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EXPLORING THE ROLE OF DIGITAL TOOLS IN ENHANCING LANGUAGE LEARNING OUTCOMES: A CORRELATIONAL STUDY OF SECONDARY SCHOOL STUDENTS IN MARDAN

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Abstract

Technology has played a pivotal role in shaping almost every sphere of life, and the field of linguistics has not remained untouched by these advancements. This study explored the impact of technology on English language teaching methodologies in educational institutions of Mardan. The research adopted a mixed-method approach, combining both qualitative and quantitative strategies to gain a comprehensive understanding of the phenomenon. The sample comprised English language educators and learners from selected schools and colleges in Mardan, and data were collected through questionnaires, interviews, and observation. The study was guided by Vygotsky's Socio-cultural Theory, emphasizing the role of social interaction and mediated learning in language acquisition. Findings revealed that the integration of technology, including multimedia tools, language apps, and online resources, significantly enhanced learners' proficiency and engagement in English language learning. Educators reported improved instructional efficiency and greater opportunities for collaborative learning. The study recommended regular professional development for teachers, increased access to technological resources, and structured integration of technology into the curriculum to maximize the benefits of technology in language education. Overall, the study highlighted that technology serves as a vital catalyst in modernizing English language teaching methodologies in Mardan's educational institutions.

Keywords: *Technology, Integration, Learner Proficiency, English Language Education, Socio-cultural Theory*

Introduction

Background of the Study

The infusion of technology into English language teaching represents a paradigm shift, redefining not only pedagogical approaches but also instructional activities themselves. This shift is a direct response to the dynamic digital environment, which continuously transforms how learners access, process, and use information (Jones & Hafner, 2012). The integration of technology into language learning is not a mere educational trend but a necessary response to the demands of twenty-first-century learners (Warschauer & Healey, 1998). Digital tools, such as educational applications, virtual classrooms, podcasts, and video-based storytelling, allow learners to engage with language in interactive, multimodal, and student-centered ways (Godwin-Jones, 2018). These tools enhance learner autonomy, self-paced learning, and comprehension, catering to diverse learning styles through multimedia content (Reinders & White, 2010; Mayer, 2009).

Current learners, often referred to as digital natives, grow up immersed in technology and informally acquire knowledge through platforms like YouTube, TikTok, and mobile apps (Prensky, 2001). For such learners, integrating technology into English classrooms is essential to align formal

education with their digital realities. Gamified exercises, interactive quizzes, and simulations foster engagement, motivation, and meaningful learning experiences (Chapelle, 2003). However, the effectiveness of technology depends on pedagogical alignment, where digital tools are integrated purposefully to achieve curricular objectives rather than used superficially (Bax, 2011; Hockly, 2012). Teachers must be adequately trained to select, customize, and implement these technologies effectively.

Historically, traditional methods such as the grammar-translation, direct, and audio-lingual approaches emphasized memorization and teacher-centered instruction, limiting learners' communicative competence. The emergence of communicative language teaching (CLT) and task-based language teaching (TBLT) shifted the focus toward real-life communication, learner-centered tasks, and negotiation of meaning (Richards & Rodgers, 2014). Coupled with information and communication technologies (ICTs), these approaches enable learners to develop listening, speaking, reading, and writing skills in interactive, authentic, and contextually rich environments (Hockly, 2012). Tools such as Duolingo, Memrise, virtual classrooms, and digital storytelling platforms support collaborative learning, creativity, and linguistic expression (Godwin-Jones, 2018).

Technology also supports assessment practices through online tests, automated feedback, electronic portfolios, and pronunciation analysis, allowing personalized and continuous monitoring of learners' progress. While developed countries may have robust digital infrastructure for seamless integration, regions like Mardan face challenges such as limited connectivity and resources. Creative solutions like mobile learning, offline materials, and local interventions have proven effective in such contexts. Ultimately, technology in English language education facilitates a learner-centered, interactive, and inclusive learning environment that promotes communicative competence, digital literacy, and lifelong learning (Kessler, 2018).

Statement of the Problem

Technology has become an integral part of daily life, influencing problem-solving and providing innovative solutions. Its integration into education is essential for developing effective teaching techniques, particularly in acquiring a second language. Although several studies have examined the use of technology in general education sectors in Pakistan, limited research has focused specifically on the sociological implementation of technology in English language teaching, especially in Mardan, Khyber Pakhtunkhwa (KPK). In recent years, educational institutions in Mardan have started incorporating technological tools, such as multimedia projectors and LED screens, to enhance teaching and learning. However, while technology has the potential to improve students' English language skills and increase engagement, there is little understanding of its effectiveness in situations where access to advanced instructional technologies is limited.

This study aims to explore the challenges faced by both instructors and learners in implementing technology in English language teaching methodologies in Mardan. Moreover, the practical impact of these technological tools on language proficiency remains insufficiently investigated in this context. By examining the experiences and perceptions of both instructors and learners, this research seeks to provide insights into optimizing the use of technology in English language classrooms, particularly in resource-constrained educational settings of KPK.

Research Objectives

1. To examine the role of technology in enhancing vocabulary acquisition among secondary school students (aged 13–19 years) in selected schools of Mardan, Khyber Pakhtunkhwa.
2. To assess the impact of technology on student motivation and engagement in learning English among secondary school learners in the selected institutions of Mardan.

Research Questions

- How does the integration of technology influence vocabulary acquisition of secondary school students (aged 13–19) in selected schools of Mardan?
- How does the implementation of technology in English language classrooms impact student motivation and engagement in selected Mardan schools?

