan Education, 2024). In 2024, one hundred billion dollars were used by the country for an AI initiative that is designated to develop a technological hub, focusing on building data centers, supporting startups, and expanding AI infrastructure (Newman et al., 2024). AI integration is also making its way in education through innovative programs like the "Artificial Intelligence Hour," reaching around 1,000 schools in Saudi Arabia to promote AI awareness and skill development among students (Arab News, 2023). Universities such as King Abdullah University for Science and Technology and King Saud University are actively engaged in driving AI research with initiatives like the AI initiative and the AI Center for Advanced Studies, emphasizing AI use and data privacy. However, challenges remain, including the need for enhanced infrastructure, teacher training, and curriculum development to fully harness AI's potential in education.

A mixed-methods study by Alammari et al. (2024) examined the implementation and use of generative artificial intelligence (GAI) in Saudi Arabia's higher education sector. The research found a significant correlation between educators' awareness of GAI and its application in teaching. Approximately half of the surveyed educators demonstrated understanding and familiarity with GAI integration, indicating a readiness for its adoption. This study suggested that increasing awareness and providing training are crucial for effective GAI adoption in educational practices.

Considering another country, the UAE has been positioned as a leader in AI integration in education. It appointed a Minister of Artificial Intelligence in 2017, underscoring the country's commitment to AI-driven educational innovation. Additionally, it introduced AI tutors into classrooms, utilizing technologies similar to ChatGPT to personalize learning experiences for students. For instance, the initiatives include UAE's Smart Learning Initiative and Egypt's Plan for Digital Egypt, which both focus on enhancing technology access and digital literacy. Moreover, Alhashmi et al. (2021) tested the use of a humanoid robot as a teaching assistant in classrooms in the UAE, exploring its effectiveness on assessing both teachers' and students' performance.

Egypt is leveraging its substantial ICT talent pool to support AI initiatives. The governments of Egypt and UAE are leveraging AI to develop ITS for personalized student instruction (MICT, 2020). AI technology has been utilized in karate training in Egypt and was found to be effective for efficient assessment and evaluation of specific karate skills performed by students (Alzahrani, 2022). The League of Arab States, in collaboration with UNESCO, worked on developing a common AI strategy for Arab countries, aiming to increase AI usage for sustainable development and educational enhancement. However, insufficient resources and lack of infrastructure across the region pose challenges. Addressing these issues requires comprehensive policies, investment in AI education, and targeted training programs to equip educators and students with the necessary skills to effectively use AI in educational settings.

2.7 Theoretical Framework

To understand difficulties faced when adopting new technologies, several studies have been developed to investigate the process of technology use and acceptance. For the purpose of this study, the Unified Theory of Acceptance and Use of Technology model elaborated below is adopted as a theoretical framework. It has been observed that most studies drawn upon this model do not apply it directly but instead adapt it to align with their specific contexts.

The Unified Theory of Acceptance and Use of Technology (UTAUT) model, proposed by Venkatesh et al. (2003), integrated eight technology acceptance models, providing a comprehensive framework for understanding technology acceptance (Nnaji et al., 2023; Xue, Rashid & Ouyang, 2024). It is essential to broaden the application of this model across diverse contexts, cultures, and countries to encompass varying perspectives on technology adoption, as studies showed its significance in integrating technologies, including electric vehicles, electronic health technology, artificial products, and educational technologies (Xue, Rashid & Ouyang, 2024). However, since its development, the UTAUT model has also proven to be a valuable academic framework for examining issues related to users' attitudes and their actual utilization of ICT resources in education (Sharma & Chandel, 2013; Kim & Lee, 2020), educational Chatbots, learning platforms, and mobile learning (Xue, Rashid & Ouyang, 2024). Granic (2022) addressed that UTAUT is a widely utilized framework for examining technology adoption, particularly within educational settings, with a strong emphasis on higher education. For instance, the UTAUT model has been applied to enhance teacher training programs by assessing whether the technology skills being taught are effectively learned and implemented in classroom instruction. It is evident that the constructs within the UTAUT model can be effectively tailored to specific contexts, enabling a more precise investigation of how they influence the actual use of technology subsequent to behavioral intention (Kim & Lee, 2020).

UTAUT model depends on four dimensions represented in figure 1: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) which are direct determinants of users' behavioral intention (BI) and usage behavior (UB) (Cabero-Almenara et al., 2024). This theoretical model suggests that the use behavior of technology is determined by behavioral intentions (Marikyan & Papagiannidis, 2023). Additionally, it incorporates four key moderators: age, gender, experience, and subject taught. Cabero-Almenara et al. (2024) claimed that these four moderators have an influence on decision-making towards adopting and integrating technology, as decision-making is affected by friends' opinions, previous experience, perceived usefulness and ease of use, and pedagogical beliefs.

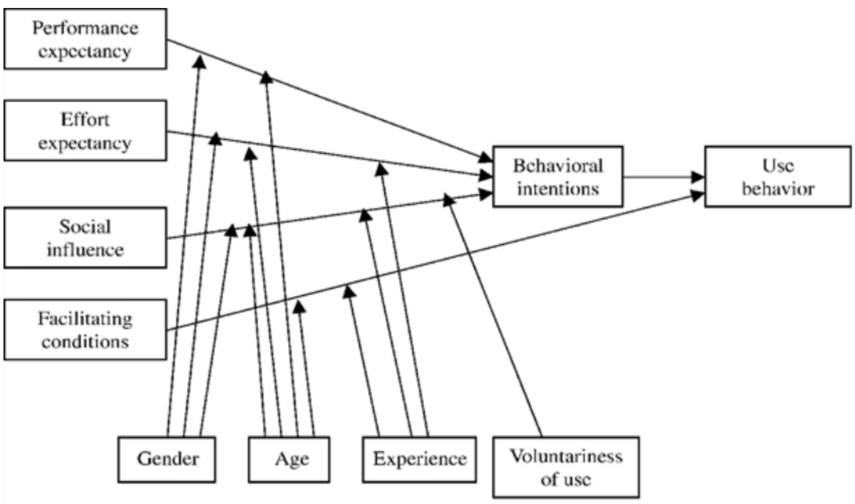

Figure 1 Unified Theory of Acceptance and Use of Technology

In Xue et al. (2024) systematic review, it was noted that UTAUT, alongside the Technology Acceptance Model (TAM), are the most frequently used theoretical framework for underscoring the importance of perceived usefulness and ease of use in technology adoption in higher education. However, the UTAUT model incorporates multiple factors beyond ease of use and usefulness, while also considering demographic and contextual differences through moderators to better understand technology adoption and usage behavior.

