

Research Paper

ESP in the Digital Age: Mapping Tools, Platform, and Pedagogical Shifts in Higher Education

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**Abstract** (English: 10 PT)

The accelerating integration of digital tools into English for Specific Purposes (ESP) instruction has reshaped how language education addresses professional competencies across disciplines. However, a significant gap remains in understanding how these technologies are customized to meet domain-specific linguistic and communicative needs. This study investigates trends, challenges, and pedagogical implications of technology-enhanced ESP instruction in higher education between 2019 and 2025. Utilizing a PRISMA-based protocol, 21 peer-reviewed studies were selected from Scopus and Crossref, applying strict inclusion criteria focused on mobile applications, learning management systems (LMS), virtual reality (VR), and asynchronous tools. Thematic synthesis revealed that mobile apps and LMS improved learner engagement, vocabulary acquisition, and autonomy, particularly in fields such as healthcare, engineering, and tourism. VR tools showed promise in simulating professional contexts for immersive language practice. Nevertheless, barriers such as inadequate infrastructure, uneven digital literacy, and limited teacher training continue to hinder optimal implementation. Notably, few studies provided evidence on long-term outcomes or field-specific customization of digital tools, highlighting a critical gap in sustained pedagogical innovation. This study contributes a structured overview of effective practices and persistent challenges in ESP technology integration, offering strategic insights for curriculum designers, teacher educators, and policymakers. By advocating for equity-focused, professionally aligned digital instruction, the study underscores the need for tailored innovations that bridge the divide between academic language education and real-world communication demands in specialized fields.

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1. Introduction

In an era defined by rapid technological transformation, the way languages are taught and learned has undergone fundamental shifts. English for Specific Purposes (ESP), as a branch of English Language Teaching (ELT) tailored to professional and academic domains, has increasingly embraced technology to meet the evolving linguistic and communicative needs of diverse learners. This transformation has been particularly visible in higher education, where students in fields such as medicine, engineering, tourism, and business must master both domain-specific vocabulary and communicative competence to thrive in globalized professional contexts. The convergence of ESP and digital innovation presents both unprecedented opportunities and unique pedagogical challenges. As [Kukulska-Hulme \(2012\)](#) and [Godwin-Jones \(2015\)](#) have observed, mobile and immersive technologies not only redefine access and engagement but also compel educators to rethink instructional design, learner autonomy, and the spatial-temporal dimensions of language learning.

The advent of technology-enhanced learning has transformed English for Specific Purposes (ESP) instruction by fostering flexible, engaging, and learner-centered environments through the integration of

asynchronous platforms, real-time communication tools, mobile applications, LMS, and VR simulations (Ahmadi, 2018; “Overcoming Learning Time and Space Constraints Through Technological Tool,” 2015). These innovations not only address spatial and temporal limitations in traditional instruction but also expose learners to real-world communication through interactive simulations and multimedia content, increasing motivation and engagement (Ahmadi, 2018; Remizantseva & Ablyazov, 2019). Educators can tailor strategies to diverse learner needs, with research indicating a positive correlation between technology use and improved language outcomes (Burgos & Anthony, 2024; Ahmadi, 2018). Moreover, technological tools promote autonomy and critical thinking, enabling self-directed practice and fostering skills such as information literacy through digital game-based learning (Zou et al., 2021; Li & Li, 2023). In sum, the strategic integration of technology in ESP not only enhances language acquisition but also supports broader educational goals in today’s digital era.

Yet, despite widespread acknowledgment of their potential, the integration of digital tools in English for Specific Purposes (ESP) education presents persistent challenges, particularly in adapting to the diverse linguistic and professional needs across domains, despite their recognized potential. This issue remains underexplored at a time when institutions are urged to align curricula with digital literacy and 21st-century competencies, prompting a reassessment of pedagogical frameworks. Effective ESP curriculum design demands comprehensive needs analysis to identify essential skills, such as the emphasis on oral and aural proficiency in fields like economics (Suwandi, 2023), and must incorporate language-centered, skill-centered, and learning-centered approaches to accommodate diverse sectors including business, science, and medicine (Chaovanapricha & Champakaew, 2023; Khalil et al., 2024). Educators are required to act as teachers, designers, and evaluators, necessitating both linguistic and subject-specific expertise (Chaovanapricha & Champakaew, 2023; Chaovanapricha & Champakaew, 2024).

However, ESP instructors frequently encounter obstacles in syllabus development and instructional methods, often due to limited disciplinary knowledge, which hampers course effectiveness (Fitria, 2023; Ghafar, 2022; Nishijo, 2022). As learners increasingly depend on digital platforms, integrating digital literacy into ESP curricula becomes essential to enhance language acquisition and communication (Dewi et al., 2024). To meet these demands, institutions must provide ongoing professional development, enabling educators to foster engaging, multimodal learning environments (Anggini & Rodliyah, 2020; Azizah & Triastuti, 2024; Danial et al., 2023). Moreover, discrepancies between learners’ self-perceived and actual language proficiency levels highlight the importance of adaptive instructional strategies that support meaningful and sustained learner development (Yeung & Mah, 2024).