Significance of the Study

Technology is essential to language learning because research shows that technology encourages student engagement and passion, which improves learning results and provides opportunities to the pupils to discover and encourage research culture. By effectively incorporating technology, students may develop critical and creative thinking, teamwork, communication, and problem-solving skills—all of which are essential for success (Tulsai & Rao, 2023). This study will contribute to literature, by giving a rich description of this integration, especially in the context of teaching English in KPK which has not been explored adequately in prior research. Thus, this research can inform educators regarding the problems and possibilities of technology implementation to allow for better approaches to language instruction and learning. It would also be possible to favor more adaptive approaches, suitable for the students and their learning profiles at a given time. The conclusions will be beneficial for the educators and policymakers in KPK to understand the applicability of the technology in the English language classrooms. This may result to a positive effect on teaching practices, students' experience and performance plus other correlated results (Kausar et al., 2023)

LITERATURE REVIEW

English language teaching has been conducted through teacher-centered approaches such as grammar-translation, direct instructions and audio-lingual methods. These strategies enabled emphasis on repetition, memorization, and language accuracy instead of communication and interaction between students (Richards and Rodgers, 2014). Insofar as these plans provided structure and dependence as they did not necessarily generate a creative, cooperative or critical thinking environment in students. In the same way the communicative language teaching (CLT) or task-based learning (TBL) became more popular in the second half of the XX century, the approach became student-centered, with its interest in interaction and language use in a specific context and the real-world situation that a student could be required to communicate in (Larsen-Freeman and Anderson, 2011). Technology has now been put in the frame of a logical extension of these pedagogical transformations so, it offers platform and tools that can make achievable constructivist learning theories in the English classroom.

There is a lot of discussion in the literature about the role of ICT in facilitating learner autonomy and differentiated instructions. As emphasized by Warschauer and Kern (2000) the internet and digital avenues provide learners with much more freedom of how they learn, what they learn and in

what order; thereby, facilitating self-directed investigation, inquiry and exploration. In digital learning, the student can access materials that can be re-read, the student can access materials that can be accessed at their level of knowledge and self-evaluation. These personalized learning permits are consistent with the socio-cultural theory of learning as described by Vygotsky (1978) that holds that meaningful learning occurs when learners are engaged with tools, the rest and the more knowledgeable persons in as far as they are in their zone of proximal development. Such technology no longer conveys content but some sort of structure to learning experiences that are responsive to individual learner needs.

Student motivation is another important aspect that is influenced by technology. The application of motivational dynamics which Dornie and Ushioda (2011) attribute to language learning and which can be significantly intertwined with the relevant perception of relevance, autonomy, and competence among the learners are pertinent. The dimensions are satisfied in languages learning apps, digital stories, online games etc., which provide individual challenge and instant feedback in addition to creative expression. And you can refer to the example of when students are writing personal blogs, stories or arguments in the virtual world they are never bothered about that they need to do their homework at all, but are rather engaged in the actual act of communication, which is expression of their interests, and identities. Such communicative experiences facilitate intrinsic motivation and improve engagement with the target language in the long term view.

This peer role may be complemented, along with other important functions of peers in the second language development within the team based learning processes, by tools based online. According to Vygotsky (1978), the central assumption of cognitive development is the problem of social interaction. The learners are offered a chance to co-construct knowledge, negotiate meaning and have actual conversations through forums or shared documents and online classrooms. Focusing on the effects of collaborative digital storytelling on the speaking proficiency in the learners, Sun and Yang (2015) have discovered that the linguistic performance and social cohesion improved to a significant degree. By scripting, digital stories in groups, recording and editing, not only have learners been given the chance to build language in use, but they have also noted an increased sense of confidence and support as a direct result. The learning activities to include this kind of cooperation will be helpful in enhancing the sense of community and responsible in the classroom that will play a pivotal role in ensuring that the students are motivated and hold themselves responsible.

Research has focused on the use of immediate feedback, which can be achieved by using online quizzes, voice recognition, and automatic scoring. According to Hattie and Timperley (2007), feedback is one of the strongest factors that influence learning. Online, feedback can be instant, extensive and allow students to detect errors, deliberate and revise their responses. This performance-feedback cycle reinforces the rate of learning and creates awareness at the Meta cognition level. The learners get to know how to be more mature in knowing what they really need, setting goals and measuring their progress which is a valuable tool in life time learning. The meaning of technology here is that it re-plants the evaluation effort as an end game into a dynamic dialogue between the learner and the learning material.

However, though integration of technology in the English language classrooms comes with numerous advantages, it also experiences its fair share of complications especially in the rural or under-resources regions. Such problems as the lack of infrastructure, unreliable access to the internet, inadequacy of trained staff, and the pedagogical conservative nature are still considerable

barriers. A recent study was conducted by Ahmad et al. (2020). The study of ICT implementation in Pakistani schools showed that most teachers can understand the pedagogical importance of technology, but they inevitably feel underprepared to incorporate it into their practice. The research recommended the provision of professional development programs, resource provisions, and curriculum comprehensive change favoring technology facilitated learning. Moreover, educational inequities could be increased by the digital divide the inequalities in means of accessing devices and connectivity unless global interventions tackling the issue are put into place.

