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Digital Tools in ESP Learning: Culturally and Linguistically Diverse Students' Practices and Challenges

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Abstract

Integrating digital technology in English for Specific Purposes (ESP) instruction has expanded opportunities for language learning, particularly for culturally and linguistically diverse (CALD) students in non-English major programs. However, limited research has explored how these learners use internet-based tools in localised university contexts. This study investigates the use of digital technology in ESP learning among CALD students at Universitas Muhammadiyah Palembang. Employing a descriptive mixed-methods design, data were gathered through questionnaires (n=505) and focus group discussions with ESP lecturers. Findings reveal that smartphones (53%) and laptops (28%) are the most commonly used devices, with tools such as Google Translate, Chatgpt, Zoom, and Grammarly supporting English learning inside and outside the classroom. Over 63% of students rated internet tools as "very useful" for accessing field-specific materials, and 44.65% identified technology as a primary companion to classroom instruction. Students also reported gains in language proficiency, self-regulated learning, and intercultural communication. Despite these benefits, students face persistent barriers, including limited digital skills (80.6%), insufficient device access (76.8%), slow internet (66.7%), and lack of technical support (63%). Nonetheless, 68.87% of students viewed technology as helpful for future learning, and half strongly believed it promotes learning flexibility. Students also called for improved digital training (44.65%) and infrastructure (33.02%). The findings highlight the need for targeted digital support and culturally responsive content to ensure inclusive and effective ESP instruction.

Keywords: ESP learning, non-English majors, CALD students, digital tools, language education

INTRODUCTION

In the Indonesian higher education landscape, the adoption of digital technologies in language education has experienced substantial growth, driven in part by national efforts to promote digital literacy and 21st-century competencies (Aditya et al., 2021; Hidayat et al., 2022). Responding to these initiatives, universities across the country have increasingly integrated internet-based tools into English language instruction, with the dual aim of enhancing students' linguistic proficiency and their technological fluency (Bashori, 2018; Asri et al., 2020; Syakur et al., 2020; Muftah, 2022). From mobile-assisted language learning

(MALL) applications to cloud-based learning management systems, digital tools have become a core component of classroom activities, online assignments, and autonomous learning strategies. As Harper (2018) emphasised, this technological shift has fundamentally redefined how students interact with content, instructors, and peers, enabling more dynamic, flexible, and student-centred approaches to English language learning. This shift aligns with global trends in language pedagogy, which emphasise the importance of learner autonomy (Agustini, 2023), personalised learning pathways (Prasetya & Nugraha, 2022), and real-world language use (Utami et al., 2021).

In the context of English for Specific Purposes (ESP), digital technologies offer unique opportunities for learners to acquire language skills tailored to their academic disciplines or future professions. English for Specific Purposes (ESP) is a branch of English language teaching that focuses on developing learners' communicative competence in specific academic, professional, or occupational fields (Widodo, 2016; Salmani-Nodoushan, 2020). Unlike General English, which emphasises broad language proficiency, ESP is goal-oriented and context-driven, aligning language instruction with the specific needs, discourse practices, and terminology of a given domain, such as business, engineering, law, health sciences, or tourism (Zahedpisheh et al., 2017; Fitria, 2019; Fadlia et al., 2020; Rumalessin & Farah, 2021; Arroyyani et al., 2022; Dou et al., 2023). The primary objective of ESP is to equip learners with the linguistic and communicative tools necessary to perform effectively in their target academic or workplace settings (Chaovanapricha & Champakaew, 2024). ESP is typically characterised by three key features: (1) it is designed to meet the specific needs of the learner; (2) it makes use of the underlying methodology and activities of the discipline it serves; and (3) it is centered on the language—grammar, lexis, register—appropriate to those activities (Dudley-Evans & St. John, 1998; Hutchinson & Waters, 1987). Because of this specificity, ESP instruction must be responsive to the professional goals of learners and their linguistic readiness and learning backgrounds.

