

Digital Transformation in Teaching English as a Foreign Language in Departments of English at Yemeni Faculties of Education: Challenges and Strategies for Effective Implementation

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ABSTRACT

Around the world, digital transformation (DT) is reshaping how English as a Foreign Language (EFL) is taught, but Yemeni Faculties of Education are struggling to keep pace. Political instability, limited institutional resources, and gaps in instructors' digital skills have made it difficult to build the kind of digital infrastructure needed for effective teaching. This study looks closely at the challenges within Departments of English at Yemeni Faculties of Education and asks what can realistically be done about them. Using a sequential explanatory mixed-methods design, the study began with a structured Likert-scale questionnaire completed by 20 EFL PhD holders selected randomly, and followed up with semi-structured interviews conducted with 6 PhD holders, who were selected in a purposive manner, to help explain and deepen the initial findings. The quantitative and qualitative analysis focused on four interconnected areas: technological, human, pedagogical, and organisational readiness for digital transformation. The results point to real and persistent problems, weak infrastructure, limited training, and inconsistent institutional support, along with noticeable differences in how instructors view and engage with digital tools. Based on these findings, the study puts forward practical strategies: investing in infrastructure, offering ongoing professional development, strengthening institutional policy, and building clearer frameworks for integrating technology into teaching. Ultimately, this research adds to what we know about digital transformation in EFL settings facing conflict and limited resources, and offers concrete guidance for policymakers, administrators, and instructors working to move digital pedagogy forward in teaching English in the Departments of English Yemeni at Faculties of Education.

INTRODUCTION

The way people use technologies is changing higher education all over the world. Universities are not just using technology to help with teaching methods. They are changing the way they teach learn and do things like administration and services. Digital transformation is not about using new technology. It represents a broader institutional process in which digital technologies become integrated into academic, administrative, and organizational practices to enhance the quality, accessibility, and effectiveness of higher education (Bond et al., 2024; OECD, 2023).

In the field of English as a Foreign Language (EFL), digital transformation has created new possibilities for language teaching and learning. Technologies such as learning management systems (LMSs), virtual classrooms, artificial intelligence (AI)-supported applications, digital assessment tools, and collaborative online platforms have expanded opportunities for interaction, personalized learning, and student engagement. At the same time, these developments have changed teachers' roles, requiring them to acquire not only technical skills but also the pedagogical knowledge needed to integrate digital technologies effectively into language instruction (Redecker, 2017; UNESCO, 2023).

The COVID-19 pandemic showed how important digital transformation is. Universities over the world had to start teaching online and this showed that they need to be able to keep teaching and learning even when things are changing. So many universities started investing more in technologies and training their teachers to use them. Today digital transformation is a priority for universities and it is changing the way they design their courses teach, assess students and make sure everything is working well. Even with all this progress different countries

are moving at different speeds when it comes to digital transformation. Some countries have money, better technology and better policies so they can implement digital initiatives more easily. In some developing countries universities are still facing challenges, like bad internet, not enough technology, limited money and teachers who are not comfortable using digital technologies. As a result, many higher education institutions increased their investments in digital infrastructure, online learning platforms, faculty training, and institutional policies that support technology-enhanced education (OECD, 2023; UNESCO, 2023).

Within EFL education, technology alone cannot guarantee better teaching and learning outcomes. Research consistently shows that successful digital transformation depends on several interrelated factors, including teachers' digital competence, their willingness to adopt new teaching approaches, institutional support, and continuous professional development (Redecker, 2017; Tondeur et al., 2021). Therefore, digital transformation in language education should be understood as a multidimensional process that combines technological resources with pedagogical innovation, organizational leadership, and human capacity development.

In the context of Yemeni higher education, over the past decade, Yemeni universities have faced unprecedented challenges resulting from prolonged conflict, economic instability, and deteriorating educational infrastructure. These conditions have affected universities' ability to modernize their educational systems, invest in digital technologies, and provide continuous professional development for academic staff (World Bank, 2023). Although several universities introduced online teaching, learning management systems, and virtual classrooms during and after the COVID-19 pandemic, the implementation of digital transformation has varied considerably across institutions and remains at different stages of development. Teachers in Yemeni Universities often limit their ICT use to basic tasks such as information retrieval or presentation preparation, failing to leverage more advanced interactive platforms.

The gap in using digital transformation is particularly pronounced in the Republic of Yemen, where most universities continue to rely on traditional, face-to-face modes of instruction, hard-copy course materials, and handwritten class notes (Aldowah, Ghazal, & Muniandy, 2015). Therefore, there is a need for research that provides a better understanding of digital transformation in Yemeni higher education. Looking at the challenges faced by departments and strategies that can help and provide useful evidence for universities, policymakers and educators. This study utilizes a mixed-methods design to investigate the current state of digital transformation in Departments of English at Yemeni Faculties of Education, aiming to provide evidence-based recommendations for effective implementation.

Statement of the Problem

Digital transformation has become a strategic priority in higher education because it enhances teaching quality, expands access to learning, and equips graduates with the digital competencies required in the twenty-first century. In EFL education, digital transformation supports innovative teaching practices, technology-enhanced assessment, and interactive learning environments. However, its successful implementation extends beyond the adoption of digital tools and requires the integration of technological infrastructure, teachers' digital competence, pedagogical innovation, institutional leadership, and supportive policies (Bond et al., 2024; UNESCO, 2023).

International research shows that many universities continue to encounter challenges in implementing comprehensive digital transformation despite substantial investments in educational technology. Common barriers include inadequate digital competence among teachers, insufficient professional development, limited institutional support, weak leadership, and fragmented implementation strategies (Bond et al., 2024; OECD, 2023; Tondeur et al., 2021). Similarly, studies conducted in Arab higher education have reported that although universities have increasingly adopted digital technologies, sustainable transformation is constrained by inadequate infrastructure, inconsistent faculty readiness, and the absence of coherent institutional strategies (Alenezi, 2021).

The situation is more challenging in Yemen, where higher education institutions operate under prolonged economic and infrastructural constraints. Existing Yemeni studies have mainly examined isolated aspects of technology use rather than digital transformation as an integrated institutional process. For example, Mohamed et al. (2020) investigate Yemeni EFL teachers' attitudes toward Information and Communication Technology

(ICT) and identified positive perceptions alongside challenges related to infrastructure, technical support, and digital resources. However, their study focused primarily on ICT use rather than institutional digital transformation. More recently, Hassan (2024) examined the effectiveness of **Moodle** activities in enhancing EFL learning among Yemeni teachers, but the study was limited to the use of a single learning management system without addressing broader organizational, pedagogical, and leadership dimensions of digital transformation.

Consequently, the existing literature reveals a clear research gap. To date, little empirical research has investigated digital transformation in Departments of English at Yemeni Faculties of Education from a holistic perspective that integrates technological, human, pedagogical, and organizational dimensions. Moreover, no previous Yemeni study has employed a mixed-methods sequential explanatory design to examine both the challenges and strategies for implementing digital transformation in EFL teaching. This gap limits the availability of evidence needed to guide institutional planning and policy development.

Addressing this gap is important because understanding the factors that facilitate or hinder digital transformation can help universities develop more effective implementation strategies, strengthen teachers' digital competence, improve institutional readiness, and support evidence-based educational policies. Therefore, this study seeks to provide empirical evidence that will benefit university leaders, policymakers, Faculties of Education, Departments of English, EFL teachers, curriculum developers, and researchers interested in digital transformation and technology-enhanced language education in Yemen.

Research Objectives

The present study aims to investigate digital transformation in teaching English as a Foreign Language (EFL) in Departments of English at Yemeni Faculties of Education. Specifically, the study seeks to:

1. Assess the extent of digital technology integration and EFL teachers' perceptions of it within Yemeni Faculties of Education.
2. Identify and classify the technological, human, pedagogical, and organizational barriers limiting the effective adoption of digital transformation in EFL teaching.
3. Propose evidence-based strategies and instructional frameworks to address these barriers and support the sustainable implementation of digital transformation.

Research Questions

This study seeks to answer the following research questions:

1. To what extent have digital technologies been integrated into EFL instruction, and how do EFL teachers perceive this integration within Yemeni Faculties of Education?
2. What are the main technological, human, pedagogical, and organizational barriers limiting the effective adoption of digital transformation in EFL teaching?
3. What evidence-based strategies and instructional frameworks can address these barriers and support the sustainable implementation of digital transformation in EFL teaching?

Significance of the Study

This study contributes both theoretically and methodologically by addressing an important gap in the literature on digital transformation in teaching English as a Foreign Language (EFL), in Department of English in Yemeni Faculties of Education. Although previous studies have examined various aspects of educational technology, they have largely focused on individual technologies, users, or platforms rather than viewing digital transformation as a comprehensive institutional process involving technological, pedagogical, human, and organizational dimensions. By adopting a mixed-methods sequential explanatory design, this study provides a more comprehensive understanding of digital transformation, combining quantitative evidence with qualitative

insights to explain not only the extent of technology integration but also the factors that facilitate or hinder its implementation. In doing so, the study extends the existing body of knowledge on digital transformation in higher education and offers a methodological framework that can guide future research in similar resource-constrained and conflict-affected educational settings.

The study also has important practical, pedagogical, and policy implications. At the practical level, its findings are expected to assist university leaders, deans, and departments of English in identifying the key barriers to digital transformation and developing evidence-based strategies to strengthen institutional readiness and support sustainable implementation. From a pedagogical perspective, the study provides insights that can help EFL teachers and curriculum developers integrate digital technologies more effectively into language teaching, enhance teachers' digital competence, and promote more engaging, interactive, and learner-centred instructional practices. At the policy level, the findings can support policymakers and higher education authorities in designing policies that address infrastructure, funding, professional development, and institutional governance, all of which are essential for successful digital transformation. More broadly, this study offers a contextualized understanding of how technology, pedagogy, institutional leadership, and organizational readiness interact within Yemeni higher education, thereby providing valuable evidence for researchers and practitioners interested in advancing technology-enhanced language education in developing and conflict-affected contexts.

Delimitations of the Study

This study's scope is precisely delimited to focus on digital transformation in teaching English as a Foreign Language (EFL). Geographically, the research article is confined to public universities in southern Yemen, specifically within the governorates of Aden, Lahj, and Abyan and Hadramout. Institutionally, it focuses exclusively on the Departments of English at the Faculties of Education in the University of Aden, University of Lahj, Hadramout University and Abyan University. Conceptually, the study examines digital transformation across four dimensions, technology integration, human factors, pedagogical practices, and organizational factors, investigating barriers and proposing strategies for effective implementation. This delimitation intentionally excludes other academic disciplines, departments and non-EFL educational contexts, ensuring a sharp focus on the stated research objectives.

LITERATURE REVIEW

This section explores the foundations of digital transformation in EFL teaching, highlighting the critical role of teacher digital competence. It also evaluates the current digital background and challenges within Yemeni universities through a synthesis of existing research.