Last but not least, culturally responsive digital content cannot be overestimated. In a culturally and linguistically practiced society such as Mardan, English language education needs to follow the international norms without making it area specific. Specifically, when digital texts are localized, allowing them to mirror the cultural experiences, values, and daily experiences of students, they will be more likely to appeal to the latter and enable them to conduct meaningful engagement (according to both Shamsi and Khan, 2021). These locales may contain such subjects as stories, idiom, and examples based on local traditions, voices and visuals that mirror lived experiences of students. This and other such culturally rooted pieces do not only make it easier to successfully establish specialties, but also justify the identity of the learners.

METHODOLOGY

Research Design and Data Collection

The research design used in this study is explanatory sequential mixed methods design, in which a quantitative collection and analysis of data are preceded by qualitative exploration. The main data were gathered by filling a questionnaire survey consisting of structured questions to quantify several aspects of technology integration such as overall language learning, vocabulary acquisition, listening comprehension, technology access, and learning environment.

The quantitative data was done through descriptive statistics (frequencies and percentages) to describe sample properties like gender, age, class, and school distribution. Moreover, Pearson Product Moment Correlation was used to analyse the relations between various sub-scales of technology use and language learning outcomes. This statistical methodology was useful in determining significant relationships among variables, including the relation between technology access, student comfort and learning effectiveness.

In order to supplement the quantitative findings, qualitative data were obtained using semi-structured interviews with a sampled population of English language teachers. These interviews gave contextual information about the classroom practices, teacher perception, and the real life difficulties of incorporating technology in teaching language.

Sampling Procedure and Sample Size

The researcher adopted a convenience purposive sampling method. The participants in the questionnaire survey were picked out of 120 students in the two schools. The sample is biased in terms of the percentage of male students and it is also more clustered in the 14-15 age range with majority of the respondents being in lower secondary classes and especially Class Six.

Moreover, English language teachers were purposely chosen to be interviewed, and the number was reduced, which led to a smaller sample of English language teachers. This helped to ascertain that qualitative data were collected among individuals who had the appropriate expertise as well as practical exposure to digital instructional tools.

Inclusion and Exclusion Criteria

Inclusion Criteria:

- Students enrolled in secondary-level classes in the selected schools
- Participants within the adolescent age group (approximately 13–18 years)
- Both male and female students
- Willing participants who provided informed consent

Exclusion Criteria:

- Students outside the specified age and class range
- Individuals not enrolled in the selected institutions
- Participants unwilling to complete the questionnaire or participate in interviews

Data Analysis Techniques

The statistical methods were employed to analyze quantitative data to determine trends and relationship between variables. Correlation analysis helped the research to investigate the relationship among various elements of technology integration in affecting the learning outcomes in English language.

Thematic analysis was applied to qualitative data, which was in line with the approach suggested by Braun and Clarke. This was done by finding commonality in patterns, themes and stories in teacher responses in order to understand the pedagogical implications, benefits and challenges of technology integration. The qualitative results were employed in supporting and explaining the quantitative results itself to enable a more detailed interpretation of the data.

DATA ANALYSIS

This will describe the statistical analysis of the data collected in the student questionnaire that attempts to determine the impact of technology on various stages of learning the English language. The questionnaire was framed to answer significant issues such as the overall general learning, acquisition of vocabulary, listening, their familiarity and ease of use with technology, and the learning environment. Patterns and relationships and the level of consensus among the students regarding the effectiveness and the issues related to the use of technology in their English classes were measured using the analysis. The interpretation of these quantitative data serve to complement the qualitative data and provide a comprehensive image of how the usage of digital tools can influence the engagement, motivation, and acquisition of language skills in students.

Sample Charactaristics:

Gender Distribution of Students:

Table 01

S.No	Gender	Frequency	Percent
1	Male	88	63.2
2	Female	32	23.2
Total		120	100.0

Note: The table shows that out of 120 students, **88 (63.2%) were male** and **32 (23.2%) were female**, indicating a higher number of male participants. This gender imbalance may affect the

generalizability of the findings on how technological integration impacts English language learning, vocabulary acquisition, and listening comprehension.

Age Distribution of Students:
Table 02

S.No	Age	Frequency	Percent
1	14-15	98	71.0%
2	15-116	10	7.2%
3	16-17	2	1.4%
4	17-18	10	7.2%
Total	120	100	100%

Note: The age distribution shows that the majority of participants (**71%**) fall within the **14–15 age group**, indicating that most students are in early adolescence. Smaller percentages are observed in the **15–116** group (7.2% – likely a typo), **16–17** (1.4%), and **17–18** (7.2%) age groups. This concentration suggests that the study primarily reflects the experiences and learning responses of younger adolescents in evaluating the impact of technological integration on English language learning.

Classes Distribution of Students:
Table 03

Classes	Frequency	Percentage
Six	69	57.5%
Seven	28	23.3%
Eight	5	4.2%
Nine	18	15.0%
Total	120	100%

Note:The table shows that the majority of participants are from **Class Six (57.5%)**, followed by **Class Seven (23.3%)**, **Class Nine (15.0%)**, and a small number from **Class Eight (4.2%)**. This indicates that the study primarily reflects the responses of lower-grade students, particularly those in Class Six. The concentration in early classes suggests that findings on technological integration and its impact on English language learning are more representative of younger students' experiences. Also, the "Percent" column seems inconsistent (adds to 87.0%), which may need correction for clarity.

