Technology-Enhanced Language Learning in Unequal Digital Contexts: A Qualitative Case Study of EFL Teachers and Students at Fergana State University

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Abstract
Grounded in Sociocultural Theory, this qualitative case study examines technology-enhanced language learning at Fergana State University, Uzbekistan, based on the perceptions of seven EFL instructors and twelve students. Thematic analysis identified four themes: participation, digital inequality, teacher readiness, and technology–interaction balance. Findings indicate that TEL expands learning opportunities but depends on reliable infrastructure, pedagogical support, and complementary face-to-face interaction.
Key words: technology-enhanced language learning, EFL, Sociocultural Theory, digital inequality, teacher readiness, blended learning

1. Introduction

Digital technologies have become increasingly embedded in higher education language teaching through online platforms, multimedia resources, mobile applications, learning management systems, and other digitally mediated environments (Chapelle, 2001; Levy, 1997). In English as a Foreign Language (EFL) education, these technologies can extend access to linguistic resources, create additional opportunities for practice and participation, and allow learners to engage with English beyond the physical classroom (Chapelle, 2001; Stockwell, 2010). Such possibilities have contributed to growing interest in technology-enhanced language learning (TEL), blended learning, and digitally mediated forms of language instruction (Chapelle, 2001; Graham, 2006).

However, technology's pedagogical value cannot be assumed from its availability alone (Bax, 2003). Early Computer-Assisted Language Learning (CALL) research often positioned computers as instructional tools that could increase efficiency and provide structured language practice (Levy, 1997). Subsequent scholarship has challenged these technologically deterministic perspectives, emphasizing that educational technologies gain pedagogical value through their integration into specific instructional, institutional, and social environments (Bax, 2003; Forkosh-Baruch et al., 2021; Hubbard, 2008). Bax (2003), for example, argues for the normalization of technology, whereby digital tools become ordinary pedagogical resources rather than being treated as inherently innovative or transformative. From this perspective, the key question is not simply whether technology is used, but how, for what purposes, and under what conditions it shapes participation in language learning.

This question matters in EFL education because language learning is fundamentally social and interactional. Sociocultural Theory (SCT) conceptualizes learning as mediated through interaction with others and through culturally and historically developed tools (Lantolf, 2000; Lantolf & Thorne, 2006). From an SCT perspective, digital technologies can function as mediational resources that reorganize learners' access to linguistic input, opportunities for practice, feedback, and participation. Their educational significance therefore depends on how teachers and learners appropriate these resources within socially organized activities. Technology may expand opportunities for interaction and independent practice, but it does not, on its own, create meaningful communication or learning (Bax, 2003; Lantolf & Thorne, 2006).

Research on TEL reflects this complexity. Digital and mobile learning environments have been associated with increased learner engagement, autonomy, access to authentic linguistic materials, and opportunities for extended language practice (Liu et al., 2026; Stockwell, 2010). Blended learning can similarly combine the flexibility of digital environments with the interactional resources of face-to-face instruction (Graham, 2006). However, positive perceptions of technology do not necessarily translate into meaningful pedagogical change. The effects of digital integration depend on instructional design, teacher mediation, institutional support, and learners' ability to access and use technological resources effectively (Ertmer, 1999; Forkosh-Baruch et al., 2021; Hubbard, 2008).

An important dimension of this problem is digital inequality. Access to technology is not merely a matter of device or internet availability. As Warschauer (2004, 2011) argues, digital inequality also concerns differences in digital literacy, participation patterns, and the capacity to convert technological access into meaningful educational opportunities. Ertmer's (1999) distinction between first-order barriers, such as infrastructure and access, and second-order barriers, such as teachers' beliefs, knowledge, and readiness, offers a complementary explanation of why technological provision alone may not lead to effective integration. Thus, the same digital resource may create additional opportunities for one learner while constraining another, depending on connectivity, device access, digital competence, and institutional support (Lythreatis et al., 2022; Warschauer, 2004).

The relationship between technology and interpersonal interaction also creates tension. Digital environments can expand access to linguistic resources and provide alternative spaces for participation, including asynchronous communication and repeated practice (Hrastinski, 2009; Stockwell, 2010). At the same time, language learners may continue to depend on teachers and peers for immediate feedback, collaborative meaning-making, emotional support, and spontaneous communication (Graham, 2006; Lantolf & Thorne, 2006). Consequently, technology-enhanced learning should not be understood primarily as an alternative to face-to-face instruction. In many contexts, its value may lie precisely in its capacity to complement and extend interpersonal interaction.

These issues are particularly relevant to higher education systems undergoing rapid digital transformation while still facing uneven technological and institutional conditions. In Central Asia, empirical research on technology-enhanced learning in higher education remains comparatively limited, although recent evidence includes a large-scale, multi-institutional quasi-experimental research program (Asadova, 2026). In Uzbekistan, emerging research has begun to examine the use of digital technologies in English-language education, including teachers' practices and the infrastructural and pedagogical barriers affecting technology integration (Khamdamov & Tojimamatov, 2026). Earlier studies in Uzbekistan documented the growing use of computer and online technologies in English teaching (Yusupjonova & Akhmadaliyeva, 2023), while broader research examined the digital transition in Uzbek higher education following the COVID-19 pandemic (Khusanov et al., 2023). However, qualitative research that brings together teachers' and students' perspectives and examines the interaction among technological affordances, infrastructural conditions, teacher readiness, and face-to-face communication remains limited.

This study addresses this gap through a qualitative exploratory case study conducted at Fergana State University, Uzbekistan. Rather than evaluating the effectiveness of a particular technological intervention, it examines how educators and students perceive and experience technology-enhanced language learning within their institutional context. Guided by Sociocultural Theory, the study treats technology as a mediational resource embedded in social interaction and shaped by institutional and material conditions. It focuses on four interconnected dimensions: technology-mediated participation and engagement, infrastructural inequality, teacher readiness for

pedagogical integration, and the relationship between digital and face-to-face interaction. Three research questions guided the study:

1. How do EFL teachers and students perceive technology-enhanced language learning at Fergana State University?
2. What opportunities and constraints do participants associate with the integration of digital technologies into EFL learning and teaching?
3. How do participants perceive the relationship between digitally mediated learning and face-to-face interaction?