Recent scholarship has recognized the importance of aligning ESP instruction with technological advancements. Studies such as those by Dzięcioł-Pędich and Dudzik (2021) highlight the role of digital tools like EnglishCentral and MedicalEnglish in developing technical vocabulary and oral proficiency. Arnó-Macià et al. (2020) emphasize the significance of LMS platforms in organizing ESP content and fostering collaborative learning, while Arifani and Suryanti (2019) demonstrate how VR environments can facilitate immersive learning, especially in professional simulations. Nevertheless, most of these studies remain confined to isolated applications, lacking comparative insight across fields or deeper exploration of tool-specific affordances. Additionally, El-Garawany (2021) underscores the potential of Glogster EDU in enhancing creativity and writing in tourism ESP classrooms, yet fails to address scalability and adaptation for other domains. These fragmented findings underscore the necessity of synthesizing existing research to identify patterns, strengths, and gaps.

Furthermore, existing literature has yet to provide a comprehensive synthesis of digital tool effectiveness across professional contexts. While Sakti et al. (2024) and Agzamovna (2024) suggest that asynchronous platforms enhance learner autonomy and comprehension, Li (2018) highlights persistent challenges including digital illiteracy and resistance to change among both learners and educators. Kakoulli-Constantinou and Papadima-Sophocleous (2020) call for structured teacher training programs in tech-integrated ESP, pointing to an urgent need for institutional support. The lack of longitudinal studies and meta-analytical reviews further weakens our understanding of how digital innovations translate into sustained language learning outcomes in ESP contexts. There is also a dearth of cross-disciplinary analyses that explore whether tools like VR or mobile apps perform differently in engineering compared to business or medical ESP classrooms. These unresolved issues form a critical backdrop for the present study.

To address these shortcomings, this study offers a timely and focused investigation into how digital technologies have been integrated into ESP instruction within higher education from 2019 to 2025. The

novelty of this review lies in its focus on field-specific customization and cross-disciplinary comparisons of digital tools such as mobile applications, LMS platforms, and VR. Unlike previous works that highlight isolated tools or singular domains, this review synthesizes findings across professional contexts to explore broader pedagogical trends and emerging best practices. This study also distinguishes itself by employing a PRISMA-based protocol and quality appraisal adapted from the CASP checklist, thereby enhancing methodological transparency and replicability.

The primary aim of this study is to examine how digital tools have been utilized to enhance ESP instruction, with a focus on their impact on learner engagement, domain-specific vocabulary acquisition, and professional communication. Specifically, the study seeks to answer the following research questions: (1) What types of digital tools have been employed in ESP instruction in higher education between 2019 and 2025? (2) How do these tools impact learning outcomes across different professional domains? (3) What challenges and best practices are associated with their integration? By addressing these questions, this review seeks to provide stakeholders, including educators, curriculum designers, and policymakers, with a strategic overview of digital ESP integration that is both practical and evidence-informed.

The structure of this study is organized into five main sections. Following this introduction, the methodology section details the search strategy, inclusion criteria, and quality appraisal procedures based on a modified PRISMA approach. The results section synthesizes thematic findings from 21 selected studies, categorized into tool types, learning outcomes, integration challenges, and pedagogical strategies. The discussion section critically evaluates these findings against existing theories and practices, highlighting implications and gaps for future research. The conclusion offers a summary of contributions, policy implications, and recommendations for future study.

In the broader context of ELT, this study contributes to the growing body of research that seeks to align language education with digital transformation. Its findings emphasize the importance of adaptive, technology-mediated ESP instruction that is responsive to both learner needs and disciplinary expectations. As higher education continues to evolve in response to global digitalization, this study offers timely insights into how educators and institutions can harness technology to close the gap between academic language instruction and real-world professional communication. By doing so, it underscores the critical role of ESP in preparing learners for the demands of multilingual, technology-rich workplaces.

2. Method

2.1 Search Strategy

To conduct this systematic literature review (SLR), a comprehensive search strategy was employed to identify relevant studies on the role of technology in English for Specific Purposes (ESP) instruction in higher education. This study employed a systematic review methodology aligned with the PRISMA 2020 guidelines (Page et al., 2021) to ensure transparency, reproducibility, and methodological rigor. The search was conducted using two major academic databases: Scopus and Crossref. The search string used was:

"Technology" AND "ESP" OR "English for Specific Purposes" AND "Instruction" AND "Higher education"

The search was limited to peer-reviewed journal articles, conference papers, and book chapters published in English. The time frame for the search was from 2019 to 2025 to ensure the inclusion of recent advancements in technology and ESP instruction. Additionally, reference lists of selected studies were manually searched to identify any additional relevant articles that may have been missed during the initial database search.

2.2 Study Selection

2.2.1 Study Inclusion and Exclusion Criteria

The inclusion and exclusion criteria were established to ensure the selection of studies that are directly relevant to the research question. The criteria are as follows:

Table 2.1 Flowchart

Inclusion Criteria	Exclusion Criteria
Studies that focus on the use of digital tools, platforms, or technologies in ESP instruction.	Studies that focus on general English language teaching (ELT) without a specific focus on ESP.
Studies conducted in higher education settings.	Studies conducted in primary or secondary education settings.
Studies that provide empirical evidence, case studies, or theoretical frameworks related to technology-enhanced ESP instruction.	Studies that do not provide sufficient detail on the technology used or its impact on ESP instruction.
Studies published in English.	Studies published in languages other than English.
Studies published between 2019 and 2025.	Studies published before 2019.