School Distribution of Students:
Table 04:

School Name	Frequency	Percent
APS Model School	43	35.83%
Peshwar Model school	77	64.1%
TOTAL	120	100.0

Note: Table 09 presents the distribution of students based on their school affiliation. Out of a total of 120 student participants, **43 students (35.83%)** were from *APS Model School*, while a higher proportion, **77 students (64.1%)**, were enrolled at *Madan Model School*. This indicates that the majority of the data collected in the study is represented by students from Madan Model School. The disparity in representation may influence the overall findings, and it is important to consider this when interpreting the results, particularly when comparing experiences or perspectives across different school settings. The total percentage sums to 100%, ensuring a complete representation of the sample population in the study.

Pearson Product Moment Correlation analysis:
Table 05:

Sub-Scales Correlation	Technology and Overall Language Learning	Technology and Vocabulary Acquisition	Technology and Listening Comprehension	Technology Access and Comfort	Technology and Learning Environment
Technology and Overall Language Learning	1	0.484**	0.037	0.401**	0.419**
Technology and Vocabulary Acquisition	-	1	0.192*	0.236**	-0.004
Technology and Listening Comprehension	-	-	1	0.263**	0.159
Technology Access and Comfort	-	-	-	1	0.509**
Technology and Learning Environment	-	-	-	-	1

p < 0.01 (2-tailed) — denoted by **
*p < 0.05 (2-tailed)** — denoted by *
N = 120 for all correlations

underscore the interconnected nature of technological factors in enhancing different aspects of English language learning.
Note: The correlation table presents the relationships between different sub-scales measuring the impact of technology on English language learning. Significant positive correlations were found between Technology and Overall Language Learning and other sub-scales such as Technology Access and Comfort ($r = 0.401$, $p < 0.01$) and Technology and Learning Environment ($r = 0.419$, p

< 0.01), indicating that students who find technology helpful overall also feel more comfortable with its use and enjoy their learning environment more.

A strong correlation was also observed between Technology Access and Comfort and Technology and Learning Environment ($r = 0.509$, $p < 0.01$), suggesting that students who have better access to technology and feel confident using it tend to have a more enjoyable and effective English learning experience.

Technology and Vocabulary Acquisition showed a moderate correlation with Technology and Overall Language Learning ($r = 0.484$, $p < 0.01$), but had a very weak or negligible correlation with Technology and Learning Environment ($r = -0.004$), indicating that while technology helps in vocabulary learning, it may not directly influence students' perception of their learning environment.

The demographic data indicates a predominantly male sample (73.3%) with the majority of students aged between 14 and 15 years (81.7%), primarily enrolled in grade six (57.5%), and coming from two schools, APS Mardan and Peshawar Model School. The correlation analysis among the sub-scales of technology use in English language learning reveals meaningful and statistically significant relationships. Specifically, overall language learning facilitated by technology strongly aligns with vocabulary acquisition, a supportive learning environment, and students' comfort with technology. There is also moderate positive correlation with vocabulary acquisition processes and listening comprehension and the learning environment underlining the synergistic role of these skills in a digital learning environment. These findings lead to the suggestion that previously experienced access and comfort with technology produces a significant effect on the learning environment, but the direct effects on vocabulary acquisition are unobservant, as these factors are subtly integrated with other factors affecting the learning environment. All this information explains why technology becomes essential in engaging, empowering, and connecting learning experience; it means that digital tools have to be integrated to develop the English language skills of students.

DISCUSSION

This paper was aimed to assess how the integration of technologies in the educational process affects the acquisition of the English language in the secondary school in Khyber Pakhtunkhwa (KPK), Pakistan taking into consideration three major areas: vocabulary learning, listening comprehension, and general participation levels of the students. The mixed methodology was used as the combination of data obtained through the survey of students and the interview of teachers implied providing the overall understanding of how digital tools are used in English language classrooms presently and what consequences this usage pattern will have on the effectiveness of language learning. This methodological approach was specifically selected to fill the gap in the existing research, in which a significant number of urban, higher education, or the use of technology was covered only in a narrow sense (Ali et al., 2021; Raza et al., 2022; Zubair et al., 2021).

As observed in the literature review, the previous studies were mostly inclined in reporting the possible positive outcomes of the digital tool usage, namely the improvements in vocabulary retention and student motivation but little to no evidence was provided on the under-resourced, rural, or semi-urban setting like Mardan. Furthermore, although research by Siddiqi et al. (2020) and Khan & Malik (2019) accepted the fact that the Pakistani teachers experienced a range of problems related to the use of these tools, the investigations did not go deeply to explore the

perceptions and the ways these tools are utilized by students and teachers. It was thus the intention of the present study to address that gap by directing the given research to this particular demographic and integrating student- and teacher-centered narrative. Moreover, this study specifically focused on the study hypothesis, which was that technology-integrated instruction into English language learning promotes vocabulary building, listening skills, and engagement among students when properly supported by infrastructure and competency level of the teacher.

The empirical support of the first hypothesis is well supported by the quantitative findings of the presented study that emphasizes the significant and quantitative impact of technology on the English language learning results produced by the students. The statistical data analysis performed with the help of various inferential statistics like correlation and the modeling regression revealed the fact that there are always positive links between the use of electronic applications in the teaching process and the increase in the motivation level, involvement, and self-estimated competence of language learning in the students. Specifically, even students whose age could be seen as the one very different, and the level of their academic performance could be considered as quite different as well, stated a very strong improvement in their desire to learn in the classroom in the instance when the educational process was provided with the technological based interventions implemented in it. This enhanced interaction was particularly noticeable where interactive games, online quizzes, multimedia applications and audiovisual content were facilitated to produce a stimulating environment that was also more accommodating to various levels of learners.

