
| RESEARCH ARTICLE

Navigating the Digital Learning Landscape: Unveiling the holistic Power of Learning Management System to revolutionize user experience

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| ABSTRACT

Collaborative learning tools are found to have high pedagogical innovativeness and engagements of students (Jonassen, 1999). However, little is known about the perception of such tools among the teachers, particularly in the case of the private higher education institutions (HEIs) in Pakistan. The qualitative study is a research on the perceptions of teacher educators toward their use of collaborative learning technologies (e.g. online discussion forums, group projects, digital platforms) in a private Pakistani HEI (Akram et al., 2021). The study follows the Technological Pedagogical Content Knowledge (TPACK) model (Mishra and Koehler, 2006) in exploring how teachers perceive the integration of such tools and the resulting implications on teaching and the interaction with the students. The interviews with semi-structured questions were performed with 25 teacher educators, and the results provide the information that demonstrates the rather positive attitude towards these tools. Faculty indicated that the technologies make student participation, critical thought, and communication as well as digital literacy easier. However, barriers including the lack of technological infrastructure, change behavior, and professional development are limiting its adoption (Asad et al., 2020). The current research gives a subtle, situational explanation of the obstacles and facilitators linked to collaborative learning tool adoption in developing higher education institutions of the countries. The results produce practical suggestions to instructors and policymakers interested in supporting successful integration in similar environments, thus adding to the current discussion on the use of technology in pedagogy and shaping possible uses of AI and XR.

| KEYWORDS

Collaborative Learning Tools; TPACK Framework; Educational Technology Integration; Digital Pedagogy; Immersive Learning Environments

| ARTICLE INFORMATION

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1. Introduction

Integration of collaborative learning tools in learning settings has turned out to be a germane path of pedagogical contemporary, especially when the learning setting entails that the learners must play an active role in creating meaning by engaging in two-way interaction, responding to one another and collectively resolving problems. Online group work, learning management systems (LMS), online discussion forums, and structured group projects have the potential to alter the classroom practice moving towards a transmission-based model to participatory learning communities where students are able to

negotiate meaning, co-produce knowledge, and form communicative competence through intentional work. It is also proposed that social interaction and instructed participation mediate the process of learning, making peer collaborative learning and teacher scaffolding particularly important in language development (Vygotsky, 1978). When used in the context of English as a Second Language (ESL), collaborative tools widen the possibilities of real-life communication, peer-support drafting and revising, collaborative vocabulary developing, and reflective dialogue, thus allowing a student to practice language in a real-life setting, as well as to obtain feedback as soon as possible and various in specific amounts.

On the one hand, even though expansive literature has been published about their promise, the adoption and continued usage of collaborative learning tools appears unevenly distributed by the geographical areas of the world, particularly in the developing environments where institutional ability and infrastructure can limit its usage. Although the introduction of LMS-based programs to the institution has been made, to achieve effective use, the system should respond to the needs of academic activities, should be reliable and should be seen by the end-users as one that encourages actual learning benefits other than creating administrative overhead. Empirical studies of e-learning adoption practices feature that the quality of the system, perceived usefulness, and perceived task-technology correspondence determine the willingness of learners to use online learning systems and their ultimate satisfaction with technology-based learning (Alyoussef, 2023). At the same time, larger institutional and contextual obstacles, such as the lack of preparedness, disparities in access to devices and connectivity, and organizational planning still hinder regular use in higher education (Ahmad et al., 2023). These do not only represent technical constraints, but also interfere with the pedagogical viability of collaboration by preventing the continuity of interactions and decreasing the reliability of engagement via the Internet.

In Pakistan, such issues are especially acute in the sphere of higher education when lack of infrastructural support and capacity often border on pedagogical, organizational drawbacks. The Degree of Autonomy in making digital tools Private Higher Education Institutions (HELs) may have an increased freedom to launch digital tools; however, they are still likely to be faced with uninterrupted problems related to bandwidth availability, intermittent power supply, insufficient staffing of technical facilities and unequal access to ongoing training. Within this kind of setting, collaborative learning tools can be implemented at the surface level (e.g. posting content or posting simple announcements), whereas any interactive features (e.g. discussion boards, peer review, collaborative authoring, and group coordination) are not effectively used. According to the evidence of the Pakistani distance-learning setting, perceived usefulness of LMS is conditioned by factors directly affecting the adoption behavior, which by extension supports the idea that uptake cannot be assured by the presence alone (Khan et al., 2025). These limitations may be especially harmful in ESL classrooms, where interaction is not a matter of choice, but is rather central to language learning, due to their constraints on the frequency and the quality of communicative practice, interaction between students, and feedback cycles.

Moreover, in well-equipped environments, collaborative learning technologies require delicate pedagogical coordination. Studies of online group projects have shown that collaboration may be harmed due to the continued presence of such challenges (as uneven participation, difficulties with coordination, unfairness in assessment, inadequate design of tasks), and that such challenges need to be mitigated by explicitly defined structures, clearly defined roles, and facilitation reinforcement instead of the assumption that collaboration will just happen online (Donelan and Kear, 2024). In the same vein, the studies which focus on the quality of digital interaction underline that the goal of learning is directly influenced by the quality of interaction, the dynamics of relations, and group-regulation processes, and not just by the availability of tools (Bach and Thiel, 2024). These insights are essential with regards to language learning since the pedagogical usefulness of collaborative tools lies in the fact that meaningful discourse, negotiated meaning and prompt peer mediation are generated and not superficial posting or/and a token participation.

Recent studies of technology-enhanced language learning have also revealed that interaction and engagement of learners can be reinforced as well as a feeling of community by creating a set up that enables presence, interaction and community-based learning activities. As an example, immersive online learning has been demonstrated to have an effect on students' engagement and a sense of community in the context of second-language, which means that carefully developed digital environments can facilitate both the cognitive and social aspects of language acquisition (Çelik and Baturay, 2024). Similarly, the structured online dialogues may boost the involvement and self-regulation when they are incorporated in the online teaching programs, proving the idea that interactive dialogue, when guided purposefully, can become an effective motivator of the participation and learning (Yorganci, 2025). These results support one of the central implications of ESL teaching in Pakistan: joint education technology can make a significant amount by creating knowledge only when the structures are stable enough to enable interactivity and when teaching practice intentionally hunches towards the creation of lasting dialogue, multilateral feedback, and responsible engagements.

Although a previous study has recorded insights into widespread obstacles to technology integration in Pakistani higher education, a significant lapse in the literature does exist regarding the contextualized perceptions of teacher-educators who

influence the selection, execution and normalization of collaborative learning tools in the ESL classroom. What is important is the beliefs, preparedness, and actual practice of teacher educators as technology integration is eventually actualized through pedagogy: design of the task, structuring of participation and ensuring that the affordances of the tools are consistent with the goals of language learning. To provide a holistic understanding on this process, Technological Pedagogical Content Knowledge (TPACK) framework proposes the conceptualization of teacher knowledge as a composite of technological knowledge (TK), pedagogical knowledge (PK) and content knowledge (CK) and all the intersections (Mishra and Koehler, 2006). T Pack is particularly applicable in ESL situations since to integrate effectively, competence in technical aspects is not only necessary, but instead, one needs to structure language tasks that utilize interaction, choose tools that serve communicative purposes and promote discourse between people in a manner that builds proficiency.

