Perception and Attitude of High School Teachers Towards the Use of Digital Classroom Technologies in Jeddah, Saudi Arabia

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DECLARATION

I, ABDULKAREEM AHMAD ABDULLATEEF, with Student ID:10212164, hereby declare that the project work entitled Perception and attitudes of high school teachers towards the use of digital classroom technologies in Jeddah, Saudi Arabia, is a record of an original work done by me, as a result of my research effort carried out in the Department of Education, Faculty of Education, International Open University, The Gambia.



19/4/2026

Student's Signature & Date

APPROVAL PAGE

I certify that this study was carried out by Abdulkareem Ahmad Abdullateef (Student ID: 10212164) in the Department of Education, Faculty of Education, International Open University, The Gambia, under my supervision.



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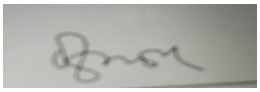
HOD **Date**



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Dr. A. A. Fawale 12/08/2026

EXTERNAL EXAMINER **Date**

DEDICATION

This work is dedicated to Almighty Allah for sparing my life and granting me the opportunity to complete this program successfully. I also dedicate it to my beloved parents, Dr Abdullateef Abdulkareem and Mrs. Saratu Shittu; my beloved wife, Mrs. Khadijah Abdulmajeed; and my son, Yusuf Ahmad.

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ABSTRACT

This research aimed to explore teachers' perceptions and attitudes regarding the utilisation of digital technologies in the classroom in high schools in Jeddah, Saudi Arabia. The sample of the study was two hundred (200) high school teachers representing both the private and the public schools of Jeddah, using a multistage sampling method. The research instrument was a structured questionnaire based on the Unified Theory of Acceptance and Use of Technology (UTAUT), with an overall Cronbach's alpha reliability coefficient of 0.971. The data were analysed using descriptive and inferential statistics, including ANOVA and independent-samples t-tests. The results indicated that educators had very positive attitudes towards the effectiveness of digital technologies on students (M = 3.83-4.09), positive attitudes towards their use (M = 3.93-4.10), and moderate real classroom use (M = 3.37-3.66), but the difference between them was significant. The most rated construct in the paper was behavioural intention to use digital technologies in the near future (M = 4.16-4.23). Poor digital equipment, lack of pedagogical training, and weak internet connectivity were identified as the main obstacles to utilisation. Digital tools training, school type, and teaching experience had a significant effect on technology adoption outcomes, whereas gender did not differ significantly across any of the outcome variables. Based on these results, it was suggested that the educational authorities should focus on equal investment in digital infrastructure, create pedagogically contextualised professional development programmes, and establish institutional cultures that actively promote and sustain the implementation of digital classroom technologies in high schools in Jeddah.

CHAPTER ONE

INTRODUCTION

Background of the Study

Digital classroom technologies are digital resources and tools that aid teaching and learning in educational settings. These technologies encompass, but not limited to learning management systems, projectors, tablets and computers but also include collaborative software and hardware that support educators and improve student learning outcomes (Singh, 2021). As education advances, these tools have become essential to contemporary teaching, enabling more interactive, tailored, and adaptable learning experiences (Alshehri, 2024). Digital classroom technologies originated with the introduction of computers into education in the late 20th century. The use of multimedia resources in teaching began in the 1980s with personal computers and became more evident in the 1990s as the internet became more widespread (Li, 2019). By the early 21st century, advancements in technology and digital literacy led many schools to establish digital learning platforms and resources that eventually reshaped education, providing virtual "second classrooms" for students (Zheng *et al*., 2019).

This shift highlights an important transition from passive to active and more engaging learning environments for learners. Despite the benefits of digital classroom technologies, significant challenges still hinder educators from adopting and effectively using them (Biletska *et al*., 2021). Studies have shown various factors that shape educators' attitudes and perceptions toward adopting digital tools into their teaching methods. For example, research indicates that teachers' ability to use digital tools plays a key role in determining their capability and readiness to incorporate technology effectively in the classroom (Canfarotta & Casado-Muñoz, 2019). Additionally, challenges such as limited resources, inadequate training, and reluctance to adopt digital technology continue to obstruct its implementation (Molotsi *et al*., 2023).

Furthermore, the incorporation of digital classroom technologies has emerged as a fundamental aspect of educational development in Saudi Arabia, particularly in light of the goals outlined in the Vision 2030 initiative. While various initiatives have been introduced, teachers' perceptions of digital technologies remain multifaceted. A recent study on teachers' views of digital citizenship

education found that while educators utilise digital tools, there is often a gap between their proficiency and confidence in successfully incorporating them into the classroom (Tangül & Soykan, 2021). This highlights a larger trend in which teachers have access to digital resources but face challenges in effectively incorporating and applying them into their daily pedagogical approach (Prodani *et al*., 2022). This review aims to contextualise these issues within Saudi Arabia's educational landscape, emphasising the importance of understanding teachers' perceptions in this specific setting to inform policy and practice.

Recognising the relationship between teachers' attitudes and the effective implementation of digital technologies highlights a major research gap in this field. Most existing studies emphasise student outcomes, often overlooking a systematic examination of teachers' perceptions and attitudes toward digital learning environments. Most of the literature suggests that teachers often feel unprepared and hesitant to use digital technologies due to insufficient support and limited resources provided by their institutions (Indahl *et al*., 2021). This hesitation is further intensified by differences in teachers' digital literacy, leading to inconsistent use of digital technologies in the classroom, ultimately affecting student engagement and learning outcomes (Hamidah, 2021).

Collectively, these results highlight the importance of comprehensive professional development programmes that enhance teachers' digital literacy and foster positive attitudes towards technology integration. It is thus critical to understand the specific perceptions, attitudes, and utilisation patterns of high school teachers in Saudi Arabia, particularly in a city like Jeddah, to develop targeted, effective interventions that support national educational objectives.

This study focuses on five major variables and their indicators, which are mainly based on the Unified Theory of Acceptance and Use of Technology (UTAUT) model (Venkatesh et al., 2003) to gain a better understanding of teachers' perceptions and attitudes towards digital classroom technologies. Performance Expectancy is the extent to which teachers think that the use of digital tools will improve their teaching effectiveness and student learning outcomes (Venkatesh et al., 2003). Effort Expectancy is the perceived ease of use of digital classroom technologies, such as how easy or difficult teachers think it is to learn and use (Venkatesh et al., 2003). Attitude is a general positive or negative attitude of teachers towards the use and integration of digital technologies in teaching (Tangül & Soykan, 2021). Actual Use is a measure of the extent to which

teachers practically use digital tools in their daily classroom activities, rather than just intention (Prodani et al., 2022). Lastly, Barriers are the factors that make it difficult to integrate technology effectively, including limited institutional support, inadequate training, insufficient infrastructure, and time constraints (Molotsi et al., 2023; Indahl et al., 2021). These variables collectively offer a holistic view of the use of digital technologies by teachers, and why, how, and what issues remain to prevent their complete integration.

Therefore, the current research aims to investigate the teachers' Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and perceived Barriers towards digital classroom technologies in Jeddah, Saudi Arabia and to analyse the differences in these constructs across teachers' demographic characteristics to provide evidence-based insights that can inform more effective and inclusive technology integration.

Statement of the Problem

The digital transformation is reshaping secondary education in Saudi Arabia. The Vision 2030 in Saudi Arabia has accelerated investment in educational technology, and schools are increasingly equipped with digital platforms, devices, and connectivity to enhance the quality of teaching and student performance (Akram et al., 2022; Alenezi et al., 2023). Nevertheless, there is limited empirical evidence on Saudi high schools, especially in Jeddah. Available literature supports the idea that the adoption of technology in Saudi high schools has been uneven, with numerous educators not using the existing tools because of the lack of infrastructure, insufficient training, and institutional support (Al-Shehri, 2020; Alenezi et al., 2023; Alghamdi & Holland, 2020; Alkinani, 2021).

The studies consistently indicate that teachers' perceptions, attitudes, confidence, and preparedness are the main factors that determine whether technology integration enhances classroom engagement and learning (Akram et al., 2022; Al-Abdullatif, 2022; Alajmi, 2022). Teachers who have Positive attitude and high-self-efficacy tends to utilize digital tools more often and in more pedagogically significant ways use digital tools, whereas low-confidence, negative-belief, and perceived-barrier teachers under utilise them (Alajmi, 2022; Alhubaishy & Aljuhani, 2021; Alkinani, 2021). Although this connection is established, the majority of empirical studies on

teacher perceptions of digital technologies have been conducted in higher education, early childhood, or non-Gulf settings (Akram et al., 2022; Al-Abdullatif, 2022; Alieto et al., 2024), which creates a gap in the evidence on the perceptions, attitudes, and actual utilisation practices of Saudi Digital reform in Jeddah is advancing at a high rate. However, no research has specifically investigated the perception, attitude, actual use of classroom technologies, and perceived barriers of high school teachers in this city (Al-Shehri, 2020; Alghamdi & Holland, 2020; Alsolami, 2022; Meccawy, 2023).

Thus, the research analyses the perceptions, attitudes, utilisation practices, and perceived barriers of high school teachers in Jeddah, and explores whether significant differences exist in demographic factors (gender, age, teaching experience, school type, and training in digital tools).

Purpose of the Study

The major aim of this study is to assess the perceptions and attitudes of high school teachers in Jeddah, Saudi Arabia, towards the incorporation and use of digital classroom technologies. Other aims of the study specifically include:

1. To assess high school teachers' perceptions of digital classroom technologies' effectiveness on students in Jeddah
2. To assess the attitudes of high school teachers towards the utilisation of digital technologies in Jeddah
3. To determine high school teachers' utilisation of digital technologies in classroom activities in Jeddah.
4. To determine the possible barriers influencing the utilisation of digital technologies among high school teachers in Jeddah.
5. To determine the relationship between teachers' demographic characteristics and the utilisation of digital technologies

Research Questions

1. What are high school teachers' perceptions of digital classroom technologies' effectiveness on students in Jeddah?
2. What are the attitudes of high school teachers towards the utilisation of digital technologies in Jeddah?
3. To what extent do high school teachers in Jeddah utilise digital technologies in their classroom activities?
4. What are the barriers influencing the utilisation of digital technologies among high school teachers in Jeddah?
5. Are there significant relationships between teachers' demographic characteristics and the utilisation of digital technologies

Research Hypothesis

Null Hypothesis

H_{01}: There is no significant difference in Performance Expectancy, Effort Expectancy, Attitude, Actual use, and Barriers to the use of digital technology based on teachers' age group.

H_{02}: There is no significant difference in Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and Barriers to the use of digital technology based on teachers gender.

H_{03}: There is no significant difference in Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and Barriers to the use of digital technology based on teachers' years of teaching experience.

H_{04}: There is no significant difference in Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and Barriers to the use of digital technology based on school type (public or private)

H_{05}: There is no significant difference in Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and Barriers to the use of digital technology based on digital technology training

Alternative Hypothesis

H_{o1}: There is a significant difference in Performance Expectancy, Effort Expectancy, Attitude, Actual use, and Barriers to the use of digital technology based on teachers' age group.

H_{o2}: There is a significant difference in Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and Barriers to the use of digital technology based on teachers' gender.

H_{o3}: There is a significant difference in Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and Barriers to the use of digital technology based on teachers' years of teaching experience.

H_{o4}: There is a significant difference in Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and Barriers to the use of digital technology based on school type (public or private)

H_{o5}: There is a significant difference in Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and Barriers to the use of digital technology based on digital technology training.

Significance of the Study

The present research is of utmost importance as it addresses an urgent gap in understanding teachers' perceptions, attitudes, and practices regarding the use of digital classroom technologies within the context of Saudi Arabia's 2030 educational reform. This will provide various stakeholders in the education sector with a comprehensive view of the current situation, helping them resolve technology implementation issues and better align their activities with the national educational objectives, thereby making the reform process more cohesive.

Teachers in high schools in Jeddah will be able to recognise their perceptions, barriers, and be informed, allowing them to reflect on these and possibly develop a more positive attitude towards technology and its more effective integration into their teaching practices. The study will equip high school teachers with practical insights and self-awareness to overcome professional and personal challenges, enhance their teaching skills, and achieve greater job satisfaction in digitally evolving educational settings.

Educational administrators and leaders will have evidence-based data to inform decisions on teacher training and resource allocation, facilitating technology adoption and improving teaching quality and classroom participation. Insights from the study will help administrators to optimise resources, design digital professional development programmes, and foster an innovative institutional culture, ultimately enhancing academic performance and stakeholder accountability.

Simultaneously, the Ministry of Education and the Vision 2030 trust will receive tailored recommendations that enable them to fine-tune the goals of the national strategy, address cited barriers related to training and infrastructure, and ensure that digital transformation across secondary schools is equitable. This study offers evidence to improve policy implementation, optimise resource distribution, and promote equity in digital education progress, thereby strengthening the achievement and sustainability of Vision 2030.