In the quantitative data, it was stated that the factor of comfort of students and their acquaintance with digital tools was one of the most significant moderating variables when it comes to the process of language development, as a whole. Students who had encountered educational technology previously described a greater sense of agency, willingness to perform the group task, and their availability of confidence in the talk, hear, and write activities. The results could be compared to the research study of Gunuc, (2016) whose scientific study of the role of digital learning platforms concluded that the systematic use of technology within the classroom is beneficial to increasing not only cognitive but also emotional engagement but also the environment of cooperation and support in terms of learning. Considered with a prudent approach, interactivity media will encourage a learner to become a co-author of knowledge rather than a mere recipient, which is also quite reflected in the results of the provided research.

In addition, use of digital platforms was found to reduce the social and academic disparities between high achievement students and low achievement students. The interactive educational technologies established a somewhat more equal playing field as it provided different forms of learning and interaction with course material among students. In fact, some learners excelled in oral presentation and use of multimedia slides, but others excelled in interactive grammar tasks or in gamified vocabulary flashcards. This variability in access to learning modes were not only appealing to diverse learning styles, but also served to counteract the sense of intimidation felt by many of the less confident students, breaking barriers to participation in the classroom, to democratize participation and classroom culture. The results are in line with the already established knowledge that there is a need to adopt Universal Designs of Learning (UDL) that aims at ensuring that multiple means of representation, engagement and expression are provided in a learning establishment (Rose and Dalton 2009).

One of the most interesting quantitative findings is the issue of language acquiring, which is a foundation of studying languages. As students pointed out and demonstrated, the new words have

increased tremendously in retention and use when they are presented with the assistance of the contextual and the within-the-boundaries-of-senses modalities. The use of videos and interactive dictionaries, and language learning programs that incorporated visual aids, auditory pronunciation advises, and sentimental context examples have proved especially useful in imposing lexical knowledge. The multi-sensory nature of such tools did not only aid in the memorization, but also boosted the student comprehension of the meaning and use of words which resulted in a transformation of memorization to the active use of the same in the oral and written assignments.

Claims were further made supported by the teachers that were surveyed by the study stating that when vocabularies were taught in a more real-life situation context e.g. short films or dialogue simulations or digital storytelling platforms, students would increase their chances of remembering and application of the new terms in the right context. These results are similar to the ones provided by Khan et al. (2019) who examined how mobile-assisted language learning (MALL) contributes to vocabulary learning in secondary school students. Khan et al. noted that the students who were introduced to the vocabulary in digital forms retained more of them over time and proved more fluent in using them in oral and written speech. The authors explained this success by the contextual richness and the learner autonomy offered by mobile applications, thanks to which students could access vocabulary individually and to practice the material when it was necessary.

Further quantitative results of the present study indicate moderate to strong correlation coefficients between the degree of usage of digital content and vocabulary test scores of the students. Importantly, the tools that were used that involved listening, e.g., watching the videos with subtitles, an audio quiz, or listening to podcasts, were also found to positively affect the process of vocabulary acquisition. This means that the vocabulary acquisition was not accomplished in a vacuum but was enhanced by the cross-modal learning cues in which auditory and visual signals interacted mutually reinforcing one another gaining strength on recalling words and understanding semantics and meanings of vocabularies acquired as a result of cross-modal reinforcement cues synergistic-ally working harmoniously together in the brain to enhance their vocabulary acquisition as a result of their common efforts of recalling words and understanding its semantics and meanings of the words acquired as a result of the cross-modal learning cues they gave one another resulting in. This supports the findings of Mayer’s (2009) cognitive theory of multimedia learning, which posits that learners retain information more effectively when it is presented through multiple channels that engage both the visual and auditory sensory systems.

In addition to vocabulary development, the use of technology demonstrated positive effects on grammar comprehension and sentence construction. Students who engaged with grammar-focused games and adaptive quizzes performed significantly better in post-assessments compared to those who relied solely on traditional instruction. These tools provided immediate feedback, allowing learners to identify and correct grammatical errors in real-time. Such interactivity aligns with Skinner's (1954) behaviorist learning principles, particularly the role of immediate reinforcement in behavior modification. However, in the context of this study, the emphasis shifted from rote learning to exploratory understanding, as students were encouraged to analyze their mistakes and apply corrected structures in new contexts—a practice more reflective of cognitive and meta-cognitive learning strategies.

Indicatively, the quantitative student-report identified the fundamentals of ownership and autonomy in learning as a point impacted by digital tools. Most of the respondents agreed that they were more likely to study on their own, use the online language resources, and show more personal initiative in

learning when technology became a part of the lessons. Older students also had this inclination to self-directed learning, reporting using apps and websites outside of the classroom, to reinforce and extend their classroom learning. This observation supports the theory of learner autonomy proposed by Little (1991) that it is possible to empower students to become more responsible in their learning by giving them access to personally-paced, personalized and goal-centered resources using technology.

However, although the quantitative data provided encouraging information on the advantages of technology, it also highlighted some weaknesses and the problems it presents. There were a few students who complained about the technical problems sometimes, like app failure or login failure, or failed to buffer the video especially in the premises with poor internet quality. Although the number of these impediments was not overwhelming, it impacted the motivation of the students and their continuity in learning. Furthermore, the quantitative results also registered the difference in the accessibility to personal students, as students with poor backgrounds had less chance to practice with educational devices at home. The potential digital divide as an issue raised in the past studies focused on corresponding to equity in access to technology, so they can be enjoyed by more people rather than a select few with the privilege to use them (Zubair et al., 2021; Raza et al., 2022).