By addressing these questions, the study contributes a context-sensitive qualitative perspective to research on TEL in higher education. Its contribution lies not in demonstrating the effectiveness of a particular digital tool, but in showing how the perceived value of technology is shaped by the interaction between digital affordances, participation, teacher mediation, infrastructural access, and interpersonal communication. The Fergana State University case thus illustrates why technology-enhanced language learning needs to be examined not only as a pedagogical innovation but also as a socioculturally and materially situated practice.

2. Theoretical framework

Technology-Enhanced Language Learning and CALL

Technology-supported language education has evolved from early Computer-Assisted Language Learning (CALL) models centered on programmed instruction and drill-and-practice toward more interactive and socially mediated approaches (Bax, 2003; Chapelle, 2001; Levy, 1997). Digital environments can expand access to authentic linguistic input, learner-controlled practice, and interaction opportunities (Chapelle, 2001). Blended learning similarly combines online and face-to-face modes, potentially extending learning beyond the classroom while retaining opportunities for interpersonal communication (Graham, 2006). However, contemporary CALL scholarship increasingly challenges technologically deterministic views of educational innovation. Bax (2003), for example, argues for the "normalization" of technology, whereby digital tools are treated as ordinary pedagogical resources rather than inherently transformative innovations. From this perspective, technology's educational value depends less on the technology itself than on how it is incorporated into instructional practices, interaction, and institutional contexts.

Research on technology-enhanced language learning (TEL) generally reports positive perceptions of digital environments, particularly regarding learner engagement, autonomy, flexible access to linguistic resources, and communication opportunities (Liu et al., 2026; Peng & Raman, 2026). Blended learning can extend communicative practice beyond classroom boundaries, while mobile and online environments can provide additional opportunities for repeated practice and learner-directed engagement (Graham, 2006; Stockwell, 2010). Recent systematic reviews of emerging technologies in EFL teaching across educational levels (Liu et al., 2026) and of blended learning in EFL education (Peng & Raman, 2026) have synthesized this growing body of research. However, positive perceptions do not necessarily indicate substantive pedagogical transformation. Consistent with Bax's (2003) normalization argument, the mere presence of digital tools does not guarantee their pedagogical integration; technology may instead reproduce teacher-fronted practices in digital form. Moreover, short-term studies based on self-reported data provide limited evidence of how technology changes interaction or participation over time (Liu et al., 2026).

These limitations are particularly relevant to the present study. Much research in technology-enhanced learning has been conducted in contexts where access to digital infrastructure and institutional support is relatively established, while contextual

constraints receive comparatively less attention (Liu et al., 2026; Lythreatis et al., 2022). Consequently, less is known about how teachers and learners experience and interpret technology in settings where such conditions are uneven. The present study therefore focuses not on the effectiveness of a particular digital tool but on participants' experiences of technology-mediated language learning within a specific institutional and infrastructural context.

Sociocultural Theory and Technology-Mediated Learning

Sociocultural Theory (SCT) provides a useful framework for examining these issues because it conceptualizes learning as socially mediated, culturally situated, and dependent on participation in socially organized activity. In second language learning, interaction with teachers and peers, scaffolding, and access to culturally constructed mediational resources are central to learning processes (Lantolf, 2000; Lantolf & Thorne, 2006). Digital technologies can consequently be understood as mediational tools that shape learners' access to interaction, linguistic resources, feedback, and opportunities for participation rather than as autonomous agents of learning.

Two sociocultural constructs are particularly relevant to technology-mediated language learning. The Zone of Proximal Development (ZPD) describes the distance between what learners can accomplish independently and what they can achieve with guidance from, or in collaboration with, more capable others (Vygotsky, 1978). Scaffolding refers to the contingent, gradually withdrawn support through which a more knowledgeable participant enables a learner to perform a task that would otherwise lie beyond their reach (Wood et al., 1976); within second language research, it has been closely associated with assistance provided in the ZPD (Lantolf & Thorne, 2006). From this perspective, the pedagogical question is not whether a digital tool is present but whether it is used in ways that create, sustain, or restrict opportunities for mediated assistance. A mobile application may offer repeated practice and automated feedback, yet the quality of assistance still depends on how teachers and peers integrate such practice into purposeful interaction.

From this perspective, technology may expand participation by enabling repeated practice, asynchronous communication, collaborative activity, and access to linguistic input. These affordances, however, become pedagogically meaningful only when embedded in purposeful interaction and appropriate forms of mediation. Digital tools alone do not guarantee language learning; their contribution depends on how teachers and learners appropriate them within particular social and institutional arrangements (Bax, 2003; Lantolf & Thorne, 2006).

Blended learning is especially relevant to this sociocultural perspective because it can combine the flexibility of digital environments with the interactional resources of face-to-face instruction (Graham, 2006). Nevertheless, simply adding online activities to existing courses does not necessarily produce meaningful interaction. The critical issue is how digital and face-to-face components are organized to support participation, scaffolding, communication, and learner engagement. This distinction provides an important conceptual basis for examining participants' preference for complementary rather than substitutive uses of technology in the present study.

Teacher Readiness and Pedagogical Integration

Teacher readiness is a further condition shaping the pedagogical value of technology (Ertmer, 1999; Hubbard, 2008). Ertmer (1999) distinguishes between first-order barriers, such as inadequate infrastructure and access, and second-order barriers, including teachers' beliefs, knowledge, and readiness to integrate technology. This distinction matters because access to digital tools does not automatically lead to pedagogically meaningful use.

Hubbard (2008) similarly argues that language teacher education should move beyond general technical competence toward professional preparation that connects

technology with language pedagogy. Teachers require not only familiarity with digital platforms but also the capacity to select appropriate tools, design interaction-oriented tasks, provide feedback, and integrate technology with communicative objectives (Forkosh-Baruch et al., 2021; Hubbard, 2008). Thus, teacher readiness involves the pedagogical appropriation of technology rather than technical competence alone.