Digital Transformation: Concept and Definitions

Today, we live in a digital age marked by multidimensional revolutions in the structures and processes of societies, as well as across all domains of human life, brought about by the emergence of digital technologies. The teaching of EFL is an area where we see the intersection of several disciplines such as applied linguistics, educational psychology, social-cultural theory, and digital pedagogy. In terms of how we approach our learners, modern EFL instruction emphasizes communication, interaction, inclusivity, and the meaningful use of language in real-life situations. Moreover, rapid developments in technologies, particularly those related to artificial intelligence (AI) and virtual learning environments (VLEs), have significantly changed what is possible and challenging in EFL instruction. Digital transformation has become one of the most widely used, yet loosely bounded, terms in contemporary organizational and educational research. Although the phrase is now applied across almost every sector, from banking to manufacturing to education, scholars broadly agree that it still lacks a single, universally accepted definition (Gkrimpizi, Peristeras, & Magnisalis, 2024). Its conceptual roots lie in the information systems literature, where the term was first used to describe how organizations restructure their business models, processes, and value propositions in response to the emergence of new digital technologies. **Haleem et al. (2022)** describe digital transformation in education as "the comprehensive integration of digital technologies into educational processes, administration, and institutional management to enhance learning outcomes, operational efficiency, and innovation." Moreover, Digital transformation is defined, following Vial (2019, p. 118), as "a process that aims to improve an entity by triggering significant changes to its properties

through combinations of information, computing, communication, and connectivity technologies.” This definition is deliberately broad: it treats digital transformation not as a single event, nor as the simple purchase of a device or piece of software, but as a cumulative, ongoing process that reshapes an organization’s structures, culture, and manner of creating value. In a similar vein, Verhoef et al. (2021) explain that digital transformation as a change in how a firm employs digital technologies to develop a new digital business model that helps to create and capture greater value. The inclusion of digital technologies and Artificial Intelligence (AI) in teaching and learning is one of the key drivers of current transformations in English as Foreign Language (EFL) didactics. Technology has fundamentally changed the way that language users have access to language, how they process language and how they generate language. As a result, technology has enabled entirely new ways of interaction that extend far beyond the confines of the classroom. Digital English teaching using technology has led to an increase in learner engagement, autonomy and access to authentic materials, according to Fernandez-Cando et al. (2026). Digital tools such as learning management systems; Mobile Applications; Virtual Classrooms enable flexible, personalizable and autonomous learning experiences for learners. Learners are able to learn languages at their own speed and receive instant feedback from their learning activities. Instantaneous feedback is crucial for language learning.

Different authors have defined the term digital transformation (DT) in varying contexts. According to OECD (2023), **digital transformation** is a process of change comprising numerous digital technologies, from 5G to AI (artificial intelligence), Blockchain and big data.

Digital transformation denotes a more holistic, strategic, and organization-wide change in which digital technology becomes a driver of new operating models, new forms of value creation, and, ultimately, new institutional identities (Verhoef et al., 2021). This triad is useful for the present study because it clarifies that merely equipping classrooms with computers or projectors does not in itself amount to digital transformation; the latter implies a deeper and more coordinated shift in pedagogy, administration, and institutional strategy.

Building on a systematic literature review combined with expert interviews; Gkrimpizi et al. (2024) describe digital transformation in higher education institutions as an evolutionary process involving deep and coordinated changes, characterized by the strategic adoption and integration of emerging technologies to significantly improve educational activities and operational efficiency, thereby transforming the educational model, strategic direction, and value proposition of the institution. Systematic reviews of this literature converge on a similar conclusion: despite a growing number of case studies and conceptual papers, digital transformation in higher education institutions remains an emerging field, and none of the proposals identified in the literature have yet been developed into a fully holistic, agreed-upon framework.

It is worth noting that most of the conceptual work on digital transformation, whether generic or higher-education-specific, has been produced in and for well-resourced institutional contexts. As Hamidi, Ghorbandordinejad, Rezaee, and Jafari (2011) observe, the current state of ICT integration in higher education reveals a substantial digital gap between developed and developing countries, with the latter still at the early stages of technology integration in education. This gap is particularly pronounced in the Republic of Yemen, where most universities continue to rely on traditional, face-to-face modes of instruction, hard-copy course materials, and handwritten class notes (Aldowah, Ghazal, & Muniandy, 2015). Understood in this light, digital transformation is not simply a technical upgrade that Yemeni universities can adopt overnight; it is a multi-dimensional process of institutional change that presupposes a level of infrastructural, financial, and human readiness that many developing-country universities, including those in Yemen, have yet to attain (Ministry of Higher Education and Scientific Research of Yemen, 2005). Bin-Hady and Al-Tamimi (2021) explored technology use in informal English language learning among Yemeni undergraduate students. The study highlighted students' use of social media, websites, and online resources for language learning but focused primarily on learner strategies outside the classroom rather than institutional digital transformation or the interaction between technology, pedagogy, and organizational structures.

In the context of this study, digital transformation in Teaching English as a Foreign Language (EFL) refers to the systematic and strategic integration of digital technologies into the teaching and learning of English in Departments of English at Yemeni Faculties of Education, resulting in fundamental changes in pedagogical practices, curriculum delivery, assessment methods, teacher competencies, student learning experiences,

institutional processes, and organizational culture. It is viewed as a multidimensional socio-technical process that requires the alignment of technological infrastructure, human capabilities, pedagogical innovation, institutional leadership, and supportive policies to enhance the quality, accessibility, effectiveness, and sustainability of English language education. One can add that digital transformation is a holistic and continuous process through which Departments of English at Yemeni Faculties of Education strategically redesign their teaching, learning, assessment, administration, and organizational practices by integrating digital technologies with pedagogical innovation, human capacity development, institutional support, and governance mechanisms. Rather than representing the simple adoption of digital tools, digital transformation entails systemic changes that improve English language teaching quality, foster learner-cantered education, strengthen digital competencies among teachers and students, and enhance institutional readiness for sustainable digital education.

The Role of Digital Transformation in Teaching English as a Foreign Language

The digital transformation of English as a Foreign Language (EFL) teaching has fundamentally reshaped pedagogical landscapes, evolving from traditional, teacher-cantered instruction to dynamic, technology enhanced environments (Zeynalova, 2025). The teaching of English as a foreign language (EFL) has undergone significant transformation over the past decades due to globalization, technological advancement, and evolving pedagogical theories.

The way English is taught in higher education has completely changed as a result of digital transformation. Teachers may now adapt their teaching strategies to accommodate a wide range of learner preferences and learning styles thanks to the development of digital materials and platforms. Teachers can design dynamic and captivating classes that encourage active learning and critical thinking by utilizing digital technologies like online writing platforms, interactive simulations, and multimedia presentations (Thorne, 2003 as cited in Lytras et al., 2024, p. 106).

In the recent era, technological diffusion and the digital revolution have transformed several facets of society and education (Alenezi et al., 2023; Kozhukhova et al., 2021; Valdés et al., 2021). Digital transformation points to combining digital technologies, tools, and resources to boost learning skills and intellectual practices (Alenezi and Akour, 2023; Alenezi, 2021; Valdés et al., 2021). In the domain of EFL teaching and learning, digital transformation involves assessing requirements and expectations of stakeholders to deliver education and research services aligned with learners' knowledge necessities.

Lytras et al., (2024, p. 106) stated that digital technologies are essential for English language learners as they make language learning and mastery easier. Students have access to interactive language labs, online dictionaries, and language learning programs that allow them to practice and improve their language skills outside of the regular classroom.

Furthermore, digital transformation has brought a significant change in the way EFL learning takes place (Alghamdi and Alnajami, 2023). It has highlighted the importance of data-driven decision-making. With the help of learning analytics and artificial intelligence algorithms, vast amounts of learner data can be analyzed to gain insights into individual and collective learning patterns. Educators can use these insights to improve instructional strategies, identify areas that need intervention, and customize learning experiences, ensuring that each learner receives the necessary support (Alenezi et al., 2023; Akour et al., 2021; Alenezi and Akour, 2023; Nguyen, 2022).

Wardat and Akour (2024) argue that digital transformation in EFL learning is not a one-time occurrence but a continual and dynamic process. It involves the integration of technological innovations, pedagogical adaptations, and the development of teaching roles. This transformation provides learners with supreme access to English language materials and appealing skills, while also developing a community of digitally literate, inspired, and globally linked language learners. As technology continues to advance, the concept of digital transformation in EFL learning will continue to evolve, anticipating a future where language learning is simplified and transformed.

There has been a significant transformation in EFL teaching, largely due to the widespread use of digital technologies (Alakrash et al., 2022; Daraghmeh et al., 2021). This transformation has brought new opportunities

for learners to engage with credible language resources and simply receive personalized instruction (Bailey and Lee, 2020). With the rise of the digital age, the way people connect, learn, and exchange information has been reformed.

Digital transformation in higher education has had a particularly visible impact on the teaching of English as a Foreign Language (EFL). Because language learning depends heavily on exposure, interaction, and authentic communicative practice, EFL classrooms have historically been early adopters of new instructional technologies, from the audio-visual materials and video-based activities discussed by Cakir (2006) to today's learning management systems, mobile applications, and artificial intelligence (AI) tools. Digital transformation in EFL teaching can therefore be seen as a natural extension of the broader digital transformation agenda in higher education, but one that carries its own distinctive opportunities and challenges because of the communicative, skills-based nature of language instruction.

Twenty-first-century digital transformation has profoundly reshaped the educational landscape, leading to a significant increase in online teaching and learning (Kumar et al., 2017). The integration of digital tools such as artificial intelligence, online learning platforms, and virtual classrooms has revolutionized EFL education, offering innovative approaches that align with modern pedagogical theories. These technologies promote interactive learning environments and provide access to a wealth of resources, thereby supporting communicative competence and learner autonomy. However, the transition to digital methodologies also presents challenges, such as the digital divide and the need for teachers to adapt to new technologies. According to Yunusova (2026), the integration of technology has significantly transformed English language teaching methodology. Digital technologies provide numerous opportunities for interactive and personalized learning experiences. Online platforms, virtual classrooms, language learning applications, and multimedia resources enable students to access authentic materials and practice language skills beyond the traditional classroom environment. Technology also allows teachers to incorporate audio, video, and interactive exercises into their lessons. Another important methodological principle involves the integration of the four language skills. Effective language teaching does not treat listening, speaking, reading, and writing.

Haleem et al. (2022) explain that digital technologies in education have given rise to various Learning management systems (LMS). These LSMs have promoted virtual classrooms where a teacher can interact with students in real-time, share his resources, deliver his lecture, assess students' learning, collect feedback, and reply to their queries. Abuhussein and Badah (2024) argue that over the past few years, significant developments have taken place in teaching English as a foreign language (EFL), particularly with the shift towards online teaching. Among the various significant changes that took place within the context was the transformation to online teaching with the COVID-19 outbreak. EFL teachers at schools and universities, similar to their counterparts in other disciplines, have suddenly found themselves transitioning entirely to online teaching after the pandemic outbreak. This has been considered a new change in the digital age that has never been expected by teachers or researchers (Zimmer, McTigue, & Matsuda; Kwon et al., 2020).

More recently, the rapid emergence of AI-based tools has added a further layer to this transformation. A systematic review of empirical studies on AI-supported EFL teaching found that such tools can offer tailored, interactive learning experiences and measurable improvements in student outcomes, but also identified continuing challenges related to the digital divide, gaps in digital literacy, uneven teacher readiness, increased cognitive load, and the need for context-specific adaptation, all of which require robust infrastructure, sustained teacher training, and institutional support to be properly addressed. The OECD (2023) further conceptualizes digital transformation in education as a systemic process involving changes in pedagogy, curriculum, assessment, governance, teacher competencies, and educational leadership. This perspective aligns closely with EFL contexts, where effective digital transformation depends on teachers' digital competence, institutional readiness, learner digital literacy, and supportive educational policies.

Digital Competence of EFL Teachers and its Role in Digital Transformation

The term “**digital competence**” is typically used to describe an individual's capacity to utilize ICT, including the manipulation of digital tools or software (Antonietti et al., 2022). While there is no consensus on a single definition of digital competence for teachers, there is a general consensus that it encompasses not only the ability

to utilize technological devices and digital resources within an educational setting, but also the attitudes, strategies, and awareness of teachers in their pedagogical practices. This competence enables teachers to integrate technological tools efficiently, thereby achieving the desired pedagogical outcomes (Cattaneo et al., 2022).