Students in Jeddah high schools will ultimately benefit from teachers' improved digital skills and effective use of technology, resulting in more interactive classrooms and higher learning outcomes. The study ultimately aims to support enriched, tailored digital learning experiences that foster critical thinking, personalised learning, and greater engagement, better equipping students with digital literacy, improving academic performance, and preparing them for future careers in a knowledge-based economy.

Scope of the Study

The study's scope is deliberately focused on a specific and relevant educational context. Geographically, the study covers public and private high schools in Jeddah, Saudi Arabia, the country's major educational centre and a place where digital reform is advancing rapidly. The study population consists of all high school teachers currently working in these schools, and the sample will be a group of teachers selected from different high schools in Jeddah using suitable sampling methods that ensure representativeness.

The constructs examined in the study included: teachers' perceptions of the effectiveness of digital technologies on student learning (Performance Expectancy), teachers' perceptions of the ease of use (Effort Expectancy), attitudes towards the use of digital technologies, actual classroom use of

digital technologies, and perceived barriers to adoption. It should be noted that the study does not directly measure students' learning outcomes; instead, it measures teachers' perceptions of how effectively they think digital technologies can help their students. A structured quantitative survey questionnaire was used to collect data.

The research is confined to the current level of digital classroom technology use by high school teachers in Jeddah, not to primary or higher education levels, to other cities in Saudi Arabia, or to the long-term longitudinal impact of the same.

Operational Definition of Terms

Digital Classroom Technologies: Digital resources and tools used by high school teachers in Jeddah, Saudi Arabia, for classroom instruction.

Perceptions: High school teachers' opinions and assessments concerning the role of digital classroom technologies in student learning outcomes, engagement, and overall educational experiences.

Attitudes: High school teachers' general feelings, dispositions, and inclinations (either positive or negative) toward the use and integration of digital technologies in their teaching practices.

Utilisation: The extent, frequency, and specific ways in which the teachers in Jeddah are using digital classroom technologies in their daily practices and instructional methods.

Barriers: Digital classroom technologies' perceived obstacles or challenges (e.g., limited infrastructure, inadequate training, technical issues, lack of resources, or personal reluctance) that impede high school teachers' effective adoption and use in Jeddah, Saudi Arabia.

Professional Development Opportunities: The training programs, workshops, courses, or initiatives offered to high school teachers in Jeddah aim at making them more digitally literate, more confident, and better able to integrate technology into their teaching.

High School Teachers: Teachers currently teaching at the high school level in Jeddah, Saudi Arabia, who participated in the study.

CHAPTER TWO

LITERATURE REVIEW

The chapter is a literature review, which is organized around five thematic areas: (1) a conceptual review of digital technologies in education; (2) the theoretical framework that underlies the current study; (3) an empirical review of relevant studies; (4) the conceptual framework of the current study; and (5) a critical appraisal of the reviewed literature. The chapter concludes with a summary of the gaps in the literature that the current study aims to fill. The literature is critically engaged throughout the review, with agreements and contradictions between studies identified, methodological limitations noted where appropriate and gaps in knowledge that motivate the present study are explicitly signposted. The purpose is not only to summarize the previous studies, but also to assess the quality, scope and applicability of the previous studies to the context of high school teachers in Jeddah.

Conceptual Review

The role of Digital Technologies in Education
Overview of Digital Technologies in the Classroom
Digital Competence and Its Impact
Current State of Digital Technology Adoption in Saudi Schools

Theoretical Review

Unified Theory of Acceptance and Use of Technology (UTAUT)
Technology Acceptance Model (TAM)
External and Internal Barriers Framework
Contextualising in the Saudi and Jeddah Context

Empirical Review

High School Teachers' Perceptions of Digital Classroom Technologies in Saudi Arabia and Similar Contexts
Attitudes of High School Teachers in Saudi Arabia and Similar Contexts Towards Digital Technologies

Utilisation of Digital Technologies in Classroom Activities

Barriers influencing the utilisation of digital technologies

Appraisal of the literature reviewed

Conceptual Review

The role of Digital Technologies in Education

Digital technologies are now in every aspect of life, and education is not an exception. The incorporation of these technologies has, in fact, restructured the educational sector, influencing the teaching and learning methodologies (Latifah *et al*., 2022). Using digital tools in education is not a new concept, but their importance in teaching and frequency of use in the classroom have become significant in recent years. Educators now use these digital tools to facilitate new learning and teaching methodologies within the classroom (Alshehri, 2024).

The emergence of education 4.0 has further boosted the move towards digital learning, highlighting the critical need for all educational systems to adopt and implement digital technologies. This approach highlights the need for enabling students to engage with learning styles that involve digital technologies, as it creates an interactive and individualised learning environment by making students involved in the learning process and overall contributing to the skills that they need to be successful in the 21st-century workplace, such as problem-solving, adaptability and critical thinking skills (Pavlidou *et al*., 2021).

Many strategies and policies have been adopted, amended, and examined in education since the development of digital technologies (Djibran *et al*., 2024). Looking back at the COVID-19 pandemic, the sudden shift to remote learning shows a significant gap in the adoption and use of digital technologies in education. It further highlights the challenges and potential benefits associated with digital technologies in education. This prompts many schools to adopt, create, and prepare to achieve digital transformation successfully (Timotheou *et al*., 2022).

Digital tools have become essential for students and educators by improving traditional forms of information to digital language and assisting in acquiring and disseminating knowledge (Yehya, 2021). Using digital tools in teaching methods can make education personalised, effective, and

accessible, ultimately improving learners' outcomes and preparing them for what they will need in the 21st-century workforce (Kalyani, 2024). However, the literature in this sub-section often depicts the relationship between digital technology and enhanced learning as unproblematic and linear. Research like Kalyani (2024) and Yehya (2021) claim benefits without considering the conditions that lead to the benefits, such as teacher competence, infrastructure adequacy, and pedagogical design. This is a well-known issue in the wider educational technology literature: conceptual and policy papers tend to present more positive results, whereas empirical studies with careful controls tend to yield more mixed or nuanced results (Timotheou et al., 2022). The current study falls within this critical tradition, acknowledging that access to digital tools is not enough to ensure better learning, and that the teacher level factors are intervening variables between the availability of digital tools and the learning outcomes in the classroom.

Overview of Digital Technologies in the Classroom

Digital technologies in the classroom have transformed the learning environment, making it even more engaging by providing teachers with new resources and tools. Tools such as educational software, tablets, computers, and interactive whiteboards have transformed the way information is disseminated, processed, and accessed in education (Jeyanthi & Sivakumar, 2011).

Online learning platforms have become widespread, offering students the opportunity to personalise their learning and learn at their own pace. All these digital technologies can make education more accessible and effective by incorporating them into the curriculum. The rapid growth of digital technology in education has created opportunities and challenges for teachers and learners, requiring us to examine its integration into the learning environment (Mhlongo *et al*., 2023).

To remove barriers and challenges to the effective incorporation of digital technologies in the classroom, a well-planned approach is required that includes teacher professional development, infrastructure upgrades, and the development of engaging, pedagogically sound digital resources (Yuliandari *et al*., 2023).

This prescription is often referenced, but the literature tends to focus on infrastructure, professional development, and resource quality as separate levers rather than on how they work together. Mhlongo et al. (2023) point out, however, that investments in technology often do not lead to new classroom practices without ongoing institutional support. This study adopts a systemic approach

to the issue by not only measuring attitudes and barriers, but also actual use, as well, and thus does not assume that positive attitudes are necessarily followed by technology integration.

Digital Competence and Its Impact

Educator's digital proficiency is another important determinant of their attitudes and perceptions. Studies have demonstrated that educators with a robust command of digital skills are more inclined to use technology effectively in their classrooms, which, in turn, leads to enhanced educational experiences for students (Tena *et al*., 2020). The Technology Acceptance Model (TAM) offers a framework for understanding how teachers use digital technologies. Research suggests that educators' views on a technology's ease of use and benefits greatly impact whether they accept it. This highlights the importance of professional development programs that address these perceptions, helping teachers gain technical skills and positive attitudes towards technology (Lehmann *et al*., 2022). Improved digital competence cultivates confidence among teachers, which is shown in the findings of Li *et al*. (2022), who reported a positive correlation between in-service educators' perceived digital competence and their more encouraging perceptions towards technology integration (Li *et al*., 2022). Additionally, Althubyani found cognitive challenges and inadequate access to technology as major obstacles that impact educators' skills and views (Althubyani, 2024).

Current State of Digital Technology Adoption in Saudi Schools

The incorporation of digital technologies within Saudi Arabia's schools has undergone a significant transformation over the past two decades, characterised by both obstacles and remarkable achievements. As the Kingdom advances towards its Vision 2030 initiative, which prioritises educational reform and the incorporation of technology in the educational landscape, it is imperative to understand the current state of this adoption process. In 2002, Saudi Arabia established a national school e-learning platform; since then, the country has made significant progress in integrating digital technologies into its education sector (Hassounah *et al*., 2020). Numerous projects have also been launched in the past few years to foster the integration of technology in classrooms. For instance, the establishment of the Future Gate Learning management system and the virtual school projects have transformed the kingdom and marked a significant shift towards a digital learning environment (Masmali & Alghamdi, 2021).

Across these conceptual domains, there is a steady tension between the accessibility of digital tools and their effective integration into classroom practice. Infrastructure investments and policy requirements have increased access, but translating access into effective pedagogical application remains uneven. This provision-practice gap is the core issue that this study aims to solve, and it indicates that teacher-level variables, such as perceptions, attitudes, competence, and barriers, are the key variables that need to be investigated. More importantly, the literature reviewed in this section is mostly policy descriptive in nature, with few studies, such as Masmali and Alghamdi (2021) and Hassounah et al. (2020), that examine the fidelity of implementation or the difference between intended and realised outcomes. In addition, most of the studies reviewed in this paper are institutional or system-level studies, and use document analysis or administrative data, not direct measurement of teacher perceptions and classroom behaviour, and most of these studies are focused on Saudi Arabia. This is an empirical blind spot at the teacher level which is directly addressed by the present study, which is quantitative and based on teacher surveys.

Theoretical Framework

This study uses the Unified Theory of Acceptance and Use of Technology (UTAUT) as its main theoretical framework to analyse how high school teachers in Jeddah view and use digital classroom technologies and what obstacles they face with these technologies. The Unified Theory of Acceptance and Use of Technology (UTAUT) provide an extensive, well-validated framework for studying educational technology adoption (Venkatesh *et al*., 2003). The four central constructs of the model, which encompass performance expectancy, effort expectancy, social influence, and facilitating conditions, offer the theoretical framework to study the intentions of teachers to use and actual use of digital technologies.

Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh in 2003, unifies multiple technology acceptance models, including the Technology Acceptance Model, the Theory of Planned Behaviour, and Innovation Diffusion Theory. UTAUT combines the strengths of earlier frameworks into a unified model that uses four essential determinants to explain technology adoption: performance expectancy, effort expectancy, social influence, and

facilitating conditions. These four constructs together account for the behavioural intention to use technology and actual technology use. (Hetharion *et al.,* 2025; Venkatesh *et al.,* 2003).

Research using UTAUT to study educational environments has demonstrated its value by showing how the model predicts technology adoption among K-12 and higher education teachers. Research on digital platforms, learning analytics, artificial intelligence tools, and new educational technologies found that performance expectancy and facilitating conditions were the primary factors determining adoption, while effort expectancy and deficiencies in institutional support posed major challenges (Tzimas & Demetriadis, 2025; Xie *et al*., 2021). The UTAUT framework is an ideal tool for analysing technology adoption patterns among high school educators in Jeddah, as their access to infrastructure, training resources, and institutional support systems varies significantly.

The study's research objectives intersect with the four UTAUT constructs, which provide an existing theoretical framework for the research. Performance expectancy refers to the effectiveness perception, describing how teachers view digital classroom technologies as tools that will enhance student learning outcomes and teaching effectiveness (Venkatesh *et al*., 2003).

This construct directly addresses Objective 1, which seeks to assess teachers' perceptions of the effectiveness of digital technologies on students. Teachers who believe that digital tools will help students better engage with class materials and achieve better academic results will develop positive attitudes toward those tools and plan to use them in their future work (Giac *et al*., 2025; Scherer *et al*., 2019). Research in Saudi educational environments showed that teachers who understand the educational advantages of digital tools are more likely to adopt them (Almulla & Adam, 2025). The study investigates how people perceive their work when using digital technologies in the work environment, while social influence measures how workplace technology usage decisions of teachers are affected by their colleagues and school administrators and educational policies (Venkatesh *et al*., 2003).

Effort expectancy and social influence, especially, influence teachers' attitudes towards educational technology (Objective 2). Teachers who find digital tools easy to use and who perceive strong encouragement from their professional community are more likely to develop favourable attitudes toward technology integration (Tzimas & Demetriadis, 2025). The combination of

complex systems that require users to spend more time and effort than they can manage, along with the absence of assistance from colleagues or managers, leads to employees developing negative perceptions of their work, which results in work refusal (Akram et al., 2022; Alieto et al., 2024).