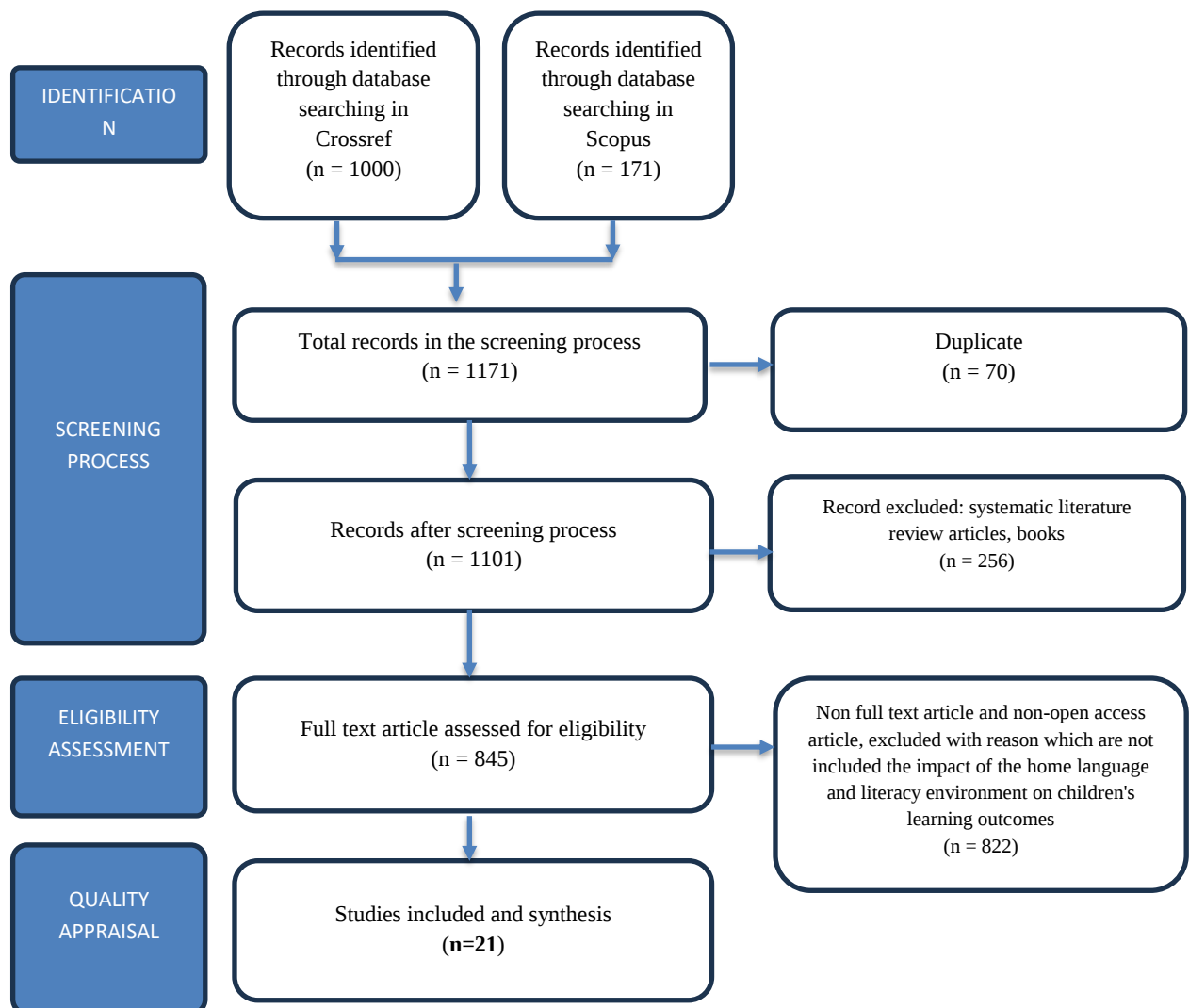
2.2 Quality Assessment

The quality of the selected studies was rigorously evaluated using a modified version of the Critical Appraisal Skills Programme (CASP) checklist, which was specifically adapted to suit the context of educational research. This adapted checklist provided a comprehensive framework to critically assess each study's overall robustness and relevance to the research focus. The evaluation was based on five key criteria:

- 1) **Research Design:** The suitability and appropriateness of the research design in effectively addressing the stated research question. This involved examining whether the study employed a design that could validly and reliably produce relevant findings.
- 2) **Methodology:** The clarity, transparency, and methodological rigor with respect to data collection, sampling techniques, and data analysis procedures. This criterion ensured that the methods were systematically applied and clearly documented.
- 3) **Validity and Reliability:** The extent to which the study incorporated measures to establish the validity and reliability of its findings. This included scrutiny of steps taken to minimize bias and errors and to ensure consistent and trustworthy results.
- 4) **Relevance:** The direct relevance and applicability of the study to the specific research question concerning the use of technology in English for Specific Purposes (ESP) instruction. Studies were evaluated on how well their focus aligned with the thematic scope of the review.
- 5) **Ethical Considerations:** Whether ethical protocols and considerations were adequately addressed within the research process, including participant consent, confidentiality, and adherence to institutional ethical standards.

Each study was then assigned a quality rating categorized as high, medium, or low based on its performance against these criteria. To ensure the integrity and reliability of the review findings, only those studies rated as medium or high quality were retained for inclusion in the final synthesis. This approach helped to filter out studies with insufficient methodological rigor or limited relevance, thereby strengthening the overall evidence base of the review.