In some instances, digital competence is synonymous with digital literacy (Falloon, 2020). In this study, teachers' **digital competence** is defined as teachers' capacity to utilize digital technologies and tools to teach and research Chinese in an online teaching and learning environment. This encompasses not only the operational level of technology, but also teachers' comprehensive utilization of instructional design, content delivery, and student interaction, reflecting their professional literacy and innovation in the digital teaching and learning environment.

Digital competencies, often referred to as digital skills, are defined as the ability to acquire, process, and apply knowledge effectively in practical and educational contexts. Teachers who possess these competencies are essential for communicating effectively, building meaningful connections, and facilitating cognitive and affective interactions in digital learning environments (Brauer, 2019). Teachers' digital competence is operationalized by Redecker (2017) in the DigCompEdu framework as a structured set of twenty-two competencies organized into six areas, professional engagement, digital resources, digitally supported teaching and learning, digitally enhanced assessment, empowering learners, and facilitating learners' own digital competence, of which only one area addresses purely technical skills.

The shift to digital EFL teaching is not only technical; it also requires pedagogical, psychological, and professional adaptation by teachers (Zou & Wang (2024; Abuhussein and Badah, 2024). Shi et al (2025) indicate that digital competence also appears closely tied to teacher confidence and self-efficacy in online foreign-language teaching environments. Furthermore, Sang et al., (2023) reveal that existing studies display that teachers with greater digital competence often demonstrate greater confidence and beliefs in their anticipated performance

At the level of higher education systems more broadly, a recent systematic review of trends and challenges in digital transformation similarly identifies teacher and staff digital competence, alongside leadership support and institutional strategy, as one of the recurring conditions that determines whether digital transformation initiatives take root or stall (Bond, Bedenlier, Marín, & Händel, 2024). International policy bodies reach comparable conclusions: the OECD's Digital Education Outlook stresses that an effective digital education ecosystem depends as much on educators' capacity to use technology purposefully as on the technology itself (OECD, 2023), while UNESCO's Global Education Monitoring Report cautions that distributing digital devices and platforms without investing in teacher preparation tends to produce limited or even negative learning outcomes, and identifies teacher preparation as one of three essential, system-wide conditions, alongside access and governance, for technology to benefit education (UNESCO, 2023).

Research on teachers' readiness for digital transformation points to a recurring set of competency-related obstacles. **Bingimlas (2009, p. 235)** traces much of the resistance to digital adoption back to three interlinked deficits at the individual level: teachers' low confidence in using digital tools, gaps in their technical competence, and restricted access to the resources needed to practise and apply what they know. **Al Mulhim (2014, p. 487)** extends this picture by showing that teachers' digital competence is shaped as much by disposition as by skill, citing negative attitudes toward technology, resistance to changing established teaching habits, insufficient time to experiment with new tools, low confidence, and underdeveloped digital knowledge and skills as factors that keep teachers from translating available technology into classroom practice. Importantly, **Al Mulhim (2014, p. 487)** also locates part of the competency gap outside the individual teacher, identifying institutional shortcomings, limited access to technology, weak or absent training programmes, insufficient technical support, and the high cost of hardware and software, as conditions that suppress the growth of digital competence even among teachers who are otherwise willing to develop it. Ertmer (1999, pp. 47–61) offers a complementary distinction that helps organize these findings, separating first-order barriers, external constraints such as access, time, training, and institutional support, from second-order barriers, internal factors such as teachers' confidence, beliefs, and perceived value of technology, and arguing that the two must be addressed differently.

Read together, these findings suggest that **digital competence** should not be treated as a purely personal attribute to be measured in individual teachers, but as an outcome that depends jointly on teacher-level factors (skill, confidence, attitude) and institution-level enabling conditions (access, training, technical support, cost). This is consistent with **Sherry and Gibson's** (2002, pp. 178–180) broader argument that technological, individual, organizational, and instructional factors must all be considered together when investigating digital integration, since a deficit in any one of these dimensions can constrain the growth of digital competence regardless of strength in the others. It is this interaction between individual competence and institutional facilitating conditions, rather than either in isolation, that the present study takes as its point of departure when examining the digital competence of EFL teachers in Yemeni public universities.

For Yemeni departments of English at faculties of education, one can claim that digital competence is likely to be a central, and currently underexamined, factor shaping how far digital transformation can progress. Given that Yemeni universities continue to rely heavily on face-to-face lecturing and hard-copy materials, and that academic staff report limited training and technical support as persistent barriers to ICT use (Aldowah, Ghazal, & Muniandy, 2015; Bingimlas, 2009), it is reasonable to expect that EFL teachers' digital competence, and the professional development structures available to build it, remain uneven across Yemeni institutions. Investigating this dimension directly, rather than assuming it from broader ICT-access findings, is therefore an important task for research situated in the Yemeni EFL context.

Digital Transformation Status in Yemeni Universities

The current state of digital transformation in Yemeni Teaching EFL is characterized by a significant gap between perception and practice. Studies consistently show that Yemeni EFL teachers and students hold highly positive attitudes toward ICT integration, viewing it as an essential tool for motivating learners and facilitating language acquisition (Ahmed et al., 2020). For instance, a study of tertiary teachers in South Yemen revealed that they perceive ICTs as effective for developing all four language skills. They add that South Yemeni tertiary teachers also viewed ICT positively, but their classroom use remained below the required level because of infrastructure, internet, competence, and training barriers. Teachers often limit their ICT use to basic tasks such as information retrieval or presentation preparation, failing to leverage more advanced interactive platforms.

Another study conducted by Alotumi (2015) investigated the use of Computer Assisted Language Learning CALL in the teaching and learning of English in 4th level EFL programs of five Yemeni public universities and teachers' and students' attitudes towards CALL. His findings revealed that using CALL in 4th level EFL classes is low. Results have also revealed that both teachers and learners had positive attitudes towards using computer in language teaching.

In Arab world, Saeed (2015) has investigated the effect of using computer technology on teaching performances of Sudanese English language teachers at Khartoum state, Sudan. He collected the data through a questionnaire and analysed it by using SPSS. His results revealed that most of EFL teachers of Khartoum state have positive attitudes towards using of computer technology in their EFL classrooms. It also showed that majority of EFL teachers are not well trained to use computer technology and most schools don't have computers. He has therefore recommended encouraging Sudanese EFL teachers to acquire computer skills required for using computer technology in English language teaching.

Khawaji (2016) has examined Saudi teachers' attitudes towards technology implementation in English language teaching at Saudi universities, current practices and the personal and professional characteristics. Data were collected through a survey questionnaire given to English teachers of Jazan University. Findings have shown that teachers regardless of their gender and teaching experience believe that integration of technology is vital for quality of education, proficiency level of technology use has increased since 2000 and integration of computer technology in universities has reached to a more sophisticated stage. Majority of teachers have also emphasized that technology is a powerful tool which tends to enhance their productivity, efficiency and effectiveness

Taken together, this body of research suggests that digital transformation in EFL teaching offers genuine pedagogical benefits, including richer opportunities for communicative practice, more personalized and interactive learning experiences, and expanded access to authentic language input, but that realizing these

benefits depends heavily on facilitating conditions such as reliable infrastructure, institutional support, and adequate training, and availability of digital resources.

For Yemeni departments of English at faculties of education, this literature suggests that the challenges of digital transformation are unlikely to be primarily about the availability of hardware alone; rather, they are likely to involve a combination of infrastructural constraints, gaps in teachers' digital competence, and institutional and attitudinal factors that shape whether digital tools are meaningfully integrated into EFL pedagogy or remain superficially adopted.

Barriers and Challenges to Digital Transformation in Yemeni Universitas

The barriers to digital transformation in higher education can be synthesized into five interrelated categories: technological, financial, human and pedagogical, organizational and cultural, and leadership and strategic challenges.

Technological challenges remain the most frequently reported barrier, particularly in developing countries. In the Yemeni context, inadequate ICT infrastructure, unreliable electricity, limited internet connectivity, insufficient access to digital devices, and inadequate technical support significantly hinder the effective integration of digital technologies into teaching and learning (Aldowah et al., 2015; Alkamel & Chouthaiwale, 2020; UNESCO, 2023; Lytras et al., 2024).

Financial challenges further constrain digital transformation, as higher education institutions often lack sufficient funding to invest in ICT infrastructure, software, maintenance, staff training, and technological innovation. These challenges are particularly acute in Yemen, where prolonged economic instability has severely limited institutional resources (Ministry of Higher Education and Scientific Research of Yemen, 2005; Benavides et al., 2020; Lytras et al., 2024).

Human and pedagogical challenges include insufficient digital literacy, inadequate ICT and pedagogical competencies, limited professional development opportunities, and difficulties in redesigning teaching for digital environments. These limitations reduce teachers' confidence in using technology, hinder meaningful pedagogical integration, and make it difficult to sustain student engagement and ensure the quality of digital learning resources (Ahmed et al., 2020; Tondeur et al., 2021; Hassan, 2024; Lytras et al., 2024).

Organizational and cultural challenges are reflected in institutional resistance to change, technological anxiety, fear of uncertainty and privacy concerns, and organizational inertia that slows the adoption of innovative practices. These cultural barriers often discourage faculty and staff from embracing digital transformation despite its potential benefits (Alhubaishy & Aljuhani, 2021; McCusker & Babington, 2018; Vogelsang et al., 2020; Lytras et al., 2024).

Leadership and strategic challenges involve weak institutional leadership, fragmented governance, slow decision-making, and the absence of comprehensive digital transformation strategies. Without clear vision, strategic planning, and sustained leadership commitment, digital initiatives tend to remain fragmented and fail to produce long-term institutional change (Bond et al., 2024; 2020; UNESCO, 2023; Lytras et al., 2024). Moreover, existing Yemeni research has largely examined technology adoption from isolated perspectives rather than considering digital transformation as an integrated process involving technology, pedagogy, people, leadership, and organizational readiness (Ahmed et al., 2020).

RESEARCH METHODOLOGY

Research Approach

This study follows a pragmatic research paradigm and uses a mixed-methods approach, combining quantitative and qualitative data within one investigation. The reasoning is straightforward: the first research question asks how widespread digital integration is, which calls for measurable, generalizable data, while the second and third questions ask why certain barriers exist and what teachers themselves think would help, which calls for depth

and context. Numbers alone would show the pattern but not explain it; interviews alone would explain individual experiences but leave open how common they are. Using both together gives a fuller and more credible picture (Creswell & Plano Clark, 2018).

Research Design

The study uses mixed methods – sequential explanatory design; a sequential explanatory design means the quantitative phase comes first and the qualitative phase follows, building directly on it. In Phase One, the questionnaire copies were distributed to EFL teachers in the three participating faculties via *Whatsapp* as word files. It aims to measure the extent of digital integration, the barriers they face, and their views on possible strategies; the data were analysed in SPSS. In Phase Two, semi-structured interviews were conducted with a smaller group of teachers (six participants), selected partly on the basis of the questionnaire results, to help explain findings that are unexpected, unclear, or worth exploring further, such as a barrier that scored unusually high or a gap between teachers' attitudes and their reported classroom practice.

Population, Sampling, and Sample Size

The population consists of all EFL teaching staff in the Departments of English at the Faculties of Education (Faculty of Education, Aden, University of Aden, Saber Faculty of Science and Education, Lahj University, and Faculty of Education, Lower, Abyan University, Faculty of Education- Radfan, Lahj University, Faculty of Education -Yafea, Lahj University, Faculty of Education, Al Mukalla, Hadramout University. The six Faculties covered by the study's delimitation. The sample of the study was selected randomly, 20 participants were participated to respond to the teaches' questionnaire. For the interviews, six participants were chosen purposively from among the questionnaire respondents who agreed to be interviewed, aiming for variation in university, rank, experience, and gender, as well as variation in how they responded to the questionnaire.