2.7.1 Performance Expectancy

In this model, performance expectancy (PE) refers to the user's belief that adopting a technology will improve job performance and boost productivity. Many studies have consistently highlighted that PE is the most significant predictor of BI for technology use, as users typically assess the potential benefits they expect to gain for a given technology (Alotaibi & Wald, 2014; Dwivedi, Rana, Jeyaraj, Clement, & Williams, 2019; Kim & Lee, 2020). In this regard the expected outcome is: H1: Performance expectancy has a strong positive correlation with behavioral intention to integrate AI in education.

2.7.2 Effort Expectancy

Effort expectancy (EE) is the level of ease users' associate with utilizing a particular system. Previous research has found that EE is a highly significant determinant, as it helps users to evaluate the effort required to use a particular technology (Magsamen-Conrad, Upadhyaya, Joa, & Dowd, 2015; Oliveria, Thomas, Baptista, & Campos, 2016; Kim & Lee, 2020). Consequently, its impact on user intention is expected to be both significant and positive. H2: Effort expectancy has a strong positive correlation with behavioral intention to integrate AI in education.

2.7.3 Social Influence

Social influence (SI) refers to the effect of external factors on an individual's decision to adopt technology, including elements such as peer pressure, social norms, and encouragement from colleagues or superiors. Numerous studies have examined the impact of SI represented by friends, family, colleagues, and peers, on individual behavior adoption (Wu & Chen, 2017; Shen, Ho, Ly, & Kuo, 2019; Kim & Lee, 2020). Accordingly, it is assumed that: H3: Social influence has a strong positive correlation with behavioral intention to integrate AI in education.

2.7.4 Facilitating Conditions

Lastly, facilitating conditions (FC) refer to the resources, support, and infrastructure required for successful technology adoption and usage. This may encompass reliable internet access, comprehensive training programs, and readily available technical support (James & James, 2023). In a study by Kim and Lee (2022), facilitating conditions were assessed based on individuals' perceptions of their ability to access the necessary resources, acquire relevant knowledge, and receive the required support for effectively using technology in instruction. H4: Facilitating conditions positively influence use Behavior of AI in education.

2.7.5 Behavioral Intention to Use Technology

Behavioral intention (BI) is defined as a user's intention to adopt and utilize a specific tool in the future. It is regarded as the most significant determinant of an individual's behavior, directly influencing technology usage (Riad, Jaradat, & Al Rababaa, 2013; Kim & Lee, 2022). In the UTAUT model, all factors impact BI, with only FC directly affecting actual technology use. The aim of this study is to explore how the UTAUT variables influence teachers' intentions to use AI and the actual adoption of such technology in their teaching practices. H5: Behavioral intentions will positively influence use behavior of AI in education.

This framework is predicted to give a significant resource for school stakeholders on teachers' perception and readiness of using AI effectively and efficiently in their teaching and learning practices.

CHAPTER 3
METHODOLOGY

The methodology section outlines the research design, context, data collection tools, procedures, and data analysis employed in the study exploring high school teachers’ current readiness for AI integration into their teaching practices and their perceptions of the practical application of AI tools in education.

3.1 Research Design

The lack of understanding of teachers’ perceptions toward AI presents a challenge for educational institutions aiming to facilitate AI adoption. A pivotal initial step to ensure effective and responsible use of AI tools in schools is to not overlook the teachers’ perceptions on AI integration in education. This study aims to explore high school teachers’ readiness and perceptions on how AI can facilitate teaching practices and it can help achieve students’ learning goals through enhancing their engagement, motivation, and academic performance.

3.1.1 Research Approach

The study adopted a mixed research approach that allowed collecting quantitative and qualitative data. A 5-point Likert-scale questionnaire with 22 multiple choice questions was used to collect data on high school teachers’ perceptions of AIEd, in addition to two open-ended questions. The multiple choice questions focused on understanding teachers’ insights into performance expectancy, effort expectancy, social influence, facilitating conditions, intention to use AI, and their actual use of AI. The two open-ended questions focused on providing deeper understanding of what motivates teachers' to adopt AI and their future thoughts of AIEd.

The collected quantitative data were anticipated to be analyzed by the descriptive analysis method, using SPSS, and the inferential analysis method, involving Pearson correlation and multiple regression to uncover the relationship between teachers' perceptions on AI tools and their actual use of such technologies. However, due to the low response rate, the statistical analysis was limited to reporting the frequencies (n) and percentages of participation. The thematic analysis method was also used to understand the interpretations of the qualitative data. This design was appropriate for representing teachers' attitudes and beliefs at a specific point in time.

3.1.2 Sample of the Study

The study targeted 84 high school teachers from grades nine to twelve, who teach different subjects, including Science, Mathematics, English, Economics, and others, all of which are delivered in English as the primary language of instruction. The participating international schools offered a diverse teaching staff in terms of age, experience, backgrounds, and subject areas, which helped in providing a comprehensive understanding of various perceptions towards AI integration in teaching practices. The purposive sampling technique was employed to identify participants based on their relevance to the study's focus. This non-probability sampling method ensured that participants meet the specific criteria significant for the study, namely high school teachers in English medium international schools in Jeddah.

Within purposive sampling, maximum variation sampling is used to gain the maximum range of variations within the characteristics or attributes. This approach enabled understanding the widest possible diversity of viewpoints. However, generalizability was limited because participants are not selected randomly.

Additionally, bias was at high risk of occurring, as the selection process is subjective and relies on the researcher's judgment (Dovetail Editorial Team, 2023).

3.2 Context of the Study

The literature of the study proved a gap in understanding of teachers' preparedness and attitudes towards the use of AI tools in their teaching practices. Gaining insights into teachers' perspectives is essential for creating targeted strategies that foster AI literacy and support effective integration within educational settings (Zawacki-Richter et al., 2019).