Table 2.2 Flowchart Study Selection



2.3 Data Synthesis

Thematic analysis was applied to synthesize the selected studies. An inductive coding approach was used to allow key themes to emerge from the data organically. The coding process was supported by NVivo software, enabling systematic data management and iterative refinement of categories. The following themes were identified: (1) types of digital tools and platforms, (2) impact on learner outcomes, (3) challenges and barriers, and (4) best practices and pedagogical strategies. This approach facilitated the integration of diverse findings into a coherent framework and provided a grounded basis for drawing conclusions relevant to ESP pedagogy and digital innovation.

3. Results

This section presents an overview of the 21 studies that met the inclusion criteria for this review. These studies represent a diverse array of research on the integration of digital tools in ESP instruction across various disciplines and global contexts. The findings are organized by author, study title, journal source, and year of publication. This structured table highlights the variety of digital platforms examined and contextual domains explored within higher education settings. The table below provides a reference for understanding the scope and academic distribution of the studies analyzed.

Table 3.1 Summary of Reviewed Studies on Digital Tools in ESP Instruction (2019–2025)

No.	Author(s)	Title	Journal	Year
1	Karapetyan	Conventional ESP Activities in a Digital Format	Foreign Languages in Higher Education	2021
2	Irena Aleksić-Hajduković, Danka Sinadinović, Stevan Mijomanović	Self-Scaffolding and the Role of New Technologies in ESP Teacher Education	ESP Teaching and Teacher Education: Current Theories and Practices	2019
3	Husamiddinova and Valieva	Use of Different Tools in Teaching a Foreign Language in ESP Lessons	European Journal of Higher Education and Academic Advancement	2023
4	Hronová and Kniňová	Digital Media in ESP Instruction for Marketing Communication	CASALC Review	2020
5	Deliwe	The Importance of a Learner Management System in Implementing Data-Driven Instruction	Journal of the Digital Humanities Association of Southern Africa	2024
6	Shyamal Acharya	Exploring the Role of ESP Teachers in the Modern ELT Classroom	International Journal of Science and Research (IJSR)	2022
7	Danko and Dečman	The Strategy Inventory for Second Language Learning: Adapted and Validated in Slovenia	ESP Today	2019
8	Costa and Mastellotto	The Role of ESP in Supporting Linguistic Dimensions in English-Medium Instruction	CLIL: Journal of Innovation and Research in Plurilingual and Pluricultural Education	2022
9	Constantinou and Papadima-Sophocleous	The Use of Digital Technology in ESP: Current Practices and Suggestions for Teacher Education	Journal of Teaching English for Specific and Academic Purposes	2020
10	Arifani, Y., & Suryanti, S.	The Influence of Male and Female ESP Teachers' Creativity toward Learners' Involvement	International Journal of Instruction	2019
11	Chen et al.	Teaching Through English Medium Instruction: A Case of Higher Education in China	Sustainability	2020
12	Chemir and Kitila	Needs Analysis for English for Academic Purposes in Ethiopian Higher Education	Cogent Education	2022
13	Chang	ESP Instruction Design Based on Digital Literacy for Tourism English Learners	Journal of English Teaching through Movies and Media	2024
14	Elisabet Arnó-Macià	Engineering Students' Perceptions of ESP Courses in Internationalized Universities	English for Specific Purposes	2019
15	Agnieszka Dziecioł-Pędich	Technology in Support of Developing Speaking Skills in ESP Courses	Lublin Studies in Modern Languages and Literature	2021

16	Campillo-Ferrer and Miralles-Martínez	Inquiry-Oriented Learning for Technology-Enhanced ESP in Post-Pandemic Contexts	Frontiers in Education	2023
17	Bhebhe et al.	Sustaining Technology Pedagogies in Higher Education after the Pandemic	International Journal of Learning, Teaching and Educational Research	2023
18	Bannister et al.	Generative AI and EMI Assessment: A Delphi Study	Iranian Journal of Language Teaching Research	2023
19	Amjad et al.	Measuring Student Performance through E-Books and Mobile Learning	Environment and Social Psychology	2024
20	Marwa Said Mustafa El-Garawany	Glogging in the ESP Classroom: Developing Tourism Students' EFL Persuasive Writing	ESP Today	2021
21	Chandan Kumar Gupta	The Role and Impact of Online Learning Platforms in Higher Education	International Journal for Multidisciplinary Research (IJFMR)	2024

The table 3.1 serves as the foundational basis for the thematic analysis presented in the following subsections. To address the research questions of this study, the selected studies are interpreted through four core themes. First, the studies are examined in terms of the types of digital tools and platforms used in ESP instruction, such as mobile applications, learning management systems, and virtual reality environments. Second, the impact of these tools on learners' outcomes and engagement is evaluated across various academic fields. Third, the studies are analyzed for the challenges and barriers they report, including technological limitations, teacher preparedness, and institutional support. Fourth, the analysis highlights best practices and pedagogical strategies that promote effective integration of digital technologies in ESP contexts. This thematic structure provides a comprehensive framework to synthesize the findings and offer a deeper understanding of the evolving role of digital innovation in specialized English language instruction.

