Beyond the Chalkboard: The Transformative Role of Emerging Technologies in Facilitating Teacher–Learner Interaction in ESL Classrooms in the North West Region of Cameroon

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ABSTRACT

This study examines how technology facilitates teacher–learner interaction in English language teaching in Cameroon. Drawing on the Technological Pedagogical Content Knowledge (TPACK) framework, the study adopts a mixed-methods design combining questionnaire data from 42 English language teachers and 210 learners with teacher interviews, learner focus group discussions, and classroom observations. Quantitative data were analysed using descriptive statistics, while qualitative evidence was thematically analysed and used to explain and contextualise the quantitative findings. The findings indicate generally positive perceptions of technology as a mediator of classroom interaction. Among teachers, 73.8% agreed or strongly agreed that technology makes English lessons more interactive, while 71.4% reported that multimedia technologies improve lesson understanding. Technology was also perceived to support learner participation (66.7%), collaboration and immediate feedback (64.3% each), and interaction beyond the classroom through online platforms (61.9%). Learners similarly reported that technology improves their understanding of English lessons (71.0%), provides clearer teacher instructions (70.4%), supports collaboration with classmates (66.6%), encourages them to ask questions (65.7%), and facilitates access to additional online learning materials (61.4%). Qualitative evidence further showed that technology supports interaction when teachers use digital resources to stimulate questioning, discussion, collaboration, clarification, and feedback. However, infrastructure limitations, internet connectivity, electricity supply, device access, and differences in digital competence constrained consistent use. The study concludes that technology does not automatically transform classroom interaction; its interactional value depends largely on how teachers integrate available technologies into pedagogically meaningful activities within the local context.

Keywords: technology, teacher–learner interaction, English language teaching, TPACK, Cameroon, digital learning

INTRODUCTION AND BACKGROUND

Digital technology has become an increasingly visible component of contemporary language education. Computers, mobile phones, multimedia projectors, online platforms, audio-visual resources and other digital tools have expanded the range of materials and communicative activities available to language teachers and learners. In English language teaching in particular, technology has been associated with opportunities for access to authentic language input, multimodal representation, collaborative learning, learner participation and communication beyond the physical classroom. The growing body of research on technology-enhanced language learning reflects this expansion. Shadiev and Yang (2020), for example, reviewed 398 studies of technology-enhanced language learning and teaching and identified a wide range of technologies used to support different language skills, with English being the most frequently investigated target language. More recent reviews similarly indicate sustained interest in technology integration in English language instruction, while emphasising that the educational value of technology depends on how it is incorporated into pedagogical activities rather than simply on its availability (Wiranata et al., 2024).

The increasing presence of technology in language classrooms, however, does not necessarily mean that classroom interaction has become more meaningful or more learner-centred.. A projector, for instance, may simply reproduce information that would otherwise appear on a chalkboard, while a mobile phone may be used

either for passive access to information or for searching, discussion, peer collaboration and communication with the teacher.

Recent research provides support for this more qualified understanding of technology integration. Liu et al. (2024), in a systematic review of technology-enhanced cooperative language learning, found evidence of positive academic, social and behavioural outcomes associated with technology-supported collaboration, but their review also demonstrates that technology operates within a broader pedagogical and social context. Similarly, Huang and Li (2024), reviewing empirical studies from 2012 to 2023, examined the relationship between technology-enhanced language learning environments and learners' willingness to communicate, highlighting the relevance of technology-supported environments to opportunities for language communication. More recently, Bhandari et al. (2025), in a systematic review of technology-mediated task-based language teaching, reported increasing attention to learner engagement, interaction and technology-supported language tasks, while also identifying continuing concerns relating to accessibility, teacher preparation and the practical implementation of technology-mediated activities.

This position is consistent with the technological pedagogical content knowledge (TPACK) perspective proposed by Mishra and Koehler (2006). The framework conceptualises effective technology integration as involving the interaction of technological, pedagogical and content knowledge rather than technological knowledge in isolation. While TPACK has provided an influential framework for understanding teachers' technology-related knowledge, its application in low-resource contexts also raises important questions about the conditions under which teachers can translate such knowledge into classroom practice. In a systematic review of ICT integration in secondary education, Msambwa et al. (2024) similarly emphasise the importance of teacher knowledge and skills, professional development, appropriate resources and supportive school environments in enabling meaningful ICT integration. Thus, the issue is not simply whether teachers possess or use technological tools, but how available technologies are pedagogically mobilised to support particular forms of learning and interaction.