Facilitating Conditions and Actual Utilisation (Objective 3): The term facilitating conditions includes all organisational and technical resources which enable organisations to implement technology solutions. These resources include hardware, software, technical support, training, and time allocation (Venkatesh *et al*., 2003). The specific element of the construct that governs digital technology use in educational settings is the main focus of Objective 3. Technology integration requires all necessary materials and support systems to function properly, even when teachers have positive attitudes toward their work and intend to use technology (Al-Sababha et al., 2025; Xie *et al.,* 2021). Research shows that facilitating conditions are the main factor determining how teachers utilise technology in classrooms, especially when schools have limited resources (Tzimas & Demetriadis, 2025).

Barriers to Adoption (Objective 4): The UTAUT framework recognises internal and external barriers that prevent people from adopting new technology. The barriers which stop people from using technology include their low performance expectancy because they doubt educational value, their high effort expectancy because they believe tools require excessive effort and time, their weak social influence because they lack institutional and peer support, and their poor facilitating conditions because they have insufficient infrastructure, training, and technical support. The research study investigates these barriers by examining Jeddah high school teachers and demonstrates how UTAUT's essential elements create obstacles to the effective use of digital technology.

Supporting Theoretical Perspectives

The study uses UTAUT as its main theoretical framework, with two additional frameworks: the Technology Acceptance Model (TAM), which serves as UTAUT's base model, and the External-Internal Barriers Framework, which is used to examine the enabling factors. The Technology Acceptance Model (TAM) serves as the foundation for UTAUT.

Technology Acceptance Model (TAM) as Precursor to UTAUT

The Technology Acceptance Model (TAM) developed by Davis (1989) is one of the essential frameworks that underpin UTAUT. TAM proposes that perceived usefulness (PU) and perceived ease of use (PEOU) are primary determinants of technology acceptance and actual use (Scherer *et al*., 2019). The two constructs provide the theoretical foundation for UTAUT, which measures performance expectancy through PU and effort expectancy through PEOU. The educational context research reviewed in meta-analyses found that TAM effectively predicts how teachers choose to use digital tools when they perceive these tools as valuable and easy to use (Scherer *et al*., 2019).

The UTAUT framework builds on TAM by adding social influence and enabling conditions that particularly affect adoption in both organisational and educational environments (Venkatesh *et al*., 2003). Thus, TAM is acknowledged in this study as the theoretical foundation for UTAUT, rather than as a separate, competing model. The study uses TAM to explain UTAUT because TAM would not provide a proper framework for studying technology adoption among Jeddah high school teachers, given the complex system of factors involved.

External and Internal Barriers Framework

Research on technology integration in K-12 education has identified two broad categories of barriers: external barriers, including infrastructure, access, technical support, policy, and resources; and internal barriers, including beliefs, attitudes, confidence, teaching knowledge, and self-efficacy (Xie *et al*., 2021). The framework provides a detailed view of the facilitating conditions present in UTAUT. The UTAUT model uses facilitating conditions to define technology adoption factors, whereas the barriers framework enables identification and classification of the teacher obstacles they encounter.

Research studies have shown that schools face several external barriers to successful technology integration, including a lack of appropriate devices, unreliable internet connections, inadequate technical support, and deficient professional development programs (Akram *et al*., 2022; Xie *et al*., 2021). The adoption of technology in schools faces internal barriers, which include low self-efficacy and fear of technology, resistance to pedagogical change, and negative beliefs about

technology's educational value (Akram *et al*., 2022). Research shows that educational institutions can achieve better classroom outcomes when they invest in improved infrastructure, offer targeted professional development programs, and build strong institutional support systems (Xie *et al*., 2021).

The study utilises the barriers framework, which serves as a supporting framework for investigating how insufficient facilitation conditions create external barriers through resource shortages and infrastructure deficiencies, and internal barriers through low confidence and negative belief systems. The UTAUT-based analysis benefits from this dual perspective, enabling researchers to conduct a comprehensive study of Objectives 3 and 4 and to identify the specific challenges that Jeddah high school teachers face when they attempt to use digital technology in their classrooms.

Contextualising UTAUT in the Saudi Arabian and Jeddah Educational Context

The application of UTAUT to the Saudi Arabian educational context is particularly timely and relevant, as the country is currently advancing toward digital transformation through its Vision 2030 initiative. The Saudi Arabian government has invested substantially in educational technology infrastructure to support its economic development and social modernisation plan (Alam *et al*., 2025). The country's national initiatives do not solve school problems because schools lack modern equipment, and their maintenance systems, technical support, and professional development programs face major deficiencies (Al-Sababha *et al*., 2025; Alam *et al*., 2025).

Saudi school research shows that teachers understand how digital tools can improve education, but they use them only at a moderate level in their classrooms (Alqahtani, 2024). Educators perceive value yet do not utilise educational resources because access to devices remains limited, teachers face time shortages, must follow strict curriculum guidelines, and lack administrative backing (Alqahtani, 2024; Meccawy, 2023). The research demonstrates that UTAUT's facilitating conditions construct holds crucial value for Saudi Arabia, as organisational and infrastructural support functions as the main factor in determining whether people will adopt new technologies.

Social influence continues to exert a strong impact across all educational environments in Saudi Arabia because school administrators directly control educational operations through their

hierarchical authority, which institutional leaders use to manage teacher performance (Meccawy, 2023). Teachers' decisions to adopt digital technologies are often heavily influenced by administrative expectations, policy directives, and peer norms within their schools. The social influence construct from UTAUT is particularly important for understanding how Jeddah teachers adopt new technologies.

The research presents practical results by applying UTAUT to Saudi Arabian educational systems, demonstrating that performance expectancy, effort expectancy, social influence, and facilitating conditions drive technology adoption among Jeddah high school teachers. The framework enables a systematic examination of teachers' perceptions, attitudes, usage behaviours, and barriers, while remaining sensitive to local infrastructural, cultural, and policy contexts.

The research study establishes its central theoretical basis through the Unified Theory of Acceptance and Use of Technology (UTAUT), which serves as its main theoretical framework. The UTAUT framework includes four essential elements that help researchers study how Jeddah high school teachers perceive and use digital classroom technologies, as well as the obstacles they face. The Technology Acceptance Model (TAM) serves as the original model that UTAUT builds upon, while the External-Internal Barriers Framework acts as an additional framework that enhances the study of assisting conditions. The study uses a theoretical framework which draws on research conducted in Saudi Arabia and similar educational environments to identify factors that help or hinder technology adoption by teachers in Jeddah (Hetharion *et al*., 2025; Scherer *et al*., 2019; Tzimas & Demetriadis, 2025; Xie *et al*., 2021).

An overview of the literature on UTAUT in education shows both positive and inconclusive results. Facilitating conditions and performance expectancy are consistently the most predictive of adoption across diverse settings (Scherer et al., 2019; Tzimas & Demetriadis, 2025). The importance of social influence varies significantly across institutional cultures and leadership styles, particularly in hierarchically structured Saudi schools (Meccawy, 2023). Most prior studies rely on self-report surveys without triangulation through classroom observation, limiting insights into actual technology use. This research addresses this gap by distinguishing between teachers' attitudes and their self-reported actual use. It justifies the choice of UTAUT as a suitable model for capturing these nuanced perceptions within the Saudi educational context.

Empirical Review

High School Teachers' Perceptions towards effectiveness of Digital Technologies

Empirical research in Saudi Arabia and the Gulf region has shown that the use of digital classroom technologies by high school teachers is increasingly seen as contributing to student engagement, instructional effects, and student learning outcomes. In one of the studies that explored the Digital Education Shifting (DES) model, the teachers trained in the given strategy have indicated that their learners displayed much better levels of observable and internal engagement than their counterparts in a physical classroom, which was explained by the means of more frequent student-teacher interaction, increased cooperation between learners, and the applied combination of learning activities that use real-life settings and are provided online (Aldhafeeri & Alotaibi, 2022). This observation directly challenges the belief that the nature of digital learning inherently leads to disengagement, suggesting that well-designed digital models can foster active engagement and sustained concentration among high school students (Aldhafeeri & Alotaibi, 2022).

Saudi-based studies have indicated that virtual learning spaces have a positive effect on student engagement at various levels, including attendance, participation, motivation, self-efficacy, and readiness to interact (Khafaga & Al-Johani, 2024). In these studies, teachers were positive about the role of digital technologies, saying that such tools not only help create more engagement but also reduce learning anxiety and build productive receptive language skills (Khafaga & Al-Johani, 2024). Such perceptions find reflection in the research of digital teaching-learning technologies, during which Saudi educators indicated that such apps as Kahoot!, Quizizz, and Quizlet, as well as active-way learning tools like Blackboard and Google Meet, are extremely popular among Saudi teachers regarding fostering classroom critical thinking, collaboration, and discussion (Ahmed, 2022). Teachers found these tools useful for assisting students with instruction, use of language rules, brainstorming, and problem analysis, thereby supporting various cognitive and social skills (Ahmed, 2022).

The success of digital platforms in improving teaching practices is also well documented. E.g., it was found that implementing Google Classroom in preservice teacher training in Saudi Arabia enhanced instructional design competencies and facilitated high cognitive, behavioural, and

social engagement among participating teachers (Gameil & Al-Abdullatif, 2023). The possibility to access a wide range of instructional materials, the ability to evaluate immediately, and the ability to personalise lessons in response to diverse learning requirements were all aspects of teaching that teachers found more effective and responsive (Gameil & Al-Abdullatif, 2023). On the same note, high school teachers noted that during the COVID-19 pandemic, online platforms enabled high levels of student engagement, with students showing higher engagement and satisfaction in online courses (Oraif & Elyas, 2021).

Regarding learning outcomes, educators typically recognise that digital classroom technologies can help achieve better academic results, especially in domains where interaction and visuals are beneficial (Aldhafeeri & Alotaibi, 2022; Gameil & Al-Abdullatif, 2023; Khafaga & Al-Johani, 2024). It has been demonstrated that learners in technology-enhanced classrooms show better comprehension, retention, and motivation of concepts than those in conventional classrooms (Aldhafeeri & Alotaibi, 2022; Gameil & Al-Abdullatif, 2023). Nonetheless, certain issues remain unresolved, such as the need for continuous professional development, trustworthy digital infrastructure, and clear instructions on how to reduce distractions and optimise the benefits of education (Ahmed, 2022; Aldhafeeri & Alotaibi, 2022; Gameil & Al-Abdullatif, 2023). Teachers also observed that their own digital literacy and the availability of institutional support are determinants of the efficacy of digital tools (Aldhafeeri & Alotaibi, 2022; Gameil & Al-Abdullatif, 2023).

Overall, the empirical evidence reveals that high school educators in Jeddah and other relevant settings view digital classroom technologies as useful resources that help to improve student attendance, teacher performance, and learning in the case of the presence of proper instruction and materials (Ahmed, 2022; Aldhafeeri & Alotaibi, 2022; Gameil & Al-Abdullatif, 2023; Khafaga & Al-Johani, 2024; Oraif & Elyas, 2021). In these studies, however, few differentiate between teachers' perceptions of technology's effectiveness and their actual classroom integration, which this study intentionally avoids by quantifying them as independent constructs. Another methodological criticism is that most of the studies referred to in this sub-section (Aldhafeeri and Alotaibi, 2022; Gameil and Al-Abdullatif, 2023; Oraif and Elyas, 2021) are based on small samples, typically from higher education or pre-service teacher training institutions. These sampling decisions restrict the generalizability of results to the high school context, which has its own unique pressures on teachers, such as standardized curricula, testing demands, and

adolescent classroom management. The positive perceptions reported in these studies could also be socially desirable responses and not true evaluative judgements, especially if perceptions are gathered using self-report instruments without behavioural validation. The present study recognizes this risk and cross checks attitudinal data with actual use data to identify possible over-reporting of perceptions.