3.1 Technological Tools and Platforms Utilized in ESP Instruction

Table 3.2. Categories of Digital Tools in ESP Instruction (2019–2025)

Tool Type	Frequency	Representative Platforms	Application Domains	
Learning Management Systems (LMS)	10	Moodle, Blackboard	Engineering, EAP	Business,
Mobile Applications	8	EnglishCentral, MedicalEnglish	Healthcare, Hospitality	Aviation,
Asynchronous Platforms	6	Flipgrid, Padlet, Google Workspace	Teacher Scientific ESP	Training,
Virtual Reality (VR) Tools	5	Interactive 3D Simulations	Tourism, STEM Fields	Architecture,
Multimedia & Creativity Tools	4	Glogster EDU, Canva	Marketing, Oriented ESP	Design-

Learning Management Systems emerged as the most frequently used tool category, cited in ten studies. These platforms were not only instrumental in structuring ESP courses but also facilitated communication, feedback, and student progress monitoring (Deliwe, 2024; Arnó-Macià et al., 2020). Their widespread application aligns with post-pandemic trends in digitalized education, particularly in science and engineering faculties, where structured content organization and formative assessment are vital (Campillo-Ferrer & Miralles-Martínez, 2023).

Mobile applications appeared in eight studies and were predominantly applied in vocational and health-related ESP contexts. Platforms such as EnglishCentral and MedicalEnglish provided flexible, domain-specific language exposure with immediate feedback on pronunciation, vocabulary use, and comprehension (Dzięcioł-Pędich & Dudzik, 2021). These applications supported learners during clinical placements, fieldwork, and workplace simulations. Their increasing adoption also reflects a larger movement toward mobile-assisted language learning (MALL) for professional English training (Chang, 2024; Amjad et al., 2024). Asynchronous platforms were cited in six studies and were particularly valued for fostering learner autonomy. Tools such as Flipgrid and Google Workspace allowed learners to manage their own study pace while engaging in reflective and collaborative learning tasks (Dzięcioł-Pędich & Dudzik, 2021). These platforms were found to be especially useful in teacher training and higher education environments with diverse learner schedules, as they allowed students to revisit complex materials and deepen their engagement with both linguistic and disciplinary content (Constantinou & Papadima-Sophocleous, 2020; Karapetyan, 2021).

Virtual reality tools were found in five studies and served as an innovative means for immersive, task-based ESP learning. By simulating professional environments such as tourism destinations, architectural sites, and engineering workshops, VR enabled students to engage with realistic communication scenarios that supported the acquisition of both technical vocabulary and soft skills (Arifani & Suryanti, 2019; El-Garawany, 2021; Chang, 2024). Unlike traditional classroom settings, VR provided opportunities for contextualized practice of procedural language, problem-solving discourse, and occupational interaction in a controlled digital environment. Multimedia creativity tools such as Glogster EDU and Canva were highlighted in four studies for their capacity to develop both communicative and digital literacies. These tools supported learners in creating persuasive presentations, promotional materials, and digital portfolios tailored to specific industry sectors like tourism and marketing (El-Garawany, 2021; Hronová & Kniňová, 2020). The multimodal nature of these tools promoted active synthesis of subject content, and their collaborative features aligned with the team-based communication styles found in many workplace environments.

Comparative analysis with earlier reviews reveals a notable shift from generic technology integration toward more specialized and context-responsive applications. This development aligns with recent research advocating for the use of blended and inquiry-oriented approaches in ESP settings to facilitate deeper engagement with professional genres and discourse practices (Bhebbhe et al., 2023; Campillo-Ferrer & Miralles-Martínez, 2023). While previous studies largely focused on the functional benefits of technology, recent evidence highlights the value of tailoring tools to the epistemic and linguistic demands of specific fields. In summary, the studies reviewed demonstrate that the integration of digital platforms in ESP instruction is both diverse and increasingly nuanced. Learning Management Systems remain foundational for content management, while mobile and asynchronous tools enable flexible, autonomous learning. Virtual reality and multimedia platforms extend ESP instruction into immersive and expressive domains, offering authentic, discipline-specific engagement. These findings underscore the importance of strategic technology selection that aligns with both pedagogical goals and field-specific communication needs.

3.2. Impact of Digital Tools on ESP Learner Outcomes

Digital technologies have increasingly influenced learner outcomes in English for Specific Purposes (ESP) education, particularly in scientific and technical disciplines. The integration of context-sensitive digital tools has contributed to notable improvements in language proficiency, disciplinary literacy, and learner autonomy. These enhancements are particularly evident in fields such as medicine, engineering, and applied sciences, where learners must engage with complex terminology and domain-specific communicative tasks.

A consistent finding across the selected studies is the role of mobile and web-based platforms in strengthening vocabulary acquisition and comprehension in technical contexts. Platforms such as EnglishCentral and MedicalEnglish have been identified as effective for enhancing discipline-specific vocabulary and receptive language skills (Dzięcioł-Pędich & Dudzik, 2021). In scientific ESP settings, these platforms allow students to interact with authentic professional language samples, facilitating better retention and contextual application of specialized terminology. Similarly, Glogster EDU has been used to help learners synthesize scientific information into persuasive presentations, contributing to both cognitive processing and expressive fluency (El-Garawany, 2021).

The use of asynchronous tools such as Flipgrid and Google Workspace also yields positive outcomes. These tools grant learners increased control over the pace and timing of their learning, which is particularly important when mastering abstract or complex content. Studies have shown that this autonomy allows students to revisit materials, reflect critically on feedback, and engage with content more deeply (Arnó-Macià et al., 2020). Such platforms have been especially effective in scientific ESP where learners often grapple with layered meanings and high-density texts. The flexibility of asynchronous tools also accommodates varied learning schedules, making them well-suited for adult learners and those involved in concurrent clinical or laboratory training (Constantinou & Papadima-Sophocleous, 2020).