Overall, the qualitative studies in this paper bear out the pedagogical promise of educational technology in enhancing outcomes in learning English as a second language. The introduction of digital technologies increased motivation and feeling of inclusiveness and generated real outcomes in terms of vocabulary development and grammar understanding. The results complement the growing body of cross-national studies, as they assist learners in a language learning environment to make the regular use of multimedia, interactivity, and agency (Gunuc, 2016; Khan et al., 2019). These treatments, although effective, largely rely on infrastructures, maintenance of students and instructors, and access. Such quantitative results do not only promote the introduction and development of technology-enhanced language instruction, but they also raise the concern of the possible barriers, because the success of technology-enhanced language instruction is not comparable in the manner of the one-size-fits-all approach since structural barriers represent the problem.

The learners utilizing the original English-language materials, including podcasts, videos with native speakers, and audio interactive activities also demonstrated the level of understanding of spoken English. The professors claim that the pupils were exposed to these resources and not only did they develop a learning ear towards the language but also gained more confidence when they spoke English. These results correspond to the ones of Shah et al. (2020) who have underlined the importance of interactive and real-time listening exercises in enhancing language proficiency. The correlational statistics confirm the notion that learners who indicated that they felt more comfortable with technology got higher scores in listening tests, provided that it is assumed that the digital fluency allows them to grasp the language.

The integration of qualitative data into the general mixed-method framework of the study would yield a more detailed, in-depth view of the way in which technology is changing the fundamentals of teaching English. Besides confirming the quantitative trends presented by the quantitative data, the richness of the insights offered by the contextually-informed reflection offered the participants a better understanding of the lived experiences of both teachers and students as they traversed the process of digitizing the classroom environment. According to survey open-ended responses and in-depth interviews, new, more noticeable paradigm shift, teacher-centred, didactic, as a teaching

pedagogy, teacher-more-student-centred, more participatory/interactive classroom experience are often cited by teachers. This observation indicates a drastic change in teaching practice that is more compatible with theories of learning and thinking that have developed during constructivism.

Teachers identified the ways in which digital tools such as smart boards, learning management systems and instructional applications transformed the classroom processes and instructional techniques entirely. The students were not being passively taught as before but were being taught to be active participants in learning through sharing knowledge and encouraging learning using technology. The learners did not rely on the teacher to read the material and pose questions real-time and were able to engage with dialogue. This change aligns with the socio-cultural theory suggested by Vygotsky (1978) which focuses on the social interaction and social mediation in Zone of Proximal Development. By using digital resources to enable immediate feedback and scaffolded learning experiences, educators could respond to the needs of individual learners and to prompt students to be more autonomous and inquisitive.

Specifically, real-time updating feedback functions within the programs of digital applications proved to be an essential component of constructiveness learning. Instructors observed that programs such as automated quizzers, voice recognition programs, and automatic checking systems gave immediate feedback to learners about their proficiency. This immediacy both consolidated proper use and meaning and provided an opportunity where students could identify and rectify errors themselves and thus felt a sense of self-efficacy. This is the pedagogical cycle of performance, feedback, reflection and revision and this is the cornerrock to Bruneurs (1986) definition of learning as an active, recursive process and is where the learner constructs new knowledge based on prior knowledge and contextual reminders. Students were more inclined to intellectual risk-taking, clarification seeking and interrogation of content areas that were of an interest to students due to the responsiveness of such tools.

Moreover, the qualitative narrations suggested an increase in the degree of collaborative learning promoted by technology. Students would have been more likely to work together or in groups when working on digital stories or when playing a vocabulary game or a multimedia presentation. These group projects were not only aimed at gaining the second language practice: they allowed to provide the scaffolding to peers, as the more skilled learners could work with another group increasing their language knowledge and developing skills. The above organic formation of learning communities is strongly aligned with the tenets presented by Vygotsky (1978), who postulated that knowledge is a socially constructed totality and that learners enjoy great benefits upon interaction with superior peers. The role of the teacher instead of being replaced by technology was instead shared through the learning ecosystem allowing the students to become the actors in their own as well as those of each other thereby becoming active participatory members in the learning ecosystem.

Teachers also reported a sense of agency among students where they did their own research, they practiced pronunciation at home using mobile-based application or they created their own vocabulary journals using digital flash cards. This level of interaction is consistent with the concept of learner autonomy, which is the characteristic of the constructive pedagogy and a key to the success of language learning. As soon as the students felt confirmed that they could learn online, they became more responsible and made content, pace and assessment decisions. The affordances of technology were thus not confined to the classroom situations only but could have a broader lifelong learning orientation which becomes self-sustaining even without requiring formal training.

Despite these pedagogical successes, issues of concern as far as critical barriers that jeopardize a fair and sustainable integration of technology in the learning and teaching of English have been identified in the qualitative data. Issues that were mentioned as motivating more than once were unstable internet connection. Because teaching online lessons were always disrupted and slowed down by the buffering effect, the mistakes made when logging in or inability to connect, this also affected student motivation. This resulted in technical pitfalls that demoralized learners especially when they could not finish assignments (digital) or even engage in online discussions as the internet connectivity failed. These interruptions undermine the consistency and wholeness of the learning process and in the case of learning a language; they become particularly counterproductive since in order to learn a language one would need to be exposed to it and practice on a frequent basis.