This is especially important in diverse educational settings such as Indonesia, where English is taught to students from diverse cultural, linguistic, and regional backgrounds (Hamied, 2012; Mistar, 2014; Lie, 2017; Zein, 2018). These students—often called Culturally and Linguistically Diverse (CALD) learners—enter English for Specific Purposes (ESP) courses with varied levels of English proficiency, digital literacy, and exposure to academic discourse. As such, ESP instruction must adopt pedagogical strategies that are not only aligned with learners' disciplinary needs but also responsive to their cultural identities and communicative preferences (Berniz & Miller, 2017; Savva, 2017). In this context, integrating digital technology plays a crucial role in expanding ESP instruction's reach and adaptability. Digital tools provide CALD learners with flexible access to authentic materials, culturally responsive content, and interactive learning experiences not limited by geography or classroom time constraints (Vail, 2019; Baker et al., 2022). Through platforms that offer simulations, multimedia content, and virtual peer collaboration, students can engage with English in ways that reflect their individual learning styles and sociocultural contexts (Ma, 2017). In doing so, technology helps bridge the linguistic and cultural gaps that often hinder CALD students' participation in academic English environments, fostering greater engagement, autonomy, and success in ESP learning (Veliz & Véliz-Campos, 2023; Cunningham et al., 2024).

Research on digital technology integration for culturally and linguistically diverse (CALD) learners highlights its potential and challenges. Siefert et al. (2019) found that while technology is widely used in linguistically diverse classrooms, it often serves only basic functions due to teachers' limited training and confidence. Similarly, Wang (2012) emphasised that pre-service teachers who experienced online language learning became more aware of linguistic and cultural diversity, suggesting the value of experiential digital exposure in teacher preparation. Veliz and Véliz-Campos (2023) introduced the concept of a "third space," where digital tools can connect students' home cultures with school learning. However, they noted that many teachers lack the pedagogical readiness to implement such multimodal practices. From the learner's perspective, Ma (2017) showed how university students use mobile technologies to personalise their second language learning, combining academic, social, and personal goals. Lastly, Cunningham et al. (2024) found that CALD older adults face barriers such as low digital literacy and limited access, underscoring the need for culturally responsive training. These studies suggest that while digital tools can enhance engagement and inclusion for CALD learners, successful implementation depends on culturally informed pedagogy, teacher preparedness, and learner-centred design.

Although digital technology has become increasingly embedded in English language education, much of the existing literature focuses on English majors or homogeneous student populations, often emphasising teacher perspectives, institutional readiness, or general pedagogical practices. In contrast, university students from culturally and linguistically diverse (CALD) backgrounds who do not major in English remain underrepresented in discussions about how technology shapes their language learning experiences. These students frequently encounter additional challenges, such as limited language exposure, varying levels of digital literacy, and access-related barriers, that are often overlooked in broader technology integration frameworks. At the same time, their diverse cultural and linguistic backgrounds may also offer unique opportunities for creative, self-directed, and meaningful engagement with digital tools. This study explores how these complexities play out in practice by examining the use of technology in English instruction among CALD students across non-English-major programs. Rather than focusing solely on instructional delivery, it investigates how students perceive and experience the benefits and limitations of digital tools in their language learning. By centring student voices in a diverse, multilingual academic context, the research offers insights beyond surface-level technology use to highlight the sociocultural dimensions of digital engagement in language education.

METHOD

This study employed a descriptive mixed-methods research design to investigate the opportunities and challenges of integrating digital technology in English instruction among culturally and linguistically diverse (CALD) students who do not major in English. Mixed-methods research enables the collection and integration of quantitative and qualitative data, allowing for a more comprehensive understanding of complex educational phenomena (Creswell & Plano Clark, 2018; Tashakkori & Teddlie, 2010). In this study, the quantitative component captured patterns and trends across a large and diverse sample, while the qualitative component provided depth and contextual richness to complement the survey findings.

Moreover, the primary instrument used was an online questionnaire, designed based on a review of existing literature on technology dissemination in education and English for Specific Purposes (ESP). It included a combination of closed-ended and Likert-scale items to measure students' experiences, perceived challenges, and attitudes toward internet-based English learning (Dörnyei & Taguchi, 2010). To enhance content validity and clarity, the questionnaire underwent expert validation by three university-level ESP lecturers, consistent with best practices in instrument development (Cohen et al., 2018). Additionally, a pilot test involving 30 students from multiple faculties was conducted to assess reliability and identify potential ambiguities (Fraenkel et al., 2019). Revisions were made accordingly before full-scale distribution. Furthermore, focused group discussions (FGDS) were conducted with ESP lecturers to enrich the findings and explore instructional perspectives. FGDS are an effective qualitative technique for generating in-depth insights into shared experiences and pedagogical practices, particularly in education settings involving technology use (Krueger & Casey, 2015; Merriam & Tisdell, 2016). This qualitative component provided complementary data on teachers' ICT innovations and institutional strategies in online English learning, contributing to a holistic understanding of the digital learning environment for CALD students.