This study involved two international schools in Jeddah, Saudi Arabia, both operating under the same educational company. The company is a well-established educational organization which has multiple branches across Saudi Arabia, including Riyadh, Jeddah, Madinah, and Dammam. These schools in Jeddah are among the most renowned in Saudi Arabia, with a persistent reputation for their academic excellence. English serves as the primary medium of instruction in both schools. One of the two participating schools implements the American curriculum only, while the other offers both American and British (IGCSE) programs.

Both schools possess a diverse and multicultural environment, with teachers and students from different nationalities representing various cultural backgrounds. The variety of nationalities and educational backgrounds among teachers brings different levels of experiences with AI tools and technologies, emerging a broad spectrum of insights and attitudes toward the use of AI in education. This diversity not only enriches the educational experience but also contributes to a more comprehensive understanding of AI's benefits, limitations, and practical implications from a global perspective within the school community.

In addition to their diverse curricula and multicultural environment, the schools have a well-established system that has been refined over decades. The organizational institution of the schools invests in external professional development for its staff such as Queen Rania Academy, HP IDEA, and other extensive training programs. It maintains partnership with international educational organizations such as McGraw Hill to ensure that the curricula remain globally competitive and locally relevant. The schools are supported by moderate technological facilities that still need advancement and professional development in traditional teaching strategies and technology application with inadequate training in AI application. The long experience and established presence of these schools underscore its dedication to nurturing academic achievement and personal growth among its students.

3.3 Data Collection

The primary data for this study is collected using a validated survey adapted from peer reviewed research studies based on the Unified Theory of Acceptance and Use of Technology model, ensuring reliability and validity (Abbad, 2021). The survey is created using the Limesurvey platform and consists of 24 items divided into several sections. The first section includes the demographic information that helps collect participants' gender, age, teaching experience, and subject areas.

The second section focuses on the main UTAUT constructs (PE, EE, SI, FC, BI, and UB), exploring to which extent participants agree on specific ideas regarding the integration of AI in teaching. The first subsection is performance expectancy which focuses on teachers' perceptions of the usefulness of AI tools in enhancing teaching strategies, quality, efficiency, and effectiveness. The second subsection is effort expectancy, focusing on easiness and manageability in using AI tools in teaching practices. The third one is social influence that highlights how social support, such as support from school leaders, colleagues, and mentors, affect teachers' use of AI tools.

The fourth is facilitating conditions that address teachers' perception of the availability of resources, training, and technical support that facilitates use of AI in their schools. The fifth subsection behavioral intentions covers teachers' intention to adopt AI tools in their future practices. Lastly, the usage behavior subsection focuses on teachers' current use of AI in classroom instruction and lesson preparation.

The last section includes 2 open-ended questions that allow respondents to express additional thoughts regarding the motivational factors influencing the use of AI tools in teaching and the expected future of AI integration in education. The included questions are:

1-What motivates or inspires you to consider using AI tools in your teaching practices?

2-What is your overall perspective on the role of AI in the future of education?

This five-point Likert-scale questionnaire, ranging from "strongly disagree" to "strongly agree" with 2 open ended questions, is disseminated online to 84 high school teachers via their school email addresses through the schools' executive education officers. It is activated for three weeks, giving sufficient time for teachers to complete it. Such questionnaires are convenient for achieving higher response rates in less time, enabling faster data collection and analysis. Furthermore, they facilitate monitoring responses in real-time and provide a high level of anonymity, ensuring participants to provide honest answers.

3.3.1 Data Collection Procedures

The process of collecting data involved several steps, starting with the creation of the survey that focused on interpreting teachers' thoughts and understanding towards the use of AI in education. After the survey was reviewed and approved by the Institutional Review Board (IRB), an invitation was sent to the participants via the school email addresses.

The email included the study's purpose and the ethical standards in this educational research, which was reviewed by the IRB, ensuring voluntary participation, anonymity, and confidentiality. An informed consent was acquired from the school directors and the participants were informed about the study objectives, procedures, and their rights. Data was anonymized to protect respondents' identities, as well as information was stored securely. After two weeks of disseminating the survey link, one reminder email was sent to encourage participation and enhance response rates. Overall, the format of the questionnaire was designed to facilitate efficient data collection and management.

3.3.2 Data Analysis

The collected data were analyzed using descriptive statistics, summarizing demographic information and survey responses into frequency distributions. Only frequency statistics were conducted for this part, since the participants number was less than 25% of the selected sample size. This provides an overview of participants' characteristics and their responses across the UTAUT model variables: PE, EE, SI, FC, BI, and UB. The UTAUT model offers significant insights into the factors that impact technology acceptance and usage (James & James, 2023). Therefore, these statistics help identify general trends, such as teachers' perceptions of the ease of use, benefits, and support for AI integration in education.

Frequency statistics refer to the process of counting how often each value of variable appears in a dataset. It is depicted using tables or charts (Turney, 2023). Such statistics provide a clear overview of the data, helps in identifying patterns, and facilitates meaningful comparisons. The frequency tables consist of absolute frequencies and relative frequencies. The absolute frequency indicates how many times each category occurs in the data, while relative frequencies show the percentage that each category contributes relative to the total number of responses (DATAtab Team, 2025).

The initial statistical analysis includes descriptive statistics related to the participants' demographic information. This is essential for clearly understanding the sample involved in the study. In this study, absolute frequencies and valid percentages were used to represent the demographic variables, using a pie chart to display the gender variables and a table to represent the age category, years of experience, and subject taught variables.

Frequency statistics should be reported whenever the data is discrete, that is, when participants select from categories. Using excel, the quantitative data from the Likert-scale responses were reported in an ungrouped frequency table showing the items of the UTAUT in the first column, the scale in the second column, and the number of each value of a variable, frequency (n), in the third column. The fourth column was added to show the relative frequencies (%), by dividing each frequency with the sample size and multiplying it by one hundred.