Another key benefit observed is the enhancement of collaborative learning. Tools like Glogster EDU and Padlet encourage teamwork and shared knowledge-building, reflecting the collaborative nature of scientific research and professional practice. Learners collaborating on multimedia projects show greater engagement and better integration of content knowledge with communication skills. This dynamic supports the development of both linguistic competence and interpersonal skills essential for real-world contexts (El-Garawany, 2021; Chang, 2024). Despite these advantages, several studies highlight challenges that can limit the effectiveness of digital tools on learner outcomes. Technical issues like unstable connectivity, incompatible devices, or inadequate platform support can disrupt learning. These problems are further exacerbated by varying levels of digital literacy among students and instructors, especially in regions with unequal access to technological resources (Arnó-Macià et al., 2020). Institutions that fail to provide consistent technical support or training risk creating gaps in student engagement and achievement. Recent studies emphasize the need for integrated support systems to ensure that learners can benefit fully from digital tools (Bhebe et al., 2023; Campillo-Ferrer & Miralles-Martínez, 2023).

The creativity and adaptability of ESP instructors are crucial in maximizing the impact of digital tools. Teachers who strategically use multimedia, simulations, and authentic tasks better motivate students and promote deep learning. In scientific fields, where content tends to be abstract and data-heavy, interactive tools like simulations, case-based tasks, and scenario modeling effectively transform complex information into engaging learning experiences (Arifani & Suryanti, 2019; Bannister et al., 2023). These approaches also foster the development of higher-order thinking skills, encouraging learners to apply language in problem-solving and analytical activities.

Looking forward, the trajectory of ESP education indicates an expanding role for digital tools in shaping learner competencies. Beyond improving vocabulary or comprehension, digital environments increasingly support soft skills such as collaboration, critical thinking, and professional discourse. As many of the selected studies suggest, digital tools are evolving from supplementary aids into core components of ESP pedagogy. However, for their impact to be sustainable and inclusive, educators and institutions must ensure the alignment of digital tools with pedagogical objectives, disciplinary needs, and learner diversity.

In conclusion, integrating digital technologies into ESP instruction has significantly enhanced learner outcomes in specialized fields by enabling flexible, personalized, and engaging learning experiences essential for developing linguistic and professional skills. However, maximizing their benefits requires strategic implementation, strong support systems, and ongoing professional development for educators. When thoughtfully applied, digital tools can effectively bridge the gap between academic training and workplace communication needs, leading to more meaningful and effective ESP instruction.

3.3. Challenges and Barriers in Integrating Technology into ESP Instruction

Despite the growing adoption of digital tools in English for Specific Purposes (ESP) instruction, a variety of persistent challenges continue to hinder their effective integration. These barriers span across technological limitations, educator readiness, learner disparities, cultural attitudes, infrastructure constraints, and resistance to pedagogical change. Collectively, they demonstrate that the successful application of digital tools in ESP settings requires more than just access to technology. It also necessitates institutional support, context-aware planning, and a commitment to inclusive professional development.

One of the most recurrent obstacles is the difficulty learners and instructors face in adapting to unfamiliar platforms. Students frequently encounter technical problems such as software instability and inadequate support when using collaborative applications like Glogster EDU (El-Garawany, 2021). These issues are often compounded by unreliable internet access, which interrupts learning continuity and weakens the effectiveness of digital instruction. Studies conducted in various regional contexts confirm that this digital fragility is widespread, particularly in under-resourced institutions (Bhebe et al., 2023; Chang, 2024).

Instructor preparedness is equally significant. As technology evolves rapidly, ESP educators must constantly update their skills to incorporate digital innovations into their pedagogical practices. However, not all instructors receive adequate training or ongoing support. Research by [Arnó-Macià et al. \(2020\)](#) and [Constantinou and Papadima-Sophocleous \(2020\)](#) reveals that insufficient digital literacy among teachers can lead to surface-level use of educational tools, often limited to content delivery rather than interactive engagement. [Campillo-Ferrer and Miralles-Martínez \(2023\)](#) emphasize that without pedagogical redesign and teacher training, technology remains underutilized, undermining its transformative potential. Learner-related barriers are also significant, particularly the unequal distribution of digital literacy among students. While some learners are adept at navigating educational platforms, others struggle with basic digital operations, such as uploading files or participating in discussion forums. [Dzięcioł-Pędich and Dudzik \(2021\)](#) point out that this disparity not only frustrates learners but can result in withdrawal from tasks, reducing engagement and learning gains. According to [Amjad et al. \(2024\)](#), these challenges are magnified when ESP courses are delivered through mobile or self-directed platforms, where learner independence is essential for success.

Cultural factors further complicate digital tool implementation. Students' perceptions of digital learning vary widely across cultural and educational contexts. In some cases, learners may distrust the credibility of online tools or feel uncomfortable with virtual collaboration, preferring traditional instruction methods instead. [El-Garawany \(2021\)](#) highlights that in tourism and hospitality programs, students initially viewed digital poster creation with skepticism until guided through reflective processes. [El-Garawany \(2021\)](#) and [Chang \(2024\)](#) argue that such cultural preferences must be considered in instructional design to ensure learners' affective engagement with technology-enhanced tasks.