Nevertheless, existing research provides limited qualitative insight into how teachers in less-resourced settings develop and apply such competence. Much of the literature has relied on survey-based or self-reported measures, which offer limited insight into how technology integration is experienced and shaped within institutional contexts (Liu et al., 2026). Understanding these conditions matters because teachers may selectively adopt, adapt, or avoid digital practices based on what is pedagogically feasible in their institutional environment.

Technology, Inequality, and the Digital Divide

Inequality also shapes the relationship between technology and educational opportunity. Warschauer (2004, 2011) argues that the digital divide extends beyond physical access to devices and connectivity to include digital literacy, participation, and the capacity to derive educational benefits from technology. Consequently, technology-enhanced education may reproduce existing inequalities when learners have unequal access to devices, reliable internet connections, or the skills and support required for effective participation.

These concerns are especially significant in developing and transitional educational contexts, where digital modernization may outpace institutional infrastructure and teacher preparation (Lythreatis et al., 2022; Warschauer, 2004). A review of higher education research from the global South and North similarly shows that digital inequalities during and after the COVID-19 pandemic were shaped not only by devices and connectivity but also by students' home study conditions and by institutional assumptions that equated accessibility with connectivity alone (Timmis & Valladares-Celis, 2025). Rural students or those with limited household resources may experience greater difficulty participating in digitally mediated activities, while institutional connectivity problems can affect learners more broadly (Lythreatis et al., 2022; Warschauer, 2004). Such inequalities are not merely technical inconveniences; they can directly shape opportunities for participation, access to linguistic resources, and engagement in language-learning activities.

Taken together, the literature indicates that TEL cannot be understood solely through technological affordances or learner attitudes. Its educational possibilities emerge through the interaction of mediational resources, teacher readiness, interpersonal interaction, and structural conditions of access. However, qualitative research examining how these dimensions are experienced together remains limited in Central Asian higher education. The present study addresses this gap by examining teachers' and students' perceptions of technology-enhanced EFL learning at Fergana State University, with particular attention to perceived participation, learner engagement, access to linguistic resources, communicative opportunities, infrastructural inequality, and the relationship between digital and face-to-face interaction.

Despite the growing body of research on technology-enhanced language learning (TEL), several gaps remain relevant to higher education contexts where digital transformation occurs under uneven technological and institutional conditions. First, much of the TEL literature focuses on the affordances or reported effectiveness of digital technologies, particularly regarding learner autonomy, engagement, personalization, flexibility, and access to linguistic resources (Liu et al., 2026; Peng & Raman, 2026). Comparatively less attention has been given to how teachers and students experience and interpret technology-mediated participation within their

everyday institutional environments. Positive attitudes toward digital technologies do not necessarily indicate meaningful changes in classroom interaction or sustained opportunities for language use.

Second, the empirical literature remains geographically uneven. Research on TEL has often been conducted in comparatively well-resourced educational settings, while higher education institutions in Central Asia remain underrepresented (Lythreatis et al., 2022; Timmis & Valladares-Celis, 2025). In Uzbekistan, existing studies have begun to document digital transformation and the use of computer- and online-based technologies in higher education and English-language teaching (Khamdamov & Tojimamatov, 2026; Khusanov et al., 2023; Yusupjonova & Akhmadaliyeva, 2023). Regional evidence has also begun to include large-scale quasi-experimental designs (Asadova, 2026); however, qualitative evidence examining TEL from both teacher and student perspectives within the same institutional context remains limited. This makes it difficult to understand how those directly involved in EFL teaching and learning experience and interpret broader digitalization processes.

Third, digital inequality is frequently conceptualized in terms of access to devices and internet connectivity, whereas meaningful participation also depends on the reliability, continuity, usability, and educational value of that access (Lythreatis et al., 2022; Warschauer, 2004, 2011). Consequently, having nominal access to digital technologies does not necessarily provide equivalent opportunities to participate in technology-mediated learning. Qualitative research is still needed to examine how infrastructural conditions and unequal access shape students' participation and teachers' ability to implement digitally mediated activities in less-resourced higher education contexts.

Fourth, the relationship between technology-mediated learning and interpersonal interaction requires further qualitative examination. Digital technologies can provide additional opportunities for practice, preparation, asynchronous communication, and access to linguistic resources, but their pedagogical value depends on teacher mediation and the quality of social interaction they support (Graham, 2006; Lantolf & Thorne, 2006). Existing research has often emphasized flexibility, efficiency, personalization, or engagement without sufficiently examining how teachers and learners perceive the respective roles of digital and face-to-face environments in communicative language learning.

Taken together, these gaps indicate a need for context-sensitive research that examines TEL not simply as the adoption of digital tools but as a socially and materially situated practice. The present study addresses this need through an interpretivist qualitative case study at Fergana State University, Uzbekistan. Drawing on Sociocultural Theory, it brings together student and teacher perspectives to examine four interconnected dimensions of technology-enhanced EFL learning: perceived participation and engagement, access to linguistic resources and communicative opportunities, infrastructural inequality, and teacher mediation in relation to face-to-face interaction. Rather than evaluating the effectiveness of a particular technological intervention, the study investigates how the perceived value and practical use of technology are shaped by the interaction among digital affordances, material conditions, pedagogical readiness, and interpersonal participation. In doing so, it provides contextually grounded evidence from an underrepresented Central Asian higher education setting and contributes to a more socially and materially situated understanding of TEL.