The importance of this distinction is especially evident in resource-constrained educational settings. Much of the literature on educational technology has emerged from contexts where reliable internet connectivity, digital devices, institutional platforms and specialised classroom technologies are relatively accessible. Such conditions cannot automatically be assumed in all educational environments. Recent reviews continue to identify unequal access to devices, connectivity, teacher preparation and institutional support as important constraints on technology integration (Wiranata et al., 2024; Bhandari et al., 2025). In such settings, teachers may work with whatever technologies are available rather than with a comprehensive digital infrastructure. Consequently, the technologies that become pedagogically significant may include relatively simple and widely accessible tools such as mobile phones, WhatsApp, projectors, computers and audio-visual materials.

This issue has particular relevance in Cameroon, where the integration of ICT into education has been examined from several perspectives, but evidence concerning the specific relationship between technology and classroom interaction remains comparatively limited. Earlier research by Ntongieh (2016) examined ICT use in English language teaching and learning in Cameroonian secondary schools and highlighted the potential of ICT to support English language learning while also reporting limited classroom use of ICT at the time of the study.

Subsequent Cameroonian research has drawn greater attention to the contextual conditions surrounding technology integration. Ngandeu (2021), examining a computer-assisted language learning experience at the University of Buea, found that although the experience reflected the principles of TPACK, practical barriers emerged during implementation. Earlier work by Ndongfack (2015) likewise examined teacher professional development and technology adoption in Cameroon, drawing attention to the knowledge and skills teachers require to move from awareness of ICT to its pedagogical use. These studies provide an important local foundation for understanding technology integration as a pedagogical and contextual issue rather than as a simple matter of technological availability.

Statement of the Problem

Although technology has become increasingly prominent in English language teaching, its presence in classrooms does not necessarily translate into meaningful teacher–learner interaction. Much of the existing

literature has focused on learning outcomes, teachers' attitudes, technological competence, or the effectiveness of particular digital applications, with comparatively less attention to the concrete ways in which everyday classroom technologies are used to mediate interaction between teachers and learners, particularly in resource-constrained secondary school contexts. Recent reviews similarly call for greater attention to how technology-mediated activities are designed and implemented in actual English language classrooms rather than relying mainly on perceptions and self-reported use (Bhandari et al., 2025). In Cameroon, where English language teachers work within varying conditions of technological access, connectivity, electricity supply and digital competence, there is a need to establish not only which technologies are available and used, but also how teachers and learners employ them to support explanation, questioning, participation, collaboration, feedback and communication beyond the classroom. The problem addressed by this study is therefore the limited empirical understanding of how technology is actually integrated into the interactional processes of English language teaching in Cameroonian secondary schools.

Research Questions

The study addresses the following research questions:

1. What technologies are used to mediate teacher–learner interaction in English language classrooms in Cameroon?

2. To what extent are these technologies used to facilitate teacher–learner interaction in English language teaching**?**

THEORETICAL FRAMEWORK

This study is guided by the Technological Pedagogical Content Knowledge (TPACK) framework proposed by Mishra and Koehler (2006). TPACK conceptualises effective technology integration as the interaction of technological, pedagogical and content knowledge rather than technological knowledge in isolation. The framework is particularly relevant to this study because the same technological resource can serve different pedagogical purposes depending on how a teacher incorporates it into classroom activity. A projector, for example, may simply display information, or it may be used to stimulate questioning, discussion and learner responses. TPACK therefore provides a useful lens for examining how teachers connect available technologies with pedagogical purposes in English language teaching.

For the present study, however, TPACK is used as an interpretive rather than a predictive framework. The focus is not on measuring teachers' TPACK competencies but on understanding how technology becomes involved in teacher–learner interaction. This is important because technology does not independently create interaction. Its contribution depends on the pedagogical activity organised around it. Recent research similarly indicates that technology-supported language learning is influenced by task design, patterns of interaction and the social context in which technology is used (Liu et al., 2024).