Thus, the proposed paper considers methods by which teachers' educators in a privatized higher education institution in Punjab, Pakistan, perceive and use collaborative learning tools in ESL classrooms with emphasis on accessing the factors that impair successful adaptation and those that may empower practice. The missing element is not the lack of technological technology but the consistent gap between the potentiality of joint instructional equipment and the classroom-level actualization within the context of unreachable training possibilities and inconsistent willingness to restructure pedagogy in an interaction-focused learning environment. The data on Pakistani ESL setting shows that the teachers acknowledge the benefits and issues in using technology but also that there are some practical limitations influencing classroom implementation and the level of reproducibility of using tools (Manzoor et al., 2024). The perceptions of teacher educators are thus needed to explain the nature of underutilization of collaborative learning tools, the interaction of pedagogical choices and infrastructure realities, and the most likely intervention of professional development allows to bring about sustainable changes.

The importance of the study is that it has the potential to cause context-relevant findings to develop professionals and institutional planning in Pakistani private HEIs. The study will fill the knowledge gap by theorizing the relationship among the knowledge domains, perceived usefulness, infrastructural realities, and interactional demands that mutually affect integration to the educational technology and ESL research. Finally, the paper is aimed at providing practical suggestions on specific professional learning, institutionalize-support mechanisms, and policy solutions that may empower the collaborative learning practices and enhance the ESL outcomes in similar developing-country situations.

2. Literature Review

The use of collaborative learning resources in the learning environment has acquired new incentive due to the fact that advanced learning has become more reliant on digitally mediated interaction as a way to maintain engagement, peer learning, and knowledge emergent practice. In this review, collaborative learning tools are the ones that permit learners to engage in collective creation, discussion, critique and refinement of ideas, including learning management system (LMS) discussion boards, collaborative writing spaces (e.g. shared documents) and interactive boards, as well as structured online group work. These tools do not exist in language education simply as delivery channels; they mediate the nature of interaction where learners practice the meaning-making, negotiate meaning and get feedback about learning. According to a sociocultural view, this kind of interaction gives a skeleton of a development where learning progresses through facilitated interaction and discourse (Vygotsky, 1978). Similarly, constructivist narratives underline that the process of meaningful learning takes place under the condition in which learners produce a projective manipulation of ideas in the concreteness of problem space than as an inputting reproduction of information (Jonassen, 1999). The most crucial implication of the ESL pedagogy approach is that the opportunities of using language by learners in meaningful cooperation are closely related to the possibility to learn language as content.

Simultaneously, the literature on the topic across the world indicates that the availability of tools does not necessarily lead to the pedagogical change. The value of collaborative technologies in learning is determined by the model of interaction, role and responsibility, and the ability of the learners to feel psychologically secure when they participate (Bach and Thiel, 2024). Such a difference is important to the growing contexts like Pakistan where digital adoption has been growing more rapidly among institutions with unequal rates and where the pressures of market responsiveness, staffing, and variable infrastructures tend to compete on the operations of the growing number of privately owned institutions of higher education (HEIs). The recent Pakistan-based scholarship sheds new light on systemic crunch in the area of digital transition to Pakistan, namely, on discrepancy between what is institutional desire towards modernization and reality in the instruction (Ashraf, 2025). Accordingly, understanding of technology and its role in facilitating learning has moved away questioning the use of technology to support learning, and critiquing the sociotechnical circumstances that would make technology instructionally significant, fair and affordable.

Pressure groups: ESL teaching and learning tools

The use of collaborative writing and discussion-based learning are also one of the best empirically established uses of digital collaboration in language development, especially in that it transforms language learning into visible and revisable social practice. The modern synthesis research emphasizes that collaborative L2 writing has grown out of the small-group classroom writing activities to become multimodal and digitally connected, and poses novel questions regarding patterns of interaction, instructor design and that assessment (Li and Zhang, 2023). The collaborative tools have in this scenery a two-fold purpose: (a) shared spaces within which language is turned into a group asset to think and write, and (b) the creation of traces of interaction, which can be utilized to provide feedback, reflection, and metacognitive regulation.

The argument is supported by recent empirical investigations that demonstrate the way in which platform affordances condition language results and patterns of participation. To illustrate, collaborative writing by means of Google has been linked to enhancing the quality of global writing and the local language characteristics, and collaborative drafting and revision may aid accuracy and cohesiveness in addition to the development of ideas in case of properly-designed tasks (Albeshier, 2024). But the literature, too, warns that collaboration is not one homogeneous process, structures of interaction differ significantly, depending upon the size of the group, channels of communication, and work in open forums or in semi-private settings. Scholarly research that investigates online group writing showing a large group of participants proves that online forums and personal chats may have different dynamics of participation, which may rearrange voice and allow fewer vocal learners to participate more regularly (Mei et al., 2025). In the case of ESL classrooms, this is important since the perceived communicative risk tends to inhibit participation; characteristics of tools that enable layered participation (public + private) may diminish barriers to participation and contribute participant diversity.

Outside of the writing domain, asynchronous online discussion has come to enjoy prominence as a tool to train students in higher-order thinking with respect to language learning, especially English for Academic Purposes. It can be seen that facilitate-facilitated asynchronous discussion is positively correlated with the triggering of higher-level critical thinking using a pro-social mechanism of peer facilitation that can bind members of the group together, keep them engaged, and track the progress of tasks (Xia and Xu, 2024). Notably, this strand of research redefines digital discourse as not additional activity, but as an organized evaluation, and knowledge-making environment processes which are closely connected with the sophisticated use of language in academics. With private HEIs in Pakistan, when the size of classes and time constraints and assessment pressures often direct teaching towards lecture-based processes, both such digitally organized conversation are a possible path to refocusing teaching on interaction even without the regular need to be always connected.

Another line of investigation focuses on the effect of digital communities and the governance of the platform on collaborative learning as time goes by. There is longitudinal evidence to support the claim that sustained learning of language in online communities is influenced by an interaction among peers, as well as platform moderation and information about the rules that contribute to the quality of participation and the growth of the social capital (Chen, 2025). It is especially applicable to ESL environments in which collaborative learning technologies can possibly increase the inequity in case students with better skills and confidence dominate learning. In this way, collaborative learning technologies are increasingly becoming social infrastructures, or systems of distributing the opportunities of speaking, writing, feedback and belonging, instead of so-called neutral tools, in the contemporary literature.

Teacher what, willingness and the TPACK lens.

Although the achievement of students is the major topic of literature on collaborative learning, the perception of teachers, their willingness and the pedagogical decision-making is the key to the success of implementation in the real classroom. In Pakistan and similar emerging situations, educators tend to play a mediatory role between the technological aspirations of the institution and classroom realities. According to the recent evidence on Pakistani higher education, the perception of teachers towards an online platform transition has been mostly predetermined by their past teaching experience and familiarity with conventional teaching modalities, which could affect the ability to adjust to the requirements of digital teaching (Naveed et al., 2025). This indicates that resistance or hesitation cannot be reduced to just attitude; it usually represents risk management in limited circumstances; less intricate infrastructure, insufficient training, and concern over an instructional failure in front of students.

Technological Pedagogical Content Knowledge (TPACK) framework is an attractive model of understanding these dynamics since it is argued that technology integration is a knowledge intersection not an added skill (Mishra and Koehler, 2006). In TPACK, educators will be required to match tool affordances to pedagogical practices and language-learning goals that is, effective implementation will be contingent on whether the teachers can add technological possibilities to language tasks that will yield some meaningful learning and interaction and feedback. The latest studies of professional training online that in-service EFL teachers receive prove that one of the most advantageous arrangement of technology-based development is closely associated with enhancing overall TPACK aptitudes upon teacher-student-teacher lenses, instead of focusing on the tool procedures in a

rather limited way (Budianto et al., 2023). This applies specifically to collaborative learning tools, which can be more valued through the aspect of designing interaction and less through knowing the platform, which includes roles and prompts, sequencing and peer feedback routines as well as assessment criteria.