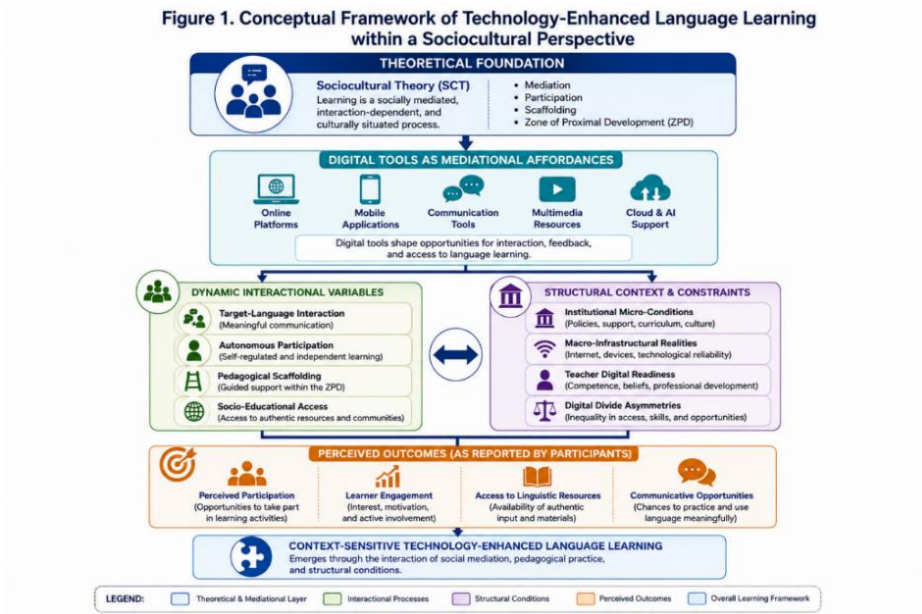


Figure 1: Conceptual framework of technology-enhanced language learning within a sociocultural perspective

Figure 1 presents an integrated conceptual framework for technology-enhanced language learning within a Sociocultural Theory (SCT) perspective. The framework conceptualizes language learning as a socially mediated, context-dependent process rather than a direct consequence of technological implementation. Drawing on the sociocultural tradition associated with Vygotsky (1978), Lantolf (2000), and Lantolf and Thorne (2006), the framework situates technology, teachers, learners, and institutional conditions within a broader language-learning ecosystem in which social and educational contexts shape opportunities for participation, interaction, and language learning.

The top layer of the framework, the Theoretical Foundation, identifies Sociocultural Theory as the overarching lens and specifies the four concepts that inform the analysis: mediation, participation, scaffolding, and the Zone of Proximal Development (ZPD). From this perspective, learning is a socially mediated, interaction-dependent, and culturally situated process (Lantolf & Thorne, 2006; Vygotsky, 1978). Digital technologies are therefore understood not as autonomous instructional agents but as mediational artifacts whose educational value depends on how they are used and integrated into socially organized language-learning activities.

The second layer, Digital Tools as Mediational Affordances, comprises online platforms, mobile applications, communication tools, multimedia resources, and cloud-based and AI-supported services. These tools shape opportunities for interaction, feedback, and access to language learning. Consistent with SCT, the framework does not assume that the presence of digital tools automatically produces learning; rather, their contribution depends on how learners and teachers use them within meaningful pedagogical and communicative activities.

The affordances of digital tools are realized through two interrelated sets of conditions that form the model's third layer. The first set, Dynamic Interactional Variables,

captures the processes through which learners engage with the language and with others: target-language interaction, autonomous participation, pedagogical scaffolding (guided support within the ZPD), and socio-educational access to authentic resources and communities. These variables reflect the SCT principle that learning develops through interaction with teachers, peers, and more knowledgeable others rather than independently of social guidance (Vygotsky, 1978).

The second set, Structural Context and Constraints, captures the conditions that enable or constrain technology-enhanced language learning: institutional micro-conditions (policies, support, curriculum, and culture), macro-infrastructural realities (internet access, devices, and technological reliability), teacher digital readiness (competence, beliefs, and professional development), and digital divide asymmetries (inequalities in access, skills, and opportunities). These conditions determine the extent to which learners and teachers can consistently participate in technology-mediated activities and therefore form an integral part of the sociocultural environment in which learning occurs (Ertmer, 1999; Warschauer, 2004).

The bidirectional arrow between the two sets indicates that interactional processes and structural conditions depend on each other. Teachers' pedagogical scaffolding, for example, is shaped by their digital readiness and by the reliability of institutional infrastructure, while unequal access to devices and connectivity affects students' capacity for autonomous participation and target-language interaction.

The fourth layer, Perceived Outcomes, specifies the dimensions examined in the study as reported by participants: perceived participation, learner engagement, access to linguistic resources, and communicative opportunities. These outcomes are framed as participants' perceptions rather than measured learning gains, in keeping with the study's interpretivist design.

The final layer, Context-Sensitive Technology-Enhanced Language Learning, synthesizes the model: technology-enhanced language learning emerges through the interaction of social mediation, pedagogical practice, and structural conditions. Rather than assuming a linear or technologically deterministic relationship between digital tools and language learning, the framework emphasizes that the educational value of technology depends on the broader language-learning ecosystem in which it is embedded.

Overall, the framework provides a context-sensitive SCT-based model for understanding technology-enhanced language learning at Fergana State University. It integrates technological, pedagogical, social, and institutional dimensions while recognizing that learners' opportunities for communicative participation and perceived language-learning experiences are shaped by the interaction between digital mediation and the conditions in which that mediation occurs. This perspective is particularly relevant to higher education contexts in regions such as Central Asia, where technological modernization takes place alongside institutional, infrastructural, and pedagogical variation.

3. Materials

Research Design

This study used a qualitative, exploratory, single-site case study to examine how educators and students perceive and experience technology-enhanced language learning (TEL) at Fergana State University, Uzbekistan. The English Practical Course Department within the Faculty of Foreign Languages served as the bounded case and primary analytical context because it provides a setting where digital tools, blended learning practices, and institutional digitalization intersect. A single-case design is appropriate for investigating contemporary phenomena within their real-world contexts, particularly when contextual conditions are integral to understanding the phenomenon (Yin, 2014).

The study adopted an exploratory orientation because qualitative research on technology-mediated EFL education in Uzbekistan and Central Asia remains comparatively limited. Rather than evaluating the effectiveness of a particular technology, the study sought to understand how participants interpreted and experienced digital learning within their institutional environment. The research was situated within an interpretivist paradigm, which views educational realities as socially constructed through participants' experiences, interactions, and institutional contexts.

Sociocultural Theory (SCT) provided the principal theoretical lens. From an SCT perspective, digital technologies are understood as mediational resources whose significance depends on how they are appropriated within socially organized activity. Accordingly, the analysis focused on participants' perceptions of participation, engagement, access to linguistic resources, communicative opportunities, teacher mediation, and infrastructural constraints, rather than treating technology use as an independent cause of measurable learning outcomes.