Attitudes of High School Teachers in Jeddah Towards Digital Technologies

Empirical results show that high school educators in Jeddah have an overall positive attitude towards digital technologies, and 3 aspects of confidence, enjoyment, and readiness to use such technologies depend on each other and are influenced by various factors. Research indicates that teachers' confidence in utilising digital technologies is strongly associated with previous experience, self-efficacy, and the usefulness of these tools in their activities (Gaonkar, 2018; Hanifah *et al*., 2023; Li *et al*., 2018; Peng *et al*., 2024). It is often noted that enjoyment is involved, as teachers are convinced that digital platforms can make lessons more interactive and engaging for both them and their learners (Akram *et al*., 2022; Ardıç, 2021; Sellami *et al*., 2024). Nonetheless, the readiness to implement digital technologies does not coincide; it depends heavily on access to training and continuous support. Educators with focused professionalisation and institutional support for introducing the new device are more likely to adopt it, whereas teachers without such support tend to experience anxiety or hesitation (Amemasor *et al*., 2025; Cabellos *et al*., 2023; Gaonkar, 2018). It is important to note that the attitudes are not always predicted by a gender, age, and teaching experience; however, more digitally competent, more often utilising teachers report higher levels of confidence and enjoyment (Gaonkar, 2018; Hanifah *et al*., 2023; Li *et al*., 2018; Peng *et al*., 2024). As the overall picture is encouraging, adherence can only be sustained through ongoing training, enabling school conditions, and opportunities for practical experience with digital technologies. Interestingly, the attitudinal literature indicates that the effects of demographic factors such as gender and age are inconsistent, suggesting that these relationships might be context-specific rather than universal, a claim directly tested in this study in the Jeddah setting. A critical examination of this literature also shows that there is a tendency to equate attitude with intention; many studies equate a teacher's reported attitude with a positive attitude, but do not differentiate between affective attitude (enjoyment, comfort) and behavioural intention (planned future use). In theory, these are two separate constructs in the UTAUT model and the Theory of Planned Behaviour (Venkatesh et al., 2003), but they are often used

interchangeably in the studies reviewed. The present study aims to overcome this by dividing the items of the survey instrument into attitude items and behavioural intention items, which allows for a more precise examination of the attitudinal profile of the teachers in Jeddah high schools.

Utilisation of Digital Technologies in Classroom Activities

The use of digital technologies in classroom settings is inconsistent among high school teachers in Jeddah, and their use patterns depend on access, competence, and institutional support. Smartboards, learning management systems, and interactive applications are the most commonly used tools for delivering lessons, measuring, and communicating (Akram *et al*., 2022; Ardity, 2021; Cabellos *et al*., 2023; Sellami *et al*., 2024). More technologically competent and more positive towards technology, teachers have greater opportunities to explore digital tools and use student-centred teaching methods (Hanifah *et al*., 2023; Li *et al*., 2018; Peng *et al*., 2024).

Nevertheless, teacher-centred activities, such as information delivery or classroom logistics, remain among the most frequent uses of digital technologies by teachers in ways that lead students to collaborate or even be creative (Abedi, 2023; Ard, 2021; Bui, 2022). A shortage of infrastructure, inadequate access to devices, and the absence of continuous technological support represent the obstacles to wider usage (Abedi, 2023; Amemasor *et al*., 2025; Cabellos *et al*., 2023). Nevertheless, during their interviews, educators also identify the opportunity of digital technologies as a means of engaging students, motivating them, and increasing their learning opportunities, and state that they want to get more possibilities to explore new digital practices (Akram *et al*., 2022; Ardıç, 2021; Bui, 2022; Sellami *et al*., 2024). According to the literature, greater access to resources, targeted training, and a positive school culture are needed to increase the effective use of digital technologies in the high school classrooms in Jeddah. Critically, the utilisation literature shows a consistent but under-theorised paradox: teachers say they have positive attitudes and recognise the value of digital tools, but their use is shallow and teacher-centred. This is a "technology-practice gap," as Abedi (2023) puts it, because the technology is being integrated into the current pedagogical practices, instead of changing them, as it is used for presentation and content delivery, but not for student-centred or collaborative activities. This is an important discovery that has direct policy implications: it indicates that providing more devices and/or more training programs is not enough if the training does not question and rethink teachers' pedagogical beliefs. The present study examines actual use in a variety of activities from

presentation to assessment to collaboration specifically to determine if this shallow-use pattern exists among high school teachers in Jeddah and if there are differences between demographic subgroups.

Importantly, the pattern across studies shows that utilisation tends to be shallow, concentrated in presentation and content delivery rather than in student-centred or collaborative activities, which serve as a key benchmark against which this study's actual use findings are interpreted.

Barriers influencing the utilisation of digital technologies among high school teachers

Research has found that a mix of infrastructural, institutional and personal barriers greatly influences the use of digital technologies amongst Jeddah high school teachers. The digital infrastructure is quite inadequate, comprising poor internet connectivity, outdated devices, and a lack of technical support in schools (Al-Khresheh *et al.*, 2025). Public schools are most affected by these infrastructural deficits, and they are mostly located in poor areas, where funding for educational technology is allocated quite inconsistently. Thus, the COVID-19 epidemic revealed both the strengths and the weaknesses of the current e-learning systems in Saudi Arabia. The rapid transition to remote teaching highlighted the teachers' unpreparedness and the need for robust digital platforms (Hassounah *et al.*, 2020). Most teachers in Jeddah say they have received very little training in using technology pedagogically, leading them to employ digital tools only for the most basic administrative tasks rather than for innovative, student-centred learning (Alshabeb *et al.*, 2020).

The UTAUT method used in the Saudi context has revealed that performance expectancy, effort expectancy, and facilitating conditions are among the main determinants that lead to the teachers' intention to adopt digital technologies; however, anxiety and lack of experience can be the major obstacles to the actual use of technology (Alshabeb *et al.*, 2020). Moreover, professional development opportunities are frequent but not specific to the needs of high school teachers, leaving a gap in skill levels (Alhazmy, 2025). Moreover, digital inequality among students, caused by differences in home internet access and the number of devices available for use, makes teachers reluctant to use digital platforms for regular instructional activities, which could widen the gap between the educationally advantaged and disadvantaged (Miah, 2024).

Overall, the non-use of digital technologies by high school teachers in Jeddah is not due to a single factor but to the combined effects of infrastructure limitations, a lack of professional development, and institutional inertia (Alhazmy, 2025; Alshabeb *et al.*, 2020). These results indicate that barriers exist at multiple levels simultaneously, and that the intervention of one of them, such as the provision of devices without training, is unlikely to result in any significant change. This paper analyses the comparative weight of various types of barriers faced by teachers in Jeddah to inform specific policy responses. The barriers literature is not without its own methodological limitations, however. There are several studies that use qualitative or small-scale survey methods, which do not allow statistical inferences about the relative severity of the various types of barriers, such as Alshabeb et al. (2020) and Alhazmy (2025). It is difficult to tell from the literature whether, for instance, lack of training is more of a problem than lack of infrastructure, since no large-scale comparative study has measured both. This study addresses this gap by operationalising all major barrier types in one instrument and applying it to a stratified sample of 200 teachers to compare the severity of the barriers in a ranked order. Another weakness in the barrier's literature is that barriers are often conceptualized as fixed characteristics of school contexts, rather than as variables that are dynamic and can interact with teacher experience, school type and training exposure. The present study aims to do this by examining whether there are significant differences in perceived barriers between demographic subgroups, providing a more detailed and contextualised picture of the barriers teachers in Jeddah high schools face.

Conceptual Framework

Based on the UTAUT framework and the evidence discussed above, the present study will measure five constructs that are interrelated among the teachers of Jeddah high schools: Performance Expectancy (perceived effectiveness of digital technologies on student learning), Effort Expectancy (perceived ease of use), Attitude toward utilisation, Actual Use of digital technologies in classroom activities, and Perceived Barriers to adoption. Moderating variables (teacher demographic characteristics, including gender, age, teaching experience, school type, and prior digital training) are analysed to explain differences across the constructs. The framework does not suggest causal directionality among constructs. However, it considers them as theoretically related dimensions of technology adoption that can provide a comprehensive picture of the current state of digital integration in high schools in Jeddah.

Appraisal of the Literature Review

The literature reviewed in this chapter reveals considerable advances in understanding perceptions, adoption, and use of digital classroom technologies in education, especially in Saudi Arabia and other Gulf-region countries. The reviewed studies collectively confirm that teachers' perceptions, attitudes, skills, and organisational factors are critical in determining the integration of technology in schools. The conceptual, theoretical and empirical threads of the literature converge to provide a strong foundation for the current study. However, a critical analysis of this literature also highlights the methodological, contextual and conceptual gaps that the present study aims to address.

Theoretical diversity is a strength of the reviewed literature. The theoretical review successfully positioned digital technologies in the context of Education 4.0 and the global transition from passive to active learning environments. The Unified Theory of Acceptance and Use of Technology (UTAUT) stood out as a well-developed and validated model for the study of technology adoption in education, given its integration of previous models such as the Technology Acceptance Model (TAM), the Theory of Planned Behaviour, and Innovation Diffusion Theory (Venkatesh et al., 2003). The theoretical review also enhanced the study's analysis by drawing on the External-Internal Barriers Framework, which offers a more detailed categorisation of the barriers teachers face. These models provide a multi-faceted understanding of technology adoption that considers both teacher-level and organisational factors, and their use in the Saudi Arabian and Jeddah education system is appropriate in the context of the Vision 2030 reform program.

The empirical literature reviewed also has considerable strengths. Research by Aldhafeeri and Alotaibi (2022), Gameil and Al-Abdullatif (2023), and Khafaga and Al-Johani (2024) offers rich contextual insights from Saudi Arabia and the Gulf region, showing that high school teachers generally perceive the effectiveness of digital technologies on student engagement and learning outcomes to be positive. Likewise, the barriers literature, such as the studies by Alshabeb et al. (2020), Al-Khresheh et al. (2025), and Alhazmy (2025), provides a comprehensive description of the infrastructural, institutional and personal barriers to technology use in Jeddah schools. These studies are especially helpful in setting empirical baselines for comparison with the present study.

However, the literature reviewed has several limitations. First, there is a widespread methodological weakness: most studies are based solely on qualitative designs or small, single-site samples, limiting the generalisability of their findings (Ahmed, 2022; Ardıç, 2021). Few studies use quantitative or mixed-methods approaches with large enough samples to enable inferential statistical analyses across demographic factors, including age, gender, years of teaching experience, school type, and previous digital training. This constrains the ability to generalise about the factors that influence technology adoption among high school teachers in settings like Jeddah.

Second, a conceptual gap is evident in much of the empirical literature: many studies conflate teachers' perceptions of the effectiveness of digital technologies with their actual use, treating them as a single construct. As noted in the review of teacher perceptions (Aldhafeeri & Alotaibi, 2022; Gameil & Al-Abdullatif, 2023) and attitudes (Akram et al., 2022), there is a known disconnect between positive attitudes towards digital technologies and the extent and nature of their classroom use. This conflation has prevented a clear understanding of where the disconnect between positive attitudes and sustained use lies, which the present study addresses by conceptualising perceptions, attitudes, actual use and barriers as distinct, independently measured constructs using validated UTAUT-based scales.

Third, there is a gap in the literature reviewed regarding geography and context. Most empirical studies that do explore Saudi Arabian educators are either in higher education or across multiple cities, rather than specifically high school teachers in Jeddah (Al-Shehri, 2020; Alghamdi & Holland, 2020; Alsolami, 2022; Meccawy, 2023). Given the distinct nature of Jeddah's educational environment, which includes a blend of public and private schools, socioeconomic diversity, and its strategic position as a commercial city in the midst of digital transformation, local data is crucial to guide policy and practice. This lack of research represents the key empirical gap addressed by this study.

Fourth, the influence of demographic factors on technology use has been mixed in the literature. Although some studies report differences in gender, age and experience (Gaonkar, 2018; Hanifah et al., 2023; Li et al., 2018), the results are often mixed or contradictory, with gender effects in particular being context-specific. There is less research on school type (public or private) and

previous digital training as moderating factors, despite their obvious importance in resource-stratified settings like Saudi Arabia. The present study fills this gap by rigorously examining whether there are significant differences across the five measured constructs based on the demographic variables, using appropriate inferential statistical tests (ANOVA and independent-samples t-tests) on a representative sample of 200 high school teachers from public and private schools in Jeddah.

In conclusion, although the literature reviewed is rich in conceptual and theoretical development and provides empirical evidence from Saudi Arabia and the Gulf region, it is limited in its methodology, the conflation of concepts, geographical representation, and treatment of demographic variables. These limitations do not diminish the value of the existing body of knowledge; rather, they highlight the necessity of the current study. By using a large-scale, quantitative, UTAUT-informed survey design with a city-specific sample from Jeddah and treating perceptions, attitudes, use, and barriers as separate, measurable constructs, this study adds to the literature in a novel way. It offers policy-relevant, empirically based insights into the technology-adoption environment of high school teachers in one of the most educationally important cities in Saudi Arabia.

CHAPTER THREE

METHODOLOGY

In this chapter, the research design, along with the population, sample and sampling technique, instrumentation, validity and reliability of the instruments, data collection, and data analysis, are presented.

Research Design

The study employed a quantitative cross-sectional research design. A survey research approach was used, in which data were collected using a structured questionnaire to assess and measure teachers' perceptions of the effectiveness of digital technologies, attitudes towards utilisation of digital technologies, utilisation of digital technology, and barriers that may influence the utilisation of digital technologies in the classroom across the sample population of teachers.

Population

The population of this study consisted of all two thousand seven hundred and eighty-eight high school teachers (2788) in 200 public and private high schools in Jeddah, Saudi Arabia. The study covered 8 zones in Jeddah city, and teachers were sampled across the English, Arabic, and French departments. The study focused mainly on high schools that have technology such as smart boards, projectors, and other digital technology in their classroom.