DATA COLLECTION METHODS

Two Instruments Were Used To Collect The Required Data.

Teachers' Questionnaire

The questionnaire is distributed via WhatsApp as word files to make it accessible to teachers across faculties. The primary quantitative instrument is a structured, self-administered, developed by the researcher on the basis of the study's conceptual framework. The questionnaire was organized into four parts:

- **Part A** – Background Information: demographic and professional information, including faculty affiliation, gender, academic rank, years of teaching experience, courses taught, and prior training in educational technology.
- **Part B** – Extent and Perceptions of Digital Integration: a 20-item, five-point Likert scale (Strongly Disagree to Strongly Agree) measuring the extent of digital tool use, infrastructure access, digital assessment practices, teachers' confidence, and institutional vision, together with one open-ended item inviting teachers to describe, in their own words, the current state of digital transformation in their departments.
- **Part C** – Barriers to Digital Integration: Likert-scale items organized into four sub-categories consistent with the study's conceptual framework, namely technological barriers, human/personal barriers, pedagogical barriers, and organizational/institutional barriers, together with an open-ended item asking teachers to identify which category constitutes the most significant obstacle in their context.
- **Part D** – Strategies for Sustainable Implementation: Likert-scale items assessing teachers' views on potential strategies (training, institutional policy, technical support, peer mentoring, curriculum redesign, and incentives), together with an open-ended item on the changes teachers believe would most improve digital transformation in their faculty.

Teachers' Semi-structured Interview

The interviews follow the same three themes as the questionnaire, extent of integration, barriers, and strategies, but in a semi-structured format that allows follow-up questions and leaves room for teachers to raise issues the questionnaire may not have captured. Interviews are conducted individually, in person where possible and by phone call otherwise, last roughly 25–40 minutes, are audio-recorded with consent, and are transcribed for analysis. Six interviews were conducted.

Validity and Reliability

The questionnaire's content was reviewed by specialists in TEFL, educational technology, and research methods, who checked items for clarity and relevance before any changes were made. Internal consistency of the Likert-scale sections was checked using Cronbach's alpha, both overall and for each sub-scale, with 0.70 generally treated as an acceptable level. For the interviews, trustworthiness is supported through triangulation with the questionnaire data, member checking where feasible, a clear record of coding decisions, and a detailed description of the institutional context so that readers can judge how far the findings might apply elsewhere.

Pilot Study

Both instruments were piloted before full data collection. The questionnaire was tested with two teachers who shared similar characteristics to the target population but were not part of the actual sample. The interview was trailed with two teachers to check that the questions flow naturally and that recording and transcription work smoothly in practice.

Ethical Considerations

Ethical approval was obtained from the relevant university authorities before data collection begins. Participants received information about the study's purpose and procedures and gave informed consent, and participation is voluntary throughout, with the right to withdraw at any point without any effect on their professional standing. Interview participants were given pseudonyms in transcripts and reporting, and recordings are stored securely and accessed only by the researcher.

DATA ANALYSIS

Quantitative Analysis

Teachers' Questionnaire data were analysed using SPSS. Descriptive statistics — means, standard deviations, and frequencies — were used to answer RQ1 and RQ2, showing the overall extent of digital integration and the relative weight of each barrier category (technological, human, pedagogical, organizational). Moreover, and for the purpose of generalization of the findings, the data were analysed using several **inferential statistical techniques**, including the Mann–Whitney U Test that was utilized to compare perceptions between two independent groups (e.g., gender) and the Kruskal–Wallis Test was applied for comparisons involving more than two independent groups (e.g., different universities). Pearson and Spearman correlation coefficients were calculated to determine the strength and direction of linear and monotonic relationships, respectively, between key variables.

Qualitative Analysis

Interview sessions were audio-recorded with informed consent, transcribed verbatim, and analysed thematically. The aim behind the interview was to answer RQ. 3. Once the themes had been identified, the analysis moved to a deductive stage, in which the data were examined item by item against the study's predefined categories. The interview findings were then discussed alongside the quantitative results to see where they confirm, explain, or complicate the numbers, which is where the real value of the mixed-methods design comes through.

Quantitative Analysis and Findings of Teachers' Questionnaire: Part A: Participants' Demographic Information

Table 1 Participants' Demographic details (N=20)

#	Characteristics	Number of Participants	Percentage
	Department of English- Faculty of Education/ Aden- University of Aden	5	25%
	Department of English- Faculty of Education/ Saber, Lahj University	3	15%
	Department of English- Faculty of Education/ Lowder, Abyan University	5	25%
	Department of English- Faculty of Education/Radfan, Lahj University	2	10%
	Faculty of Education Yafea, Lahj University	3	15%
	Faculty of Education- Mukala – Hadramout University	2	10%
2	Gender	15 Males 5 Females	75% 25%
3	Academic rank	16 Assistant Professor 3 Associate Professor 1 Professor	80% 15% 5%
4	Years of teaching experience	1 participant=5-10 yrs. 5 participants=11-15 yrs. 5 participants=16-20 yrs. 1 participant= more than 20yrs.	5% 25% 25% 5%
5	Courses participants teach	7 participants= Linguistics 5 participants= Literature 6 participants = Methodology 2 participants = Translation	35% 25% 30% 10%
6	Receiving formal training in educational technology or digital teaching tools	6 participants=yes 14 participants=yes	30% 70%
7	If yes, briefly specify the type of training	Training in Workshops	

Part B : Extent and Perceptions of Digital Integration

The participants were asked to rate the extent to which each factor represents a barrier to digital transformation in teaching EFL context by selecting one option (*SD = Strongly Disagree D = Disagree N = Neutral A = Agree SA = Strongly Agree*) regarding the extent and perceptions of digital integration.

Table 2 Extent and Perceptions of Digital Integration

#	Statement	Mean	STD	Scale				
				SD 1	D 2	N 3	A 4	SA 5
1	I regularly use digital tools (e.g., PowerPoint, LMS, video, apps) in my EFL teaching.	3.90	1.16	1 5%	2 10%	2 10%	8 40%	7 35%
2	My department provides access to functional digital infrastructure (computers, internet, projectors).	1.90	1.16	8 40%	10 50%	0 0%	0 0%	2 10%
3	I use digital platforms to communicate with students outside class time.	2.80	1.28	3 15%	7 35%	3 15%	5 25%	2 10%

4	I incorporate digital assessment tools (e.g., online quizzes, e-portfolios) in my courses.	2.40	1.23	7	2	8	2	1
				35%	10%	40%	10%	5%
5	I believe digital transformation improves the quality of EFL teaching and learning.	4.70	0.73	0	1	0	3	16
				0%	5%	0%	15%	80%
6	I feel confident in my ability to use digital tools effectively for teaching.	3.95	0.88	0	2	2	11	5
				0%	10%	10%	55%	25%
7	My students are generally receptive to digitally mediated instruction.	3.30	0.86	0	4	7	8	1
				0%	20%	35%	40%	5%
8	The current level of digital integration in my department meets the demands of modern EFL education.	1.65	0.81	10	8	1	1	0
				50%	40%	5%	5%	0%
9	I actively seek out new digital tools or methods to enhance my teaching.	4.10	0.71	0	1	1	13	5
				0%	5%	5%	65%	25%
10	My university has a clear vision or policy for digital transformation in education.	2.55	1.27	4	8	3	3	2
				20%	40%	15%	15%	10%
11	I am competent in using e-mail.	4.65	0.74	0	1	0	4	15
				0%	5%	0%	20%	75%
12	I am able to download and upload files from/to the Internet.	4.85	0.36	0	0	0	3	17
				0%	0%	0%	15%	85%
13	I have the equipment needed to implement digital transformation in my teaching.	2.95	1.14	3	3	7	6	1
				15%	15%	35%	30%	5%
14	I can use social media such as Facebook, LinkedIn, Twitter, YouTube... to communicate with my students.	3.45	1.39	3	2	3	7	5
				15%	10%	15%	35%	25%
15	I am competent in using word processing software.	4.35	0.74	0	0	3	7	10
				0%	0%	15%	35%	50%
16	I am able to use learning management systems such as Google Classroom, Moodle, Canvas, Edmodo... to supplement my teaching.	3.25	1.29	3	1	8	4	4
				15%	5%	40%	20%	20%
17	I am able to convert the printed content and activities to the digital form in the curriculum.	3.65	1.49	4	0	2	7	7
				20%	0%	10%	35%	35%
18	I am able to publish my lessons and classroom activities on the Web.	3.45	1.57	4	1	5	2	8
				20%	5%	25%	10%	40%
19	I am familiar with and can create a blog.	4.05	2.74	2	4	5	1	8
				10%	20%	25%	5%	40%
20	I am familiar with and can create wikis or Web sites.	2.35	1.42	7	6	3	1	3
				35%	30%	15%	5%	15%

Table 2 presents the descriptive statistics and response distributions for the 20 items measuring the extent of digital integration and teachers' perceptions of digital transformation in the Departments of English at Yemeni Faculties of Education. The first item examined teachers' use of digital tools in classroom instruction. The findings indicate that 15 teachers (75%) either agreed ($n = 8$, 40%) or strongly agreed ($n = 7$, 35%) that they regularly use digital tools such as PowerPoint, learning management systems, videos, and educational applications in their EFL teaching. Only three teachers (15%) disagreed with this statement, while two teachers (10%) were neutral. This distribution produced a relatively high mean score ($M = 3.90$, $SD = 1.16$), suggesting that digital technologies have become common instructional tools among most participants.

In contrast, the availability of institutional digital infrastructure received one of the lowest ratings in the questionnaire. Ten respondents (50%) disagreed and eight (40%) strongly disagreed that their departments provide functional digital infrastructure such as computers, internet access, and projectors. Only two respondents

(10%) strongly agreed with the statement, resulting in a very low mean ($M = 1.90$, $SD = 1.16$). Thus, although teachers attempt to integrate digital technologies, institutional infrastructure remains a major weakness.

Teachers also reported limited use of digital platforms for communication with students outside the classroom. While seven respondents (35%) disagreed and three (15%) strongly disagreed, only five respondents (25%) agreed and two (10%) strongly agreed that they communicate with students through digital platforms. Three teachers (15%) selected the neutral response. Consequently, the overall mean ($M = 2.80$, $SD = 1.28$) indicates only a moderate level of digital communication beyond classroom instruction.

Similarly, the use of digital assessment tools appears relatively limited. Nearly half of the respondents (nine teachers, 45%) disagreed or strongly disagreed that they use online quizzes or electronic portfolios in their teaching, whereas only three teachers (15%) agreed or strongly agreed. The largest proportion (eight teachers, 40%) selected the neutral category, producing a relatively low mean ($M = 2.40$, $SD = 1.23$). These findings suggest that assessment remains one of the least digitally integrated aspects of EFL instruction.

Despite these institutional limitations, teachers demonstrated remarkably positive perceptions toward digital transformation. Regarding whether digital transformation improves the quality of EFL teaching and learning, 19 out of 20 teachers (95%) expressed positive opinions, including three teachers (15%) who agreed and 16 teachers (80%) who strongly agreed. Only one participant (5%) disagreed. This statement recorded one of the highest mean scores in the instrument ($M = 4.70$, $SD = 0.73$), indicating an almost unanimous belief in the educational value of digital transformation. Ahmed et al. (2020) similarly found that South Yemeni tertiary teachers held positive perceptions of ICT's value for developing language skills, yet their actual classroom use remained below the required level precisely because of infrastructure, internet, and training constraints rather than any deficiency in attitude.