Context and Participants

The study was conducted at Fergana State University, a public higher education institution in Uzbekistan. The research focused on the English Practical Course Department within the Faculty of Foreign Languages, where blended learning, multimedia materials, online platforms, and mobile technologies are incorporated into EFL instruction. The setting also reflects broader challenges associated with digital transition, including uneven connectivity, differences in device access, and varying levels of digital readiness. These characteristics made the department an appropriate bounded context for examining TEL's affordances and constraints.

Participants were recruited through criterion-based purposive sampling. Instructor eligibility required current teaching responsibility in the English Practical Course Department and sustained experience using technology-enhanced or blended approaches in EFL instruction. Student eligibility required enrollment in the third or fourth year of the English Philology program and completion of at least three semesters involving technology-enhanced English-language learning. The final sample comprised seven EFL instructors and twelve senior undergraduate students.

The seven instructors included five women and two men, aged 29–48 years (M = 37.1), with 4–22 years of tertiary EFL teaching experience (M = 11.4). Two instructors described their digital proficiency as basic, four as moderate, and one as advanced. Four had participated in short-term workshops on educational technology or digital pedagogy, whereas three reported relying primarily on informal peer learning and self-directed practice. Five instructors lived in urban Fergana and two commuted from nearby rural districts.

The twelve students, aged 20–24 years (M = 21.7), included eight women and four men. All were third- or fourth-year English Philology students and had completed at least three semesters involving technology-enhanced instruction, including blended learning activities, online assignments, and mobile-assisted language learning. The students varied in linguistic background, digital proficiency, and access to technology. Seven students also reported rural residence and limited or shared access to smartphones, which affected their ability to participate consistently in out-of-class digital activities. These participant characteristics provided variation in teaching experience, digital proficiency, linguistic background, and access conditions while maintaining a clearly bounded institutional case.

Ethical Considerations

Participation was voluntary, and all participants provided informed consent after receiving information about the study's purpose, procedures, data handling,

confidentiality, and right to withdraw. The researchers obtained institutional permission from Fergana State University before data collection. Participants also consented to the publication of anonymized research results. To protect anonymity, participants are identified by alphanumeric codes (S1–S12 for students; T1–T7 for instructors), and potentially identifying information has been generalized.

Data Collection

Data were collected over four weeks using two qualitative instruments: an anonymous open-ended questionnaire completed by students and a semi-structured focus group with instructors. The instruments were developed based on previous research on technology-enhanced language learning and SCT-informed concepts of mediation, participation, interaction, and scaffolding. The questionnaire contained eight open-ended prompts addressing students' experiences with online learning platforms, digital participation, communicative interaction, and technological barriers. Students could respond in Uzbek, Russian, or English to minimize linguistic constraints on expressing their experiences.

The educator focus group was audio-recorded, lasted approximately 78 minutes, and covered five areas: digital pedagogy, communicative interaction, institutional support, infrastructure, and blended learning. A focus-group format was selected because it enabled instructors to discuss and compare their experiences, thereby revealing both shared and divergent understandings of technology integration. An external researcher facilitated the discussion and had no evaluative authority over the participants, reducing potential power-related and social-desirability effects.

The focus-group recording was transcribed verbatim. Responses submitted in Uzbek and Russian were translated into English through forward and back-translation by bilingual philologists with expertise in English language teaching. Translation discrepancies were discussed by the research team and resolved by consensus.

4. Analysis

Data were analyzed using Braun and Clarke's (2006) six-phase approach to thematic analysis. The analysis combined inductive initial coding with theoretically informed interpretation, allowing patterns to emerge from participants' accounts before they were related to SCT concepts. During familiarization, the researchers repeatedly read the questionnaire responses and focus-group transcripts, noting recurrent descriptions of technology use, participation, interaction, access, and constraints. The researchers then generated initial semantic codes manually and recorded them in a shared coding matrix. Codes were subsequently compared and refined, with related codes grouped into broader categories. Candidate themes were developed by examining relationships among these categories across the student and instructor datasets. Particular attention was paid to convergence and divergence between participant groups and the relationship between technological affordances and contextual constraints. The research team reviewed candidate themes for internal coherence and distinction before defining and naming them. SCT served primarily as an interpretive and sensitizing framework, rather than a predetermined coding scheme. Concepts such as mediation, participation, scaffolding, and the Zone of Proximal Development (ZPD) were therefore drawn on more explicitly when interpreting the emerging thematic structure. This approach kept the analysis grounded in participants' accounts while connecting the findings to the study's theoretical framework.

The final analysis generated four interrelated themes: (1) technology as a mechanism for engagement and participation; (2) infrastructural inequality and the digital divide; (3) teacher readiness and pedagogical integration; and (4) balancing technology with interpersonal interaction.

The study addressed trustworthiness using the criteria of credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). Credibility was

strengthened by comparing student questionnaire responses with instructor focus-group data, enabling the researchers to examine convergence and divergence across participant groups. As a form of member checking, three participating instructors reviewed a summary of the preliminary thematic interpretations rather than the full coded dataset and provided feedback on whether the interpretations accurately reflected their experiences.

Dependability and confirmability were supported through systematic documentation of the analytical process. To enhance coding consistency, two researchers independently coded 25% of the dataset using the preliminary codebook. Their coding was compared using Cohen's kappa ($\kappa = .84$), indicating strong agreement (McHugh, 2012). The team discussed and resolved discrepancies through consensus, then refined the codebook and applied it to the remaining data. The audit trail documented coding decisions, codebook revisions, and researchers' reflections throughout the analysis.

Transferability was supported through detailed description of the institutional context, participant characteristics, technological access conditions, and pedagogical environment. Such contextual detail enables readers to assess the relevance of the findings to other higher education settings experiencing similar processes of digital transformation and infrastructural inequality.

Thematic analysis of the student and educator accounts generated four interrelated themes concerning how technology-enhanced language learning was experienced and perceived at Fergana State University: (1) technology as a mechanism for engagement and participation, (2) infrastructural inequality and the digital divide, (3) teacher readiness and pedagogical integration, and (4) balancing technology with interpersonal interaction. The themes were analytically distinct but interconnected: participants often described the affordances of digital technologies alongside constraints related to infrastructure, teacher mediation, and opportunities for face-to-face communication. Overall, the accounts portray technology as a potentially useful mediational resource whose value depended on students' access, teachers' pedagogical decisions, and the availability of interpersonal interaction.