The framework is also interpreted contextually. In resource-constrained settings, meaningful technology integration may involve ordinary and widely accessible tools rather than specialised technologies. This is particularly relevant to Cameroon, where Ngandeu's (2021) analysis of a CALL experience at the University of Buea found that TPACK principles alone did not fully account for the barriers encountered in a low-tech context. Accordingly, this study views technology as a mediator of interaction whose pedagogical value is shaped by teachers' practices, learner participation and the material conditions in which teaching takes place.

METHODOLOGY

5.1 Research Design

The study adopted a mixed-methods design to investigate technology-mediated teacher–learner interaction in English language classrooms in the North West Region of Cameroon. Quantitative data were collected through teacher and learner questionnaires to identify the technologies used and examine participants' perceptions of their contribution to classroom interaction. Qualitative data were collected through semi-structured teacher

interviews, learner focus group discussions and classroom observations to provide contextual accounts of how these technologies were used in teaching and learning. The two strands of data were integrated during interpretation, allowing reported perceptions to be compared with qualitative accounts and observed classroom practices.

5.2 Participants and Setting

The study was conducted in seven secondary schools in the North West Region of Cameroon. The schools were selected using purposive sampling. The participants comprised 42 English language teachers and 210 Form Five learners, giving a total of 252 participants for the questionnaire component. The teachers were involved in teaching English, while the learners were drawn from Form Five classes in the participating schools.

For the qualitative component, 42 English language teachers participated in semi-structured interviews, while 50 more learners participated in 7 focus group discussions. Qualitative participants and observed lessons were purposively selected based on their reported use of technology particularly their involvement in technology-mediated English language teaching and learning.

5.3 Data Collection Instruments and Procedure

Four instruments were used: teacher and learner questionnaires, semi-structured teacher interview guides, learner focus group discussion guides and a classroom observation schedule. The questionnaires elicited information on the technologies used in English language teaching and learning and included statements concerning their perceived contribution to interaction, participation, understanding, collaboration, feedback and learning beyond the classroom. The interview and focus group guides explored participants' experiences with the technologies identified in the questionnaires, particularly projectors, computers, mobile phones, WhatsApp and audio-visual resources. The instruments were developed in line with the research questions and were pre tested to establish their clarity and relevance before data collection.

The qualitative data were analysed thematically. Interview and focus group data were transcribed, coded and organised into categories, with codes developed around recurring patterns related to technology use, participation, understanding, collaboration, feedback and interaction.

5.4 Method of Data Analysis

Quantitative data from the questionnaires were analysed using frequencies, percentages, means and other descriptive statistics where appropriate. The analysis focused on the frequency with which particular technologies were used and the proportions of teachers and learners reporting positive, neutral or negative experiences of technology-mediated interaction. Qualitative data from teacher interviews, learner focus group discussions and classroom observations were analysed thematically. Recurring patterns were identified around technology use, interactive lesson delivery, learner participation, collaboration, feedback and communication beyond the classroom. The qualitative findings were then considered alongside the quantitative results to identify areas of convergence and divergence. The analysis did not treat positive questionnaire responses as evidence of a causal effect of technology on interaction. Rather, such responses were interpreted as participants' reported perceptions. Claims concerning actual classroom practices were supported primarily through interview, focus group and observational evidence. This distinction was important in interpreting the relationship between technology and interaction.

DATA ANALYSIS AND FINDINGS

The findings are presented in relation to the two research questions. The quantitative results are presented first to establish the overall patterns of technology use and participants' perceptions of its contribution to teacher–learner interaction. Qualitative evidence from teacher interviews, learner focus group discussions and classroom observations is then used to explain and contextualise these patterns. Such integration is consistent with mixed-methods approaches in which qualitative evidence is used to elaborate and interpret quantitative patterns rather than merely being presented alongside them (Zhou et al., 2024).

6.1 Technologies Used to Mediate Teacher–Learner Interaction

The first research question examined the technologies commonly used to mediate teacher–learner interaction in English language classrooms. The findings show a selective pattern of technology use, with teachers relying mainly on accessible technologies that can be incorporated into face-to-face lessons. The table below shows the frequency of technologies used.