The literature on higher-education e-learning at large supports the fact that the perception of usefulness, task-technology fit, and user experiences also contribute to adoption (Alyousef, 2023). As put in the context of collaborative tools used in ESL classrooms, this suggests that the higher the likelihood of persistence of teachers is, the higher the level of the platforms diminishing the friction of instruction (e.g., organizing group work, monitoring their inputs, facilitating feedback) and perceived benefits to participation and learning products. In resource intensive settings, where extra burden may undermine motivation very fast design usability and institutional support are the key factors that define the continuation of practice.

Since hindrances to technology adoption affect Pakistan and other similar settings, this paper will explore the barriers.

The problems of collaborative learning tools in the private HEIs in Pakistan cannot be referred to as isolated obstacles but to structural constraints. Systemic examinations of the Pakistani technology the presence of higher education indicate that ambitions to achieve digital modernization usually outrun the capacity to implement changes, and that teachers have to make improvisations of the uneven infrastructure and alternative institutional demands (Ashraf, 2025). In this case, collaboration learning tools could be counterproductive, as far as teachers have to coordinate groups, fix technical problems with connectivity, and offer online feedback even when they have to qualify the content of the curriculums.

According to the existing international studies on an online group project, the long-standing issues associated with the work on this topic include uneven participation, coordination challenges, managing conflicts, and issues related to fairness in the assessment process - and they intensify when students and teachers lack adequate preparation to cooperate online (Donelan and Kear, 2024). The implications of these findings to ESL classrooms are that, since language proficiency differences encourage the development of feelings of free-riding, or silence in less confident students unless cooperation is designed as a planned behavior.

The barrier-model studies further reveal that adopting e-learning is also inhibited by inter-institutional, technical, as well as human elements that reinforce each other instead of acting on their own (Naik and Naik, 2025). These interdependencies in the Pakistan context of the private HEIs are generally manifested as: the lack of connectivity, support that is underproduction in teaching instruction design, the lack of professional development, and policy spaces regarding quality assurer in digitally mediated teaching. An LMS may do little more than facilitate superficial use (e.g., posting materials) of collaborative tools rather than pedagogy based on interaction even in the presence of institutions offering one.

Pedagogical innovation implications and future research.

Out of the literature reviewed, there are two implications in relation to ESL education in the Pakistani private HEIs. To start with, collaborative learning tools have the greatest pedagogical potential when approached as interaction designs, and not as a technological implementation. The best indicators of the learning gains occur when the discussion and writing frames are aimed to facilitate reasoning, feedback loop, and mutual responsibility (Albeshir, 2024; Xia and Xu, 2024). Second, teacher capacity development should shift away from tool training to more integrated pedagogical design capabilities that align with TPACK, in particular, task design to interact, assess team collaboration, and equitable interaction strategies (Budianto et al., 2023; Mishra and Koehler, 2006).

Although there is increasing evidence across the board, there still exists an impressive deficit in context-laden insight into perceived practices and enactment of collaborative learning technologies by teacher educators in Pakistani private HEIs, specifically in ESL spheres where communicative interaction is the transactional as well as the end-point of teaching and learning. The literature that currently exists on Pakistan-related people throws light on the larger digital transition and institutional challenges (Ashraf, 2025; Naveed et al., 2025), yet, additional research is required to bridge the gap between these conditions on the one hand and the micro-levels of ESL-related culture, i. e., how are shaping of collaborative work, how they make sense of student engagement, how they address participation imbalances, how they reduce risk and workload in a pastorally meaningful ways. Closing this gap can generate some viable suggestions regarding the further development of professional learning, policy, and the choice of tools to be used, this is because the collaborative learning technologies are not presented as aspiration reforms, but as pragmatic pedagogical platforms of language learning in developing higher education environments.

3. Research Methodology

The chapter describes the research design, research setting, sample of interviewees, sampling rationale, interview processes and methodology of presenting research findings with an aim of investigating the perceptions and practices of teacher educators

towards the use of collaborative learning tools in ESL instructions in the Pakistani private higher education sector. It was imposed by the need to establish contextual sensitive meaning, shed light on reality of day to day teaching, and produce results that are credible, transparent and applicable in similar environments.

3.1 Research Design

Qualitative exploratory design was used in the study. The case was chosen due to this design as research phenomenon, including the perception, the argument, and the practice of the teacher educators in relation to collaborative learning tools, requires an in-depth approach to interpretation instead of isolating the variables. Qualitative inquiry is especially adaptable to examining complicated educational phenomena which are both socially located and stipulated by institutional circumstances, career backgrounds, and pedagogies that are negotiated at local levels (Lim, 2025). The use of an exploratory approach was justified by the fact that the research on collaborative learning tools has not been uniform in the Pakistani private higher education institutions, and within the ESL classrooms, in particular, the study aimed at revealing the patterns which would otherwise be obscured by overarching concepts.

None of the exploratory in this study meant the unstructured research. It was rather a methodical endeavor to produce deep descriptions of (a) what teacher educators make out of the collaborative tools, (b) why including or avoiding them, and (c) how the institutional limitations contribute to adoption. This reasoning fits the current qualitative advice that puts the focus on the methodological coherence: research questions, data generation, and data analysis must coincide and work jointly to generate the interpretations that may be defended (Lim, 2025).

Last but not least, the research conceptually focused on the TPACK model to structure the interview guide and interpret the interaction of technological, pedagogical and content-based types of teacher knowledge (Mishra and Koehler, 2006). TPACK influenced the subject of investigation as well as the format of interview questions, but the qualitative exploratory design of the study dictated the production and discussion of evidence.

3.2.a Research Situation and Optimization

It was done in one private institution of higher learning in Punjab, Pakistan. The location was chosen purposely since it is a kind of institution where teaching is gradually moving towards modernization through a use of LMS practices but at the same time is heading in the infrastructural and policy limitations as inherent to developing settings. The environment was considered to be information-rich wherein the integration of technology is visible enough to be studied but controversial enough to reflect the obstacles, trade-offs, and adaptations.

The term collaborative learning tools was widely interpreted to incorporate LMS-integrated systems and third-party systems (e.g. discussion forums, collaborative boards, document co-authoring agents, and group based digital project spaces). The research focused on the ESL-related teaching settings, since learning a language is strongly dependent on interaction, feedback, and worthwhile engagement, which collaboration teaching tools are purported to improve.

3.3 Participants

The sample size consisted of 25 teacher educators ($N = 25$) who are working in the chosen institution of higher education that is privately owned. The inclusion criteria included: (1) active teaching role in the courses that include English language learning or English-mediated instruction, (2) having experience with an LMS and/or collaborative learning tools, used on a regular or experimental basis. This guaranteed that the participants were able to speak out of direct experience not hypothetical ideologies.

The team was highly and professionally qualified. The study subjects were between 38 and 62 years in age, with an experience of at least five years of teaching experience. Regarding qualifications, 80 per cent of them had a PhD and 20 per cent had a master degree qualification. The sample consisted of 21 women and 4 men. Instead of considering this gender distribution as an obstacle in its own right, the study took it as a representative feature of the environment, one that can influence the way in which technology adoption, workload, and among the professionals learning are spoken and lived.

3.4 Are The Sampling Procedures and the Adequacy of the Samples Reasonable?

The purposive sampling method was used in order to choose the individuals who could offer a comprehensive, experience-based information upon the use of collaborative learning tools. Modern-day methodological scholarship focuses on purposive sampling as an active process of exploration through the research process: specifying the inclusion rationality, streamlining recruitment as the study progresses, and recording reasons that led to the inclusion (Ahmad and Wilkins, 2025). Purposive sampling in this research was appropriate because of the objectives of the study, to obtain a range of variation in the aspects of comfort with tools, teaching role, and perception of institutional support, instead of attempting to achieve statistical representativeness.