Theme 1: Technology as a Mechanism for Engagement and Participation

Students and educators generally described digital technologies as expanding opportunities for engagement and participation. Students particularly valued the ability to practice English beyond scheduled classroom hours, repeat activities, and access linguistic resources through mobile applications, messaging platforms, and online learning environments. Reported uses included pronunciation practice, asynchronous speaking, vocabulary learning, and exposure to English outside formal lessons.

For some students, asynchronous activities seemed to reduce the pressure of immediate public performance. One student explained:

> When I record a voice note on Telegram, I am not as afraid of making mistakes as I am when I speak in front of the whole class. I can listen to my recording and think, 'This word is not correct,' or 'I need to say it differently.' Then I record it again. (S9)

Another student emphasized the flexibility of digital practice:

> With online platforms, I can choose when and where I practice. If I make a mistake, I can try again without feeling embarrassed. (S7)

These accounts suggest that participants valued digital environments partly because they allowed repetition, flexible participation, and preparation before face-to-face communication, consistent with the view that participation is central to learners' experiences of online learning (Hrastinski, 2009). Students also described digital technologies as increasing their access to English beyond the classroom. Rather than

viewing this access simply as an additional source of materials, participants associated it with more frequent opportunities to encounter and practice English.

Educators similarly reported that digital resources could create additional entry points into classroom participation, particularly when they were incorporated into interaction-oriented activities. One instructor described using digital materials to stimulate discussion:

> Students are not only listening to the language or completing an exercise. They can watch short, authentic videos, respond to questions, exchange opinions in pairs or groups, and then discuss what they understood with the class. (T2)

Another instructor noted that digital response formats could encourage contributions from students who were reluctant to speak immediately in front of the whole class:

> When I use an online poll, chat, or a short digital task, [quieter students] are much more willing to contribute. (T5)

However, educators also stressed that increased participation was not an automatic consequence of technology. One instructor explicitly linked the value of digital tools to their pedagogical use:

> The technology itself does not automatically make students more active. … When I use the task as a starting point for pair work, discussion, or peer feedback, participation changes. (T3)

This distinction is important for interpreting the theme. Participants did not describe technology as independently producing engagement. Rather, digital tools appeared to provide additional opportunities for participation, while teachers' instructional decisions determined whether those opportunities developed into meaningful interaction. Digital resources were particularly useful when combined with authentic materials, peer exchange, discussion, and follow-up classroom activities.

Thus, the evidence supports viewing technology as an extension of participation rather than an independent source of learning. Students valued flexibility, repetition, and access to linguistic resources, while educators emphasized embedding these affordances within interaction-oriented pedagogical activities.

Theme 2: Infrastructural Inequality and the Digital Divide

The perceived benefits of digital learning were accompanied by persistent concerns about unequal access. Seven of the twelve students were from rural districts within the Fergana region, while the remaining five came from urban areas. Participants described differences in internet reliability, device availability, and continuity of access. These accounts suggest that the digital divide operated not only through access to technology but also through unequal opportunities to participate consistently in technology-mediated learning.

Students from rural areas particularly emphasized unstable internet connectivity. One participant explained:

> The biggest problem is that I cannot always depend on the internet. During an online lesson, the connection can suddenly become very weak or disappear completely. (S3)

Another described the effect on continuity:

> By the time I come back, I have missed the question or the instructions for the task. It is difficult to participate when you are constantly trying to catch up. (S5)

Device availability represented another dimension of inequality. One student reported having to share a device within the household:

> Having an internet connection is not enough if you do not have your own device. Sometimes I have to share my phone with my sister, so I cannot join an online session whenever I need to. (S2)

Participants also described an affective dimension to infrastructural instability. For some students, uncertainty about connectivity generated anxiety during speaking activities:

> If I am giving an answer or a presentation, I think about the connection instead of concentrating on my English. (S6)

This account suggests that technical instability could interfere with students' attention to the communicative task itself. The issue was therefore not limited to whether students could technically access a platform. Unreliable connectivity could interrupt participation, reduce continuity, and increase uncertainty during communicative activities.

Educators reported similar difficulties. One instructor described the disruption caused by unstable connections during group work:

> Online group work becomes difficult when several students have unstable connections. A student may join the discussion, then suddenly disappear, and the others have to wait or continue without them. (T7)

Another instructor explained how such connection problems disrupted carefully planned activities:

> When this happens, a digital activity that I have carefully prepared cannot be completed as planned. (T4)

Teachers therefore had to anticipate technological failure and adapt activities so that disconnected students were not completely excluded. One instructor noted:

> Students do not experience the same online lesson in the same way. Some students have a stable connection … while others lose the connection several times. (T1)

Taken together, these accounts show that infrastructural inequality operated at several interconnected levels. Unstable connectivity interrupted participation; limited device access constrained students' opportunities to engage; and repeated disruptions required teachers to modify planned activities. Consequently, access to a digital platform did not necessarily produce equivalent opportunities for participation.

The findings therefore extend the notion of the digital divide beyond simple device ownership. In this context, meaningful access involved the reliability, continuity, and usability of technological resources for participation in language-learning activities. Infrastructure consequently shaped not only whether students could access digital learning but also which forms of pedagogy teachers could realistically implement.

Theme 3: Teacher Readiness and Pedagogical Integration

The third theme concerned the role of teacher readiness in determining how digital technologies were incorporated into language teaching. Although instructors generally expressed positive attitudes toward digital innovation, their accounts identified limitations in formal professional development, pedagogical guidance, time for experimentation, and institutional support.

Importantly, teachers distinguished between technical competence and pedagogical competence. Knowing how to operate a platform did not necessarily mean knowing how to use it to promote language learning. One instructor explained:

> Knowing how to use a computer or an application does not necessarily mean that you know how to teach with it. (T1)

Another instructor emphasized the need to connect technology with communicative objectives:

> The difficult part is knowing how to use it effectively in an English lesson. (T3)

Teachers therefore described readiness as involving decisions about when, why, and how to use a particular digital resource. They considered whether a tool supported

speaking, collaboration, feedback, interaction, or another specific instructional purpose rather than simply whether it was technically available.