Sample and Sampling Procedure

Participants for the study were selected from the 8 zones of Jeddah city using a multistage sampling technique. The sampling strategy ensured the use of multiple sampling methods, including simple random and systematic sampling. The stages of sampling include;

Stage one: Simple random sampling was used to select 5 zones from the 8 in Jeddah city.
Stage two: A simple random sampling technique was used to select 2 public and 2 private schools in each of the 5 selected zones in Jeddah city.
Stage three: A systematic random sampling technique was used to select 10 teachers in each selected school, where every fifth teacher from the school teachers' registry was selected until the

required number was reached, giving a total sample of 200 high school teachers (20 schools x 10 teachers)

Research Instruments

A formal Quantitative Questionnaire for High School Teachers in Jeddah was developed to gather data on teachers' perceptions, attitudes toward, and use of digital classroom technologies, as well as perceived obstacles to their use. The tool will be self-administered and tailored to the study, drawing on relevant literature and established technology acceptance and educational technology frameworks. (Granić & Marangunić, 2019). The survey was originally divided into four general thematic areas based on the study's specific goals; after expert review and validation, the tool was further developed into eight distinct sections with 41 items to enhance construct validity and theoretical consistency with the UTAUT framework. All questions are closed-ended and are evaluated using a five-point Likert scale that goes from Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), to Strongly Disagree (1) and also the responses format for digital technology use is adopted from Very Often (5), Often (4), Sometimes (3), Rarely (2), to Never (1) which aids quantitative analysis and at the same time, maintains the clarity of responses.

Section A: Demographic Information

Section A gathers background information on the teachers involved in the study. The variables included in this section are gender, age, highest educational degree, years of teaching experience, subject taught, school type (public or private), and prior training in digital technologies. These demographic features characterise the sample and help investigate possible patterns or differences in the perceptions and attitudes of teachers grouped by subcategories.

Section B: Teachers’ Perceptions of the Effectiveness of Digital Classroom Technologies

Section B addresses the study's first objective: to evaluate high school teachers' perceptions of the impact of digital classroom technologies on students in Jeddah. This section includes up to 8 questions that investigate teachers' perceptions of the impact of digital tools on student engagement, participation, motivation, understanding of content, academic success, and the overall quality of teaching and learning. Questions are constructed to reflect perceived benefit and

pedagogical value. Scoring higher in this section suggests that the perceptions of the effectiveness of digital classroom technologies are more positive.

Section C: Teachers' Attitudes Towards the Use of Digital Technologies

Section C addresses the second objective: to evaluate high school teachers' attitudes towards the integration of digital technologies in Jeddah. Here, the focus is on the affective and cognitive aspects of attitude, such as the teacher's confidence, enjoyment, interest, willingness to experiment with new tools, and openness to integrating digital resources into daily teaching practice. Along with these, other traits are also assessed, depending on the teachers' readiness to use the digital technologies provided for proper training and support. The questions regarding teachers' attitudes highlight the concepts of perceived ease of use, self-efficacy, and technology acceptance. The higher the composite scores in this section, the more positive the attitudes towards the digital classroom technologies.

Section D: Utilisation of Digital Technologies in Classroom Activities

Section D is connected to the third objective, which is to assess the role of digital technologies in classrooms in Jeddah schools. It is composed of items that quantify how frequently and to what extent teachers actually use a variety of digital tools (e.g., interactive whiteboards, learning management systems, educational software, online resources, tablets, and presentation tools) during their instruction. The questions inquire about how often teachers use these technologies for various purposes such as lesson delivery, assessment, student communication, and classroom management. Although the answers are given on a Likert scale, the items are phrased to reflect typical practices and actual use. A higher score in this section indicates that digital technologies are more widely used in classroom instruction.

Section E: Perceived Barriers to the Utilisation of Digital Technologies

Section E is linked to the fourth objective of the study, which is to investigate potential barriers to the use of digital technologies among high school teachers in Jeddah. The section includes a set of questions that examine various constraints, such as a lack of infrastructure, limited access to devices or the internet, inadequate technical support, limited time, few training opportunities, large class sizes, and school policy issues. Moreover, it examines personal issues such as low self-esteem, reluctance to change, and fear of technology. The questions are intended to highlight the

most significant hindrances to effective integration of digital technologies. Higher scores in this section indicate a stronger perception of barriers.

Scoring and Validation

Each main section (B-E) provides a subscale score, derived by either summing or averaging the individual answers. In Sections B, C, and D, higher scores indicate more positive perceptions, attitudes, and utilisation, respectively, whereas higher scores in Section E indicate stronger perceived obstacles.

Validity of the instrument

To confirm both the face and content validity of the questionnaire, the instrument was reviewed by a panel of four experts: my supervisor (Prof. Ambreen), a specialist in educational technology, a master's in measurement and evaluation, and a working school administrator. The draft questionnaire was emailed to each expert, along with a cover letter explaining the study's purpose, objectives, target population, and the constructs measured.

The evaluators assessed the items based on their relevance, clarity, comprehensiveness, redundancy, and theoretical alignment. The review process identified critical issues, including misalignment between the Performance Expectancy and Effort Expectancy constructs, combining attitude, intention, and anxiety items, double-barreled items, missing timeframes for usage items, and inconsistent contextual references.

All the reviewers' recommendations were incorporated into the instrument. The main modifications involved splitting Performance Expectancy into 8 items, Effort Expectancy into 4 items, and dividing attitude into three sections: Attitude (6 items), Behavioural Intention (3 items), and Technology Anxiety (3 items). Utilisation was divided into Intention and Actual Use, comprising 8 items with a 4-week timeframe. Double-barreled and reverse-coded items were removed, and standardised instructions were established for the Saudi Arabian context. These comprehensive revisions strengthened the theoretical alignment of the UTAUT framework and improved clarity by eliminating unclear elements, making the assessment easier for participants.

The final instrument contains eight clearly defined sections with 40 items, enhancing both construct validity and psychometric performance.

Reliability of the instrument

A pilot test was conducted with 10% (20) of the actual sample size of high school teachers outside the main study area, and reliability analysis using Cronbach's alpha was employed to determine the internal consistency of each section, with coefficients at or above the acceptable threshold of 0.70. The instrument passes the reliability test with an overall Cronbach's alpha of 0.971.

Table 3.1: Cronbach's alpha reliability test

Sections		Sub-section	Cronbach's alpha	No of Item
B	Perceptions of Digital	Performance Expectancy	0.969	7
	Technologies' Effectiveness	Effort Expectancy	0.992	4
	Overall	PE & EE	0.980	11
C	Attitudes toward Utilisation	Attitude	0.981	6
	of Digital Technologies	Technology Anxiety	0.964	3
	Overall	A & TA	0.926	9
D	Utilisation of Digital	Actual Use	0.991	8
	Technologies	Behavioural Intention to Use	0.986	3
	Overall	AU &BIU	0.986	11
E	Barriers to the Utilisation of Digital Technologies		0.886	9
General Overall			0.971	40

Procedure for Data Collection

The questionnaire was administered online through WhatsApp groups of teachers in the sampled high schools. The online survey was distributed to the group administrators in both public and private schools, who then sent the link to their members. The involvement was voluntary, and responses were collected over 4 weeks. A total of 200 questionnaires were sent, of which 200 were returned and completed, yielding a 100% response rate.

Method of Data Analysis

The statistical analysis of the data obtained in the study survey was performed using descriptive and inferential statistics. The demographic characteristics of the participating teachers were summarised using descriptive statistics, such as frequency counts and percentages. Each subscale was analysed using mean scores and standard deviations to answer Research Questions 1-4, providing a general picture of teachers' perceptions, attitudes, utilisation, and perceived barriers to digital classroom technologies. Inferential statistical analyses were conducted to answer Research Question 5 and test the five research hypotheses (H01-H_{05}). The differences in outcome variables among groups with three or more categories were analysed using one-way Analysis of Variance (ANOVA) to compare group differences. The independent-samples t-test was used to test differences between male and female teachers. The statistical significance was defined as $p < 0.05$. All analyses were conducted in SPSS.

Ethical Consideration

Ethical approval was sought and obtained from the Directorate of Research and Publication, International Open University, with Ref. No. ETHICS/19/08-25. The study upheld ethical standards to protect participants and maintain integrity, supporting the quantitative cross-sectional design and objectives.

Informed Consent

Informed consent was obtained from all participants. Written explanations of the study's purpose, procedures, minimal risks, and benefits were provided. Participation was voluntary, and teachers were free to withdraw at any time without penalty.

Confidentiality

Confidentiality was ensured by assigning unique ID codes to participants in place of personal identifiers. Data were stored on password-protected devices accessible only to the research team and will be discarded five years after the study in line with ethical norms.

Conflict of Interest

No conflict of interest existed in this research study. The study was conducted for academic purposes only, with no financial or personal gain influencing the research process or outcomes.

CHAPTER FOUR

RESULTS AND DISCUSSION

The chapter presents both the findings of the quantitative data analysis and a thorough discussion of the research findings gathered from a sample of 200 high school teachers in Jeddah, Saudi Arabia. The research objectives include: (1) how effective teachers feel the use of digital classroom technologies is for students; (2) the attitudes teachers hold toward the use of digital technologies; (3) the degree and the nature of actual use of digital technology in classroom activities; and (4) the perceived barriers affecting the use of digital technology. The paper contains descriptions and inferences about the statistics applied by researchers to assess the existing literature within the theoretical framework of the Unified Theory of Acceptance and Use of Technology (UTAUT).

Demographic Data of the Respondents

This section presents the respondents' data in percentages.

Table 4.1: Respondent information

Respondents' information	Frequency n=200	Percentage (%)
Age group		
20-30	66	33.0
31-40	90	45.0
41-50	39	19.5
51-60	5	2.5
Sex		
Male	113	56.5
Female	87	43.5
Years of experience		
Less than 5 years	56	28.0
5-10 years	50	25.0
11-15 years	58	29.0
More than 15 years	36	18.0
School type		
Private	69	34.5
Public	131	65.5
Training in digital tools		
Yes	168	84.0
No	32	16.0

The 200 respondents' demographic profile reveals that nearly half, 90 (45.0%), are between 31 and 40 years old. Out of these, over half, 113 (56.5%), are male teachers. Regarding professional background, the distribution of teaching experience is fairly balanced, with the majority (58, 29.0%) of teachers having between 11 and 15 years of teaching experience. Moreover, nearly two-thirds, 131 (65.5%), of the respondents teach in public schools, and the majority, 168 (84.0%), reported being trained to use specific digital tools.

Answering Research Questions

Research Question One: What are high school teachers' perceptions of digital classroom technologies' effectiveness on students in Jeddah?

Table 4.2: Performance Expectancy (PE)

Variables	Mean (M)	Std. Deviation (SD)
Using digital classroom technologies improves my students' academic performance.	4.09	0.67
Digital technologies help my students understand complex concepts more easily.	4.00	0.61
Digital tools increase my students' motivation and interest in learning.	3.88	0.50
Digital classroom technologies make lessons more engaging and interactive for students.	3.93	0.55
Digital technologies enable me to provide more effective assessment and feedback to my students.	3.83	0.50
Using digital technologies helps my students develop critical thinking skills.	3.89	0.51
Using digital technologies helps my students develop collaboration skills.	3.88	0.48

Table 4.2 presents teachers' perceptions of the effectiveness of digital classroom technologies for students. All items recorded mean scores above 3.80, indicating a generally high level of agreement. The highest-rated item was the belief that digital classroom technologies improve

students' academic performance (M = 4.09, SD = 0.67), followed by the view that digital technologies help students understand complex concepts more easily (M = 4.00, SD = 0.61). These findings suggest that respondents generally perceive digital technologies as beneficial for student learning and engagement.

Table 4.3: Effort Expectancy (EE)

Variables	Mean	Std. Deviation
Learning to use new digital classroom technologies is easy for me.	3.89	0.50
I find it easy to integrate digital teaching tools into my lessons.	3.87	0.46
It is easy for me to become proficient with digital classroom technologies.	3.88	0.47
I find most digital teaching platforms user-friendly and straightforward.	3.87	0.46

Table 4.3 indicates that teachers have a great deal of confidence in the ease of use of digital technologies. The average results between 3.87 and 3.89 indicate that teachers consider learning and their combination with these tools to be an easy task. It is worth noting that standard deviations below 0.50 indicate a high degree of consistency, as teachers consistently view digital platforms as convenient and fast for learning.

Research Question Two: What are the attitudes of high school teachers towards the utilisation of digital technologies in Jeddah?