This study provides a comprehensive overview of the dissemination of learning innovations by analysing responses from 505 students representing diverse cultural, regional, and linguistic backgrounds across five faculties at Universitas Muhammadiyah Palembang. Data collection through the online questionnaire was conducted from October 10 to November 29, 2024, ensuring sufficient participation from students across non-English-major programs. The purposeful inclusion of a heterogeneous student population allows for a nuanced understanding of the factors influencing technology adoption in English language learning across various academic disciplines (Cohen et al., 2018). To complement the student data, in-depth interviews were conducted on October 23, 2024, with five ESP lecturers via Zoom video conferencing. These lecturers were purposively selected based on their subject-matter expertise and active engagement in integrating technology into English instruction—an approach consistent with the qualitative sampling strategies recommended by Merriam and Tisdell (2016).

Quantitative data from the questionnaire were analysed using descriptive statistics, including frequencies, means, and standard deviations, to identify trends in students' experiences and attitudes toward internet-based English learning (Fraenkel et al., 2019). In parallel, qualitative data from lecturer interviews were analysed through thematic analysis, wherein emerging patterns were coded and categorised to capture shared challenges and pedagogical strategies (Braun & Clarke, 2006). By integrating perspectives from both students and instructors, this study presents a holistic view of how digital learning innovations are implemented, adapted, and experienced in culturally and linguistically diverse educational settings.

FINDING AND DISCUSSION

To better understand how digital technology supports English for Specific Purposes (ESP) learning among culturally and linguistically diverse (CALD) students, the survey findings were interpreted through a set of ESP-relevant dimensions. While the original questionnaire items addressed general perceptions of technology use, the data were

analysed by aligning them with key pedagogical goals in ESP, such as access to authentic materials, engagement with field-specific content, development of academic language skills, and support for culturally responsive instruction.

Table 1. Student perceptions of technology use aligned with ESP learning goals

ESP Area	Survey Indicator	Finding
Access to authentic, field-specific resources	Benefits of Internet Technology in Enhancing English Skills	Very Useful (63.43%)
Self-regulated and discipline-specific learning	Effectiveness of Technology Utilisation	Much Easier (37.78%)
Engagement with academic/professional content	Impact of Technology on Learning Activities	Very Large (43.03%)
Role of tech in blended ESP instruction	Integration of Technology in English Language Learning	Used as Primary Companion (44.65%)
Language proficiency within academic/professional contexts	Effectiveness of Technology Use in English Language Proficiency	Moderately Increased (32.93%)
Cultural relevance of professional discourse	Suitability of Information Access to Local Culture	Suitable (33.33%)
Technology-related barriers to ESP learning	Challenges in Using Technology for English Language Usage	Little Challenging (31.72%)
The pedagogical ESP engagement	Ease of Learning English via Local Culture-Based Approach	Moderate (41.01%)
Intercultural communication in academic settings	Technology Helps Interact in Diverse Classrooms (CALD contexts)	Very Helpful (32.73%)
Sustainability and Future-readiness of ESP	Perception of technology's role in enhancing future learning	Very Helpful (68.87%)
Flexibility of future learning through technology	Belief in technology making learning more flexible	Strongly Believe (50.94%)
Institutional and pedagogical support needs	What should be done to support the sustainability of tech-based learning (multi-select)	Training for teachers and students (44.65%); Better internet infrastructure (33.02%)

The findings from the survey demonstrate several key ways digital technology supports English for Specific Purposes (ESP) learning among culturally and linguistically diverse (CALD) students. Most students (63.43%) rated internet technology as *helpful in* enhancing their English skills, pointing to its potential in facilitating access to authentic, field-specific resources such as academic articles, professional videos, and domain-relevant vocabulary banks. This aligns with ESP's emphasis on needs-based and discipline-specific instruction (Trinder, 2016; Salmani Nodoushan, 2020). Digital platforms offer real-time access to professional language input and enable learners to engage with language in the

context of their future fields, which is essential for non-English majors (Rachmawati & Irawan, 2024). Moreover, 37.78% of students found learning to be *much easier* through technology, which supports findings that digital tools foster self-regulated learning, autonomy, and motivation—particularly when aligned with learners' academic goals (Wang, 2012; Lai, 2015; Kormos & Csizér, 2014).