Participants also identified a gap between institutional encouragement to digitalize teaching and the practical support available to teachers. One instructor stated:

> We are encouraged to use new technologies, but when we come to the classroom, we often have to work out the practical side ourselves. (T7)

Another participant emphasized that professional development needed to be practical and sustained:

> A single workshop is not enough. … Teachers need opportunities to try the technology, discuss what worked and what did not, and receive feedback. (T4)

Workload was another constraint. One instructor explained:

> Our teaching load leaves little time for this. … Sometimes we use a familiar application simply because we already know how it works. (T5)

These accounts suggest that teachers' readiness was not reducible to basic digital literacy. It involved the capacity to select, adapt, and pedagogically orchestrate technologies in relation to learner needs, language objectives, and interactional purposes. Institutional support, opportunities for experimentation, and sustained professional learning were also perceived as important conditions.

The findings consequently distinguish technological availability from pedagogical capacity. Even when teachers had access to digital tools and viewed them positively, meaningful integration required time, confidence, relevant training, and opportunities to develop context-sensitive practices. Without these conditions, teachers might rely on familiar technologies or use digital resources in ways that added activities without substantially changing classroom interaction patterns.

Theme 4: Balancing Technology with Interpersonal Interaction

The fourth theme concerned participants' emphasis on the continuing importance of interpersonal communication. Although students and educators recognized the usefulness of digital technologies for vocabulary and grammar practice, preparation, repetition, and exposure to English, they generally did not regard technology-mediated activities as sufficient on their own. Face-to-face interaction was associated with spontaneous communication, immediate feedback, meaning-making, emotional support, and interpersonal connection.

One student described the complementary relationship between digital practice and classroom communication:

> Digital tools are very useful when I need to learn new vocabulary, practice grammar, or prepare what I want to say. However, practicing alone on an application is different from having a real conversation. (S8)

Another student emphasized the immediacy of classroom interaction:

> When I speak in class, the teacher can immediately notice if I use the wrong word or if my meaning is unclear. (S1)

Participants also valued spontaneous peer interaction, particularly the need to respond to unexpected contributions. One student explained:

> Classroom discussion is different because you cannot always predict what another student will say. You have to listen carefully and respond immediately. (S4)

Educators expressed a similar preference for complementarity rather than substitution. One instructor stated:

> I do not think technology should replace communication between students and teachers. (T1)

Another described how blended learning could allocate different functions to digital and face-to-face environments:

> Students can watch materials, learn vocabulary, practice grammar, or prepare their ideas online before the lesson. Then, in class, we can spend more time discussing, solving problems together, and speaking. (T4)

These accounts indicate that participants assigned different but complementary functions to digital and face-to-face environments. Participants saw digital technologies as particularly useful for preparation, repetition, independent practice, and extended access to English. In contrast, participants valued face-to-face interaction for spontaneous communication, immediate feedback, collaborative activity, and interpersonal connection.

The theme therefore reinforces the broader finding that participants did not conceptualize technology as a replacement for teachers or classroom interaction. Instead, they positioned it as a mediational resource that could expand participation opportunities when integrated with interpersonal communication.

Cross-Theme Synthesis

Taken together, the four themes indicate that the value of technology-enhanced language learning is shaped not by the presence of digital tools alone, but by the conditions under which they are used. Digital technologies can expand opportunities for participation and language practice, while unequal access and unreliable infrastructure may limit these opportunities. At the same time, effective technology integration depends on teachers' pedagogical readiness and mediation, while face-to-face interaction remains important for communication, feedback, and social connection.

Viewed through a Sociocultural Theory perspective, these findings position technology as a mediational resource embedded within a broader language-learning ecosystem. Its educational value therefore emerges from the interaction of digital resources, infrastructural conditions, teacher support, and social participation rather than from technology itself.

5. Discussion and conclusions

The findings indicate that technology-enhanced language learning (TEL) at Fergana State University is not a purely technical process but a situated practice shaped by digital affordances, infrastructural conditions, teacher mediation, and face-to-face interaction. From a Sociocultural Theory (SCT) perspective, this supports viewing digital technologies as mediational tools through which learners access input, rehearsal, interaction, and feedback. However, their educational value depends on how they are socially and pedagogically organized. In the present study, technologies became more meaningful when embedded in communicative activities, peer interaction, and teacher-supported learning rather than used as stand-alone exercises. In SCT terms, digital practice appeared to function mainly as a rehearsal resource, while the support that enables learners to move beyond what they can do independently remained largely in teacher and peer mediation (Vygotsky, 1978).

The findings also extend this perspective by showing that access to digital mediation is itself uneven. Unstable connectivity, limited device access, and uneven institutional provision affected not only whether students could use particular technologies but also the continuity and quality of their participation. This finding adds contextual nuance to conventional understandings of the digital divide (Timmis & Valladares-Celis, 2025; Warschauer, 2004) by showing that inequality operates not only at the point of access but during the interaction itself. A learner may have a smartphone and nominal

internet access yet still be unable to sustain participation in a synchronous communicative activity.

Teacher mediation emerged as another central condition of meaningful technology integration. Participants valued digital tools for repeated practice, flexible participation, and reduced performance pressure, but teachers emphasized the difficulty of connecting technologies with communicative objectives and learner needs. This distinction aligns with Ertmer's (1999) differentiation between first-order barriers, such as infrastructure and connectivity, and second-order barriers, such as teachers' knowledge, confidence, and pedagogical readiness. The coexistence of both types of barriers suggests that institutional digitalization requires not only technological investment but also sustained, context-specific professional development (Ertmer, 1999; Hubbard, 2008).

The study also contributes a contextually grounded perspective from a comparatively underrepresented Central Asian higher education setting. Recent reviews indicate substantial research attention to technology-enhanced language learning across educational levels, while infrastructure gaps, unequal access, and other contextual barriers remain important challenges to technology integration (Liu et al., 2026; Lythreatis et al., 2022). The Fergana case shows that familiar benefits of technology-mediated learning, including increased opportunities for practice, reduced performance pressure, and greater participation, are shaped by local infrastructural and institutional circumstances. Consequently, students' and teachers' preferences for particular forms of technology use cannot be understood solely as pedagogical choices; they also reflect the material conditions of digital learning.