Thematic analysis was used for the qualitative responses, identifying common themes of responses and insights that coordinate with the quantitative findings. Firstly, teachers' comments were reviewed and coded into four different themes. Irrelevant responses that represent uncertainty to the themes were discarded. Developing a clear and consistent framework for categorizing responses into themes ensures that the same responses are consistently coded in the same way. The coded responses were then used to find the frequency of each theme by using the "countif" equation. Additionally, the percentages of each theme was calculated and displayed in another column. These frequencies were used for writing up the findings for thematic analysis, addressing each theme in turn. The writing described and explained the frequency with which the themes appear and their significance, showing how the analysis answered the research questions. By ensuring that the analysis directly addresses the study's research questions, it helps maintain validity of the analysis.

The findings may help identify enablers and barriers, offering actionable recommendations for educational leaders and policymakers to enhance AI adoption in schools. The overall analysis of the study provides a comprehensive understanding of the factors influencing teachers' perceptions and readiness to integrate AI in education.

CHAPTER 4
FINDINGS AND DISCUSSION

4.1 Findings

The teachers' questionnaire contained 22 questions including 4 demographic questions, 18 multiple choice questions of UTAUT dimensions, and 2 open-ended questions. The design of the questionnaire in this way allowed for gathering a combination of quantitative and qualitative responses including teachers' level of agreement with items in performance expectancy, effort expectancy, social influence, facilitating conditions, behavioral intentions, and usage behavior, along with their justifications for current usage and their thoughts for future use.

The purpose of the questionnaire was to explore teachers' perceptions towards adopting and using AI tools in their teaching practices for enhancement and improvement of their teaching strategies. The questionnaire also aimed to explore their thoughts of integrating AI tools for achieving students' learning goals and needs.

4.1.1 Demographic Information

The teacher population, who were expected to participate in the survey, was 84 high school teachers. Of the teachers' population, 33 teachers started taking the survey but only 22 of them completed it. This small number of respondents shifted the study into a pilot study, which can be replicated for a larger and more extensive study. Figure 2 shows that female participants (n=17) were remarkably higher than the males (n=5); apparently due to the lower number of male teachers (39) compared to the female teachers (45) at the schools under study.

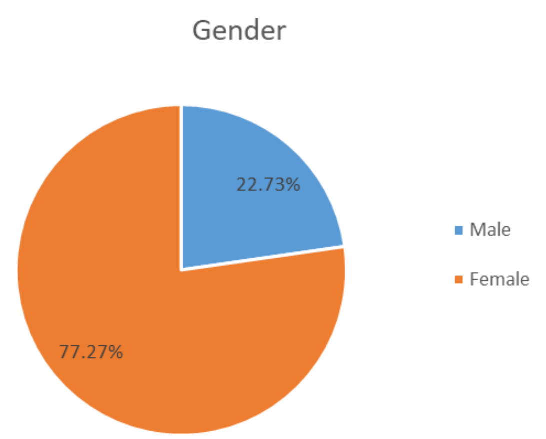

Figure 2 Gender Percentage of Participating High School Teachers

Table 1 shows the frequency distribution of teachers' age range, years of teaching experience, and subject areas taught. Half of the total number of teachers (50%) were between the ages of thirty one and forty, while few (13.64%) were under the age of thirty one and the rest (36.37%) were above the age of forty. The majority of the participants (72.72%) had a teaching experience of over ten years and 27.27% of teachers had less than eleven years of teaching experience. These teachers specialize in different subject areas, where the biology (18.18%) and math teachers (18.18%) were the ones to participate more in the survey.

Table 1 Demographic Information of Participating High School Teachers

Demographic Items	**Category**	**Frequency (n=22)**	**Percentage (%)**
Age	20-25 years	1	4.55
	25-30 years	2	9.09
	31-40 years	11	50.00
	41-50 years	7	31.82
	Above 50 years	1	4.55
Teaching Experience	1-5 years	4	18.18
	6-10 years	2	9.09
	11-15 years	10	45.45
	More than 15 years	6	27.27
Subject Taught	Math	4	18.18
	Biology	4	18.18

	Physics	2	9.09
	Chemistry	2	9.09
	English	3	13.64
	History/Geography	1	4.55
	Humanities	2	9.09
	Computer	3	13.64
	Physical Education	1	4.55

4.1.2 UTAUT Dimensions

The first part of the questionnaire explored teachers' thoughts and beliefs towards using AI tools to help in improving performance and fostering productivity. The results indicated that the majority of teachers perceive AI tools as beneficial for teaching practices. More than half of the respondents (63.64%) agreed that AI tools play a positive role in transforming educators' teaching strategies, improving quality of teaching and learning, and increasing productivity and efficiency in teaching. 59.09% agreed as well that AI tools help teachers achieve learning objectives faster. While most teachers recognized the potential of AI in enhancing teaching performance and efficiency, only 9.09% strongly disagreed and remain skeptical (Table2).

Table 2 Teachers' Performance Expectancy toward Adopting AI Tools

Performance Expectancy Items	**Scale**	**Frequency (n=22)**	**Percentage (%)**
AI tools positively transform my teaching strategies.	Strongly disagree	2	9.09
	Disagree	0	0.00
	Neutral	3	13.64
	Agree	14	63.64
	Strongly agree	3	13.64
AI tools improve the quality of teaching and learning.	Strongly disagree	2	9.09
	Disagree	0	0.00

	Neutral	2	9.09
	Agree	14	63.64
	Strongly agree	4	18.18
Using AI helps me achieve learning objectives faster.	Strongly disagree	2	9.09
	Disagree	0	0.00
	Neutral	2	9.09
	Agree	13	59.09
	Strongly agree	5	22.73
Using AI increases my productivity and efficiency as a teacher.	Strongly disagree	2	9.09
	Disagree	0	0.00
	Neutral	3	13.64
	Agree	14	63.64
	Strongly agree	3	13.64

The second UTAUT dimension explored teachers' ease of use of AI tools, where most of the teachers find AI tools clear, relevant, and easy to use in their teaching practices. Generally, 77.27% expressed agreement that AI tools are clear and relevant and 81.82% agreed they have the skills needed to use AI tools. Regarding the effort required for AI integration, 72.73% agreed that using AI tools does not require effort and are easy to use for accomplishing certain tasks. A minority strongly disagreed with the accessibility and ease of use of AI tools (Table 3).