Teachers also expressed confidence in their own digital competence. A total of 16 respondents (80%) agreed (55%) or strongly agreed (25%) that they are confident in using digital tools effectively for teaching, while only two respondents (10%) disagreed and another two (10%) remained neutral. This produced a relatively high mean score ($M = 3.95$, $SD = 0.88$), suggesting that teachers generally perceive themselves as capable digital users.

Participants reported moderately positive perceptions regarding students' readiness for digitally mediated learning. Nearly half of the respondents (nine teachers, 45%) agreed or strongly agreed that students are receptive to digitally mediated instruction, while four teachers (20%) disagreed and seven (35%) remained neutral. The resulting mean ($M = 3.30$, $SD = 0.86$) suggests cautious optimism regarding students' acceptance of digital learning environments.

A markedly different picture emerged concerning institutional digital readiness. Regarding whether the current level of digital integration in their departments meets the demands of modern EFL education, 18 respondents (90%) expressed disagreement, including 10 teachers (50%) who strongly disagreed and eight (40%) who disagreed. Only one respondent (5%) agreed, while another 5% remained neutral. Accordingly, this statement recorded the lowest mean in the scale ($M = 1.65$, $SD = 0.81$), highlighting teachers' dissatisfaction with institutional implementation of digital transformation.

Teachers nevertheless demonstrated strong professional motivation to improve their digital practices. Eighteen respondents (90%) agreed (65%) or strongly agreed (25%) that they actively seek new digital tools and teaching methods. Only one teacher (5%) disagreed and another 5% selected the neutral category, producing a high mean ($M = 4.10$, $SD = 0.71$). This finding suggests that teachers themselves are willing to drive digital innovation despite institutional constraints.

However, institutional strategic planning appears insufficient. Only five respondents (25%) agreed or strongly agreed that their university has a clear vision or policy for digital transformation, whereas 12 teachers (60%) disagreed or strongly disagreed and three (15%) remained neutral. The relatively low mean ($M = 2.55$, $SD = 1.27$) further confirms the absence of clear institutional leadership for digital transformation.

The final 10 items measured teachers' digital competencies. The results demonstrate very high levels of basic digital literacy. For example, 19 teachers (95%) agreed or strongly agreed that they are competent in using e-mail ($M = 4.65$, $SD = 0.74$), while all participants (100%) reported that they can download and upload files from the Internet, with 17 respondents (85%) selecting "Strongly Agree" and three (15%) selecting "Agree" ($M = 4.85$, $SD = 0.36$). Likewise, 17 teachers (85%) agreed or strongly agreed that they are competent in using word-processing software ($M = 4.35$, $SD = 0.74$).

In contrast, perceptions regarding access to equipment were more divided. Only seven teachers (35%) agreed or strongly agreed that they possess the necessary equipment for implementing digital transformation, while six teachers (30%) disagreed or strongly disagreed and seven (35%) remained neutral ($M = 2.95$, $SD = 1.14$). Similarly, competence in using learning management systems was moderate, with eight teachers (40%) agreeing or strongly agreeing, four (20%) disagreeing, and eight (40%) selecting the neutral response ($M = 3.25$, $SD = 1.29$).

Teachers also demonstrated moderate competence in creating digital instructional materials. Fourteen respondents (70%) agreed or strongly agreed that they can convert printed teaching materials into digital form ($M = 3.65$, $SD = 1.49$), while 10 teachers (50%) reported that they can publish lessons on the web ($M = 3.45$, $SD = 1.57$). Similarly, 12 respondents (60%) indicated that they use social media to communicate with students ($M = 3.45$, $SD = 1.39$).

Finally, more advanced digital authoring skills were less consistently reported. Although the mean score for creating blogs was relatively high ($M = 4.05$), this item contains a coding anomaly in the dataset and should therefore be interpreted cautiously. By contrast, competence in creating websites or wikis remained comparatively low, with 13 respondents (65%) disagreeing or strongly disagreeing and only four respondents (20%) expressing agreement or strong agreement ($M = 2.35$, $SD = 1.42$).

These findings indicate that digital transformation within Yemeni Faculties of Education is teacher-driven rather than institution-driven. Teachers demonstrate high levels of digital literacy, strong confidence, and overwhelmingly positive attitudes toward the educational value of digital transformation. For many items, between 80% and 95% of respondents expressed positive perceptions regarding their own digital competence and the benefits of technology for EFL teaching. However, these positive perceptions contrast sharply with teachers' evaluations of institutional readiness, where 90% reported inadequate infrastructure and 60% perceived the absence of a clear institutional vision or policy. Therefore, the findings suggest that the primary barriers to digital transformation do not stem from teachers' attitudes or competencies but from organizational, infrastructural, and strategic limitations within Yemeni higher education institutions. This pattern provides a clear answer to the first research question by demonstrating that digital integration has progressed primarily through individual teacher initiative rather than comprehensive institutional implementation. The results reveal that digital transformation has been adopted to a **moderate extent**, characterized by strong individual teacher readiness but relatively weak institutional support.

Part C: Barriers to Digital Integration

The participants were asked to rate the extent to which each factor represents a barrier to digital transformation in teaching EFL context by selecting one option ($SD = Strongly Disagree$ $D = Disagree$ $N = Neutral$ $A = Agree$ $SA = Strongly Agree$) regarding C1. Technological Barriers. The same was followed in C2, C3, C4.

Table 3 Technological Barriers

#	Statement	Mean	STD	Scale				
				SD 1	D 2	N 3	A 4	SA 5
1	Internet connectivity in my faculty is unreliable or insufficient.	3.80	1.60	4	1	0	5	10
				20%	5%	0%	25%	50%
2	Hardware (computers, smartboards) is outdated, insufficient, or poorly maintained.	4.30	1.08	0	3	0	5	12
				0%	15%	0%	25%	60%

3	Our departments lack Hardware (computers, smartboards).	4.45	0.88	0	1	2	4	13
				0%	5%	10%	20%	65%
4	Software and digital platforms available to me are limited or inappropriate for EFL teaching.	3.90	1.16	0	3	5	3	9
				0%	15%	25%	15%	45%
5	Electrical power outages disrupt the use of digital tools in class.	4.35	1.18	1	1	2	2	14
				5%	5%	10%	10%	70%

Table 3 presents teachers' perceptions of technological barriers to digital transformation in EFL teaching. Overall, the findings indicate that technological factors constitute the most significant barriers to digital integration, with all items recording relatively high mean scores ($M = 3.80$ – 4.45).

The greatest obstacle identified by participants was the lack of hardware (computers and smartboards) ($M = 4.45$, $SD = 0.88$), with 85% of respondents agreeing or strongly agreeing that their departments lack adequate digital equipment. Similarly, electrical power outages were perceived as a major challenge ($M = 4.35$, $SD = 1.18$), as 80% of participants agreed or strongly agreed that unstable electricity disrupts the use of digital tools during teaching. A comparable pattern emerged for the availability of hardware, where 85% reported that existing equipment is outdated, insufficient, or poorly maintained ($M = 4.30$, $SD = 1.08$).

Furthermore, participants considered unreliable internet connectivity to be a substantial barrier ($M = 3.80$, $SD = 1.60$), with 75% agreeing or strongly agreeing that internet services are inadequate for effective digital teaching. Likewise, 60% indicated that the available software and digital platforms are limited or inappropriate for EFL instruction ($M = 3.90$, $SD = 1.16$).

These findings suggest that inadequate infrastructure, unreliable electricity, limited internet access, and insufficient technological resources remain the primary technological constraints hindering digital transformation in Yemeni Faculties of Education.

Table 4 Human/Personal Barriers

#	Statement	Mean	STD	Scale				
				SD 1	D 2	N 3	A 4	SA 5
1	I lack sufficient training in using digital tools for teaching.	2.75	1.33	4	6	3	5	2
				20%	30%	15%	25%	10%
2	I lack time to design or prepare digitally mediated lessons.	2.75	1.16	3	6	5	5	1
				15%	30%	25%	25%	5%
3	I experience anxiety or reluctance toward adopting new technologies.	2.55	1.39	6	4	6	1	3
				30%	20%	30%	5%	15%
4	Students lack the digital literacy skills needed to engage with digital tools.	3.75	1.16	0	5	1	8	6
				0%	25%	5%	40%	30%
5	There is resistance to changing traditional teaching methods.	3.20	0.83	0	5	6	9	0
				0%	25%	30%	45%	0%

Table 4 summarizes teachers' perceptions of human and personal barriers to digital transformation. Compared with the technological barriers, this category recorded relatively **moderate mean scores** ($M = 2.55$ – 3.75), indicating that personal factors are perceived as less influential.

The highest-rated human barrier was **students' limited digital literacy** ($M = 3.75$, $SD = 1.16$), with **70%** of respondents agreeing or strongly agreeing that students lack the digital skills required to engage effectively with technology-enhanced learning. In addition, **45%** agreed that resistance to changing traditional teaching methods remains a challenge ($M = 3.20$, $SD = 0.83$), although 30% remained neutral.

Conversely, teachers generally did not perceive their own digital competence as a major obstacle. Half of the respondents (50%) disagreed or strongly disagreed that they lacked sufficient training ($M = 2.75$, $SD = 1.33$),

while only 35% acknowledged this as a barrier. Similarly, 45% disagreed that insufficient preparation time hindered their use of digital technologies ($M = 2.75$, $SD = 1.16$). Moreover, resistance or anxiety towards adopting new technologies received the lowest mean score ($M = 2.55$, $SD = 1.39$), with 50% rejecting this statement. Overall, these findings indicate that teachers generally possess positive attitudes towards digital transformation and do not consider their own readiness a major barrier. Instead, they perceive students' digital competencies and adherence to traditional teaching practices as the more significant human-related challenges. This pattern is also consistent with Alotumi's (2015) finding that CALL use in Yemeni public universities was low despite both teachers and learners expressing positive attitudes toward computer-based language teaching.

Table 5 Pedagogical Barriers

#	Statement	Mean	St.D	Scale				
				SD 1	D 2	N 3	A 4	SA 5
1	The current curriculum does not allow flexibility for integrating digital tools.	4.05	1.14	0	3	3	4	10
				0%	15%	15%	20%	50%
2	There are no clear pedagogical guidelines for how to integrate technology into EFL teaching.	4.25	.91	0	1	3	6	10
				0%	5%	15%	30%	50%
3	Class sizes make it difficult to manage digitally mediated instruction effectively.	3.45	1.23	0	7	2	6	5
				0%	35%	10%	30%	25%
4	Assessment methods in my department are not adapted to digital learning.	4.15	1.08	1	1	1	8	9
				5%	5%	5%	40%	45%

Table 5 presents teachers' perceptions of pedagogical barriers affecting digital transformation. Overall, pedagogical issues were perceived as considerable barriers, with mean scores ranging from 3.45 to 4.25.

The absence of clear pedagogical guidelines for technology integration was identified as the most significant pedagogical challenge ($M = 4.25$, $SD = 0.91$), with 80% of respondents agreeing or strongly agreeing that teachers lack clear instructional guidance for integrating digital technologies into EFL teaching. Likewise, 85% believed that current assessment methods are not adapted to digital learning ($M = 4.15$, $SD = 1.08$).

In addition, 70% of participants agreed that the existing curriculum does not provide sufficient flexibility for technology integration ($M = 4.05$, $SD = 1.14$). Although class size was also viewed as a challenge, its impact was comparatively lower ($M = 3.45$, $SD = 1.23$), with 55% agreeing or strongly agreeing that large classes make digitally mediated instruction difficult.