The preference for blended learning further illustrates this contextual and relational character. Participants generally viewed online activities as complementary spaces for preparation, repetition, independent practice, and extended exposure to English, while retaining face-to-face interaction for spontaneous communication, immediate feedback, emotional support, and meaning-making. Rather than suggesting that digitalization should replace classroom interaction, the findings indicate that participants valued technology primarily when it extended and enriched interpersonal learning (Graham, 2006).

Taken together, the findings confirm and extend central insights from SCT and TEL scholarship (Bax, 2003; Lantolf, 2000; Lantolf & Thorne, 2006; Vygotsky, 1978). The study illustrates how digital affordances, infrastructural inequality, teacher readiness, and blended learning interact within a Central Asian university undergoing digital transformation. The findings suggest a broader interpretation of mediation beyond the immediate learner–teacher–technology relationship by showing that institutional and material conditions also structure technology-mediated participation. Thus, digitally mediated learning is not technologically neutral but is partly shaped by the social and infrastructural environment in which it takes place (Lantolf & Thorne, 2006; Warschauer, 2004).

Implications

The findings have several implications for higher education institutions, policymakers, and EFL educators. First, equitable digital infrastructure should be treated as a pedagogical prerequisite rather than merely a technical investment. The findings suggest that universities should prioritize stable connectivity, appropriate device access, technical support, and alternative arrangements for students whose access is disrupted (Warschauer, 2004, 2011). Without these foundations, TEL initiatives may reproduce existing educational inequalities.

Second, professional development should move beyond generic digital-literacy training toward pedagogically focused preparation. Teachers need support in selecting appropriate tools, designing interaction-rich tasks, providing feedback, monitoring participation, and integrating technology with communicative objectives. Sustained

professional development, peer observation, collaborative lesson design, and sharing of contextually relevant practices may be particularly valuable (Forkosh-Baruch et al., 2021; Hubbard, 2008).

Third, blended learning should be designed as an intentional pedagogical model rather than simply a combination of online and face-to-face delivery. Digital components should have clearly defined functions, such as preparation, repetition, independent practice, or extended exposure, while classroom time should continue to support dialogue, collaboration, immediate feedback, and interpersonal interaction (Graham, 2006; Hubbard, 2008).

Finally, technology policies should be locally responsive. The findings suggest that sustainable TEL depends on infrastructure, teacher preparedness, institutional capacity, and learners' material circumstances (Ertmer, 1999; Hubbard, 2008; Warschauer, 2004). Educators and students should therefore be involved in planning and evaluating digital initiatives, so that technology selection reflects pedagogical needs, users' experiences, and the institutional context (Forkosh-Baruch et al., 2021; Karner et al., 2026). In Central Asian higher education, sustainable digitalization will likely depend less on maximizing technology use than on developing equitable, pedagogically purposeful, and socially grounded forms of technology-enhanced learning.

Limitations

Several limitations should be acknowledged. First, the study was conducted as a single-site case study within one department at Fergana State University. Although this design enabled an in-depth, contextually grounded examination of participants' experiences, the findings are situated within the institution's specific infrastructural and sociocultural conditions and should not be assumed to transfer directly to other settings.

Second, the study relied primarily on self-reported questionnaire and focus-group data. Although triangulation across students and instructors, instructor member checking, and an audit trail strengthened credibility, the findings represent participants' perceptions rather than direct evidence of technology use or classroom interaction. Self-reported accounts may also be affected by recall and social-desirability biases. In addition, the written, open-ended questionnaire did not allow follow-up probing of students' responses.

Third, the relatively small sample and the inclusion of only students and instructors limited the range of institutional perspectives represented. The study did not include administrators, IT personnel, or policymakers, although their perspectives could have added insight into infrastructure, institutional decision-making, professional development, and technology policies.

Finally, the study captured experiences at a particular stage of an ongoing digitalization process and therefore could not examine changes over time. Future research could address these limitations through comparative or longitudinal designs, broader stakeholder participation, and methodological triangulation involving classroom observations, interviews, and learning-platform or technology-use data.

This study explored educators' and students' experiences of technology-enhanced language learning at Fergana State University through a qualitative exploratory case study informed by Sociocultural Theory. The findings show that digital technologies were neither uniformly beneficial nor inherently problematic; their educational value depended on the conditions under which participants accessed, mediated, and integrated them into language-learning activities.

Participants identified digital technologies as providing greater flexibility, repeatable practice, extended exposure to English, and additional opportunities for participation. However, these affordances were constrained by unequal connectivity and device

access, insufficient institutional infrastructure, few opportunities for pedagogically oriented digital professional development, and difficulties in sustaining meaningful interaction. Technology therefore emerged not as an autonomous driver of educational change but as a mediational resource whose value depended on teacher mediation, pedagogical purpose, and social participation.

The findings further indicate that participants viewed technology and face-to-face interaction as complementary rather than competing modes. Participants particularly valued digital environments for preparation, repetition, flexible practice, and extended exposure, while classroom interaction remained important for spontaneous communication, immediate feedback, collaborative problem-solving, and interpersonal support.

By examining these dynamics within a Central Asian higher education context, the study contributes a contextually grounded perspective to TEL research by showing that digital learning is shaped not only by technological availability but also by infrastructural equity, teacher pedagogical capacity, and the social organization of participation. Meaningful digital transformation therefore requires more than introducing technological tools; it requires reliable infrastructure, sustained teacher development, and pedagogical models that preserve the social and dialogic character of language learning.

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AI Use Declaration

During the preparation of this manuscript, the authors used ChatGPT (OpenAI) and Grammarly as auxiliary language-editing tools to check grammar and morphosyntax and to improve the clarity, readability, and academic presentation of selected passages. Their use was limited to language editing and refinement of author-developed text. All AI-suggested changes were reviewed, critically evaluated, edited, and approved by the authors. AI tools were not used to design the study, generate or analyze research data, determine the thematic structure, interpret the findings, or formulate the conclusions. The authors certify that the manuscript is the result of their own intellectual effort and take full responsibility for its content.

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