Adequacy of the sample was assessed in terms of two complementing principles that are prevalent in present-day debates on qualitative methods:

1. Saturation as repetitiveness and exhaustion - determining whether new themes would still emerge in new interview sessions or accounts would now start repeating previous patterns (Ahmed, 2025; Lim, 2025).
2. Fitness-for-purpose - determining whether the data gathered is adequately answering the research questions in detail and interpretively, due to the nature of practice setting and expertise of the participants (Lim, 2025).

Interviews were then carried on until the research team perceived there was a declining amount of validity as new concepts were being learned. The use of 25 therefore was deemed to be justifiable as sufficient to undertake exploratory qualitative analysis in a limited institutional setting, and nonetheless enable within-sample comparisons between dissimilar adoption paths and pedagogical thought processes.

3.5 Data Collection Methods

Semi-structured and in-depth interviews were the main sources of the data, as they are conceptualized by allowing the participants to tell their stories in their own words and provide an opportunity of the researcher to interrogate meaning, conflict, and logic. The qualitative interview inquiry is particularly effective when the interest is to learn about the professional judgment, and the frames of interpretation applied by teachers when they modify pedagogy to the tools and constraints (Dunwoodie et al., 2023; Xu et al., 2025).

Interview procedures

Interviews were between 75-90 minutes. Seventeen face-to-face interviews were carried out to facilitate the construction of rapport, and long term reflection, six phone interviews were carried out, to manage schedules and workload realities of the participants. There were informed consent audio-recorded and transcribed verbatim of all interviews to enable rigorous analysis.

Interview protocol development

A **15-question interview protocol** structured the conversations, with prompts mapped to TPACK dimensions (e.g., tool familiarity and confidence; pedagogical integration strategies; tool-content alignment; and intersecting knowledge domains). The protocol was designed as a layered scaffold: early questions invited descriptive accounts (what tools are used, how they were adopted), while later questions elicited reflective evaluation (perceived benefits, challenges, institutional conditions, and future needs).

To increase the clarity and validity, the protocol developing followed current suggestions related to the concept of the gradual process of refining, experts review, and piloting of the interview questions, so that the questions were understandable, focused on the objectives, and provided the ability to extract rich data (Coker and Akande, 2025; Xu et al., 2025). Where necessary in the interviews, follow-up probes were used to deepen interpretation and clarify meaning when participants made broad claims (e.g., "engagement improved") without specifying mechanisms or classroom evidence (Dunwoodie et al., 2023).

3.6 Data Analysis

The discussion was made possible with the help of the systematic coding procedure through which the close reading developed into formation of patterns and the establishment of themes. Repeated readings of transcripts were encouraged as a way of bringing familiarity, their coding was then coded in a way that aligned structural organization with interpretive openness. The analysis took the form of a reflexive qualitative analysis approach by accepting that the process of coding is not the technical exercise of a questionable classification but an act of interpretation that is mediated by the place of positionality of the researcher and their theoretical commitments (Nicmanis, 2024).

The process of analysis included:

1. First coding aimed at describing salient units (i.e. barriers, enabling conditions, pedagogical adaptations, shifts in participations).
2. Concentrated coding that aimed at syndicating codes and finding common correlations among participants.
3. The development of the themes was directed at infusing the codes into higher-order patterns that would answer directly the research questions (e.g. perceived value, community-building, tool-feature preferences, dynamics of resistance, scaling conditions).

In the process, the research team kept an audit friendly record of the decision-making during the coding process as well as refinement of themes, which also supports transparency. Those involved in the study used analytical memos in order to document the growing interpretations and to prevent turning the themes into mere topic labels instead of explanatory patterns based on meaning of participants.

3.7 Trustworthiness and Ethical Matters

Credibility, dependability, and confirmability are the three strategies of pursuing trustworthiness that were in line with the modern deliberations of qualitative quality (Ahmed, 2024). Specifically:

- **Credibility:** The building of credibility came about as a result of sustained interaction with the data (with repeated readings, memoing) and thoughtful incorporation of quotes of the participants to base interpretations on evidence.
- **The reliability** was provided by writing up interview guidelines, transcription processes and phases of analysis so that the interpretive rationale can be traced.
- **Reflexive note-taking** and discussion of emergent themes with peers enhanced the confirmability that served to reduce the likelihood of regulations being excessively influenced by the expectations of the researcher (Ahmed, 2024; Nicmanis, 2024).

In the ethical consideration, the participants were made aware of the purpose of the research, their right to ask questions and to withdraw. The confidentiality was ensured by anonymization (e.g. participant numbering) and safe storage of recordings and transcripts.

Narrative explanation of the thematic table (Table: Themes, subthemes, codes, and protocol alignment)

The table demonstrates a thematic outline that covers a systematic development of the progress, starting with the teacher engagement, developing to observable results at the student level, and terminating with the institutional requirements of sustainable adoption of collaborative learning tools. On the first level, the theme Teacher Engagement and Perceived Value of Collaborative Learning Tools defines the way the implementation begins as the willingness of educators to experiment, learn and reset the practice. The subtheme of active participation takes a developmental course: the teachers will face misunderstanding or fear at first, gradually gaining competence and doing it through informal and formal professional learning processes. This development can be supported by the narratives of participants where they stated that the implementation of Padlet provided a more welcoming atmosphere in which more quiet students would feel freer to engage and that the role of a teacher goes beyond technical acquaintance and implies that it goes beyond simply having a more specific conceptualization and feature facilitation of participation.

The same key theme can be seen in the concentration of the reported benefits around the democratization of participation, inclusiveness and fortification of collaborative competencies. Using the coding schema which includes equity, participation, teamwork and digital literacy in teaching, it is demonstrated that teachers evaluated tools on the basis of both convenience and the relationship that they build in the classroom. This line of reasoning is further substantiated in the subtheme of community and connection where the participants are able to describe collaborative settings as capable of affording relational continuity beyond the physical classroom where students sense belonging as a result of shared online environments. Notably, the parallel between the protocol highlights that they were obtained through questions that cut across Teacher Knowledge (TK) and Pedagogical Knowledge (PK), and in particular their intersection, thus suggesting that the usefulness of the tools in question is also felt when teachers effectively elicit pedagogical consequences by assisting them to translate technical affordances into pedagogical consequences.

The second theme, which is Observed impacts on student outcomes and tool designs preferences, causes the attention to be shifted to the outcomes in education, seen by the teacher, and the improvements the teacher intended to see to the design of the tool. The subtopic around critical thinking and creativity indicates that the teachers associated collaborative tools with higher levels of learning outcomes like the argument, the exchange of feedbacks, building of meaning through co-construction and creative project. These findings have come to mind especially in English as a Second Language (ESL) situations where acquisition of language requires authenticity usage, repetitive feedbacks and chances to practice in meaning-making with others. The adjacent subtheme on desired features shows that preferences on the part of teachers are pragmatic and situation-conscious, as they are more interested in accessibility and customization and the ability to combine synchronous and asynchronous interactions. The fitness of gamification and feedback is another sign that teachers have aimed at finding tools that assist the motivation process, as well as offering formative guidance instead of only relaying content.

The last theme, called Strategies to Overcoming Adoption Barriers and Scaling Implementation reflects a shift in practice at the classroom level to institutional change. Resistance was defined by teachers as not only a form of personal obstinacy but also as an effect of diminished encouragement and increased workloads and disproportionate peer competency. Peer modeling and observable success stories were also placed as agents of change, which suggests that culture will be accepted within a community of practice and not only be accepted by top-down prescriptions. The sub theme on scaling explains that sustainable execution requires system-wide coordination, which is included in workload-sensitive planning, structures of technical and pedagogical support, and commitment at the policy level. Overall, the thematic synthesis suggests that the supporting aim of integrating collaborative learning tools is an exosystemic problem that requires teacher knowledge and beliefs, fit of the tools design, and institutional capacity that can help in supporting professional learning and infrastructure.