Table 1. Technologies frequently used by English language teachers

Technology	Always/Often n (%)
Projector/multimedia	27 (64.3)
Audio-visual resources	25 (59.5)
Mobile phones/WhatsApp	23 (54.8)
Computers/laptops	20 (47.6)
Online platforms	9 (21.4)
Tablets/iPads	7 (16.7)
Interactive whiteboard	0 (0.0)
Language laboratory	0 (0.0)

Source: Field Survey, 2026. n = 42.

Projectors/multimedia equipment were the most frequently reported technology (64.3%), followed by audio-visual resources (59.5%), mobile phones/WhatsApp (54.8%) and computers/laptops (47.6%). In contrast, tablets and online platforms were used much less frequently, while interactive whiteboards and language laboratories were unavailable. The pattern therefore suggests that technology integration in these classrooms is pragmatic rather than comprehensive, with teachers working mainly with tools that are relatively accessible and adaptable to existing classroom practices.

The qualitative evidence explains this pattern. Teacher 07 stated:

"*I use the projector quite often because it helps me present passages, pictures and videos to the learners. It is easier to explain some English concepts when the learners can see what I am talking about.*"

Similarly, Teacher 16 reported using the projector to display activities that learners could discuss and respond to. Audio-visual resources served a related purpose. Teacher 12 explained that videos and audio recordings allowed learners to hear natural English before responding to questions and engaging in discussion. These accounts indicate that the technologies were not used simply to transmit information; they could provide a shared stimulus around which teacher explanation, questioning and learner response were organised.

Mobile phones and WhatsApp served a somewhat different function. Teacher 18 explained:

"*WhatsApp is easy because most learners have access to it. I use the group to send exercises, learning materials and corrections."*

Teacher 21 similarly reported that learners could send questions after lessons and receive clarification. Thus, mobile technology extended teacher–learner communication beyond the physical classroom, while projectors and audiovisual resources were more strongly associated with activities occurring during lessons. The lower use of tablets and online platforms reflects more limited access. Teacher 27 noted that tablets were not common among learners, while Teacher 23 indicated that platforms such as Google Classroom were not used regularly because of difficulties with internet and device access. Importantly, the absence of interactive whiteboards and language laboratories should be interpreted as non-availability rather than non-use. Teacher 31 stated, "*We do not have an interactive board, so we rely on the projector*," while Teacher 36 explained that, in the absence of a language laboratory, teachers used computers, phones or projectors to provide audio materials.

Table 2. Learners' reports of technologies used in English learning

Technology	Agree/Strongly Agree n (%)
Audio-visual resources	147 (70.0)
Projector/multimedia	140 (66.7)
Mobile phones/WhatsApp	131 (62.4)
Computers/laptops	128 (61.0)
Tablets/iPads	54 (25.7)
Online platforms	54 (25.7)
Interactive whiteboard	0 (0.0)
Language laboratory	0 (0.0)

Source: Field Survey, 2026. n = 210.

Learners' responses broadly corroborate the teachers' accounts, with audio-visual resources (70.0%), projectors (66.7%), mobile phones/WhatsApp (62.4%) and computers (61.0%) again emerging as the principal technologies. Learner 07 explained that the projector enabled the whole class to see passages and questions, while Learner 13 described listening to audio materials and discussing answers with classmates. Learner 09 also reported that teachers sometimes asked learners to use their phones to search for information or submit exercises through WhatsApp.

The convergence of questionnaire, interview, focus group and observation evidence suggests that the technological repertoire of these classrooms is characterised less by sophisticated infrastructure than by adaptation of available tools to pedagogical purposes. Projectors and audiovisual resources provide shared materials for explanation and questioning; computers support information searching and digital tasks; and mobile phones/WhatsApp facilitate communication and resource sharing. This is significant because the findings indicate that technological presence alone does not constitute integration. Rather, the interactional value of a technology depends on how teachers incorporate it into classroom activities. This interpretation is consistent with Liu, Thurston and Ye's (2024) finding that technology-enhanced language learning is shaped by task design and patterns of interaction rather than by technology alone. The answer to Research Question 1 is that projectors/multimedia, audio-visual resources, mobile phones/WhatsApp and computers constitute the principal technological resources used to mediate English language teaching and learning, while tablets and formal online platforms remain limited and specialised technologies are unavailable. The next section therefore examines not simply which technologies are used, but how their use facilitates teacher–learner interaction.