Regarding content engagement, 43.03% of students reported that technology significantly impacted their learning, reinforcing that digital tools facilitate deeper engagement with specialised texts and tasks—a cornerstone of ESP (Basturkmen, 2010; Flowerdew, 2013). Additionally, 44.65% of students indicated that technology was a *primary companion* to classroom learning. This reflects the growing trend of blended learning models in ESP, where classroom-based instruction is complemented by digital extensions that allow for flexible, multimodal access to language tasks (González-Lloret & Ortega, 2017; Barrot et al., 2021). When it comes to language proficiency, 32.93% of respondents reported *moderate improvement*, which echoes literature suggesting that technology-enhanced ESP instruction strengthens language outcomes, particularly in academic writing, professional discourse, and genre-specific communication (Anthony, 2018; Li & Flowerdew, 2020).

The findings also point to cultural and intercultural affordances of digital tools in ESP. A third of respondents (33.33%) found integrating local culture in digital content *suitable*, reflecting the need for culturally responsive materials. The emerging role of ethnopedagogy, particularly in multilingual settings like Indonesia, underscores the benefit of connecting English learning to students' lived experiences and cultural narratives (Gay, 2010; Zein, 2018; Mistar, 2014). The fact that 41.01% of students found learning through local cultural content *moderately easy* also supports calls for contextualised ESP curriculum design that acknowledges learners' social and cultural capital (Savva, 2017; Berniz & Miller, 2017). Moreover, 32.73% found that technology supported *intercultural interaction* in diverse classrooms, which aligns with research highlighting the role of digital tools in fostering intercultural communicative competence (ICC) and collaborative engagement across linguistic boundaries (O'Dowd, 2018; Veliz & Véliz-Campos, 2023).

Although only 31.72% found technology use *challenging*, barriers remain around digital literacy and confidence, especially for CALD students who may face unequal access to resources or prior training (Siefert et al., 2019; Cunningham et al., 2024). Nonetheless, the low percentage suggests that students are essentially adapting to digital learning environments, and that the main issue lies not in resistance but in the need for sustained support and development. Importantly, students' forward-looking perspectives reflect an apparent optimism about the future of technology-enhanced ESP. An overwhelming 68.87% considered technology *helpful* for improving future learning, while 50.94% *strongly believed* it would enable more flexible learning experiences. These insights support global trends in ESP pedagogy that emphasise personalisation, flexibility, and learner autonomy in digital contexts (Stickler & Hampel, 2015). Flexibility is especially critical in ESP, where learners often need asynchronous access to domain-specific materials that support their academic and professional development (Vail, 2019)

To support sustainable digital ESP learning, students identified key areas of intervention, including increased training for students and teachers (44.65%) and improved infrastructure (33.02%). These findings align with calls for systemic support to address the digital divide regarding access to hardware and pedagogical capacity building (Reinders &

White, 2016). The emphasis on training reflects the understanding that teachers must be prepared to curate, deliver, and adapt content for diverse learner groups using digital tools (Wang, 2012; Veliz & Véliz-Campos, 2023). For CALD learners, institutional investment in connectivity, hardware, and culturally responsive materials can significantly enhance inclusive, sustainable, and outcome-driven ESP instruction (Prasetya & Nugraha, 2022; Cunningham et al., 2024).

Table 2. Perceived challenges in accessing and utilising digital tools in ESP instruction

Challenge	Percentage	Description
Lack of technology skills	80.6%	Limited digital skills hinder the effective use of learning platforms.
Insufficient access to devices	76.8%	Inconsistent access to devices limits online learning participation.
Slow internet connection	66.7%	Slow internet disrupts access to digital learning materials.
Lack of technical support	63%	Lack of support delays the resolution of technical issues.
Distraction from other online activities	42%	Online distractions reduce focus during learning activities.