3.5 Data Analysis

The process of analysis of data was carried out in parallel with data collection, which allowed a further cycle of refining follow up queries. The theoretical framework was grounded on the grounded theory approach, which, in turn, involves the in-depth analysis focus, with the general ideas of their constructs being a direct result of the data (Connor et al., 2024). The analytical procedure involved detailed, inductive coding: in open coding, nascent concepts were identified; in the process of axial coding, the concepts were grouped into larger themes by expressing connections between them; and in selective coding, the themes were bundled around a central phenomenon, thus obtaining overarching themes. The constant comparative method was employed throughout the process by continually comparing the new data to the previously existing codes in order to shape the topics further until the process of the theoretical saturation occurred, as evidenced by the fact that there was no new information of significant value (Ahmed et al., 2025).

The qualitative data analysis packages, including NVivo or ATLAS. it, were part of the management, organization, and implementation of the coding and thematic analysis to categorize data fragments in a systematic way, finding patterns, and visualizing interrelationships to promote greater methodological rigor and transparency. The "floors and scaffolding" technique, structuring interview questions, also aided results organization, systematically exploring perspectives on LMS instruction, novel pedagogies, and innovative technology. Content analysis of transcripts, combined with interviewees' experiences and researchers' interpretations, informed the process, with recurring topics considered against study objectives and theoretical understanding (Moncada, 2025).

To further illustrate the iterative process of data analysis and thematic development grounded in the TPACK framework, Table 1 provides a comprehensive overview of the coding structure, linking interview questions to emergent themes and supported by example quotes (Shambare & Simuja, 2024).

Table 1: Thematic Coding Framework Derived from Semi-Structured Interviews

Main Theme	Subthemes	Sample Codes (from Open/Axial Coding)	Example Quotes from Interviews	Related Interview Questions (from Protocol)
Teacher Engagement and Perceived Value of Collaborative Learning Tools	Proactive Engagement and Skill Development	- Adaptation to tools (e.g., overcoming apprehension), Professional development pursuit, Skill enhancement	"I saw how Padlet created a space where students who were less vocal in traditional settings began to express themselves more openly." (Participant quote from Section 4.1.1)	Questions probing Technological Knowledge (TK): e.g., "How do you initially approach and adapt to new collaborative tools in your teaching?" (Q1-3 from protocol, focusing on tool familiarity).
	Reported Benefits:	- Inclusivity and equity, Improved participation,	"These tools allow every student to	Questions on Pedagogical

	Democratization of Knowledge and Enhanced Engagement	Development of skills (e.g., teamwork, digital literacy)	participate, making the learning environment more inclusive and equitable." (From Section 4.1.2)	Knowledge (PK): e.g., "What benefits have you observed in student engagement when using tools like online forums?" (Q4-7, exploring integration strategies and impacts).
	Collaborative Tools Fostering Community and Connection	- Building relationships, Bridging digital and physical worlds, Sense of belonging	"When students work together online, they build relationships that extend beyond the classroom; they feel like part of a digital community." (From Section 4.1.3)	Questions on intersections of TK and PK (TPK): e.g., "How do collaborative tools help foster community among students in your classes?" (Q8-10, addressing social and communicative aspects).
Observed Impacts on Student Outcomes and Tool Design Preferences	Improvements in Student Critical Thinking and Creativity	- Enhanced critical thinking, Creativity in projects, Skill development (e.g., language and digital literacy)	"The use of collaborative whiteboards helped students better understand abstract concepts and boosted creativity in group projects." (From Section 4.2.1)	Questions on Content Knowledge (CK) and TK (TCK): e.g., "In what ways have these tools improved student outcomes, such as critical thinking in ESL contexts?" (Q11-12, focusing on subject-specific applications).
	Desired Features for Effective Collaborative Tool Design	- Customization and accessibility, Synchronous/asynchronous options, Gamification and feedback	Not directly quoted, but inferred from discussions: "Asynchronous tools have made learning more adaptable, especially for students with varying schedules." (Adapted from Section 4.2.2)	Questions on TPK: e.g., "What features of collaborative tools do you find most effective for your teaching practices?" (Q13-14, exploring tool design and adaptability).
	Educators' Views on Professional Development and Future Technologies	- Need for training, Interest in AI/AR/VR, Data analytics for progress tracking	"Educators also expressed interest in future tools incorporating AI, AR, and VR to offer more immersive learning	Questions on future-oriented PK and TK: e.g., "How could professional development support your use of these tools, including emerging

Strategies for Overcoming Adoption Barriers and Scaling Implementation	Addressing Teacher Resistance and Reluctance	- Overcoming resistance, Institutional support, Incentives and workshops	experiences." (From Section 4.2.3)	technologies?" (Q15, addressing long-term implications).
			"When teachers see their peers succeeding with these tools, it encourages them to try it themselves." (From Section 4.3.1)	Questions on barriers (TPACK intersections): e.g., "What challenges have you faced in adopting these tools, and how could they be addressed?" (Q5-6, linking to pedagogical beliefs).
	Collaborative Tools' Influence on Critical Thinking and Participation	- Active participation, Debate and feedback, Shift to dynamic learning	"Collaborative tools give students a platform to debate ideas, which helps them develop critical thinking skills." (From Section 4.3.2)	Questions on PK and CK: e.g., "How do these tools influence student participation and critical thinking in your classroom?" (Q9-11, exploring outcomes).
	Challenges and Strategies for Institutional-Level Scaling	- Workload concerns, Systemic support, Scaling across disciplines	"Institutional support was deemed essential for successful adoption." (From Section 4.3.3)	Questions on broader implementation: e.g., "What strategies could help scale the use of these tools institution-wide?" (Q14-15, addressing policy and systemic factors).

3.6 Trustworthiness

In order to guarantee the trustworthiness and methodological rigor, the current study embraced several strategies that were in line with the accepted standards (Lincoln and Guba, 1985; Creswell, 2014):

- **Credibility:** Attained with excessive and descriptive narratives obtained by means of semi-structured interviews, and reinforced by peer debriefing following pilot interviews and management by subject-matter specialists.
- **Transferability:** Enhanced by presenting an extensive, thick account of the research environment (a privately based institution of higher learning in Punjab, Pakistan) and aspects of salient features of the participants, one would be able to infer the applicability of the results to similar settings.
- **Dependability:** Achieved through detailed and methodical documentation of the overall research procedure, including design, sampling, data collection and analytic methods, which provides a sound audit trail to which external review and possible reproducibility can be directed.
- **Confirmability:** Upheld by taking an objective and reflective position, as well as strict adherence to methodology of grounded-theory, thus ensuring findings resulting are based unambiguously on the empirical content.

3.7 Ethical Considerations

The study was guided more by the ethical considerations. Before data collecting, the approval was given by the institutional Ethics Committee. Teacher educators, who are all the participants, gave voluntary informed consent and therefore, accepted the

complete scope and objective of the study and that they could in no way doubt their right to drop out at any point. Privacy and anonymity were also ensured by the methodical deletion of all identifiable information, the use of pseudonyms and the safe storing of digital information in password encrypted forms in password secured computers.