Table 3 Teachers' Perceived Ease of Use of AI Tools

Effort Expectancy Items	**Scale**	**Frequency (n=22)**	**Percentage (%)**
Using AI tools is clear and relevant.	Strongly disagree	2	9.09
	Disagree	0	0.00

	Neutral	3	13.64
	Agree	15	68.18
	Strongly agree	2	9.09
I have the skills I need to use AI tools in my school.	Strongly disagree	1	4.55
	Disagree	0	0.00
	Neutral	3	13.64
	Agree	16	72.73
	Strongly agree	2	9.09
Integrating AI effectively in my teaching and learning practices does not require much effort.	Strongly disagree	1	4.55
	Disagree	1	4.55
	Neutral	4	18.18
	Agree	12	54.55
	Strongly agree	4	18.18
I find it easy to use AI to do what I want to do.	Strongly disagree	1	4.55
	Disagree	1	4.55
	Neutral	4	18.18
	Agree	12	54.55
	Strongly agree	4	18.18

The third dimension referred to the extent external factors influence teachers' adoption of AI tools. The results revealed mixed perceptions with less than half of teachers (40.91%) agreeing that school principals and supervisors encourage AI use, while 45.45% remained neutral. Similarly, 45.45% agreed colleagues and mentors are helpful in providing assistance in using AI, but an equal percentage remained neutral. On the other hand, more than half of the teachers agreed on ensuring that most school staff acknowledge the importance of AI and that AI would add to teachers' status among their social network (Table 4).

Table 4 Social Influence on the Adoption of AI in Teaching

Social Influence Items	Scale	Frequency (n=22)	Percentage (%)
The school principal and supervisors encourage me to use AI.	Strongly disagree	1	4.55
	Disagree	1	4.55
	Neutral	10	45.45
	Agree	9	40.91
	Strongly agree	1	4.55
Most staff think AI tools are important.	Strongly disagree	1	4.55
	Disagree	1	4.55
	Neutral	7	31.82
	Agree	12	54.55
	Strongly agree	1	4.55
My colleagues and mentors are helpful and provide valuable assistance in using AI.	Strongly disagree	1	4.55
	Disagree	1	4.55
	Neutral	10	45.45
	Agree	10	45.45
	Strongly agree	0	0.00
Using AI would add to my status amongst my social network.	Strongly disagree	1	4.55
	Disagree	2	9.09
	Neutral	4	18.18
	Agree	15	68.18
	Strongly agree	0	0.00

The results of Table 5 revealed teachers' perceptions of the facilities required for successful AI adoption and usage. The results suggest significant gaps in resources, training, and support, although many teachers feel knowledgeable about AI. While 59.09% agreed that they have the necessary knowledge to use AI in their schools, only 40.91% agreed on having the necessary resources to use AI at the school. However, 31.82%, which is a close percentage, disagreed on the school providing the necessary resources to adopt AI tools. Similarly, an equal percentage of teachers (31.82%) agreed and disagreed on the availability of AI training and manuals at school. Additionally, technical support for AI-related issues is not widely accessible, with 31.82% neutral and 31.82% disagreeing or strongly disagreeing (Table 5).

Table 5 Teachers' Perceptions on the Availability of Technical Support and Resources

Facilitating Conditions Items	**Scale**	**Frequency (n=22)**	**Percentage (%)**
I have the resources necessary to use AI in my school.	Strongly disagree	1	4.55
	Disagree	7	31.82
	Neutral	5	22.73
	Agree	9	40.91
	Strongly agree	0	0.00
I have the knowledge necessary to use AI in my school.	Strongly disagree	1	4.55
	Disagree	2	9.09
	Neutral	6	27.27
	Agree	13	59.09
	Strongly agree	0	0.00
Training and manuals for AI are available.	Strongly disagree	3	13.64
	Disagree	7	31.82
	Neutral	5	22.73

	Agree	7	31.82
	Strongly agree	0	0.00
Technical support is available for assistance with resolving AI-related issues when needed.	Strongly disagree	3	13.64
	Disagree	4	18.18
	Neutral	7	31.82
	Agree	8	36.36
	Strongly agree	0	0.00

Lastly, the findings indicated a strong intention among teachers to integrate AI into their teaching practices in the future, with 68.18% agreeing and 18.18% strongly agreeing (Table 6). However, the actual AI usage behavior appears less consistent, as 50% agreed that they regularly use AI for classroom instruction and preparation, while 40.91% remained neutral (Table 7).

Table 6 Teachers' Intentions to Use AI Tools in the Future

Behavioral Intention Item	**Scale**	**Frequency (n=22)**	**Percentage (%)**
I intend to use AI tools in my teaching practices in the future.	Strongly disagree	1	4.55
	Disagree	0	0.00
	Neutral	2	9.09
	Agree	15	68.18
	Strongly agree	4	18.18

Table 7 Teachers' Current Use of AI Tools in their Teaching Practices

Usage Behavior Item	**Scale**	**Frequency (n=22)**	**Percentage (%)**
I consider myself a regular user of AI during my classroom instruction and for	Strongly disagree	1	4.55
	Disagree	1	4.55

my class preparation.	Neutral	9	40.91
	Agree	11	50.00
	Strongly agree	0	0.00

4.1.3 Open-ended Questions

The teachers' responses regarding the use of AI in education and their thoughts of the future of AI in education revealed four key themes: efficiency and automation, enhancement, threats to teaching practices and learning skills, and human relationships in teaching.

One of the primary motives for using AI in teaching was found to be due to its ability to foster efficiency and automation, where 44.74% of teachers emphasized its vital role in generating materials, automatically completing teachers' tasks, and saving time. One respondent stated, "AI saves time in planning and generating interesting classroom activities for my students". Another teacher highlighted that "It helps accomplish my tasks faster". Other teachers highlighted their optimism about AI making information more readily available and improving accessibility, mentioning that the use of AI in teaching practices "saves time and effort", "helps in generating questions for pop quizzes and homework", and helps in "checking correct answers for questions". Another respondent claimed that AI helps "to improve efficiency in achieving learning objectives on a daily basis".