These findings indicate that the successful implementation of digital transformation requires curriculum reform, updated assessment practices, and clear pedagogical frameworks to guide teachers in integrating technology into EFL instruction.

Table 6 Organizational/Institutional Barriers

#	Statement	Mean	St.D	Scale				
				SD 1	D 2	N 3	A 4	SA 5
1	My institution allocates insufficient budget to digital transformation initiatives.	3.90	1.51	3	1	2	3	11
				15%	5%	10%	15%	55%
2	There is a lack of institutional leadership or strategic planning for digital transformation.	4.15	1.08	1	1	1	8	9
				5%	5%	5%	40%	45%
3	Technical support staff are unavailable or insufficient when problems occur.	4.30	1.08	1	1	0	7	11
				5%	5%	0%	35%	55%
4	Decision-making about technology adoption happens without consulting teaching staff.	3.50	1.14	1	2	8	4	5
				5%	10%	40%	20%	25%

#	Statement	Mean	St.D	Scale				
				SD 1	D 2	N 3	A 4	SA 5
5	Lack of appropriate infrastructure and facilities of our Department such Internet, classrooms equipment hinder digital transformation.	4.25	1.16	1 5%	1 5%	2 10%	4 20%	12 60%

Table 6 illustrates teachers' perceptions of organizational and institutional barriers. Similar to the technological dimension, organizational barriers received high mean scores ($M = 3.50$ – 4.30), indicating that institutional issues substantially hinder digital transformation. The most prominent organizational barrier was the lack of technical support ($M = 4.30$, $SD = 1.08$), with 90% of respondents agreeing or strongly agreeing that technical support staff are unavailable or insufficient when technological problems occur. Similarly, 80% reported that inadequate infrastructure and facilities hinder digital transformation ($M = 4.25$, $SD = 1.16$). Participants also perceived a lack of institutional leadership and strategic planning as a major challenge ($M = 4.15$, $SD = 1.08$), with 85% agreeing or strongly agreeing that their institutions lack effective leadership for digital transformation. Furthermore, 70% believed that insufficient financial investment limits digital transformation initiatives ($M = 3.90$, $SD = 1.51$).

By contrast, the statement regarding teachers' involvement in technology-related decision-making received the lowest mean score in this dimension ($M = 3.50$, $SD = 1.14$). While 45% agreed that decisions are made without consulting teaching staff, 40% expressed a neutral opinion, suggesting mixed perceptions regarding participatory decision-making. Overall, the findings demonstrate that inadequate institutional leadership, insufficient funding, weak technical support, and poor infrastructure are major organizational barriers to the effective implementation of digital transformation in Yemeni Faculties of Education.

Overall Summary of Barrier Dimensions

Across the four dimensions, technological and organizational barriers emerged as the most influential obstacles to digital transformation, reflected in consistently high mean scores and strong levels of agreement among participants. In contrast, human/personal barriers were comparatively less significant, indicating that teachers generally possess positive attitudes and sufficient confidence in using digital technologies. These findings suggest that the successful implementation of digital transformation in Yemeni Faculties of Education depends primarily on strengthening institutional infrastructure, leadership, technical support, and pedagogical frameworks rather than addressing teachers' willingness to adopt digital technologies.

Part D: Strategies for Sustainable Implementation (RQ3)

The participants were asked to rate the extent to which each factor represents a barrier to digital transformation in teaching EFL context by selecting one option ($SD = Strongly Disagree$ $D = Disagree$ $N = Neutral$ $A = Agree$ $SA = Strongly Agree$).

Table 7 Strategies for Sustainable Implementation

#	Statement	Mean	St.D	Scale				
				SD 1	D 2	N 3	A 4	SA 5
1	Regular, hands-on training workshops would improve my use of digital tools.	4.70	0.73	0 0%	1 5%	0 0%	3 15%	16 80%
2	A clear institutional digital transformation policy would support my teaching.	4.60	0.75	0 0%	1 5%	0 0%	5 5%	14 70%
3	Dedicated technical support would encourage me to use more digital tools.	4.75	0.71	0 0%	1 5%	0 0%	2 10%	17 85%
4	Peer mentoring or collaboration among colleagues would help digital adoption.	4.35	0.74	0 0%	1 5%	0 0%	10 50%	9 45%

5	Redesigning the curriculum to formally include digital components would be beneficial.	4.80	0.69	0	1	0	1	18
				0%	5%	0%	5%	90%
6	Incentives (e.g., recognition, workload adjustment) would encourage greater digital adoption.	4.40	0.82	0	1	1	7	11
				0%	5%	5%	35%	55%

Table 7 presents teachers' perceptions of strategies that could promote the sustainable implementation of digital transformation in EFL teaching. Overall, all proposed strategies received very high levels of agreement, with mean scores ranging from 4.35 to 4.80, indicating a strong consensus among participants regarding the measures needed to support digital transformation.

The highest-rated strategy was redesigning the curriculum to formally include digital components ($M = 4.80$, $SD = 0.69$). An overwhelming 95% of respondents agreed or strongly agreed that embedding digital competencies and technologies within the curriculum would facilitate effective digital transformation, with 90% expressing strong agreement.

Similarly, participants strongly endorsed the provision of dedicated technical support ($M = 4.75$, $SD = 0.71$), as 95% agreed or strongly agreed that readily available technical assistance would encourage greater use of digital technologies. Regular hands-on training workshops also emerged as a key strategy ($M = 4.70$, $SD = 0.73$), with 95% of respondents believing that continuous practical training would enhance their ability to integrate digital tools into teaching.

The need for a clear institutional digital transformation policy was likewise emphasised ($M = 4.60$, $SD = 0.75$). A total of 95% of participants agreed or strongly agreed that a well-defined institutional vision and policy would support effective technology integration in EFL teaching.

In addition, incentives for teachers, such as recognition and workload adjustments, were viewed positively ($M = 4.40$, $SD = 0.82$), with 90% of respondents agreeing or strongly agreeing that such measures would motivate greater adoption of digital technologies. Likewise, peer mentoring and collaboration among colleagues received substantial support ($M = 4.35$, $SD = 0.74$), with 95% of participants acknowledging that collaborative professional learning would facilitate digital adoption.

To sum up, the findings demonstrate a strong consensus among teachers that sustainable digital transformation requires a comprehensive institutional approach. Participants emphasized that curriculum reform, continuous professional development, technical support, clear institutional policies, collaborative learning, and motivational incentives should be implemented collectively to ensure the successful and long-term integration of digital technologies into EFL teaching. These findings directly address Research Question 3, highlighting that sustainable digital transformation extends beyond technology provision and depends on coordinated pedagogical, institutional, and professional support mechanisms.

Inferential Statistical Techniques

This inferential statistical technique presents an analysis of teachers' perceptions regarding digital transformation, barriers, and implementation strategies across various universities. The analysis included the Mann–Whitney U Test, Kruskal–Wallis Test, and Pearson and Spearman rank correlations, to assess significant differences and relationships within the collected data.

Gender Differences in Digital Integration Perception

A Mann–Whitney U test was conducted to investigate potential gender-based differences in teachers' overall perceptions of digital integration (Part B). The results indicated no statistically significant difference between male and female teachers, with a U statistic of 52.50 and a p-value of 0.203 ($p > 0.05$). This finding suggests that gender does not significantly influence teachers' perceptions of digital transformation within the participating universities.

Table 8 Mann–Whitney U Test Results

Test	U	p-value	Decision
Mann–Whitney U	52.50	0.203	Not significant

Inter-University Differences in Digital Integration Perception

The Kruskal–Wallis test was employed to assess whether there were statistically significant differences among the six participating universities concerning teachers' perceptions of digital integration. The analysis yielded a Kruskal–Wallis H statistic of 3.651 with 5 degrees of freedom, and a p-value of 0.601 ($p > 0.05$). These results indicate that there are no statistically significant differences in perceptions of digital integration across the various universities, suggesting a general consistency in views among teachers from different institutions.

Table 8 Kruskal–Wallis Test Results

Test	H	p-value	Decision
Kruskal–Wallis	3.651	0.601	Not significant

Correlations Between Digital Integration, Barriers, and Strategies

Pearson and Spearman correlation analyses were performed to explore the relationships between perceptions of digital integration (Part B), perceived barriers (Part C), and proposed implementation strategies (Part D).

Digital Integration (Part B) vs. Perceived Barriers (Part C)

For the relationship between digital integration and perceived barriers, the Pearson correlation coefficient was -0.289 with a p-value of 0.217, indicating no statistically significant linear relationship. However, the Spearman's rank correlation revealed a moderate negative correlation ($\rho = -0.461$) that was statistically significant ($p = 0.041$). This suggests that teachers reporting higher levels of digital integration tend to perceive fewer barriers, a relationship more clearly observable through non-parametric analysis.

Digital Integration (Part B) vs. Implementation Strategies (Part D)

Neither the Pearson correlation ($r = -0.163$, $p = 0.492$) nor the Spearman correlation ($\rho = -0.245$, $p = 0.297$) demonstrated a statistically significant relationship between perceptions of digital integration and teachers' ratings of implementation strategies. This implies that teachers' views on digital integration are not significantly associated with their assessments of the proposed strategies.

Table 9 Pearson and Spearman Correlation Results

Variables	Pearson r	p	Spearman ρ	p
Part B ↔ Part C	-0.289	0.217	-0.461	0.041
Part B ↔ Part D	-0.163	0.492	-0.245	0.297

In summary, the inferential statistical analyses revealed several key findings. The Mann–Whitney U test indicated no significant difference in perceptions of digital integration between male and female teachers ($U = 52.50$, $p = 0.203$). Similarly, the Kruskal–Wallis test showed no significant differences among teachers from the six participating universities regarding digital integration perceptions ($H(5) = 3.65$, $p = 0.601$). While Pearson's correlation did not identify a significant linear relationship between digital integration and perceived barriers ($r = -0.289$, $p = 0.217$), Spearman's rank correlation demonstrated a significant moderate negative association ($\rho = -0.461$, $p = 0.041$), suggesting that enhanced digital integration is linked to reduced perceived barriers. Finally,

no significant relationship was observed between digital integration and implementation strategies using either Pearson ($r = -0.163$, $p = 0.492$) or Spearman ($\rho = -0.245$, $p = 0.297$) correlation coefficients.

QUALITATIVE ANALYSIS AND FINDINGS OF THE INTERVIEW

Six interviews were selected to be analyzed. The first theme of the teachers' interview explored teachers' experiences regarding the extent to which digital technologies have been integrated into English as a Foreign Language (EFL) instruction within the Departments of English at Yemeni Faculties of Education. Specifically, **Questions (1–3) (See appendix A)** investigated teachers' professional backgrounds and their relationship with digital technology, the perceived impact of digital tools on teaching and learning, and the existence of institutional policies supporting digital transformation.

The interview findings indicate that participants generally held positive perceptions of digital technology and recognized its contribution to improving EFL teaching and learning. Five participants (83.3%) reported regularly integrating digital tools such as PowerPoint, projectors, educational videos, AI applications, and online platforms into their teaching. Participant 5 stated, *"I regularly use a data projector, PowerPoint presentations, educational videos, and other digital resources to support teaching and enhance students' learning experiences."* Similarly, Participant 4 noted, *"I use several technological tools and approaches in my teaching inside and outside the classroom."*

Regarding the impact of digital technologies, four participants (66.7%) believed that digital tools had greatly or moderately improved teaching effectiveness and student learning. Participant 2 highlighted the educational value of artificial intelligence, explaining that students used AI to *"transform their imaginative stories into complete stories"* and create digital learning products such as posters and infographics. However, two participants (33.3%) believed that the impact of digital technologies remained limited because of insufficient institutional resources. As Participant 5 remarked, *"These tools are not widely available or effectively implemented in most English Departments."*

Concerning institutional policies, four participants (66.7%) acknowledged that their universities had some form of digital transformation policy; however, they indicated that implementation and teacher awareness were limited. Participant 1 stated, *"There is a digital transformation policy, but only some teachers are aware of or implement it."* Likewise, three participants (50.0%) argued that institutional policies were informal and not clearly communicated.