6.2 Technology and Interactive Lesson Activity

The second research question examined how technology facilitates teacher–learner interaction in English language classrooms. Teachers generally perceived technology as supporting more interactive forms of lesson delivery. As shown in Table 3, the strongest response concerned interactive lesson delivery (73.8%), followed by multimedia-supported understanding (71.4%), active learner participation (66.7%), collaborative tasks (64.3%), immediate feedback (64.3%), and interaction beyond the classroom (61.9%).

Table 3. Teachers' perceptions of technology-mediated interaction

Perceived contribution of technology	Agree/Strongly Agree n (%)
Makes lesson delivery more interactive	31 (73.8)
Multimedia enhances understanding	30 (71.4)
Encourages active student participation	28 (66.7)
Facilitates collaborative tasks/group work	27 (64.3)
Allows immediate feedback	27 (64.3)
Enables interaction beyond the classroom	26 (61.9)

Source: Field Survey, 2026. n = 42.

The relatively high proportion of teachers reporting interactive lesson delivery suggests that technology was being incorporated into activities involving learner responses rather than being used exclusively for content presentation. Teacher 16, for example, explained that a projector could be used to display an activity and then invite learners to discuss and answer questions. Teacher 07 similarly observed:

"*When I use a projector to display a passage or a video, the learners become more interested and they want to discuss what they are seeing*."

These accounts are supported by the classroom observations, where teachers paused projected materials, asked questions and invited learners to interpret or respond to what they had seen or heard. The interaction therefore involved more than the presence of a digital resource. A typical sequence was digital presentation → teacher questioning → learner response → clarification or discussion. Technology thus functioned as a mediator through which classroom interaction was organised.

Learner responses provide further support for this interpretation. 65.7% of learners agreed or strongly agreed that digital tools encouraged them to ask questions during lessons. Learner 07 reported that when passages and questions were projected, learners could respond to the teacher based on the material displayed. Learner 04 similarly explained that videos and examples sometimes enabled learners to understand an explanation and subsequently ask questions. The findings therefore suggest that technology can provide learners with a concrete stimulus for participation, particularly where teachers deliberately pause, question and invite responses.

However, the findings should not be interpreted to mean that technology automatically produces interactive teaching. The remaining 26.2% of teachers who were neutral or negative about interactive lesson delivery, together with the learners who did not report increased questioning, indicate variation in experience. The classroom observations help explain this variation: the interactional value of a digital resource depended largely on what the teacher asked learners to do with it. A projected passage could support discussion and questioning, but it could equally be used simply for teacher explanation.

This finding has an important pedagogical implication. The interactive potential of technology appears to lie less in the technology itself than in the activity organised around it. This is consistent with Liu, Thurston and Ye's (2024) systematic review, which notes that the effectiveness of technology-enhanced language learning depends on factors such as task type, patterns of interaction and the social context in which the technology is used. It also supports the view that technology integration should be understood as a situated pedagogical process rather than as the simple addition of digital tools to existing instruction. The findings therefore indicate a shift, in some classrooms, from technology as a means of displaying content to technology as a resource for organising classroom interaction. Its contribution becomes more evident when teachers use digital materials to prompt questions, elicit responses, initiate discussion and clarify learners' understanding. This distinction is central to interpreting the subsequent findings on collaboration, feedback and interaction beyond the classroom.

6.3 Technology, Learner Understanding and Participation

The learner responses provide further evidence of the ways in which technology mediated classroom interaction. As shown in Table 4, 71.0% of learners agreed or strongly agreed that technology helped them understand lessons better, while 70.4% reported that teachers used technology to provide clear instructions. In addition, 65.7% indicated that digital tools encouraged them to ask questions, and 66.6% reported using technology to collaborate with classmates.