3.8 Methodological Limitations

Although the research has useful in-depth information, it is vulnerable to a number of methodological limitations. The qualitative focus, purposive sampling, and focus on a single, Punjabi based, institution of higher education limits the direct generalizability of the research to different educational contexts (e.g. to other ways of educating teachers, or even to the broader population of teacher educators in Pakistan). The outcomes reflect views that can be impacted by the institutional setting used, that is, possibly more resources or a culture of innovation environment. The use of self-reported data of interviews exclusively despite its richness presents the possibility of the existence of social desirability bias. More so, the gender imbalance (21 females, 4 males) suggests that the conclusions will be mostly a reflection of the experiences of female educators; whereas it appears to be a unique way of looking at the issue, the situation might be biased and fail to include all the perspectives of male teacher educators and the variety of disciplines. These constraints are part of qualitative inquiry which is more focused on depth and situational nuance.

4: Results

The section provided below outlines the main results obtained following semi-structured interviews with 25 participants of the teaching pedagogical staff of a private institution of higher learning in Punjab, Pakistan. All the findings are generalized into the three main themes that are supplemented by direct quotes of participants thus contributing to the richness of the description and explaining the main propositions.

4.1 Teacher relationships and perceived value of collaborative learning tools

Teacher educators provided diverse insights on understanding and application of collaboration learning tools, thus, coding the assumed impact on teaching and students learning.

4.1.1 The proactive involvement of teachers and development of their skills

The participants mentioned mixed experiences using collaborative tools, which included Google Workspace, Microsoft Teams, Padlet, and Zoom. Implementing the tools was connected with the high rates of enhancements of the teamwork among students and the encouragement of active engagement in the classroom activities. One of them noted that Padlet has provided a platform on which those students who were quieter in the real sense of the word started to show their voices more freely. Even though the early concerns about adopting new technologies were often mentioned, a great number of teachers were able to cope with the changes relatively quickly, and then they could understand the valid benefits. This change in attitude indicated a strong willingness to engage in lifelong learning because members were self-focused to utilize the chances available to them to improve their teaching abilities. One of the educators explained that once she noticed the favorable results in student activities, she ensured she identified new tools and learned their peculiarities, (Tondeur et al., 2021).

4.1.2 Reported Positive sides: Knowledge Democratization and Increased Engagement

Educators highlighted the process of democratization of knowledge which is provided through collaborative tools so that learners can have a stronger ownership of the learning process. As one of these teachers remarked, these tools permit full involvement of all philosophers which makes the process of learning more accommodative and fairer. Tools like collaborative tools, especially those ones facilitating the interactions between a group and its members, both synchronous and asynchronous, were viewed as nurturing crucial competencies of tomorrow, such as teamwork, communication, and digital literacy. Another benefit of these tools that teachers appreciated is the ability to provide immediate feedback thus providing pedagogical intervention promptly.

According to one of the teachers, learning has become flexible since it is asynchronous, particularly among learners with diverse time schedules (Akram et al., 2021b).

4.1.3 Community and Connection Multiplying Collaborative Tools.

The participants noted that collaborative tools were instrumental in developing a community among students. These tools were used to find any valuable interaction and one of the teachers had commented that when learners collaborate online they form relationships that are not limited to the classroom and they feel they are a part of an online community. Moreover, these tools allowed closing the gap between the physical and digital world, which provided students with an opportunity to communicate with peers regardless of geocentric position (Zhao et al., 2021).

4.2 Observed Impacts on Student Outcomes and Tool Design Preferences

Teacher educators expressed the role of collaborative learning tools on student outcomes and what they considered as good tool design and the difficulties in implementing these tools.

4.2.1. Student Critical Thinking and Creativity

The respondents cited that there have been remarkable achievements in learning of students especially in the process of critical reasoning, innovation and problem solving. An example of such feedback is provided by a teacher; after using collaborative whiteboards, students were able to grasp abstract ideas and increase creativity in group work. Digital stories telling assignments in language courses were also found to improve digital literacy and language fluency of the students. One of the teachers observed that the students in the group who were engaged in collaborative storytelling improved significantly in their language use as well as their collaboration capacity (Jonassen, 1999).

4.2.2 Preferred Characteristics of an Effective Collaborative Tool Design

Teachers determined their important characteristics that promoted efficiency of collaborative learning tools. These were options of customization that enabled students to make their learning process more individual and accessibility like language preferences and closed captions. Synchronous and asynchronous collaboration was especially appreciated due to its laxity in supporting different styles of learning. The notion of gamification, real-time feedback systems and adaptable tools capable of modifying the content based on the requirement of students was another one to which teachers attached importance.

4.2.3 Teachers perception about Professional development and the new technology

Teachers recognized the importance of such professional development with regards to the improvement of the integration of collaborative learning tools. Several interviewees said that ongoing training in order to abreast with changing technologies was necessary. Teachers were also keen on tools that will use AI, AR, and VR in the future to provide a more realistic learning experience. They predicted an increasing use of data analytics to monitor the student development and define the teaching approach.

4.3 Strategies for Overcoming Adoption Barriers and Scaling Implementation

Teacher educators provided information on how their resistance to collaborative learning tools could be overcome and studied their effects on critical thinking and student participation.

4.3.1- Teacher resistance/ Reluctance

The unwillingness to adopt new technologies came out as a common theme. The barriers identified by the teachers involved failure to change and poor institutional support. In order to overcome these obstacles, teachers suggested the introduction of example cases of successful adopters and peer-to-peer workshops. One of them said: When I see teachers using these tools and they succeed, I am motivated to use them myself. The use of incentives to create a focus on the use of tools was also suggested.

4.3.2 implication of Collaborative Tools on Participation and critical thinking

The participants observed that collaborative learning tools had a strong impact on students with regard to critical thinking and engagement. The mentioned tools helped to engage actively in the discussion, create more detailed arguments, and refine the ideas. One of the teachers stated: Collaborative tools provide students with an opportunity to argue out ideas, and thus, become able to develop the skill of critical thinking. The mechanisms of real-time feedback were considered particularly effective in enhancing the active participation and student work.

4.3.3 Strategy and Institutional Level Scaling Publics

The educators were aware of the difficulties of scaling the implementation of collaborative learning technologies into various subjects. Successful adoption was considered to be impossible without institutional support. Teachers also emphasized that it is important to handle the issues of faculty workload, support personnel, and offer a smooth and general integration with current systems.

5. Discussions

The presented study has investigated the attitudes of teacher educators regarding collaborative learning tools in one of the private higher education institutions (HEI) in Punjab, Pakistan and specifically how it is implemented, perceived benefits,

challenges facing its implementation, and its implication to pedagogical innovation and pupil engagement. The findings, which are arranged in three major themes, provide subtle findings on the dynamic nature of educational technology adoption in a developing country setting. The next section presents the interpretation, puts these findings into the framework of the available literature, describes their theoretical input, identifies the practical implications, discusses the limitation of the methods used and gives recommendations on the future study.

5.1 Interpretation and Contextualization of some main findings.

5.1.1 Knowledge, and Practice in Collaborative Learning Tools: A Basing of Positive Orientation

The results are always close to show that there is a positive inclination by teacher educators to the use of collaborative learning tools, regardless of the primary concerns. Respondents noted that there were transformative impacts in the participation of students and the ability to work in teams, and that they sought professional development opportunities. This active participation and a favorable attitude correlate with the prior studies that attest that the attitudes of the teachers, their technological awareness, and competencies determine the successful implementation of technologies in Pakistan (Zhao et al., 2021). The perceived benefits, such as, the democratization of knowledge, increased student engagement, and development of future work-related competencies such as teamwork, communication, and digital literacy, align well with the predetermined benefits of collaborative learning with regards to the promotion of deeper learning and increased participation on an international level (Jonassen, 1999). The fact that these tools encourage an inclusive atmosphere, in which everybody may be heard, and instant feedback is given, directly seeks to both essential pedagogical requirements, especially in large classrooms, where an individualized approach is in most cases hard to achieve.