Teachers (39.47%) also viewed AI as a tool that enhances the learning environment by making learning interactive and dynamic. One participant emphasized the potential of AI to foster student engagement by saying "It makes the learning environment fun and interactive". Teachers appreciated AI's role in promoting the accessibility and flexibility of the learning process, where one teacher stated that "Integrating AI tools in education will make learning more flexible and information more reachable anytime and anywhere" and will "provide more relevance in real time examples". AI was also seen as an enhancer for students' creativity, helping students engage more with digital learning in better ways, as one teacher said "It will increase their creativity and help them to get involved more into the digital world".

Despite the positive comments, 10.53% of teachers expressed concerns regarding AI's potential to negatively impact students' learning experiences. One concern was that AI could reduce students' attention and make them overly reliant on technology. A participant expressed, "It will negatively affect the students' attention in the regular classroom". Another respondent commented, "We need to be cautious about overuse of AI because students may depend on it fully." Additionally, teachers highlighted their concern about students' overreliance on AI saying, "Students relying on AI tools completely will have decreased critical thinking skills".

The last theme includes teachers (5.26%) emphasizing the significance of human interaction in education. One teacher noted, "Teaching is a more one on one human interaction with students. The emotional relationship between a teacher and student is very crucial for the learning process in any field of study". Another respondent mentioned that "AI is very beneficial for teachers and students but in a limit", assuming the reassurance of the importance of the teacher-student relationship in the teaching learning process.

4.2 Discussion

The findings of this study suggests that most teachers recognize the potential benefits of AI in education, specifically in enhancing teaching practices, improving efficiency, and achieving learning objectives faster. Additionally, teachers greatly perceive AI tools as easy to use, clear, and relevant, though some factors regarding social influence and support as well as technical assistance remain uncertain. Moreover, while teachers show strong intention to use AI in their teaching practices, the actual usage remains inconsistent. This shows that teachers possibly tend to face barriers to AI adoption.

4.2.1 Performance Expectancy

The results of the study revealed that a majority of teachers (63.64%) agreed and 13.94% strongly agreed that AI tools positively transform their teaching strategies and promote efficiency in teaching. Similarly, 63.64% agreed and 18.18% strongly agreed on AI's role in improving the quality of teaching and learning. These findings align with studies suggesting that AI-driven tools, such as intelligent tutoring systems, automated grading systems, and real-time feedback, significantly benefit teachers in reducing their workloads, allowing them to focus on interactive teaching methods and facilitating the process tailored to meet individual students' needs (Inspired Schools, 2023). Most of the teachers (81.82%) had positive perceptions of AI's ability to achieve learning objectives faster, reflecting existing research that highlights AI's role in enhancing students' learning outcomes and engagement (Gligorea et al., 2023; Ivanashko et al., 2024), as well as improving their academic performance (Chen et al., 202).

However, a small but considerable percentage (9.09%) strongly disagreed with these benefits. This probably suggests that although most educators have positive attitudes towards AI tools in teaching practices, some may be concerned about issues such as overreliance on technology which leads to reducing students' active participation and engagement with the material along with the potential to decrease their critical thinking skills. Addressing these concerns through professional development and ethical AI policies is crucial to increase teachers' confidence in utilizing AI tools effectively with students.

4.2.2 Effort Expectancy

Generally, teachers found AI tools clear, relevant, and easy to use with 77.27% agreeing on AI's clarity and relevance. Additionally, 81.82% agreed on having the necessary skills to use AI. These findings support the claim that individuals with sufficient AI knowledge and skills are more likely to find it easy to use and have confidence to integrate AI tools (Ayanwale et al., 2024). The presence of notable neutral responses (13.64%) regarding AI's ease of use suggest that some teachers may require training and exposure to AI applications to help them acknowledge in what context to use AI tools for ease of delivering information and accomplishing teaching tasks.

Furthermore, while 72.73% of participants agreed that AI integration does not require much effort, only 4.55% disagreed. This highlights teachers' ability to easily adopt new technology and integrate it in classroom instruction effortlessly, while some teachers who may still be adjusting to new tools. Bridging this gap could necessitate providing structured AI training programs and continuous technical support.

4.2.3 Social Influence

Although social influence plays a crucial role in teachers' adoption of AI tools, the findings suggest mixed perceptions regarding supervisor and peer support. While 40.91% agreed that school leaders support AI use, 45.45% remained neutral and indecisive, indicating uncertainty. Similarly, 45.45% agreed that colleagues and mentors provide assistance, but an equal percentage remained neutral, suggesting gaps in collaboration. Most of the teachers (68.18%) believed that using AI enhances their social network, which indicates that AI is seen as a valuable skill for career development.

These findings are supported by Du et al. (2024) study that revealed teachers recognize the societal benefits of AI when they are more likely to engage AI tools in learning and teaching. Such results also align with the UTAUT model, which emphasizes that institutional support and peer assistance significantly impact technology adoption. The remarkable percentage of neutral responses highlights the need for stronger leadership in encouraging AI adoption. Schools should consider peer-learning communities and mentorship programs to support teachers' AI integration.

4.2.4 Facilitating Conditions

Despite the positive attitudes toward AI, the findings indicate significant gaps in resources and technical support. Only 40.91% agreed they have adequate AI resources, while 31.82% disagreed and 22.73% remained neutral. Training materials were scarce, with 45.46% disagreeing or strongly disagreeing that training and manuals are available at school. Additionally, technical support was limited, as 31.82% disagreed or strongly disagreed that assistance with resolving AI-related issues are available. These findings align with previous research indicating that lack of infrastructure, inadequate teacher training, technological incompetence, and limited accessibility to resources are major barriers to technology adoption in schools (Liu et al., 2021; Akram, 2022). Additionally, Yuting et al. (2022) has claimed that one of the barriers that hinder successful adoption of technology in schools is limited technological infrastructure and support, as well as in adequate training and professional development. Even when teachers are willing to integrate AI, the lack of training programs and technical support at school may discourage them from using these tools consistently. Such challenges require investment in AI infrastructure, comprehensive AI training programs, and dedicated AI support team.