Table 4. Learners' perceptions of technology-mediated learning and interaction

Learner experience	Agree/Strongly Agree n (%)
Technology helps me understand lessons better	149 (71.0)
Teachers use technology to provide clear instructions	148 (70.4)
I use technology to collaborate with classmates	140 (66.6)
Digital tools encourage me to ask questions	138 (65.7)

Source: Field Survey, 2026. n = 210.

The 71.0% positive response concerning understanding suggests that learners generally perceived technology as providing additional support for comprehending English language content. The qualitative evidence indicates that this was particularly associated with the combination of visual and auditory input. Learner 04 explained that videos enabled learners to hear pronunciation while also seeing examples, while Learner 07 noted that projected passages and questions made the material visible to the whole class. Thus, technology appeared to supplement rather than replace teacher explanation by providing alternative ways of representing the same language content. This was also evident in classroom observations. Teachers displayed texts, questions and examples on screens and used audio-visual materials to support explanation. Learners were subsequently asked to interpret the material, answer questions or seek clarification. The findings therefore suggest that improved understanding was linked not simply to exposure to digital materials, but to the way those materials were incorporated into teacher explanation and learner activity.

Technology also appeared to create opportunities for learner questioning. Learner 09 reported that teachers sometimes asked learners to use their phones to search for information or communicate through WhatsApp when they did not understand an exercise. Learner 04 similarly explained that a video or computer-based example could make an explanation clearer and encourage a learner to ask a question. The 65.7% positive response on questioning therefore suggests that digital resources can provide learners with a basis for seeking clarification rather than remaining passive recipients of teacher explanations. However, the findings also show that this experience was not universal. More than one-third of learners were neutral or disagreed that digital tools encouraged them to ask questions. This variation is important because it cautions against interpreting technology use as automatically producing learner-centred interaction. Learners' digital competence, access to devices, technical interruptions and the manner in which teachers structure activities may all affect the extent to which learners participate.

The findings concerning collaboration provide a similar pattern. 66% of learners reported using technology to collaborate with classmates. Learner 15 explained that learners working with technology could discuss answers before presenting them, while classroom observations showed learners working together around projected questions and digital materials. Technology therefore sometimes shifted classroom activity from individual reception towards peer discussion and collective response. Taken together, the findings suggest that technology supported learner participation through three related processes: making content more accessible, providing stimuli for questions, and creating opportunities for collaborative responses. The implication is not that digital tools independently improved learning, but that they provided additional resources through which teachers could organise learner engagement.

6.4 Technology, Collaborative Learning and Immediate Feedback

The findings further indicate that technology supported teacher–learner interaction through collaborative activities and immediate feedback. Among the teachers, 64.3% agreed or strongly agreed that technology facilitated collaborative tasks and group work, while the same proportion reported that it allowed them to provide immediate feedback. Among learners, 66.6% reported using technology to collaborate with classmates.

The qualitative evidence suggests that collaboration occurred mainly when teachers deliberately organised learners around a digital task. One teacher explained:

"*I sometimes put learners into groups and give them a digital task. They discuss the answers together before presenting them to the class*."

Learners described a similar process. Learner 15 noted that when working with technology in groups, learners discussed their answers before presenting them. Classroom observations also showed learners working together on projected questions and digital activities. These findings indicate that technology did not simply provide learners with individual access to information; in some lessons, it became a shared resource around which peer interaction was organised. This is significant because the interaction generated by technology was not restricted to teacher–learner exchanges. The use of digital materials created opportunities for learner–learner interaction, particularly when learners were required to negotiate answers before reporting to the class. The teacher

consequently moved, at least during such activities, from being the sole source of information towards organising, monitoring and responding to learner activity.

A similar interactional process was evident in the use of technology for feedback. 64.3% of teachers reported that technology enabled immediate feedback. Teacher 18 explained:

"*Once I correct an answer on the screen, students can ask why the answer is wrong, and we discuss it there and then*."