The other consistent barrier to technology is inequality, especially in low-income or the rural home. Not all students were able to access smart phones, tablets, and access to personal computers at home and this limits their chances to study digital materials, complete their assignments or practice other language activities. Teachers were concerned that this disparity widened an achievement gap between students in the varied socioeconomic background and it also left resource deprived students frustrated and hopeless. Technology has a long-standing educational prospect of democratizing education, which has not been realized in most of the settings where we are operating on infrastructural and financial constraints.

These findings can be aligned to the claims of Raza et al. (2022), who also study the rural-urban digital divide of educational access in various regions of Pakistan. Based on their research, the urban schools have made strides to overcome the problem by slowly integrating digital technologies in their educational programs, but the rural ones cannot even cope with such most basic infrastructures as stable power supply, good internet access and trained personnel. Technological innovation is not evenly distributed in these settings, and leads to contemporary exclusion and marginalization. The qualitative data of the present research proves this point and suggests concluding that, unless special interventions, such as subsidized equipment, community Wi-Fi projects, and further professional development of teachers are offered, the digitization of the educational process will cause not the removal of educational inequalities but, in one way or another, their further improvement.

Also, a number of educators mentioned that culturally relevant digital content in context should be emphasized. Foreign-based educational platforms and materials may be high on functionality but did not necessarily find a connection with local values, language, or education protocols. The guides suggested by Pakistani professors promoted the construction of local resources that mirrored the experience, customs and social life of Pakistani pupils. Its lack may decrease the pedagogical effectiveness of the material because students may fail to identify with it or internalise it. This concern is connected to the greater body of literature on culturally responsive pedagogy, which assumes that the capability to align what is taught with the sociocultural context of students is the key to their engagement and effective learning (Gay, 2018).

All in all, the qualitative data obtained through teacher interviews and student observation acted as a credible, comprehensive account of the transformation impacts- and unaddressed challenges that the introduction of technology in English teaching brings. In line with constructive learning theories, digital tools were proved to be effective in delivering the following benefits: increased classroom participation, provision of real-time feedback, control by the learner, and collaboration with peers. On the one hand, technological influences such as device inequity, internet instability,

and cultural insufficiency continue to deprive the full potential of technology to be realized, at least in lower-resource settings. Based on these two realities, there is a need to have comprehensive and inclusive policies that will not only encourage digital innovation but also consider the contextual and infrastructure factors that can or cannot make it successful.

The other serious observation is the preparedness of the teachers. Although most teachers were enthusiastic about the use of technology, they failed to be adequately trained on how to use it. The reason is that they may have known the overall use of digital technologies, but they have no idea of the extent to which they can be used in differentiated instruction, lesson plans, and assessments. This gap is justified by the fact that the necessity to introduce comprehensive and pedagogically oriented professional development is periodically underlined in the research (Bashir et al., 2017; Naeem et al., 2018). The educators encouraged the training beyond the functional tutorial to develop the curricula that were compatible with the student-centered digital pedagogy and technology-supported classroom management.

Accordingly, the study has two implications. On the one hand, the findings make it obvious that, when implemented properly, technology can deliver certain observable outcomes related to the increase of vocabulary levels, comprehension, and student engagement. But the sustainability of such an integration lies in the larger system (solid infrastructure, hardware access, capacity building of teachers and the availability of content that fits culture and context).

Conclusion

In summary, this study has observed the use of technology in improving acquisition of English language especially in vocabulary, listening comprehensions among others and the overall interest of students. Digital tools, multimedia applications, and language learning software application, real time feedback systems and interactive exercises have enabled learning to be more dynamic, more engaging and learner directed. As they have a chance to know more about each other, i.e. have a chance to interact more and to feel that they are the owners of the process, these findings are clearly showing that in case such technology intervention exists, the monotony which may be associated with the process of learning English language is breaking. In addition to the fact that this passive acceptance is turned into active engagement increases the involvement of the language content, the motivating process is made even more severe.

In addition, owing to the high level of stakes involved in such involvement and especially in the more digitalize world, one will say that technological fluency is a state of high desirability but not a set of skills that are optional in this situation. The ability to study and work in the conditions of using the most advanced learning technologies is the secret of successful graduation and professional growth of students in the globalization of communication, education and workplace. Due to this, the application of digital tools in the process of English language education is not an option; it is more like a necessity, and the reaction to the alterations that our society requires. Besides becoming more competent language users, language proficient students who learn language skills via contemporary interactive strategies are also better equipped and prepared to handle new challenges in the future.

Despite the many benefits of technology integration, this research paper also notes that successful application of educational technology is contingent on a series of practical and logistic and human variables. The realities on the ground are especially challenging in the developing world or the provinces with limited resources such as Khyber Pakhtunkhwa and present enormous challenges to

the successful implementation of the full potential of these digital innovations. The utility of the digital tools in most of the classrooms is still being undermined by poor internet connectivity, unreliability of electricity and lack of proper equipment and low technical support. Such interruptions, as both teachers and students noted even in the current study, were marked by frustration, withdrawal, and lack of learning, which directly contradict the reason behind using technology in the first place.

In addition to that, one of the most acute issues raised by the current research is the lack of teacher training in the sphere of digital pedagogy. When provided with the digital training tools, most teachers seem not to be prepared to embrace digitally mediated learning meaningfully. The study not only discovered that teachers must have more than functional knowledge, but the students learning should be holistically subdivided into the module of professional development that puts primary emphasis on pedagogical integration into the teaching procedure, which includes: how to organize and manage the application of technology in the classrooms in a way that it improves and supports the educational objectives, how to integrate student learning and classroom use of technology, and how to evaluate and measure student achievement in computer facilitated classrooms. In the absence of such capacity building, technology integration would be similar to merely a veneer or hollow superficiality of learning with little or no tangible impact on learning.