Table 4.4: Attitudes toward Utilisation of Digital Technologies

Variables	Mean	Std. Deviation
I enjoy using digital technologies in my teaching.	4.10	0.67
I would recommend using digital classroom technologies to other teachers.	4.09	0.67
I feel confident about integrating new digital tools into my teaching.	3.93	0.54
Using digital technologies in my classes is a good idea.	4.10	0.67
I believe digital technologies are essential for modern teaching.	4.09	0.67
I am willing to invest time to learn new digital classroom technologies.	3.93	0.54

According to Table 4.4, teachers show a positive attitude towards digital technology. The teachers also showed high scores in enjoying (M = 4.10, SD = 0.67) and strongly agreeing that employing such tools is a good idea (M = 4.10, SD = 0.67). Although the scores for belief in the integration of new tools and readiness to devote time to learning new tools (M = 3.93) are also high, the increased importance of technology (M = 4.09) indicates that teachers consider digital tools a necessity for the new educational method.

Table 4.5: Technology Anxiety

Variables	Mean	Std. Deviation
I feel anxious when I have to use unfamiliar digital technologies in the classroom.	2.97	0.33
I worry that I might make mistakes when using digital technologies in front of students.	2.99	0.30
Using digital technologies makes me feel uncomfortable or stressed.	3.03	0.22

Table 4.5 shows that the respondents reported moderate, stable levels of technology anxiety across all three items. The mean scores ranged from 2.97 to 3.03, with standard deviations of 0.22 to 0.33,

indicating a close similarity in the level of caution when using unknown digital technologies in the presence of students. Although teachers do not complain of high anxiety, this average and steady trend suggests that there is an underlying current of apprehension, which could moderate the transfer of positive attitudes into assured classroom practice.

Research Question Three: To what extent and in what ways do high school teachers in Jeddah utilise digital technologies in their classroom activities?

Table 4.6: Actual use of digital technologies

Variables	Mean	Std. Deviation
In the last 4 weeks, I used presentation tools (e.g., PowerPoint, interactive whiteboards) during my lessons.	3.66	1.17
In the last 4 weeks, I used learning management systems or digital platforms (e.g., Madrasati, LMS, Google Classroom) to share materials with students.	3.42	1.14
In the last 4 weeks, I asked students to use digital tools to complete assignments or projects (e.g., documents, slides, videos).	3.48	1.10
In the last 4 weeks, I used digital assessment tools (online quizzes, digital tests, e-portfolios) to evaluate students' learning.	3.37	1.09
In the last 4 weeks, I used digital technologies to provide students with feedback (e.g., online comments, digital rubrics).	3.52	1.09
In the last 4 weeks, I communicated with students about classwork via digital channels (e.g., platforms, email, and approved messaging apps).	3.47	1.09
In the last 4 weeks, I integrated subject-specific digital resources (simulations, educational apps, videos) into my lessons.	3.4	1.13
In the last 4 weeks, I used digital technologies to support collaborative student activities (e.g., group documents and discussion forums).	3.43	1.10

The findings indicate that digital tools were used moderately in the classroom over the last four weeks, with means ranging from 3.37 to 3.66. The most frequently used tools were presentation tools such as PowerPoint and interactive whiteboards (M = 3.66, SD = 1.17), which ranked second in popularity, followed by digital communication with students (M = 3.52, SD = 1.09). Nevertheless, the standard deviations of all usage variables are also quite high (SDs greater than 1.0), indicating a lack of agreement.

Table 4.7: Behavioral intention to utilize digital technology

Variables	Mean	Std. Deviation
I intend to increase my use of digital technologies in my teaching in the near future.	4.23	0.74
I plan to integrate digital tools into my lesson planning regularly.	4.18	0.72
I will try new digital teaching methods in my classroom in the coming months.	4.16	0.71

The finding indicates that the desire to use digital tools more (M = 4.23, SD = 0.74) and to include digital tools in the regular lesson plan (M = 4.18, SD = 0.72) became very high among the teachers. The standard deviations are not high, suggesting that most respondents will use more digital approaches.

Research Question Four: What are the possible barriers influencing the utilisation of digital technologies among high school teachers in Jeddah?

Table 4.8: Barriers to the Utilisation of Digital Technologies

Variables	Mean	Std. Deviation
My school lacks sufficient digital equipment (computers, tablets, projectors, and interactive boards).	3.41	0.76
Internet connectivity at my school is unreliable or too slow for effective classroom use.	3.35	0.71
I do not receive enough technical support when digital technologies do not work properly.	3.14	0.47
I have not received sufficient training in using digital technologies effectively in teaching.	3.39	0.57
I do not have enough time to prepare lessons that effectively integrate digital technologies.	3.23	0.49
The digital systems and platforms I am expected to use are too complex or difficult to use.	3.11	0.38
The curriculum and examinations leave little flexibility for using digital classroom technologies.	3.10	0.46
I am concerned that using digital technologies may cause classroom management problems (e.g., distraction, off-task behaviour).	3.09	0.45
The school leadership does not strongly encourage or support the use of digital classroom technologies.	3.07	0.45

Table 4.8 includes key barriers to digital adoption, with the most significant ones being institutional factors. The top barriers mentioned were the insufficiency of digital equipment (M = 3.41, SD = 0.76) and the lack of training (M = 3.39, SD = 0.57). Furthermore, all the items associated with flexibility of curriculum, classroom management, and school leadership reported the close means (M = 3.07-3.10) and standard deviations (SD = 0.45-0.46).

Answering the Research Hypothesis

Research Hypothesis One: Is there a significant difference in Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and Barriers based on teachers' age groups?

The following tables present the results of ANOVA and independent samples t-test analyses conducted to examine group differences in five outcome variables, which include Performance Expectancy (PE), Effort Expectancy (EE), Attitude toward utilisation (AT), Actual Use (AU), and Barriers to utilisation (BA) across teacher demographic and professional characteristics. Results are expressed as mean ± standard deviation. Values marked with an asterisk (*) indicate statistically significant group differences at $p < 0.05$.

Table 4.9: Association between the age group and outcome variables

Age group	N	PE	EE	AT	AU	BA
20-30	66	3.84±0.63	3.87±0.65	4.03±0.76	3.13±1.36*	3.47±0.37
31-40	90	3.95±0.37	3.89±0.32	4.07±0.5	3.63±0.85*	3.41±0.31
41-50	39	3.98±0.47	3.85±0.37	3.98±0.52	3.71±0.89*	3.53±0.3
51-60	5	4.26±0.83	3.80±0.45	4.07±0.68	3.30±1.32*	3.47±0.09
F		1.65	0.12	0.20	3.63	1.27
df		3, 196	3, 196	3, 196	3, 196	3, 196
p-value		0.179	0.948	0.895	0.014*	0.285

No statistically significant differences were noted in PE, EE, AT, or BA over the four age groups (20-30, 31-40, 41-50, and 51-60). Actual use (AU), however, showed a significant relationship with age group across all categories. The highest mean utilisation was reported by teachers aged 41-50 (3.71 ± 0.89), followed by 31-40 (3.63 ± 0.85), and the youngest group (20-30) demonstrated the lowest mean utilisation (3.13 ± 1.36). The observation that actual usage is highest among teachers aged 41-50, rather than the youngest group, contradicts the popular belief that younger, digitally native teachers are inherently more active technology integrators. It is more likely that mid- to senior-career teachers have gained both pedagogical confidence and familiarity with the institution. Although digitally fluent, the youngest teachers (2030) might experience more anxiety regarding classroom management and making mistakes in front of students, which the data on

technology anxiety in this study also indicate. The high standard deviations in the youngest and oldest age groups indicate substantial within-group variation that warrants further investigation.

Research Hypothesis Two: Is there a significant difference in these variables between male and female teachers?

Table 4.10: Association between the teacher's gender and outcome variables

Gender	PE	EE	AT	AU	BA
Male (n=113)	3.94±0.52	3.88±0.47	4.05±0.6	3.48±1.1	3.46±0.3
Female (n=87)	3.91±0.48	3.86±0.46	4.03±0.61	3.46±1.06	3.46±0.37
t	0.53	0.26	0.15	0.11	0.08
df	198	198	198	198	198
p-value	0.599	0.797	0.879	0.911	0.934

An independent samples t-test showed that there were no statistically significant differences between male (n = 113) and female (n = 87) teachers on any of the five outcome variables (all $p > 0.05$). The mean scores of both groups were almost identical across all constructs (e.g., PE: 3.94 vs 3.91; AU: 3.48 vs 3.46), suggesting that gender is not a major distinguishing factor in perceptions, attitudes, utilisation, or perceived barriers to teachers' use of digital technologies in this sample.

Research Hypothesis Three: How do teachers' years of teaching experience affect their Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and Barriers?

Table 4.11: Association between the teachers' years of experience and outcome variables

Years of experience	PE	EE	AT	AU	BA
< 5 years (n=56)	3.86±0.65*	3.9±0.68	4.04±0.77	3.17±1.39*	3.5±0.39*
5-10 years (n=50)	3.79±0.43*	3.78±0.42	3.94±0.59	3.27±1.03*	3.34±0.33*
11-15 years (n=58)	4.04±0.28*	3.97±0.18	4.16±0.4	3.84±0.52*	3.47±0.23*
> 15 years (n=36)	4.03±0.58*	3.81±0.4	3.99±0.59	3.62±1.1*	3.55±0.33*
F	3.11	1.78	1.33	4.82	3.52
df	3, 196	3, 196	3, 196	3, 196	3, 196
p-value	0.027*	0.152	0.265	0.003*	0.016*

Teaching experience revealed that PE, AU, and BA yielded significant associations, whereas EE and AT did not. The highest mean PE (4.04 ± 0.28) and AU (3.84 ± 0.52) scores were measured in teachers with 11-15 years of experience; the lowest AU (3.17 ± 1.39) was measured in teachers with less than 5 years of experience. Equally, teachers who had 5-10 years of experience had the lowest PE (3.79 ± 0.43). In terms of barriers (BA), the teachers who were of early career age (< 5 years: 3.50 ± 0.39) showed relatively higher barriers than the mid-career teachers (5-10 years: 3.34 ± 0.33), with senior teachers demonstrating 3.55 ± 0.33. These results indicate that teaching experience can be important in how teachers think about and use digital technologies, with mid-career teachers (11-15 years) becoming the most confident and active users.

Research Hypothesis Four: Does school type (public or private) result in significant differences in teachers' Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and Barriers?

Table 4.12: Comparison between the type of school and outcome variables

School type	PE	EE	AT	AU	BA
Private (n=69)	4.11±0.38	4.03±0.34	4.36±0.50	4.01±0.64	3.55±0.31
Public (n=131)	3.83±0.54	3.79±0.50	3.87±0.58	3.18±1.15	3.41±0.33
t	3.73	3.71	5.92	5.52	3.04
df	198	198	198	198	198
p-value	<0.001*	<0.001*	<0.001*	<0.001*	0.003*

Table 4.12 indicates that the five outcome variables were significantly related to school type. Private school teachers consistently reported higher mean scores than their public school counterparts across PE (4.11 vs 3.83), EE (4.03 vs 3.79), AT (4.36 vs 3.87), AU (4.01 vs 3.18), and BA (3.55 vs 3.41). It is also worth noting that perceived barriers were slightly higher among teachers in private schools (3.55 vs 3.41). This could indicate greater sensitivity to constraints than expected in resource-abundant settings, rather than increased hindrance, a trend consistent with rising expectations as exposure to technology increases.

Research Hypothesis Five: To what degree does previous training influence significant differences in teachers' Performance Expectancy, Effort Expectancy, Attitude, Actual Use, and Barriers

Table 4.13: Association between training in digital tools and outcome variables

Training	PE	EE	AT	AU	BA
Trained (n=168)	4.10±0.34	4.03±0.30	4.23±0.44	3.83±0.69	3.50±0.28
Not Trained (n=32)	3.03±0.18	3.03±0.18	3.00±0.14	1.56±0.68	3.25±0.47
t	17.36	18.42	15.22	17.25	3.97
df	198	198	198	198	198
p-value	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*

Table 4.13 indicates that the most consistent and statistically significant differences were observed across all five outcome variables for training in digital tools. Trained teachers (n = 168) reported

substantially higher mean scores on PE (4.10 vs 3.03), EE (4.03 vs 3.03), AT (4.23 vs 3.00), and AU (3.83 vs 1.56) compared to untrained teachers (n = 32). The most notable difference was in the Actual Use, where trained teachers reported more than one full-scale point higher. Perceived barriers had a smaller yet significant difference. The results of these studies provide solid empirical evidence that structured professional development in digital tools is one of the most direct and effective levers for enhancing the outcomes of technology adoption among high school teachers.

Discussion of the Findings

The findings of Research Question One indicated that Jeddah high school teachers held a very positive attitude towards the impact of digital classroom technologies on student learning. This implies that teachers believe digital technologies enhance student learning outcomes, motivation, critical thinking, and classroom engagement and interactivity. This is consistent with Aldhafeeri and Alotaibi (2022), who found that the use of digital technology improved student engagement and learning outcomes in Saudi high schools. Likewise, Gameil and Al-Abdullatif (2023) reported that teachers in Saudi digital learning environments believed that technology has a positive impact on teaching effectiveness and student performance. The UTAUT model suggests that performance expectancy is one of the strongest predictors of intention to use technology (Venkatesh et al., 2003). The fact that all items in this study measuring Performance Expectancy had mean scores greater than 3.80 and standard deviations less than 0.70 suggests that this key attitudinal prerequisite for widespread adoption is already well established among the study participants. In their systematic review, Akram et al. (2022) also found that teachers who believe technology is useful for their students' learning are more likely to use it regularly and creatively. This is therefore a positive result, as it indicates that the cognitive and evaluative precondition for more advanced technology integration is already in place among high school teachers in Jeddah.