In the Pakistani environment, where the conventional pedagogues often center on rote learning and poorly developed oral skills, the ability of collaborative tools to foster community, bridge the real world and the online world, and improve communication is especially relevant (Akram et al., 2021). This implies that despite historical pedagogical inertia, the teachers are aware of inherent worth of technologies that could be used to support interactive and communicative language use. The attitude of positive disposition that is apparent at this small HEI is an important refresh of increased technological adoption, which may be viewed as increased institutional capacity or a self-selected group of innovators in comparison to larger national trends, in which opposition to new pedagogies is more common.

5.1.2 Practical Impacts and Navigating Implementation Challenges: Bridging Theory and Practice

The research provides significant proof that collaborative tools have a significant impact on student performances in a variety of areas, including critical thinking, creativity, problem solving, statistical reasoning, argumentative construction, and language proficiency and more specifically, when they are capitalized under digital storytelling settings. Such results echo the body of research that agrees with the ability of digital tools in a significant improvement of various aspects of learning and skill acquisition. Furthermore, the fact that educators focus on well-designed features like customization, accessibility, asynchronous and synchronous functionality, gamification and adaptive features shows a high level of understanding of pedagogically effective technology that goes beyond primitive utilitarian thought.

However, the advantages are counterbalanced by major implementation challenges such as poor technological infrastructure, change resistance and lack of training. The expressed concerns about the infrastructural constraints, changes seeking resistance, and educational inadequacies by the participants in the study are documentation of well-established obstacles to the implementation of technology in the Pakistani higher-education sector. Slow internet connectivity and intermittent load shedding are structural issues that have always been endemic, especially students and professors at rural or marginalized areas with unstable internet connection. The fact that collaborative tools are inherently dependent on good internet connectivity thereby breeds the scale of a trade-off, albeit they have enormous potential, this benefit is inaccessible to individuals who stand above the digital divide. The evidence therefore points out the fact that only personal fervor is not sufficient to produce fair, extensive application; solid systemic help systems are necessary.

The statements of the intent to use the future technologies like artificial intelligence, augmented reality, and virtual reality, in order to promote the user-centered learning and immersion experiences testify to the strategic focus of educators on the global trends in innovations. However, these progressive hopes are checked with the fear of data privacy and the rising dependency on online applications, hence, foreshadowing subtle value of related ethical concerns. Pragmatically, implementation of AI, AR, and VR in Pakistan requires significant pre-implementation steps such as the infrastructural investment, localization of content, as well as a great deal of professional training of educators. The lack of appropriate infrastructure and the unavailability of highly skilled professionals to design AI and manage it is an insurmountable challenge that should be overcome before it will be possible to use so sophisticated tools massively.

5.1.3 Making the Complex Simple: Systemic Change Strategies

Such strategies of mitigation and promotion of adoption, as used by teachers, such as the introduction of successful case studies, organization of peer workshops, thorough pedagogical and technical training, the creation of open communications, incentive systems, are aligned with generally accepted practice in professional development and managing organizational change. These interventions head-on address the lack of technically trained educators and the unwillingness to embrace new technologies and training models which have been singled out as the key impediments in the Pakistani setting (Sadeghi et al., 2021).

The results of the research prove that the resistance of educators towards change is of multifarious nature. This opposition is not only due to lack of technical skills and poor training but also due to established pedagogical dogma that favors traditional, teacher focused methods and also organizational cultures that might not adequately reward innovation. An understanding of such underlying reasons is needed in order to come up with more specific intervention measures. The focus on reducing teacher workload and the offering of specific assistance in early adoption development stages take into consideration practical limitations of teachers.

Pedagogical effectiveness of collaborative tools is proven by the fact that the recorded impact on developing critical thinking and encouraging active participation among students will result into a noticeable shift in the passive learning to participatory learning. This is quite relevant especially to English as a Second Language instruction in Pakistan where the more conservative pedagogical methods often do not develop higher-level cognition. The barriers to scaling inter-disciplinary use of collaborative tools and calls of systemic approach and institutional backing by administrators and faculty make it clear that technology implementation must be a top-down plan and distribution of resources as opposed to individual ad hoc efforts. The support of long-term, faculty-based professional development, which is responsive to the transformations, emphasizes the role of training in our lifetime even more.

5.2 Theoretical Contribution: Extending TPACK in a Developing Context

This research paper has a considerable contribution to the available literature in that it goes beyond the scope of the Technological Pedagogical Content Knowledge (TPACK) framework use and interpretation in a developing nation, namely higher learning institutions of private institutions in Pakistan. Although TPACK has been known to outline the knowledge that teachers need in order to integrate technology efficiently, its actual application in other non-Western settings, especially non-Western and resource-strained settings, especially when it comes to the use of qualitative inquiry has been little studied. The current study can be seen as one of the first important attempts to use the TPACK framework qualitatively to how Pakistani teachers perceive collaborative learning tools in higher education, thus contributing to the deeper understanding of the nexus of knowledge and contextual issues.

We are able to shed light on the interactive nature of TPACK components. The positive orientation of the teachers and active learning behavior is an indicative of Technological Knowledge (TK) building and eagerness to obtain new skills. The fact that they are able to detect effective tool designs, and also, to evaluate their influence on student outcomes, indicates a strong connection between TK and Pedagogical Knowledge (PK), forming Technological Pedagogical Knowledge (TPK). In addition to that, their observations involving critical thinking, communication and language skill development as means of collaboration tools form an articulate bridge between TK and Content Knowledge (CK) making Technological Content Knowledge (TCK), and the way with which technology has the potential to model and mediate particular subject matter learning.

Most importantly, the research indicates that although a particular teacher may have good TPK and TCK, external influences like the poor state of the facilities, lack of essential institutional backing, and the domineering traditional ideas of pedagogy may hinder the full expression of his or her TPACK. This implies that TPACK is a personal quality, but implementation of the same is rooted and embedded in definite contextual realities, as pointed out by Mishra and Koehler. The findings high-profile the fact that in developing situations, development of TPACK is extremely dependent on the facilitating or limiting institutional and infrastructural setting. Therefore, this study adds to the practical implications of TPACK as it brings about the importance of systemic interventions that should support the development of individual teachers, especially in environments where the digital gap and traditional pedagogies are still dominated.

5.3 Practical Implications

These findings offer some of the practical suggestions to the teachers, policy makers, and institutional heads in Pakistan and other developing nations:

1. Strategic Infrastructure Development (Short to Long-term)

Considering the continued inadequacies, namely slow internet speed, load shedding, and unreliable access to digital devices, policymakers and administrators of HEIs have to focus on the stepwise sustainable investment in the powerful technological infrastructure. The optimization of current mobile networks, considering the possibility of finding cheap, mobile-first solutions should be seen as immediate actions. Long term plans need huge budgetary allocation of reliable internet connection and hardware especially in rural and underserved regions to close the digital divide.

2. Professional development (Ongoing) Contextualized and TPACK-Guided

Complete, ongoing professional development initiatives implicating the explicit application of the TPACK framework must be carried out. Such programs can go beyond their elementary training in technical issues by focusing on enhancing certain modes of pedagogy, and content delivery in ESL classrooms. The training must address the outlined TPACK gaps that need to be improved (e.g., by advancing the TPK and TCK of the teachers) and must reduce the change resistance with the help of case studies, workshops with peers, and incentives, which would promote the confidence and proving of the pedagogical value.