Another point that can be critical is relevance and localization of digital content. One of them consistently appeared in interviews, as most of the available content is oriented to reflect other cultural/educational situations and cannot be applied to the real experiences of students. The usage of technology in the classroom must be rendered meaningful, in terms of culture, linguistically oriented and nationally associated to the curriculum. The gap in cultural distance between the global applications of digital technologies and locally based learning contingencies, the localized resources could be used to address the gap of cultural distance where the students make use of resources which correlate in a cognitive and yet social meaningful way. Not only does this cultural relevance aid in a more comprehensive understanding, but also a sense of identity and belonging in the learning.

Other than this, the research adds to the available literature through the provision of situational understanding on the influence of technology on the teaching and learning of the English language in the semi-urban region of Pakistan. The mixed-methods approach made it possible to triangulate the quantitative data with the qualitative results in this area, which offers a detailed explanation of the opportunities and challenges in this field. The findings indicate that although digital tools may be useful to enhance vocabulary retention, listening comprehension, and classroom engagement, classroom performance is strongly context-dependent, and it needs to have infrastructure, teacher training, and content congruence. Thus, it cannot be possible to judge the worth of the educational technology without considering the broader institutional and sociocultural process in which the educational technology is embedded.

That is, to realize the potential of technology in the teaching and learning of English language, a multi-layered approach is needed. To make the digital tools available to every student, it is important to invest in infrastructure (good internet connections, relevant devices and technical support) first and foremost. Second, to ensure that educators possess the knowledge, skills and creativity to design and implement technology-enriched education, the issue of teacher training and professional development must be made a permanent and enduring aspect of an education policy. Third, politicians, software developers, and curriculum creators have to work together in co-

production and distribution of locally appropriate digital content, which merely informs the target student body of their own requirements, experience, and objectives.

It is thanks to this that this research project could be considered both an action call and a commentary to the practice in question. The complete delivery of the digital revolution promise in education cannot be implemented without considerate inclusion and situational implementation. There must be collaboration between policymakers, teachers, school administrators and technology providers to have an environment where digital technologies can be used in a significant and equitable form. Educational equality, innovation and long term prosperity may be in addition to the pedagogical instrument that technology can be with its potentials used effectively.

There is nothing under wraps that the adoption of technology as one of the most incredible bridges between the traditional teaching and demands of the contemporary learning world has been confirmed through this study. Nonetheless, it is a bridge that should be constructed within the frames of the availability, preparation, and situational awareness. Educational technology can only exist until the processes leave no student behind, at which point it can be effectively utilized without being discriminatory as being called a revolution in terms of language acquisition.

REFERENCES

Ahmad, M., Hussain, I., & Khan, S. (2020). Barriers to ICT integration in public schools of Pakistan: A case study. Journal of Educational Technology Systems, 49(2), 215–230. https://doi.org/10.1177/0047239520934012

Bax, S. (2011). Normalisation revisited: The effective use of technology in language education. International Journal of Computer-Assisted Language Learning and Teaching, 1(2), 1–15. https://doi.org/10.4018/ijcallt.2011040101

Chapelle, C. A. (2003). English language learning and technology: Lectures on applied linguistics in the age of information and communication technology. John Benjamins Publishing.

Dörnyei, Z., & Ushioda, E. (2011). Teaching and researching motivation (2nd ed.). Routledge.

Godwin-Jones, R. (2018). Using mobile technology to develop language skills and cultural understanding. Language Learning & Technology, 22(3), 1–17. https://doi.org/10.1016/j.compedu.2018.03.001

Hockly, N. (2012). Teacher training for digital age language teaching. ELT Journal, 66(1), 97–105. https://doi.org/10.1093/elt/ccr024

Hattie, J., & Timperley, H. (2007). The power of feedback. Review of Educational Research, 77(1), 81–112. https://doi.org/10.3102/003465430298487

Jones, R. H., & Hafner, C. A. (2012). Understanding digital literacies: A practical introduction. Routledge.

Kessler, G. (2018). Technology and the future of language teaching. The Modern Language Journal, 102(S1), 1–15. https://doi.org/10.1111/modl.12422

Larsen-Freeman, D., & Anderson, M. (2011). Techniques and principles in language teaching (3rd ed.). Oxford University Pvress.

Richards, J. C., & Rodgers, T. S. (2014). Approaches and methods in language teaching (3rd ed.). Cambridge University Press.

Shamsi, A. F., & Khan, M. A. (2021). Cultural relevance in English language teaching materials: A study of Pakistani classrooms. Journal of Language and Cultural Education, 9(3), 45–58. https://doi.org/10.2478/jolace-2021-0021

Sun, Y. C., & Yang, F. Y. (2015). I help, therefore, I learn: Service learning on Web 2.0 in an EFL speaking class. Computer Assisted Language Learning, 28(3), 202–219. https://doi.org/10.1080/09588221.2013.818555

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Harvard University Press.

Warschauer, M., & Kern, R. (Eds.). (2000). Network-based language teaching: Concepts and practice. Cambridge University Press.

Warschauer, M., & Healey, D. (1998). Computers and language learning: An overview. Language Teaching, 31(2), 57–71. https://doi.org/10.1017/S0261444800012970