Classroom observations supported this account. Teachers displayed exercises or learner responses, identified errors and provided explanations while the activity was still in progress. The resulting interaction could therefore be represented as learner response → teacher feedback → learner clarification → further discussion. Technology made the response visible to the wider class, allowing an individual answer or error to become a resource for collective learning. The findings nevertheless show that these possibilities were conditional. Not all teachers reported strong benefits, and classroom observations indicated that collaborative or feedback-oriented uses depended on the teacher's activity design, available equipment and functioning electricity or connectivity. Thus, the presence of a projector or computer did not itself create collaboration or immediate feedback. It was the pedagogical organisation of the technology that turned it into an interactional resource.

6.5 Extending Teacher–Learner Interaction Beyond the Classroom

Technology also provided opportunities for teacher–learner interaction beyond formal classroom hours. As reported in Table 3, 61.9% of teachers agreed or strongly agreed that online platforms enabled interaction outside the classroom. Similarly, 61.4% of learners reported accessing additional online materials to improve their English. The qualitative evidence indicates that this extension was particularly associated with mobile phones and WhatsApp.

Teacher 18 explained:

"The class WhatsApp group helps me continue the lesson after school. Students send questions and I sometimes send them materials to read or listen to."

Teacher 21 similarly noted that learners could send questions after a lesson when they had not understood something and receive further guidance. Learner 24 described a comparable experience, explaining that WhatsApp allowed learners to receive information, ask questions and share answers outside the classroom. These findings suggest that mobile technology extended interaction across both time and space. Teacher–learner communication was no longer restricted to the period when teacher and learners were physically together. Digital communication also allowed learning materials to circulate after lessons and gave learners additional opportunities to seek clarification. However, this extension was not universal. The proportion of teachers and learners who were neutral or negative indicates that online interaction remained uneven. Learners reported limitations associated with internet access, device availability and affordability, while teachers also pointed to the practical difficulties of maintaining online communication. The findings therefore suggest that technology can extend classroom interaction, but it does not automatically produce continuous or equitable access to learning. The implication is that mobile and online technologies should be understood as additional channels of pedagogical interaction rather than replacements for classroom teaching. Their contribution depends on whether learners can access them and whether teachers deliberately use them to sustain learning activities beyond the classroom.

DISCUSSION

The findings demonstrate that technology-mediated interaction in the participating English language classrooms was shaped less by the sophistication of available technologies than by how teachers incorporated those technologies into pedagogical activities. Although projectors, audiovisual resources, mobile phones and computers were the most commonly used tools, their contribution to classroom interaction depended on whether they were used to stimulate questioning, discussion, collaboration, feedback and continued communication.

Three issues emerge from these findings: technology as a mediator of interaction, the importance of pedagogical integration, and the influence of context on technology use.

7.1 Technology as a Mediator of Teacher–Learner Interaction

A central finding of the study is that technology functioned primarily as a mediating resource within teacher–learner interaction, rather than as an independent source of interaction. Classroom observations showed that digital materials became interactional when teachers used them to stimulate explanation, questioning and learner response. A projected passage, for example, did not create interaction simply because it was displayed; interaction emerged when the teacher asked learners to interpret it, discuss possible answers or seek clarification.

This finding is consistent with Liu, Thurston, and Ye's (2024) systematic review of technology-enhanced cooperative language learning, which shows that the contribution of technology is shaped by task design, group interaction and the social conditions surrounding learning. The present finding also resonates with Mbibeh's (2025) study of AI-supported ESL learning in Bamenda, which found that technology created opportunities for language practice and engagement but that its educational value was influenced by teacher preparedness, institutional support and the available technological environment.. Similarly the finding is also relevant to the Cameroonian pedagogical context described by Nkwetisama (2012), who argues for an English language pedagogy that connects classroom learning with learners' communicative needs and the wider social context. From this perspective, technology becomes useful not because it is technologically sophisticated, but because it can help connect classroom activity with meaningful language use.

The present study therefore suggests that the important issue is not simply whether technology is present, but what interactional work it enables teachers and learners to undertake. Technology provides resources for interaction, but teachers' pedagogical decisions determine whether those resources remain tools for content delivery or become instruments for questioning, discussion, collaboration and feedback.

7.2 Pedagogical Integration as the Condition for Interaction

The findings reinforce the relevance of TPACK while also showing why the framework should not be reduced to knowledge of technological tools. Mishra and Koehler (2006) conceptualise TPACK as the interaction of technological, pedagogical and content knowledge. The present findings demonstrate this relationship in practice: teachers used similar technologies for different purposes depending on the learning activity they designed.