Overall, the findings suggest that teachers demonstrate positive attitudes toward digital transformation and are increasingly integrating digital technologies into their teaching. Nevertheless, institutional support and policy implementation remain insufficient to ensure consistent and sustainable digital integration. These qualitative findings support the questionnaire results, which showed a moderate-to-high level of digital technology integration and positive teacher perceptions. The interviews explain that while teachers are willing to adopt digital technologies, institutional limitations reduce the extent of their effective implementation.

The second theme explored the barriers limiting the effective implementation of digital transformation in EFL teaching (**Questions 4–7) (See appendix A)**. Analysis of the interviews revealed four major barriers: inadequate technological infrastructure, limited digital preparedness, curriculum-related constraints, and insufficient institutional support.

The most frequently reported challenge was **technological infrastructure**. Five participants (83.3%) identified poor internet connectivity, inadequate digital equipment, and limited technical support as the main obstacles to integrating digital technologies into teaching. Participant 4 stressed that *"all of them are the biggest technological obstacles for both students and teachers and the academic institutions themselves."* Likewise, Participant 5 noted that *"poor internet connectivity, inadequate digital equipment, and limited technical support... significantly restrict the effective integration of digital technologies into teaching."* Similarly, Participant 2 identified both *"internet access and equipment"* as the major challenges, while Participant 1 highlighted *"internet access"* as the primary obstacle.

Another recurring theme was **the limited preparedness of teachers and students**. Four participants (66.7%) considered teachers and students to be moderately prepared but in need of further professional development, whereas two participants (33.3%) believed that digital readiness remained limited. Participant 5 explained that *"both teachers and students have a moderate level of digital readiness. However, they still require additional training and continuous professional development."* Likewise, Participant 3 observed that teachers and students have *"limited preparedness, with noticeable gaps in digital skills and training."*

Participants also highlighted **curriculum and assessment constraints**. Three participants (50.0%) believed that the curriculum, class sizes, and assessment methods provided only limited support for technology integration, while the remaining participants (50.0%) acknowledged that these aspects generally support digital integration but still require improvement. Participant 5 commented that *"the curriculum, class sizes, and assessment methods provide only limited support for the integration of digital technology,"* making implementation difficult under the current educational conditions.

Finally, **insufficient institutional support** emerged as a significant barrier. Four participants (66.7%) reported that institutional support was either limited or inadequate, particularly regarding funding, infrastructure, planning, and technical assistance. Participant 1 explained that *"digital transformation is progressing slowly due to obstacles such as inadequate internet connectivity, insufficient digital equipment, limited facilities, and a lack of technical resources."* Similarly, Participant 5 stated that *"the institution provides little or no meaningful support for digital transformation,"* making technology integration *"extremely difficult."* In contrast, Participants 3 and 6 acknowledged moderate institutional support but emphasized the need for improvements in funding, infrastructure, and planning.

These qualitative findings reinforce the questionnaire results, which identified technological and organizational barriers as the most influential factors hindering digital transformation. The interviews provide deeper insight by demonstrating that teachers' willingness to adopt digital technologies is constrained primarily by inadequate infrastructure, insufficient institutional support, and limited professional development rather than by resistance to technology itself.

The third theme explored teachers' views on the strategies required to achieve sustainable digital transformation in EFL teaching (**Questions 8–10**) (**See appendix A**). The findings identified three key priorities: improving digital infrastructure, strengthening institutional commitment, and enhancing professional development and strategic planning.

The most frequently recommended strategy was **improving digital infrastructure and resources**. Five participants (83.3%) emphasized that successful digital transformation depends on providing reliable internet access, modern digital equipment, and adequate technical support. Participant 5 stated that *"the highest priority is improving digital infrastructure and providing adequate resources,"* adding that teachers require *"reliable internet access, modern digital equipment, and appropriate technological resources"* to implement digital teaching effectively. Similarly, Participant 6 simply identified *"infrastructure and resources"* as the primary requirement, while Participant 3 recommended *"improving internet connectivity, providing digital devices and software, and expanding technical support services."*

Another major theme was **strengthening institutional commitment and leadership**. Four participants (66.7%) stressed the need for stronger institutional support through increased funding, strategic planning, collaboration, and incentives for teachers. Participant 3 recommended *"strengthen institutional commitment by allocating sufficient funding, encouraging collaboration, and providing incentives for teachers to adopt digital technologies."* Likewise, Participant 6 selected the same strategy, while Participant 2 emphasised that organizational and administrative support should accompany improvements in infrastructure and training.

Participants also highlighted the importance of **capacity building and long-term planning**. Three participants (50.0%) recommended continuous professional development for teachers alongside clear institutional policies and phased implementation plans. Participant 3 suggested *"develop[ing] a phased digital transformation plan supported by clear policies, continuous teacher training, and regular monitoring and evaluation."* Similarly,

Participant 2 identified *"capacity building (training)"* as one of the most important forms of support needed to integrate digital technologies effectively.

In their concluding remarks, participants further emphasized the importance of sustainability. Participant 2 recommended exploring students' perceptions and the long-term impact of AI integration, stating that *"students' readiness and attitudes play a significant role in the success of technological transformation."* Participant 6 stressed the need for national support, arguing that universities should be *"rehabilitated... to be more updated and able to face any problems like Corona COVID-19,"* while Participant 3 expressed the hope that *"the results of this study find their way into application."*

These qualitative findings support the questionnaire results, which ranked infrastructure, institutional support, and professional development as the most important strategies for effective digital transformation. The interviews further demonstrate that teachers view sustainable digital transformation as a shared institutional responsibility requiring adequate resources, continuous training, effective leadership, and long-term strategic planning rather than isolated individual efforts.

CONCLUSIONS

This study set out to examine digital transformation in the teaching of English as a Foreign Language within Departments of English at Yemeni Faculties of Education, pursuing three interrelated objectives: to assess the extent of digital integration and teachers' perceptions of it, to identify the barriers constraining effective implementation, and to propose evidence-based strategies for sustainable digital transformation. Drawing on both the questionnaire and the follow-up interviews, the findings provide clear and consistent answers to each of the study's research questions.

The study demonstrates that digital integration within these departments has advanced largely through individual teacher initiative rather than coordinated institutional planning. Participants reported strong digital literacy, considerable confidence, and markedly positive attitudes toward the value of digital transformation for EFL instruction, yet they were equally emphatic in rating their institutions' digital infrastructure and strategic vision as inadequate. This disconnection between participants' readiness and institutional readiness constitutes the most consistent finding to emerge across both the quantitative and qualitative datasets, and it is one that carries direct implications for how digital transformation should be understood in this context: not as a failure of will on the part of teaching staff, but as a failure of institutional provision.

The study establishes that technological and organizational barriers represent the most substantial obstacles to digital transformation, namely unreliable internet connectivity, outdated or insufficient hardware, recurrent power outages, inadequate technical support, and the absence of decisive institutional leadership or coherent policy. Pedagogical constraints, particularly rigid curricula and assessment methods ill-suited to digital learning environments, further compound these difficulties. Human and personal barriers, by contrast, proved comparatively minor, a finding that carries considerable weight: it indicates that resistance or reluctance among teachers cannot be credibly invoked as the principal obstacle to change, and that any remedial strategy misdirected toward teacher attitudes would be addressing the wrong problem.

The study set of priorities for sustainable implementation of DT: dependable infrastructure and technical support, formal curriculum redesign that embeds digital components rather than appending them, sustained hands-on training, unambiguous institutional policy, structured peer mentoring, and incentive mechanisms that recognize teachers' efforts. The participants lent further weight to these priorities, underscoring the necessity of institutional commitment, phased strategic planning, and sustained national investment in higher education infrastructure.

Taken as a whole, these findings substantiate the study's central thesis: digital transformation within Yemeni Faculties of Education is presently sustained by the motivation and competence of individual teachers, while the institutional conditions required to consolidate and scale this transformation remain largely wanting. Meaningful progress, accordingly, depends far less on persuading teachers of technology's pedagogical value, a battle already won, and far more on constructing the infrastructural, financial, pedagogical, and leadership foundations capable of converting willing individual effort into durable institutional change. The strategies advanced in this study

are offered as a concrete and evidence-grounded point of departure for university leaders and policymakers seeking to close this gap.

REFERENCES

8. Abuhussein, H. F., & Badah, A. (2024). Exploring the impact of online teaching environment on EFL teachers' professional identity. *Electronic Journal of e-Learning*, 22(5), 39–52. <https://doi.org/10.34190/ejel.22.5.3280>
9. Ahmed, A., Qasem, A., & Pawar, S. V. (2020). Computer-assisted language instruction in South Yemeni context: A study of teachers' attitudes, ICT uses and challenges. *International Journal of Language Education*, 4(2), 59–73. <https://doi.org/10.26858/ijole.v4i2.10106>
10. Akour, M., & Alenezi, M. (2022). Higher education future in the era of digital transformation. *Education Sciences*, 12(11), Article 784. <https://doi.org/10.3390/educsci12110784>
11. Alakrash, H. M., Razak, N. A., & Krish, P. (2022). The application of digital platforms in learning English language. *International Journal of Information and Education Technology*, 12(9), 899–904. <https://doi.org/10.18178/ijiet.2022.12.9.1699>
12. Alenezi, M. (2021). Deep dive into digital transformation in higher education institutions. *Education Sciences*, 11(12), Article 770. <https://doi.org/10.3390/educs11120770>
13. Alenezi, M. (2023). Digital learning and digital institution in higher education. *Education Sciences*, 13(1), Article 88. <https://doi.org/10.3390/educs13010088>
14. Alenezi, M., & Akour, M. (2023). Digital transformation blueprint in higher education: A case study of PSU. *Sustainability*, 15(10), Article 8204. <https://doi.org/10.3390/su15108204>
15. Alenezi, M., Wardat, S., & Akour, M. (2023). The need of integrating digital education in higher education: Challenges and opportunities. *Sustainability*, 15(6), Article 4782. <https://doi.org/10.3390/su15064782>
16. Alghamdi, S. A. A., & Alnajami, M. M. L. (2023). Challenges in the effective utilization of blended learning in English instruction within higher education. *Arab Journal for Scientific Publishing*.
17. Alhubaishy, A., & Aljuhani, A. (2021). The challenges of digital transformation in higher education institutions. *Journal of Higher Education Theory and Practice*, 21(4).
18. Alkamel, M. A. A., & Chouthaiwale, S. S. (2020). ICT availability and uses among Yemeni university EFL students. *TESOL and Technology Studies*, 1(1), 1–9. <https://doi.org/10.48185/tts.v1i1.63>
19. Al Mulhim, E. (2014). The barriers to the use of ICT in teaching in Saudi Arabia: A review of literature. *Universal Journal of Educational Research*, 2(6), 487–493.
20. Alotumi, M. A. (2015). *Use of CALL for EFL instruction in ELTE programmes in Yemeni universities: An impact study* (Doctoral dissertation, English and Foreign Languages University).
21. Antonietti, C., Rauseo, M., Amenduni, F., & Cattaneo, A. (2021). *How do teachers' digital competence and attitude towards technology affect technology use? Digital competence and technology acceptance in vocational education*. Swiss Federal Institute for Vocational Education and Training (SFUVET).
22. Bailey, D. R., & Lee, A. R. (2020). Learning from experience in the midst of COVID-19: Benefits, challenges, and strategies in online teaching. *Computer-Assisted Language Learning Electronic Journal*, 21(2), 178–198.
23. Benavides, L. M. C., Tamayo Arias, J. A., Arango Serna, M. D., Branch Bedoya, J. W., & Burgos, D. (2020). Digital transformation in higher education institutions: A systematic literature review. *Sensors*, 20(11), Article 3291. <https://doi.org/10.3390/s20113291>
24. Bingimlas, K. A. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science and Technology Education*, 5(3), 235–245.
25. Bin-Hady, W. R. A., & Al-Tamimi, N. O. M. (2021). The use of technology in informal English language learning: Evidence from Yemeni undergraduate students. *Learning and Teaching in Higher Education: Gulf Perspectives*, 17(2), 107–120. <https://doi.org/10.1108/LTHE-09-2020-0037>
26. Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2021). Emergency remote teaching in higher education: Mapping the first global online semester. *International Journal of Educational Technology in Higher Education*, 18, Article 50. <https://doi.org/10.1186/s41239-021-00282-x>