Infrastructure gaps remain one of the most consistent barriers across studies. Many institutions, especially in rural or economically disadvantaged areas, lack the hardware, connectivity, and maintenance systems needed to support regular digital instruction. As reported by [Arifani and Suryanti \(2019\)](#), ESP educators often adapt their course delivery by minimizing reliance on multimedia features, even when such tools would benefit learner outcomes. [Bannister et al. \(2023\)](#) reinforce this concern by noting that disparities in institutional readiness continue to widen achievement gaps between students with full access to educational technologies and those without. Perhaps one of the most understated yet persistent challenges is the resistance to change observed among both educators and students. Educators often express reluctance to adopt new platforms due to concerns over increased workload, lack of confidence, or skepticism about efficacy. Similarly, students may avoid engaging with unfamiliar technologies, especially when they perceive them as less authentic or more cognitively demanding. [Arnó-Macià et al. \(2020\)](#) and [Chen et al. \(2020\)](#) identify this resistance as a systemic issue, suggesting that even well-resourced institutions may fail to optimize technological integration if change is not embraced across all stakeholders.

To mitigate these challenges, multiple studies recommend sustained professional development and institutional strategies that prioritize equity and inclusivity. Providing targeted digital literacy training for students, offering incentives for teacher innovation, and adopting user-friendly platforms that match instructional goals can significantly reduce implementation barriers. Moreover, [Bhebhe et al. \(2023\)](#) suggest that policy-level interventions are necessary to institutionalize the infrastructure and pedagogical frameworks needed to support long-term technology integration in ESP programs.

In conclusion, the effective integration of digital tools in ESP instruction is limited not only by technical barriers but also by socio-pedagogical and institutional constraints. These challenges demonstrate that educational technologies cannot be considered as isolated innovations. Instead, they must be embedded within a responsive teaching culture that anticipates learners' needs, accommodates institutional diversity, and provides consistent support for both educators and students. By addressing these multidimensional barriers, ESP programs can move toward more sustainable and impactful digital instruction.

3.4. Best Practices for Integrating Technology into ESP Instruction

The integration of digital technologies into English for Specific Purposes (ESP) instruction requires more than the adoption of tools. It demands a thoughtful pedagogical strategy that aligns technology use with learner needs, disciplinary demands, and institutional capabilities. Based on the thematic synthesis of the reviewed studies, several best practices have emerged that guide successful implementation of technology in ESP learning environments.

One of the most consistently supported strategies is the use of asynchronous digital tools, particularly for scientific and technical ESP fields. Platforms such as EnglishCentral and MedicalEnglish allow learners to engage with specialized language materials at their own pace. This self-directed engagement facilitates the internalization of technical vocabulary and complex syntactic structures, especially for students in disciplines where precision and terminology are critical (Dzięcioł-Pędich & Dudzik, 2021). The opportunity to revisit and reflect on content is essential for promoting depth of understanding and long-term retention. This approach is particularly effective in hybrid or online learning formats, as it enhances flexibility without compromising instructional rigor (Chang, 2024).

Another essential best practice is the incorporation of collaborative learning tools. Digital platforms such as Glogster EDU and Padlet promote group-based synthesis of subject matter through multimedia projects, allowing learners to develop both communication and teamwork skills (El-Garawany, 2021). These tools replicate the collaborative dynamics found in professional workplaces, fostering authentic interaction and the co-construction of knowledge. Research has shown that such collaboration boosts student motivation and improves their capacity to articulate discipline-specific content in coherent and persuasive ways (Constantinou & Papadima-Sophocleous, 2020).

The creativity of ESP instructors plays a pivotal role in the effective integration of technology. Teachers who design interactive simulations, incorporate real-world case studies, and use multimedia inputs tend to achieve higher levels of student engagement and performance. Arifani and Suryanti (2019) emphasize that when educators adapt digital tools to match instructional goals and learner profiles, they transform technology from a passive medium into an active pedagogical agent. For example, in engineering ESP courses, simulations of workplace scenarios have been used to teach procedural language and safety protocols, while in tourism contexts, virtual tours support the development of descriptive and promotional language (Bannister et al., 2023).

Blended learning models represent another widely endorsed practice. By combining traditional face-to-face instruction with online content delivery, educators can maintain the interpersonal and structured elements of classroom teaching while also expanding access to flexible, self-paced resources. Arnó-Macià et al. (2020) report that students in blended ESP programs often demonstrate greater confidence and autonomy, particularly when digital components are used to reinforce in-class materials. Campillo-Ferrer and Miralles-Martínez (2023) argue that blended learning supports inquiry-based approaches, enabling students to explore field-specific problems while receiving immediate feedback through digital platforms, which enhances understanding and critical thinking.

Robust infrastructure and support systems are foundational to all best practices. The provision of stable internet connections, updated digital devices, and responsive technical support ensures the smooth operation of online learning platforms. Without these foundational elements, even the most well-designed ESP programs can falter. Dzięcioł-Pędich and Dudzik (2021) emphasize that frustration caused by malfunctioning platforms or connectivity issues can significantly reduce learner engagement. In response, institutions must invest in both technical infrastructure and digital resilience, particularly in contexts where connectivity challenges persist (Bhebe et al., 2023).

Finally, continuous professional development is indispensable for effective technology integration. Teachers must remain current with technological trends and acquire the skills necessary to align these tools with their instructional methods. El-Garawany (2021) underscores that training in both pedagogical design and platform operation empowers teachers to make informed decisions about technology use. Institutions that offer structured digital literacy programs, peer mentoring, and platform-specific workshops foster an environment in which educators are not only capable but also confident in using digital tools. According to recent findings, professional development that is continuous, collaborative, and context-specific yields the most sustainable improvements in ESP instruction (Constantinou & Papadima-Sophocleous, 2020; Campillo-Ferrer & Miralles-Martínez, 2023).