The data in Table 2 reveal that students face several persistent challenges when using digital tools in English for Specific Purposes (ESP) instruction. The most frequently reported issue is a lack of technology skills, with 80.6% of students indicating that limited digital literacy hinders their ability to engage with online learning platforms fully. This challenge is well-documented in existing research, particularly in studies on culturally and linguistically diverse (CALD) learners, who may enter higher education with uneven exposure to educational technologies (Siefert et al., 2019; Cunningham et al., 2024). In ESP contexts—where learners are expected to access discipline-specific materials and use specialised language tools—digital competence is not optional but essential (González-Lloret & Ortega, 2014; Hyland, 2007).

Following this issue, 76.8% of students reported insufficient device access, and 66.7% cited slow internet connectivity. These findings echo previous research highlighting the ongoing digital divide that affects students' ability to participate meaningfully in online learning (Zhang, 2023). For ESP learners, infrastructure barriers can limit access to authentic materials such as interactive simulations, technical databases, discipline-specific video content, and synchronous communication tools—essential for developing field-specific communication skills (Flowerdew, 2013; Anthony, 2018). Poor device access and unreliable connectivity also impede collaborative activities, peer interaction, and real-time feedback, which are central to effective ESP pedagogy (Stickler & Hampel, 2015; Ma, 2017).

In addition, 63% of respondents reported a lack of technical support, suggesting a need for institutional structures that provide just-in-time assistance and ongoing training for students and educators. This aligns with studies that argue for systematic digital preparedness as part of ESP implementation (Wang, 2012; Veliz & Véliz-Campos, 2023). Without timely support, students may struggle to complete digital tasks aligned with their professional or academic goals, reducing learning efficacy and motivation (Barrot, 2021; Lai, 2015). Furthermore, 42% of students identified online distractions as a barrier to concentration during digital learning. This concern is particularly relevant for ESP courses

that rely on independent online study, which demands sustained attention and task management skills often underdeveloped in students transitioning from traditional learning environments (García-Sánchez, 2016; Sun & Rueda, 2012).

Although these challenges signal areas that require immediate attention, they should also be seen as opportunities for institutions to improve digital integration. Reinders and White (2016) emphasised that successful technology-enhanced language learning depends on the tools and the pedagogical ecosystem surrounding them. This includes equitable device distribution, structured digital literacy programs, localised internet infrastructure support, and responsive technical guidance. For CALD learners, addressing these challenges is crucial for ensuring inclusive and effective ESP delivery (Zein, 2018; Hamied, 2012). When properly supported, digital platforms can promote linguistic proficiency, academic resilience, and cross-cultural competence—outcomes central to ESP and broader educational equity (Muftah, 2022; Fitria, 2019; Widodo, 2016).

CONCLUSION

This study has examined the opportunities and challenges surrounding using digital technology in English for Specific Purposes (ESP) instruction, focusing on culturally and linguistically diverse (CALD) students from non-English major programs. The findings demonstrate that digital tools are widely perceived as beneficial for enhancing field-specific English proficiency, improving access to authentic resources, and enabling more flexible, self-regulated learning. Most students reported that technology plays a central role in their learning, both as a companion to classroom instruction and as a means of developing discipline-aligned communicative competence, core objectives in ESP pedagogy. Moreover, technology integration supported linguistic outcomes and intercultural and ethnopedagogical dimensions of ESP. Students acknowledged that technology helps bridge gaps between academic English and their cultural backgrounds, particularly when instruction includes local wisdom, multilingual collaboration, and inclusive content. These findings affirm that digital platforms can facilitate intercultural communication and support meaningful engagement for CALD learners, especially when designed with context-sensitive approaches.

However, the study also highlights critical barriers that must be addressed for technology integration to be equitable and sustainable. Significant obstacles were the lack of digital literacy, limited access to devices, unstable internet connections, and inadequate technical support. These challenges suggest that digital ESP instruction cannot succeed on access alone; instead, it requires robust institutional support, including infrastructure investment, student and teacher training, and continuous technical assistance. Looking ahead, students expressed optimism about the future role of technology in English learning. They emphasised the need for increased digital preparedness, more interactive learning content, and scalable support systems. These insights reinforce the view that technology, when implemented with strategic planning, has the potential to transform ESP learning into a more personalised, accessible, and culturally responsive experience for CALD students.

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