The findings of Research Question Two show that Jeddah's high school teachers generally have a positive attitude towards the use of digital technologies in the classroom. This implies that most teachers find using digital technologies enjoyable, believe their use is a good pedagogical decision, consider digital technologies necessary for teaching, and feel confident in using new digital resources in their teaching. This result is consistent with Khafaga and Al-Johani (2024), who found that teachers in Saudi schools have significantly positive attitudes towards digital

integration, and with Sellami et al. (2024), who observed similar positive attitudes in school environments. Theoretically, these findings align with the UTAUT model, which suggests that positive attitudinal factors are highly associated with higher behavioural intention and, in turn, with greater technology use (Venkatesh et al., 2003). Al-Shehri (2020) also suggested that attitudinal readiness among Saudi teachers is a critical prerequisite for successful digital reform and that policy reform efforts are more likely to succeed when they build on positive dispositions rather than trying to establish them. However, the results also showed a moderate, almost universal level of technology anxiety across the three anxiety items (M = 2.97-3.03, SD = 0.22-0.33), suggesting that many teachers experience some level of anxiety about using new technologies in front of their students despite their positive dispositions. Similarly, Alshabeb et al. (2020) and Alieto et al. (2024) found that technology anxiety can moderate actual use, even among teachers with otherwise positive attitudes, and that professional development must focus on confidence-building and emotional readiness in addition to technical skills.

The findings of Research Question Three showed that the use of digital technologies in the teaching and learning process in Jeddah high school is moderate. This suggests that while teachers are using digital technologies, they are doing so in a limited way, focusing on low-risk, teacher-centred applications such as presentation tools (PowerPoint, interactive whiteboards) rather than more innovative, student-centred applications such as collaborative digital activities, digital assessment, or subject-specific simulations. This aligns with Akram et al. (2022) and Bui (2022), who also reported that teachers in similar settings tended to use technology as an adjunct to traditional teaching methods rather than as a transformative tool. Cabellos et al. (2023) also observed that moderate levels of utilisation, such as these, are often associated with a transitional stage in technology integration, where teachers have achieved basic proficiency but have yet to receive the necessary support to move to more sophisticated and student-centred uses. The high standard deviations across all utilisation items (SD > 1.0) suggest considerable variability within the sample, with some teachers using digital tools frequently and others rarely or never, which is in line with Meccawy's (2023) finding that institutional and contextual factors are the main sources of variability in actual classroom technology use in Saudi schools. Interestingly, the study also found that teachers have very high behavioural intentions to increase their use of digital tools in the coming months (M = 4.16-4.23), which suggests a gap between current moderate utilisation

and future ambitions. This implies that rapid and widespread increases in utilisation are possible if the structural factors currently limiting teachers are removed.

The finding of Research Question Four was that the most significant factors affecting the use of digital technologies among Jeddah high school teachers are institutional and infrastructural. This suggests that teachers are primarily limited by the lack of digital equipment in schools and by inadequate pedagogical training, rather than by their own attitudes or unwillingness to use technology. This is consistent with Al-Khresheh et al. (2025), who also reported high levels of infrastructure inadequacy in the Saudi English Language Teaching context, with equipment inadequacy and connectivity being the most frequently mentioned barriers to the effective integration of digital technologies. Hassounah et al. (2020) also reported significant structural weaknesses in Saudi Arabia's e-learning infrastructure, noting that institutional rather than teacher attitudes are the biggest barriers to technology integration in the national education system. Most notably, the training barrier: while 84% of respondents reported receiving some form of digital training, the majority still considered training adequacy a significant barrier, suggesting that the problem lies not in the amount of training but in its quality and relevance. This point is supported by Alhazmy (2025) and Alshabeb et al. (2020), who suggested that training that focuses solely on the technical aspects of technology use, without considering how to integrate digital technologies into the classroom, is ineffective at bridging the attitude-to-practice gap. Taken together, these findings confirm the model proposed by Xie et al. (2021), in which extrinsic barriers to technology integration suppress it regardless of positive teacher attitudes, and highlight the need for a holistic institutional and policy response that extends beyond hardware provision.

The finding of Hypothesis One showed that age group was significantly related to Actual Use of digital technologies ($F = 3.63$, $p = 0.014$), but not to Performance Expectancy, Effort Expectancy, Attitude, or Barriers. This suggests that while teachers of all ages have similar perceptions, attitudes and barriers, their actual use of digital technologies in the classroom varies significantly. Notably, the highest actual use was reported by teachers aged 41–50 ($M = 3.71 \pm 0.89$), followed by those aged 31–40 ($M = 3.63 \pm 0.85$), while the youngest group (aged 20–30) reported the lowest mean actual use ($M = 3.13 \pm 1.36$). This runs counter to the popular belief that younger, "digital native" teachers are the most active technology users and suggests that pedagogical self-efficacy and institutional familiarity are more important than digital nativity. This

finding aligns with Alieto et al. (2024) and Peng et al. (2024), who reported that institutional contextual factors and teaching experience were better predictors of actual technology use than digital nativity. The large standard deviations for the youngest (SD = 1.36) and oldest (SD = 1.32) age groups also suggest significant variability within these groups, indicating that age is not a reliable predictor of professional development.

The findings of Hypothesis Two showed there was no difference in Performance Expectancy, Effort Expectancy, Attitude, Actual Use, or Barriers between male and female teachers (all $p > 0.05$). This suggests that gender is not a significant differentiating factor in teachers' perceptions, use, or barriers to using digital classroom technologies in this study, with the mean scores for male and female teachers being almost identical for all five constructs. This result is consistent with Alieto et al. (2024) and Peng et al. (2024), who also found that gender differences in technology-related outcomes are likely to be reduced or eliminated when institutional and professional training factors are taken into account. Al-Abdullatif (2022) also found no gender differences in technology acceptance and attitude among Saudi teachers, indicating that the professional culture of technology use in Saudi schools is relatively gender-neutral in terms of attitude. This finding suggests that gender-specific policy interventions are not the highest priority for improving technology integration in Jeddah high schools, and that it would be better to focus on the institutional and structural barriers identified in Research Question Four.

The finding of Hypothesis Three showed that teaching experience was significantly related to Performance Expectancy ($F = 3.11$, $p = 0.027$), Actual Use ($F = 4.82$, $p = 0.003$) and Perceived Barriers ($F = 3.52$, $p = 0.016$), but not to Effort Expectancy or Attitude. This indicates that teachers' beliefs about the effectiveness of digital technologies and their actual classroom use of these technologies are significantly influenced by their years of teaching experience, but not in a linear way. Teachers with 11-15 years of experience reported the highest Performance Expectancy ($M = 4.04 \pm 0.28$) and the highest Actual Use ($M = 3.84 \pm 0.52$), suggesting that this mid-career group is the most confident and frequent technology users. This result was corroborated by Tye and O'Brien (2012), who concluded that mid-career teachers are the most adaptable because they have the confidence to try new pedagogical technologies without feeling professionally threatened. Teachers with less than 5 years of experience reported the lowest Actual Use ($M = 3.17 \pm 1.39$), despite their likely digital proficiency, suggesting that early-career teachers may not have the

classroom management security to integrate technology-intensive lessons without fear. Luthans (2015) also suggested that professional self-efficacy, rather than technical skills, is the key determinant of whether employees translate positive attitudes into workplace behaviours. This principle can be applied to the early-career technology integration gap identified in this study. These results have clear implications for the design of professional development: mid-career teachers can mentor others in the use of digital technology. In contrast, early-career teachers need more classroom-based support to build confidence in their use of digital technology.

The findings of Hypothesis Four showed that school type (public vs private) was significantly related to all five outcome variables, including Performance Expectancy, Effort Expectancy, Attitude, Actual Use and Barriers (all $p < 0.001$ or $p = 0.003$). This indicates that private school teachers consistently reported more positive perceptions, more favourable attitudes, higher actual use, and higher perceived barriers than public school teachers, consistent with the moderating effect of institutional resources on technology adoption outcomes. This result aligns with Alghamdi and Holland (2020), who reported considerable differences in ICT integration between public and private school systems in Saudi Arabia, attributing them to differences in access to devices, technical support, and institutional leadership. Alajmi (2022) also found that institutional digital leadership is a key predictor of teacher technology use, with schools that have leaders who actively promote and support digital integration achieving higher levels of teacher technology use. The marginally higher perceived barriers among private school teachers ($M = 3.55$ vs 3.41 in public schools) is an interesting finding that may reflect greater sensitivity to perceived constraints in a more well-resourced environment, rather than greater actual barriers. This phenomenon is consistent with higher expectations as teachers become more familiar with technology and its potential. These findings have significant equity implications, as they show that while positive teacher attitudes are a necessary prerequisite for technology adoption, they are not sufficient; the institutional environment must offer commensurate resources, support and leadership to translate positive attitudes into regular classroom practice.

The finding of Hypothesis Five showed that training in digital tools was the most important demographic variable, with significant differences in all five outcome measures: Performance Expectancy, Effort Expectancy, Attitude, Actual Use and Barriers (all $p < 0.001$). This means that teachers who had been trained in the use of digital tools significantly outperformed their untrained

peers in all five dimensions of technology adoption, with the greatest difference in Actual Use, where the mean score of trained teachers was more than two full-scale points higher than that of untrained teachers (M = 3.83 vs M = 1.56). This result is well supported by Amemasor et al. (2025), whose systematic review found that professional development is one of the most direct and consistent ways to promote technology adoption in schools, with trained teachers showing significantly greater confidence, usage and pedagogically meaningful integration of digital tools. Likewise, Alhazmy (2025) stressed that the quality and pedagogical relevance of training programs are crucial, noting that generic technical training that fails to address subject-specific applications and classroom management issues results only in marginal improvements in teacher practice. Spector (2017) also noted that training that links new skills to teachers' professional identity and classroom priorities has a greater, more sustained impact on behaviour change than training perceived as imposed or irrelevant to classroom practice. These findings offer strong empirical support for prioritising high-quality, pedagogically focused digital training as a national infrastructure priority in Saudi Arabia, alongside the provision of hardware and internet access, and as the most actionable, short-term solution to accelerate the integration of technology in Jeddah's high schools.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The chapter summarises the main findings of the research, explains their implications on educational practise and policy, and makes evidence-based suggestions to the relevant parties. It ends with a reflective conclusion, the recognition of the study's limitations, and future research directions.

Summary of the Findings

The present research investigated the perceptions, attitudes, actual classroom use, and perceived barriers of 200 high school teachers in Jeddah, Saudi Arabia, to digital classroom technologies, through a quantitative cross-sectional survey based on the Unified Theory of Acceptance and Use of Technology (UTAUT). The analysis revealed five important findings with unique policy and practice implications for Saudi high school education.

Finding 1: Teachers have always had positive perceptions of the effectiveness of digital technology.

All Performance Expectancy items scored higher than M = 3.80, with the highest score of belief in academic performance improvement (M = 4.09). Effort Expectancy scores were also high (M = 3.87–3.89), indicating that teachers perceive digital tools as readily available and easy to use. This agreement is important, as it indicates that the cognitive and evaluative preconditions for adoption are already in place across the sample.

Finding 2: There are positive attitudes, but a consistent undercurrent of technology anxiety.

The teachers indicated high levels of enjoyment (M = 4.10), confidence in the pedagogical effectiveness of digital tools (M = 4.10), and a strong behavioural intention to use them more often in the future (M = 4.23). However, all three items of technology anxiety were centred around the neutral (M = 2.97–3.03) with very low standard deviations, suggesting a near-universal undercurrent of fear of using unknown tools in front of students that cuts across the otherwise positive attitudinal portrait.

Finding 3: The actual use is moderate and biased towards presentation activities.

Although the intentions were high, the actual classroom use during the previous four weeks was moderate (M = 3.37–3.66), with the most common use of presentation tools (M = 3.66) and the least common use of digital assessment tools (M = 3.37). The large standard deviations (SD > 1.0) across all utilisation items indicate substantial individual variation, with some teachers using technology every day and others using it only occasionally.

Finding 4: The major barriers are infrastructure, training, and connectivity.

The perceived barriers were the lack of digital equipment (M = 3.41), pedagogical training (M = 3.39), and reliable internet connectivity (M = 3.35). Curriculum flexibility and administrative support were viewed as less restrictive (M = 3.07–3.10), but still exist.

Finding 5: The most consequential demographic differentiators are training, school type, and experience.