For example, a projector could be used for straightforward content presentation, but it could also support questioning, discussion and collaborative interpretation. Similarly, a mobile phone could provide access to information, facilitate communication with the teacher or enable the sharing of learning materials. The interactional value of technology therefore emerged from the alignment between the tool, the language-learning activity and learner participation.

This interpretation is compatible with Nkwetisama's (2012) argument that English teaching in Cameroon needs to move beyond classroom practices that separate linguistic knowledge from its communicative application. His emphasis on communication in specific social contexts is particularly relevant to technology-mediated teaching because digital tools can extend the contexts in which learners use and negotiate language. Recent work by Mbibeh (2025) similarly demonstrates that the introduction of newer technologies such as AI does not eliminate the need for teacher mediation. His study in Bamenda found substantial learner engagement with AI but also identified gaps in teacher training, exposure and institutional support. The implication is that technological competence alone does not ensure pedagogically meaningful integration. The present findings therefore support a situated interpretation of TPACK in which teachers' pedagogical decisions determine how technological affordances become meaningful in particular classroom contexts.

7.3 Context and the Pragmatics of Technology Integration in Cameroon

A further contribution of the study concerns the contextual nature of technology integration. The participating classrooms were not characterised by extensive access to specialised digital infrastructure. Interactive

whiteboards and language laboratories were unavailable, while teachers relied more heavily on projectors, audiovisual materials, computers and mobile phones. This pattern should not be interpreted simply as technological deficiency. It also demonstrates teachers' ability to adapt available resources to particular instructional purposes. A mobile phone can provide audio input, a projector can create a shared visual resource, and WhatsApp can provide a channel for communication beyond the classroom. Such practices illustrate a form of context-sensitive integration, in which teachers work with available resources rather than waiting for comprehensive digital infrastructure.

This contextual dimension is important in Cameroon, where English language teaching takes place within complex educational and sociolinguistic conditions. Nkwetisama (2012) argues that classroom English teaching should be connected to learners' real communicative needs rather than separated from the contexts in which language is used. The present study extends this principle to technology-mediated teaching: the usefulness of a technology depends partly on whether it responds to the realities of the classroom and the communicative purposes of learners.

Recent evidence from Matsap, Mbibeh, and Toh (2026) report that AI integration in English language and literature teaching in Cameroonian secondary schools is constrained by technological infrastructure, teacher preparedness and institutional support. These findings are closely consistent with the present study, although the current research concerns technology-mediated interaction more broadly rather than AI alone. At the same time, the findings demonstrate the limits of adaptation. Unequal access to devices, internet connectivity, electricity and online platforms restricts the extent to which technology-mediated interaction can become a consistent feature of English language teaching. Technology may therefore expand interactional possibilities without making those possibilities equally available to all learners. The implication is that technology integration in Cameroon requires more than the provision of digital devices. Teachers need opportunities to develop the pedagogical knowledge required to transform available technologies into interactive learning activities, while schools need conditions that permit sustained and equitable use. As Nkwetisama's work reminds us, meaningful English language teaching requires attention to the relationship between classroom practice and the wider context in which learners communicate. The present study shows that the same principle applies to technology: access provides the possibility, but pedagogy and context determine the interactional value of that possibility.

CONCLUSION

This study examined the technologies used to mediate teacher–learner interaction in English language classrooms in Cameroon and how these technologies facilitated classroom interaction. The findings show that teachers relied mainly on projectors/multimedia resources, audio-visual materials, mobile phones/WhatsApp and computers, while specialised technologies such as interactive whiteboards and language laboratories were unavailable. Technology was used to support explanation, questioning, learner participation, collaboration, feedback and communication beyond the classroom. The central finding is that technological presence does not necessarily constitute pedagogical integration. Technology became interactionally meaningful when teachers incorporated it into activities that required learners to respond, discuss, collaborate, ask questions or receive feedback. The findings therefore position technology as a mediator of teacher–learner interaction rather than an independent driver of classroom change.

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