27. Brauer, S. (2019). *Digital open badge-driven learning—competence-based professional development for vocational teachers* (Doctoral thesis, University of Lapland).
28. Cattaneo, A. A. P., Antonietti, C., & Rausedo, M. (2022). How digitalised are vocational teachers? Assessing digital competence in vocational education and looking at its underlying factors. *Computers & Education*, 176, Article 104358. <https://doi.org/10.1016/j.compedu.2021.104358>
29. Çakir, I. (2006). The use of video as an audio-visual material in foreign language teaching classroom. *Turkish Online Journal of Educational Technology*, 5(4), 67–72.
30. Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.
31. Daraghme, A., Mead, H., & Copeland, K. (2021). English K–12 teacher experiences in Saudi Arabia in the pandemic era: A follow-up study of one Khbrat University program. *Arab World English Journal*, 1, 3–20. <https://doi.org/10.24093/awej/covid.1>
32. Ertmer, P. A. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development*, 47(4), 47–61.
33. Falloon, G. (2020). From digital literacy to digital competence: The teacher digital competency (TDC) framework. *Educational Technology Research and Development*, 68, 2449–2472. <https://doi.org/10.1007/s11423-020-09767-4>
34. Gkrimpizi, T., Peristeras, V., & Magnisalis, I. (2024). Digital transformation: A systematic literature review of definitions and conceptual models. *Government Information Quarterly*.
35. Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3, 275–285. <https://doi.org/10.1016/j.susoc.2022.05.004>
36. Hamidi, F., Ghorbandordinejad, F., Rezaee, M., & Jafari, M. (2011). A comparison of the use of educational technology in developed and developing countries. *Procedia Computer Science*, 3, 374–377. <https://doi.org/10.1016/j.procs.2010.12.063>
37. Hassan, M. M. N. (2024). Exploring the effectiveness of Moodle activities in enhancing EFL learning for Yemeni teachers. *Social Science and Humanities Journal*, 8(7), 4177–4187. <https://doi.org/10.18535/sshj.v8i07.1183>
38. Khawaji, S. A. N. (2016). English teachers' perception and practices towards technology implementation. *International Journal*, 4(2), 123–133.
39. Kozhukhova, N. V., Agaphonov, I. A., & Korobkova, Y. Y. (2021). Competencies of the future: Transforming education in the digital economy. In *International Scientific Conference "Digital Transformation of the Economy: Challenges, Trends, New Opportunities"*. Springer International Publishing. [1, 2]
40. Kumar, A., Kumar, P., Palvia, S. C. J., & Verma, S. (2017). Online education worldwide: Current status and emerging trends. *Journal of Information Technology Case and Application Research*, 19(1), 3–9.
41. Lytras, M. D., Şerban, A. C., Alkhalidi, A., Malik, S., & Aldosemani, T. (Eds.). (2024). *Digital transformation in higher education: Part B—Cases, examples and good practices*. Emerald Publishing Limited. <https://doi.org/10.1108/9781836084242>
42. McCusker, S., & Babington, P. (2018). Institutional culture and the disruption of digital transformation in education. *International Journal of Educational Technology*.
43. Mohamed H., M. A., Tlemsani, I., & Matthews, R. (2021). Higher education strategy in digital transformation. *Education and Information Technologies*, 27, 3171–3195.
44. Nguyen, Q. (2022). Teachers' scaffolding strategies in Internet-based ELT classes. *Teaching English as a Second or Foreign Language—TESL-EJ*, 26(101). <https://doi.org/10.55593/ej.26101a1>
45. OECD. (2023). *Digital education outlook 2023: Towards an effective digital education ecosystem*. OECD Publishing. <https://doi.org/10.1787/b14bef59-en>
46. Redecker, C. (2017). *European framework for the digital competence of educators: DigCompEdu*. Publications Office of the European Union.
47. Saeed, Y. B. M. (2015). The effect of using computer technology on English language teachers' performance. *SUST Journal of Humanities*, 1, 64–79.
48. Sang, G., Wang, K., Li, S., Xi, J., & Yang, D. (2023). Effort expectancy mediates the relationship between instructors' digital competence and their work engagement: Evidence from universities in China. *Educational Technology Research and Development*, 71(1), 99–115.

49. Shi, Q., Xu, X., Zhang, Y., & Hu, B. (2025). Research on psychological resilience, digital competence, and self-efficacy in online TCFL teachers. *Behavioral Sciences*, 15(3), Article 366. <https://doi.org/10.3390/bs15030366>
50. Sherry, L., & Gibson, D. (2002). The path to teacher leadership in educational technology. *Contemporary Issues in Technology and Teacher Education*, 2(2), 178–180.
51. Tondeur, J., Howard, S. K., Siddiq, F., & Scherer, R. (2021). Enhancing teachers' digital competence through professional development: A systematic review. *Computers & Education*, 166, Article 104196.
52. UNESCO. (2023). *Global education monitoring report 2023: Technology in education—A tool on whose terms?* UNESCO.
53. United Nations. (2023). *The Sustainable Development Goals Report 2023*. United Nations.
54. Valdés, K. N., Alpera, S. Q. Y., & Suárez, L. M. C. (2021). An institutional perspective for evaluating digital transformation in higher education: Insights from the Chilean case. *Sustainability*, 13(17), 9850
55. Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901. <https://doi.org/10.1016/j.jbusres.2019.09.022>
56. Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.003>
57. Vogelsang, K., Liere-Netheler, K., Packmohr, S., & Hoppe, U. (2020). Success factors for digital transformation in academia: Overcoming the barrier of privacy and trace uncertainty. *Proceedings of the European Conference on Information Systems (ECIS)*.
58. Wardat, S., & Akour, M. (2024). EFL instructors' perceptions of integrating digital transformation in EFL learning contexts in higher education. *Journal of Infrastructure, Policy and Development*, 8(8), Article 6074. <https://doi.org/10.24294/jipd.v8i8.6074>
59. World Bank. (2023). *Yemen economic monitor: Coping with crisis*. World Bank.
60. Yunusova, N. A. (2026). Modern methodology of teaching English as a foreign language. *The Bioscan*, 21(2), 471–480. [https://doi.org/10.63001/tbs.2026.v21.i02.S.I\(2\).pp471-480](https://doi.org/10.63001/tbs.2026.v21.i02.S.I(2).pp471-480)
61. Zeynalova, S. (2025). The digital transformation of English language teaching: Navigating the shift from traditional to technology-enhanced EFL classrooms. *Journal of Digital Pedagogy & Applied Linguistics*, 4(1), 112–126.
62. Zimmer, W. K., McTigue, E. M., & Matsuda, N. (2021). Development and validation of the teachers' digital learning identity survey. *International Journal of Educational Research*, 105, Article 101717. <https://doi.org/10.1016/j.ijer.2020.101717>
63. Zou, D. P., & Wang, Y. T. (2024). EFL teachers in the digital era: A journey of adaptation. *Open Access Library Journal*, 11, 1–13. <https://doi.org/10.4236/oalib.1111434>

APPENDIX A: SEMI-STRUCTURED INTERVIEW

Opening

1. Could you briefly describe your teaching background and the courses you teach, and how would you describe your general relationship with technology, both inside and outside the classroom?
2. Based on your recent teaching experience, how has your use of digital tools (e.g., moodle, google classroom, zoom, microsoft teams, powerpoint, quizizz, chatgpt, canva, or similar technologies) affected the quality of teaching and learning?
 - A. It has greatly improved teaching effectiveness and student learning.
 - B. It has moderately improved teaching and learning.
 - C. It has produced only limited improvements in teaching and learning.
 - D. I do not use them due to lack of such digital tool
3. Does your faculty or university have a clear policy or vision for digital transformation, and how aware are teachers of it in practice?
 - A. Yes. There is a clear digital transformation policy, and teachers are highly aware of and actively follow it.
 - B. Yes. There is a digital transformation policy, but only some teachers are aware of or implement it.
 - C. There is an informal or partially developed approach, but no clearly communicated institutional policy, and teacher awareness is limited.
 - D. No. There is no digital transformation policy or vision in my faculty/university.
4. What would you say are the biggest technological obstacles you face — internet access, equipment, or technical support?
5. How would you rate the overall preparedness of teachers and students in your department to teach and learn using digital tools?
 - A. Teachers and students are highly prepared and have the necessary digital skills and training to use digital tools effectively.
 - B. Teachers and students are moderately prepared but would benefit from additional training and skill development.
 - C. Teachers and students have limited preparedness, with noticeable gaps in digital skills and training.
 - D. Teachers and students are not adequately prepared and require substantial training before digital tools can be effectively integrated into teaching and learning.
 - E. Other, please specify.....
6. To what extent do the curriculum, class sizes, and assessment methods in your department support the integration of digital technology into teaching?
 - A. They strongly support the integration of digital technology in teaching.
 - B. They generally support the integration of digital technology, although some improvements are needed.

- C. They provide limited support, making technology integration somewhat difficult.
- D. No. They do not support the integration of digital technology and make it difficult to use technology effectively in teaching.
7. How would you describe the level of institutional support (e.g., budget, leadership, planning, infrastructure, and technical support) for digital transformation in your faculty or university?
- A. The institution provides strong support, including adequate funding, clear leadership, strategic planning, and sufficient infrastructure for digital transformation.
- B. The institution provides moderate support, but improvements are needed in areas such as funding, planning, infrastructure, or technical support.
- C. The institution provides limited support, and digital transformation is progressing slowly due to obstacles such as inadequate internet connectivity, insufficient digital equipment, limited facilities, and a lack of technical resources.
- D. No. The institution provides little or no support for digital transformation, making technology integration into teaching extremely difficult.
- E. Other, please specify.....
8. What kind of support or training would most help you integrate digital tools into your teaching?
- a: capacity building (training).
- b: infrastructure and resources.
- c: organizational and administrative support.
- d: no further support required.
- e: Other, please specify.....
9. Which of the following would be the most effective strategy for achieving sustainable digital transformation in your faculty or university?
- A. Develop a phased digital transformation plan supported by clear policies, continuous teacher training, and regular monitoring and evaluation.
- B. Invest in digital infrastructure by improving internet connectivity, providing digital devices and software, and expanding technical support services.
- C. Strengthen institutional commitment by allocating sufficient funding, encouraging collaboration, and providing incentives for teachers to adopt digital technologies.
- D. No major policy changes are needed, as the current policies and implementation strategies are adequate for achieving digital transformation.
- E. Other, please specify.....

Closing

10. Is there anything important we haven't covered, and do you have any questions for me about this research?