3. Encouraging Buy-in (Institutional and Policy Level) (Strategic and Systemic)

Leaders in institutions should show their commitment fully by coming up with strong policies, ensuring that sufficient funds are allocated, and that there should be special support personnel assigned to it. On the governmental level, policymakers must come up with national policies in e-learning, budget on the ICT infrastructure, and promote the use of collaborative tools using supportive structures. It is necessary to solve the problems of faculty workload in the first phase of adoption.

4. Curriculum and Pedagogical Reform (Long-term)

Curriculum reforms should be championed by decision makers to ensure integration of collaborative learning tools as part and parcel of nurturing critical thinking, communication, and language proficiency skills, thus overcoming the rote learning paradigms. This shift is very well justified by the positive effects these tools have on the student outcomes.

5. Responsible Integration of Future Technologies (Phased and Ethical)

The manifested willingness towards AI, AR and VR shows the preparedness to the advanced technologies. The policymakers and the institutions ought to consider and pilot such immersive learning environments, strictly integrating ethics, data-security and focus on users. Specific projects may include small-scale projects in well-endowed institutions, and a predetermined plan to increase the scale based on the solution of the infrastructural and training requirements.

5.4 Limitations

Although this research paper provides valuable insights that are in depth, concerning teacher perceptions, it is imperative to note that the research also has certain methodological weaknesses that could be attributed to its design. The qualitative methodology used by the study, which involves the use of purposive sampling and a focus on one of private higher education institution (HEI) in Punjab, limit the extrapolation of the conclusions had to other educational settings, including other types, i.e., publicly funded institutions, schools in rural districts or Pakistani population in general as teacher educators. It was chosen as a representative of the other private HEIs in Punjab due to the fact that it resembles other institutions concerning challenges of infrastructure and the disposition towards educational technology, which will make it a relevant case to investigate in depth. The results however are those that are based on perceptions within this particular setting and they could be based on the fact that they have more resources or a culture of innovation as opposed to other institutions. Furthermore, the dependency on self-reports data in the form of interviews as rich narrative data is vulnerable to the social desirability bias. The sample gender (21 women and 4 men) also implies that most of the findings were related to the views of female teacher educators; this gives it a unique perspective but may not adequately represent the experiences of male teacher educators and the diversities of discipline. These constraints are, though, characteristic of qualitative research designs, which have their priorities in depth and contextual comprehension, rather than statistical representativeness.

5.5 Future research

According to the results and the (imposed) constraints of this research, a number of directions emerge in which future research can take place:

1. Comparative studies. Subsequent studies might involve a comparative qualitative study in different kinds of HEIs (e.g. public and or private, urban and or rural) in Pakistan with the idea of exploring the role that contextual differences can play in terms of teacher perceptions and technology integration. This kind of research would give a better insight into the issues and facilitators of the different education environment.
2. Longitudinal studies. The longitudinal qualitative studies might follow the change of perceptions of the teachers and produce the long-term effects of using collaborative learning tools on the pedagogical practice and student achievement over the period of time and, therefore, provide information about the sustainable adoption.

3. Mixed-methods research. A mixed-methods research design comprising qualitative information and quantitative statistics of technology use rates and student-level or teacher-T Pack self-report assessments would maybe able to provide a more comprehensive view of the phenomenon.
4. Intervention studies. The next step in working on the topic might be the design and assessment of specific professional development programs specifically targeting the TPACK gaps (e.g., TPK, TCK) and other obstacles to technology integration that will be observed in this study. Such intervention studies would equip factual evidence of the best approaches that should be adopted to assist teachers effectively in integrating collaborative learning tools.
5. AI/XR pilot studies. Bearing in mind the interest of the teachers in the area of artificial intelligence, augmented reality, and virtual reality, the further study would explore pilot-implementation of those immersive learning settings within the Pakistani HEIs, and specific focus on feasibility, effectiveness, and perceptions of the teachers and students. The ethical concerns and approaches to discover fair use of advanced technologies in the developing situations must also be analyzed through this line of questioning.
6. Policy impact studies. The effects of certain educational policies and funding programs on the introduction of technology into the Pakistani HEIs could be analyzed, and their role in closing the digital divide and favoring innovation could be examined.
7. Widening range of participants. Future research studies should aim to have a more heterogenous sample (teacher educators of different fields, different types of institutions, e.g., public universities, colleges, vocational training centers) to be able to obtain a broader range of perceptions and experiences related to the concept of technology integration in Pakistan.

6. Conclusion

This qualitative study examined both the perception and use of collaborative learning tools by teacher educators in a privately-owned Higher Education Institution located in Punjab, Pakistan, which gave an in-depth explanation of how these tools were interpreted, applied, and supported in English as a Second Language teaching. The results are always positive in regard to collaborative technology; teachers said that there were real improvements in student interaction, discussion-based involvement, communicative skills, and computer literacy. Notably, the perceived value of such tools did not depend on the novelty or institutional requirements but, instead, on the credibility of the tools to provide an interactive mode, expansion of participation, and visible processes of learning that could be supported and assessed by the teachers (Chugh et al., 2023; Alyousef, 2023).

The unique contribution of the given study is that it contextually defines the workings of teacher agency into a larger ecosystem of limits. Although the majority of the participants have raised concerns about the anxiety at first, there was also an expression of professional intentions to learn and master the use of the tools, which implies that the readiness to innovate depends on the capability of educators to connect the tools to better classroom engagement and student performance. At the same time, the results show that individual competence does not provide consistent integration. Instructors may have successful plans and confidence, and still adoption will be susceptible to the infrastructural trustworthiness, temporal constraints, and the presence of institutional scaffolding, issues that have frequently been highlighted by the general literature on the subject of technology implementation in higher education (Chugh et al., 2023; Naik and Naik, 2025).

The limitations of the study have to be mentioned. The emphasis on the example of one single non-state institution limits the immediate applicability of the findings to the Pakistani diverse system of higher education where the institutional capacities, administrative priorities, and resource endowments can vary significantly. Moreover, the number of women (21) and men (4) is uneven, so the results are mostly going to be the experiences, priorities, and limitations of feminine educators. Further studies must endeavor to have a more equal representation and multi-site sampling to elicit more institutional and professional views (Naik & Naik, 2025).

The conclusions made based on this study highlight the importance of effective adoption being undertaken as a pedagogical as well as an organizational venture. In the short-term, institutions must focus on ensuring the determination of short-term infrastructural and institutional obstacles disrupting arrangements and instructional integrity and should provide specific professional development that does not only familiarize him or her with the tools but also with the creation, facilitation, and fair evaluation of the group work. To maintain the long-term viability level, institutions ought to create consistent implementation plans, invest in the support capacity, and provide workload-aware adoption courses since online collaboration would either increase coordination, monitoring, and assessment pressure unless institutions actively design to these realities (Donelan and Kear, 2024; Chugh et al., 2023).

Lastly, since the educational environment in Pakistan undergoes the process of digital transformation, the implication of the research also applies to new technologies that educators are becoming open to implementing as methods of instruction. The interest in the field of artificial intelligence, augmented reality, and virtual reality among educators reflects the willingness to

work with immersive and analytics-specific viewpoints on learning as long as professional learning, ethical direction, and institutional policy keep abreast with the uptake. According to the results provided by immersive second-language learning studies, the effect of metaverse-based environments can consolidate the results of engagement and community-building that correspond closely to the collaborative objectives stressed by participants (Çelik and Baturay, 2024). At the same time, Gen AI literacy development provides evidence that the advantages of education lie in explicit competency training, responsible-use instructions, or clear expectations of policy, and not in informal experimentation (Park, 2025). In this sense, the study contributes not only by documenting present realities, but by offering a grounded pathway for developing collaborative learning ecosystems that are pedagogically meaningful, equitable, and sustainable in Pakistan's HEIs.

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