The trained teachers performed significantly better than their untrained counterparts across all five constructs, with the largest difference in actual use (M = 3.83 vs much lower in untrained teachers). The teachers in private schools scored higher across all constructs than those in public schools, indicating resource inequality. The experience in teaching revealed a non-linear relationship, with the most active and confident users being 11-15-year-old teachers. There were no significant differences in gender in any construct.

Implications of the Findings

Implications for Teachers

The positive perceptions and attitudes obtained affirm the presence of the human preconditions for digital adoption among high school teachers in Jeddah. Nevertheless, strong attitudes and moderate actual use coexist, indicating that attitudinal readiness is both necessary and insufficient. Educators require more than technical training to achieve professional development; it must involve classroom-based practice, peer mentoring, and opportunities to explore technology in low-stakes contexts. The aim must be to transform the current faith in the usefulness of technology into certain, pedagogically significant classroom use.

School Administrator and Educational Leader Implications.

The high correlation between school type and all five outcome constructs indicates that institutional conditions, rather than individual teacher characteristics, are the main factors influencing technology integration. The administrators of public schools should be proponents of equal infrastructure investment and of providing teachers with reliable devices, connections, and technical support as the preconditions for any pedagogical development program. Leaders in schools must also foster a culture of normalising digital experimentation, allocating time to prepare and rewarding technology-integrated teaching in performance appraisal.

Implications for the Ministry of Education and Vision 2030

The data show that teachers' ambition for digital transformation is present but constrained by structural deficiencies. The national reform strategies should be translated into support for implementation at the school level, directly addressing the three main barriers identified: equipment adequacy, the depth of pedagogical training, and internet reliability. Equity in public and private schools should be a clear policy objective, as the existing resource disparity threatens the Vision 2030 promise of universal quality education. High-quality, pedagogically contextualised professional development should be viewed as a national infrastructure priority on par with hardware provision.

Recommendations

1. **Equalise digital infrastructure in both public and private high schools in Jeddah**. The large performance gap between teachers in public and private schools across all five constructs indicates that infrastructure inequality is the most significant systemic obstacle. The Ministry of Education and Jeddah district authorities are to conduct a systematic audit of device availability and technical support across all public high schools in the city, and to provide specific capital funding to address the identified gaps within a specified time frame.
2. **Substitute generic ICT training with pedagogically contextualised professional development.** The fact that 84 per cent of teachers had undergone some digital training but still rated training adequacy as a major barrier (M = 3.39) suggests the issue is not the

quantity of training, but its quality. The professional development programmes must be restructured based on specific subject contexts, classroom situations, and UTAUT-based competency objectives, including not only how to use the tools but also how to combine them to enhance student outcomes. Mentored classroom practice and follow-up coaching should be part of the training rather than attending workshops.

3. **Introduce specific anxiety-reduction support in the professional development**. The moderate technology anxiety (M = 2.97–3.03, SD = 0.22–0.33) is almost universal in the whole sample and is a structural confidence gap that is not addressed by generic training. Peer observation, co-designing lessons with confident colleagues, and low-stakes trial opportunities should be included in schools' professional development programmes. School leaders ought to overtly normalise errors in the use of technology and position classroom experimentation as a professional development.
4. **Use mid-career teachers (11-15 years of experience) as digital mentors**. This group had the highest actual use and performance expectancy scores in the study. Schools should officially recognise and empower confident mid-career teachers as technology integration mentors or digital champions, and give them dedicated time to support early-career teachers, facilitate demonstration lessons, and organise peer learning communities on technology use.
5. **Create accountability for digital integration at the school level.** The fact that administrative support and institutional culture, though rated lower than infrastructure and training as barriers (M = 3.07), are always present shows that schools vary in the extent to which leadership encourages the use of digital technologies. Every school is to create a digital integration plan with specific, measurable goals for the use of technology in classrooms, which are reviewed annually by school administration and district superintendents and linked to teachers' professional development plans.

Conclusion

This paper shows that high school educators in Jeddah hold perceptions, attitudes, and intentions to integrate digital technology meaningfully. However, structural and institutional constraints prevent these good intentions from being consistently translated into classroom practice. The value of this research does not lie in the mere recording of the fact that teachers are

optimistic about technology, which has already been proven in the larger contexts, but rather in showing how the attitude-to-practice gap is manifested in a large Saudi city where digital reform is actively taking place, and what structural factors mediate that gap.

The results have a clear policy implication: the human aspect of the digital transformation in Jeddah's high schools is largely prepared. The institutional constraint is a limitation. The three levers that can transform the good intentions and positive beliefs of Jeddah teachers into the consistent, pedagogically meaningful digital practice needed by Vision 2030 are equitable infrastructure investment, high-quality, pedagogically oriented professional development, and sustained school-level leadership commitment.

Limitations of the Study

The research has several limitations that must be considered when concluding. To begin with, the findings cannot be generalised to other cities and regions of Saudi Arabia due to the geographical limitation of high schools in Jeddah. Second, a cross-sectional design does not allow for causal inference; the correlations found reflect statistical associations rather than causal influence. Third, the exclusive use of self-reported data creates a risk of social desirability bias, which could have exaggerated scores on positive constructs and underrepresented the magnitude of barriers and anxiety. This is especially important to the technology anxiety items, with near-neutral mean scores and very low standard deviations possibly indicating social desirability, as opposed to actually universal moderate anxiety, which could only be determined by behavioural observation or qualitative follow-up. Fourth, the sample has been selected mainly because language departments and schools that already have digital infrastructure are unlikely to be representative of the overall population of high school teachers in Jeddah.

Suggestions for Further Research

These results, along with the shortcomings of this paper, suggest several fruitful research paths for the future. Future research should expand the sample's geographical boundaries to include other Saudi cities and regions to establish a more nationally representative evidence base for digital education policy. Longitudinal designs would enable the researchers to track the development of perceptions, attitudes and utilisation in relation to particular institutional interventions and, hence,

make causal inferences about the force behind sustained adoption. It would be more informative to conduct mixed-methods designs that combine survey data with classroom observations or qualitative interviews to understand better the underlying mechanisms of the attitude-utilisation gap identified in this research. Lastly, intervention-based research examining the efficacy of specific professional development programme designs for teachers in terms of digital competence, technology anxiety, and classroom use would provide directly actionable evidence for programme designers and policymakers seeking to promote a valuable and equitable digital transformation in Saudi secondary schools. Also, the possibility of repeating this research in other cities in Saudi Arabia, especially with different resource bases and reform implementation timelines, would determine whether the trends in Jeddah are unique to the urban, reform-progressive environment or indicative of the general structural situation in Saudi secondary education. Comparative research across the countries of the Gulf Cooperation Council would further put national policy frameworks into context to determine the outcomes of technology adoption in schools.

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APPENDIX 1

INTERNATIONAL OPEN UNIVERSITY, THE GAMBIA

FACULTY OF EDUCATION

DEPARTMENT OF EDUCATION

Dear Respondents,

Informed consent: The purpose of this study is to explore high school teachers' perceptions and attitudes towards the use of digital classroom technologies. Participation is voluntary, and you may withdraw at any time without penalty. All responses will be kept strictly confidential and used only for academic purposes. No identifying information will be collected, and results will be reported in aggregate form. The questionnaire should take approximately 15 minutes to complete.

By proceeding, you are giving your informed consent to participate in this study. If you have any questions about this research, you may contact Ahmad Abdullateef at tomiwaahmad@gmail.com

Thank you for your valuable time and participation.

SECTION A: PERSONAL DATA

INSTRUCTION: *Please select by ticking* (√) *the box as appropriate:*

1. Age: ( )
2. Sex: Male ( ), Female ( )
3. Years of Teaching experience: Less than 5 years ( ), 5-10 years ( ), 11-15 years ( ), More than 15 years ( )
4. School type**:** Public ( ) Private ( )
5. Subject(s) taught: _____
6. Have you received any training in digital teaching tools**?** Yes No

SECTION B: Perceptions of Digital Technologies' Effectiveness for Students

Performance Expectancy (PE)

S/N	ITEMS	SA	A	N	D	SD
1.	Using digital classroom technologies improves my students' academic performance.					
2.	Digital technologies help my students understand complex concepts more easily.					
3.	Digital tools increase my students' motivation and interest in learning.					
4.	Digital classroom technologies make lessons more engaging and interactive for students.					
5.	Digital technologies enable me to provide more effective assessment and feedback to my students.					
6.	Using digital technologies helps my students develop critical thinking skills.					
7.	Using digital technologies helps my students develop collaboration skills.					

Effort Expectancy

S/N	ITEMS	SA	A	N	D	SD
1.	Learning to use new digital classroom technologies is easy for me.					
2.	I find it easy to integrate digital teaching tools into my lessons.					
3.	It is easy for me to become proficient with digital classroom technologies.					
4.	I find most digital teaching platforms user-friendly and straightforward.					

SECTION C: Attitudes toward Utilisation of Digital Technologies

Attitude

S/N	ITEMS	SA	A	N	D	SD
1.	I enjoy using digital technologies in my teaching.					
2.	Using digital technologies in my classes is a good idea.					
3.	I feel confident about integrating new digital tools into my teaching.					
4.	I am willing to invest time to learn new digital classroom technologies.					
5.	I believe digital technologies are essential for modern teaching.					
6.	I would recommend using digital classroom technologies to other teachers.					

Technology Anxiety

S/N	ITEMS	SA	A	N	D	SD
1.	I feel anxious when I have to use unfamiliar digital technologies in the classroom.					
2.	I worry that I might make mistakes when using digital technologies in front of students.					
3.	Using digital technologies makes me feel uncomfortable or stressed.					

SECTION D: Utilisation of Digital Technologies in Classroom Activities

Actual Use of Digital Technologies

S/N	ITEMS	Never	Rarely	Sometimes	Often	Very Often
1.	In the last 4 weeks, I used presentation tools (e.g., PowerPoint, interactive whiteboards) during my lessons.					
2.	In the last 4 weeks, I used learning management systems or digital platforms (e.g., Madrasati, LMS, Google Classroom) to share materials with students.					
3.	In the last 4 weeks, I asked students to use digital tools to complete assignments or projects (e.g., documents, slides, videos).					
4.	In the last 4 weeks, I used digital assessment tools (online quizzes, digital tests, e-portfolios) to evaluate students' learning.					
5.	In the last 4 weeks, I used digital technologies to give feedback to students (e.g., comments online, digital rubrics).					
6.	In the last 4 weeks, I communicated with students about classwork using digital channels (e.g., platforms, email, messaging apps approved by the school).					
7.	In the last 4 weeks, I integrated subject-specific digital resources (simulations, educational apps, videos) into my lessons.					
8.	In the last 4 weeks, I used digital technologies to support collaborative activities among students (e.g., group documents, discussion forums).					

Behavioral intention to utilize digital technology

S/N	ITEMS	SA	A	N	D	SD
1.	I intend to increase my use of digital technologies in my teaching in the near future.					
2.	I plan to regularly integrate digital tools into my lesson planning.					
3.	I will try new digital teaching methods in my classroom in the coming months.					

SECTION D: Barriers to the Utilisation of Digital Technologies

INSTRUCTION: *Please select by ticking* (√) *the box as appropriate:*

S/N	ITEMS	SA	A	N	D	SD
1.	My school lacks sufficient digital equipment (computers, tablets, projectors, interactive boards).					
2.	Internet connectivity at my school is unreliable or too slow for effective classroom use.					
3.	I do not receive enough technical support when digital technologies do not work properly.					
4.	I have not received sufficient training on how to use digital technologies effectively in teaching.					
5.	I do not have enough time to prepare lessons that effectively integrate digital technologies.					
6.	The digital systems and platforms I am expected to use are too complex or difficult to use.					
7.	The curriculum and examinations leave little flexibility for using digital classroom technologies.					
8.	I am concerned that using digital technologies may cause classroom management problems (e.g., distraction, off-task behaviour).					
9.	The school leadership does not strongly encourage or support the use of digital classroom technologies.					

APPENDIX TWO

ETHICAL APPROVAL



Ref. No. ETHICS/19/08-25

Date: 12/08/2025

To,

Ahmad Abdullateef Abdulkareem
Student ID: ID: 10212164
Program: Master's of Education Research
Contact Email: tomiwaahmad@gmail.com

Subject: Ethical Approval

Dear Ahmad Abdullateef,

With reference to your application dated 23/7/2025 regarding the Ethical Approval of your research proposal, I am pleased to inform you that our International Open University Board of Research and Publications (IOUBRP) is satisfied with the documents you submitted. After a critical evaluation of your papers, the IOUBRP has decided to accept your research topic entitled "Perception and Attitude of High School Teachers towards the Use of Digital Classroom Technologies in Jeddah, Saudi Arabia," along with your proposal.

Therefore, you are permitted to conduct the research according to your proposal and submit the report on time as well.

Barak Allahu Feek!

Prof. Dr. Afroza Bulbul
Chairperson, Board of Research and Publications
International Open University

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