4.2.5 Behavioral Intention and Usage Behavior

The findings also suggest a strong intention to use AI in the future, as 86.36% agreed or strongly agreed, yet actual AI usage is less consistent with only 50% who agreed that they regularly use AI for classroom instruction and 40.91% remained neutral, probably indicating hesitation or infrequent usage. Surprisingly, this gap conflicts with studies that revealed teachers' acceptance and usage of AI is significantly determined by their intention to use AI (Cabero-Almenara et al., 2024). The gap may be attributed to limited time of AI integration, lack of clear implementation strategies, and uncertainty about AI's long-term impact. To close this gap, schools should focus on providing real-world AI applications, showing teachers how AI can streamline tasks. Additionally, offering professional development for AI training and encouraging teachers to gradually integrate AI in their teaching practices should be considered to narrow the gap between teachers' intention to use AI and their actual AI-driven practices.

4.2.6 Open-ended Questions

The open-ended questions of the survey explored teachers' perceptions of AI tools in their teaching practices, focusing on four themes: automation and efficiency, enhancement, threats to teaching practices and learning skills, and human interaction in teaching. These themes are discussed in depth, comparing them with existing literature and considering the broader implications for educational practice.

One of the most prominent findings was that 28.95% of teachers perceive AI as a tool that enhances efficiency. Respondents highlighted AI's ability to save time in lesson planning, generating assessments, and assist in grading. Teachers noted that AI plays a significant role in enhancing efficiency in accomplishing teaching tasks, including lesson planning, lesson preparation, and creation of activities and assessments. AI tools' ability to automate repetitive tasks was thought to be significantly beneficial as this would help teachers to focus on students' outcomes and achieve learning objectives more efficiently. This aligns with previous studies that identified the benefits of AI tools specifically in automating administrative tasks, and facilitating adaptive learning (Ivanashko et al., 2024).

Previous research also proved that AI educational tools can significantly reduce teachers' workload, allowing them to focus more on instructional strategies and student engagement (Holmes et al., 2019). It has been also shown that AI helps in improving administrative efficiency and personalizing learning experiences (Mallik & Gangopadhyay, 2023), as well as increase accessibility and flexibility in education (Joshi & Khatiwada, 2024). However, while AI offers practical solutions and effective assistance in teaching practices, the risk of dependency should be considered, as excessive reliance on automated tasks may lead to reduced teacher involvement in the planning, preparation, and creating lessons process.

Teachers showed a major acknowledgement of AI's role in enhancing students' learning environment. Some believe that AI tools can enhance entertainment and interactivity in classrooms, having a great impact on students' motivation and engagement. This supports a previous study that revealed AI learning tools such as simulations, adaptive learning platforms, and gamified activities play a crucial role in enhancing students' engagement and making learning more enjoyable (eSchool News, 2024). Liu et al. (2022) also revealed that adoption of technologies in learning environments enhances students' cognitive understanding and improves academic performance, which supports teachers' agreement with the role AI tools play to enhance teaching and learning. Furthermore, participants expressed the potential of AI to make a remarkable transformation in the future as the accessibility to educational resources and the flexibility in learning increases. AI tools were found to facilitate adaptive learning, where students receive personalized educational content tailored to enhancing their academic performance and learning skills (Chen et al., 2021). Such personalization can ensure enhanced motivation and improved learning outcomes.

Despite the advantages, several teachers expressed concerns about the potential negative impact of AI in students' learning skills. They showed fear that students might become overly dependent on AI, leading to distraction and decreased learning skills. Previous studies have revealed teachers' concerns about students' overreliance on AI tools, citing the negative impact on students' authenticity in their work and the potential to engage less actively with the material and rely less on their problem-solving skills. Overreliance on AI plays a role in reducing opportunities for students to develop essential learning skills such as analytical thinking, creativity, and resilience. However, other studies showed using AI tools in teaching can enhance educational outcomes (Thomas et al., 2023), as well as it can lead to improvements in students proficiency and engagement. Moreover, it was shown that such tools support students' cognitive development (Montenegro-Rueda et al., 2023; Ivanashko et al., 2024), particularly fostering their critical thinking skills and digital fluency (Inspired Schools, 2023). Therefore, the necessity for educators to learn and acquire knowledge on how to implement AI in a way that promotes active learning and develops students' learning skills rather than passive usage of information is important.

While AI is considered to enhance the teaching and learning process, there is concern that it may shift the role of the teacher from an active instructor to a facilitator of AI-based content. This shift require careful consideration to ensure that students remain engaged with both AI tools and human instruction. The findings of the study showed an emphasis on human relationship in education. One respondent mentioned that the emotional relationship between a teacher and student is very crucial for the learning process in any field of study. The comment reflected anxiety among teachers that overuse of AI may weaken the social and emotional aspects of education. It suggests that human engagement and interaction remains essential for effective learning. Conversely, it was proved in previous studies that educational technologies play a vital role in fostering connections between students and teachers, helping learners to overcome academic challenges and remain engaged and active in learning (Liu Z. et al., 2021; Akram, 2022).

However, this finding is supported by some studies emphasizing the critical role of teacher-student relationship in fostering student motivation, engagement, and academic achievement and the importance of balancing human control with automation (Mallik & Gangopadhyay, 2023). While AI can personalize learning experiences, it is recognized that it lacks the emotional intelligence and empathy that human educators provide. This aligns with the claim that AI use is effective when it serves as a complement to traditional teaching methods and not as a replacement for human interaction (Memarian & Doleck, 2023; Ivanashko et al., 2024).

In summary, the findings addressed the study's two main research questions:

1. How do high school teachers in Jeddah private schools perceive AI tools in classrooms for their teaching job?
2. How do high school teachers in Jeddah private schools perceive AI tools in classrooms for their student's learning?

For the first question, high school teachers in Jeddah private schools generally perceived AI tools as beneficial to their teaching practices. The majority of participants agreed that AI enhances teaching efficiency, supports strategy development, and helps in achieving learning objectives more effectively. Most teachers additionally found AI tools clear, relevant, and easy to use, with over 77% reporting confidence in using them. However, actual usage of AI in classrooms remains inconsistent despite high intention, highlighting a gap likely due to factors like limited resources, lack of training, and lack of institutional support were revealed to hinder teachers' actual implementation of AI. While some teachers expressed concern about overdependence on AI potentially reducing teacher involvement, most viewed AI as a powerful tool that boost automating tasks like lesson planning and assessment. Teachers also reinforced AI's ability to save time and reduce workload, allowing them to focus more on students' learning outcome and academic performance.

Regarding the second research question, teachers perceived AI tools as enhancing students' learning experiences. Many believe that AI improves student engagement, motivation, and academic performance by personalizing learning and offering interactive tools like simulations and gamified content. The majority realized AI's ability in support students' individual needs. On the hand, some teachers expressed concerns about students' overreliance on AI, which they felt could hinder the development of critical thinking, creativity, and authentic engagement. Emotional and social aspects of learning were also highlighted, where some teachers emphasized that AI could weaken teacher-student relationships if not implemented thoughtfully. Overall, while AI was seen as a valuable tool for teaching, teachers believed it must be balanced with human interaction to support holistic student development.

CHAPTER 5
CONCLUSION

The findings of the study provide valuable insights into teachers' perceptions of AI in education, highlighting both its benefits and challenges. In summary, the results indicate that most teachers recognize AI as a transformative tool for enhancing teaching strategies, improving efficiency, and achieving learning objectives faster. Additionally, the majority of participants found AI tools to be clear, relevant and easy to use, suggesting positive insights toward AI adoption in schools. However, the study also revealed significant barriers, including lack of resources, insufficient AI related training opportunities, and inadequate leadership and peer support. These challenges contribute mainly to the gap between teachers' intentions to use AI and their actual adoption behavior. Addressing these barriers is essential for ensuring the effective integration of AI into educational practices.

5.1 Limitations

Several limitations should be considered, although this study offers important contributions to understanding AI integration in education. First, the sample size was relatively and unexpectedly small, which limits the generalizability of the findings to broader educational contexts. Future studies should consider larger and more diverse samples to provide a more comprehensive understanding of teachers' perceptions across different regions and school types.

Second, the study was based on participants' own responses, which could lead to bias. They might have given answers they thought were expected instead of their true opinions and experiences. To mitigate this limitation, future research could incorporate interviews and focus groups to gain deeper insights into teachers' perceptions and experiences with AI in education.

Third, the small number of participants restricted more statistical analysis and testing hypotheses, such as testing the correlations between the independent and dependent variables, as well as examining the relationships involving the moderators within the UTAUT framework. This limitation reduced the depth of understanding of the factors that influence teachers' readiness to successfully integration of AI in educational settings.

Fourth, the findings of the study focused greatly on teachers' intentions on using AI, but did not focus on actual classroom implementations of AI. Further research is needed to explore AI tools' practical applications and how they are integrated into daily teaching practices. Long-term studies could involve tracking teachers' actual AI usage over time, which would be beneficial in understanding the sustainability of AI adoption.

5.2 Recommendations

Based on the study's findings, several recommendations can be made to enhance AI adoption in educational settings. There is a need for more structured AI training programs for teachers. Schools should offer professional development workshops and hands-on training that focus on AI integration in teaching practices rather than the usual training of traditional teaching strategies. Such programs will equip teachers with the necessary skills to effectively utilize AI into their teaching practices.

Another recommendation would include improving institutional support and leadership management that is crucial for shifting the teaching and learning processes towards AI adoption and inclusion. School administrators and policymakers should actively promote AI usage by providing clear guidelines and recognition for teachers who successfully implement AI in their classrooms. Additionally, encouraging peer support by fostering a collaborative environment where teachers can share best practices with AI tools.

Addressing technical and resource-related barriers is also essential for successful AI integration. Schools should invest in AI infrastructure, including access to AI educational tools, technical support, and instructional resources. Enhancing teachers' confidence in using AI effectively is integral as well, which could be accomplished by providing easy AI applications that require minimal effort for implementation.

Lastly, while this study focused on teachers' perceptions, examining students' learning experiences with AI technology will provide a more comprehensive understanding of AI's role in education. Comparing AI-driven teaching strategies with traditional teaching methods and its impact on students' academic performance could offer valuable insights into its effectiveness.

In conclusion, AI presents significant opportunities for transforming education. However, its successful integration requires addressing barriers related to training, support, infrastructure, and resources. By implementing targeted strategies and fostering a culture of innovation, schools can ensure that AI serves as a valuable tool for enhancing both teaching and learning experiences. Future research should continue to explore ways to maximize the potential of AI in education while ensuring ethical and equitable implementation practices.

APPENDIX
SURVEY

A 5-point Likert-scale survey adopted from Abbad (2021) study is modified and used to evaluate teachers' performance expectancy, effort expectancy, social influence, and facilitating conditions that significantly and directly affect their behavioral intentions and usage of AI.

The demographic information includes:

Variable	**Description**
Gender	Male
	Female
Age	20-25 years
	25-30 years
	31-40 years
	41-50 years
	Above 50 years
Teaching Experience	1-5 years
	6-10 years
	11-15 years
	More than 15 years
Subject Taught	Biology
	Physics
	Chemistry
	Math
	English
	Economics/Entrepreneurship
	History/Geography
	Computer
	Physical Education

The UTAUT model dimensions include:

Variables	Description of Items
Performance Expectancy	PE1: AI tools positively transform my teaching strategies PE2: AI tools improve the quality of teaching and learning PE3: Using AI helps me achieve learning objectives faster PE4: Using AI increases my productivity and efficiency as a teacher
Effort Expectancy	EE1: Using AI tools is clear and relevant EE2: I have the skills I need to use AI tools in my school EE3: Integrating AI effectively in my teaching and learning practices does not require much effort EE4: I find it easy to use AI to do what I want to do
Social Influence	SI1: The school principal and supervisors encourage me to use AI SI2: Most staff think AI tools are important SI3: My colleagues and mentors are helpful and provide valuable assistance in using AI SI4: Using AI would add to my status amongst my social network
Facilitating Conditions	FC1: I have the resources necessary to use AI in my school FC2: I have the knowledge necessary to use AI in my school FC3: Training and manuals for AI are available FC4: Technical support is available for assistance with resolving AI-related issues when needed
Behavioral Intentions	BI1: I intend to use AI tools in my teaching practices in the future
Usage Behavior	UB1: I consider myself a regular user of AI during my classroom instruction and for my class preparation

Open-ended questions:

1- What motivates or inspires you to consider using AI tools in your teaching practices?

2- What is your overall perspective on the role of AI in the future of education?

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