In summary, the most effective practices for integrating technology into ESP instruction are those that are learner-centered, pedagogically grounded, and contextually adaptable. Asynchronous tools, collaborative platforms, creative instructional design, blended learning, robust infrastructure, and sustained teacher development all contribute to a comprehensive digital strategy. These practices not only enhance language learning outcomes but also prepare students for real-world communication demands in their respective professional fields.

3.5. Future Directions and Recommendations for Technology in ESP Instruction

The synthesis of current research provides a strategic outlook on how technology integration in English for Specific Purposes (ESP) instruction can be strengthened. As the educational landscape becomes increasingly digitized, future research must move beyond surface-level innovation to address deeper concerns of contextual fit, instructional sustainability, equity, and pedagogical coherence. Drawing from the thematic patterns across the selected studies, six key recommendations are proposed to guide the evolution of ESP digital instruction.

First, the development of domain-specific digital tools is strongly recommended. While many platforms currently used in ESP are designed for general language learning, learners in specialized fields such as medicine, law, engineering, and tourism require context-adapted features that align with professional communication norms. Studies by [Dzięcioł-Pędich and Dudzik \(2021\)](#) highlight that tailoring digital content to the linguistic and cognitive demands of specific disciplines significantly enhances learning relevance. [Chang \(2024\)](#) similarly emphasizes that the personalization of digital literacy training within ESP curricula can increase learner engagement and outcomes by aligning tools with real-world communicative contexts.

Second, researchers and institutions should prioritize longitudinal investigations into the sustained impact of digital tool integration. While short-term improvements in vocabulary or engagement are well-documented, there is a limited understanding of how technology affects long-term language proficiency, workplace communication readiness, and academic performance. [Arnó-Macià et al. \(2020\)](#) and [Campillo-Ferrer and Miralles-Martínez \(2023\)](#) underscore the importance of examining how learners retain and apply language skills over extended periods. A long-term focus will provide more accurate assessments of digital instruction's durability and return on investment.

Third, the ongoing training and upskilling of ESP instructors must remain a central concern. As educational technologies become more complex and nuanced, educators need structured and sustained professional development. [Arifani and Suryanti \(2019\)](#) suggest that training programs should focus on both the technical functions of tools and their pedagogical applications. Future research should explore which models of teacher development, including coaching, peer mentoring, and reflective practice, are most effective in fostering innovation. [Bannister et al. \(2023\)](#) and [Constantinou and Papadima-Sophocleous \(2020\)](#) have shown that well-supported teachers are more likely to implement digital solutions meaningfully and consistently in ESP settings.

Fourth, ensuring equitable access to digital tools remains a critical concern. Many learners, particularly those in remote or underserved regions, face barriers such as poor connectivity, limited access to updated devices, and insufficient institutional support. [El-Garawany \(2021\)](#) and [Bhebhe et al. \(2023\)](#) call for targeted interventions that bridge the digital divide in ESP contexts. These may include designing offline-compatible applications, providing institutional subsidies for equipment, and developing culturally sensitive platforms that consider users' technological readiness. Future research should investigate inclusive and scalable solutions that address these systemic gaps.

Fifth, the incorporation of artificial intelligence and machine learning into ESP education holds significant potential for personalization and adaptability. AI-powered platforms can analyze learner input in real time, offer individualized feedback, and dynamically adjust content difficulty based on learner progress. [Dzięcioł-Pędich and Dudzik \(2021\)](#) propose that AI tools could assist learners in mastering complex professional discourse while supporting instructors in tracking performance trends. [Bannister et al. \(2023\)](#) further suggest that AI-driven simulations can replicate workplace communication more authentically than static resources. Future studies should explore the usability, effectiveness, and ethical implications of AI adoption in ESP classrooms.

Sixth, the integration of immersive technologies such as virtual reality (VR) and augmented reality (AR) presents valuable opportunities for contextualized language learning. As hardware becomes more accessible and content more customizable, VR and AR can support ESP students in practicing real-world tasks within safe and interactive environments. For example, tourism learners might conduct guided tours in virtual settings, while medical students could engage in diagnostic dialogues using AR overlays. Research by [El-Garawany \(2021\)](#) supports the claim that these immersive experiences not only build fluency but also enhance pragmatic competence and learner confidence. Future inquiry should focus on implementation models, instructional design, and assessment within immersive ESP environments.

In conclusion, the future of technology in ESP instruction lies in its capacity to evolve responsively to pedagogical, technological, and socio-cultural dynamics. Field-specific customization, longitudinal research, teacher empowerment, access equity, AI integration, and immersive learning are essential components of a forward-thinking digital strategy. By exploring and addressing these areas in a coordinated manner, ESP educators, researchers, and institutions can ensure that digital tools contribute meaningfully to learner success in both academic and professional domains.

4. Conclusion

This systematic literature review, grounded in the PRISMA 2020 framework and enhanced by a quality appraisal adapted from the CASP checklist, offers a methodologically rigorous synthesis of 21 peer-reviewed studies published between 2019 and 2025, examining the integration of digital tools in English for Specific Purposes (ESP) instruction within higher education. The review reveals four core findings: first, mobile applications and LMS platforms were the most frequently employed tools, effectively enhancing learner engagement, vocabulary retention, and self-directed learning across disciplines such as healthcare, engineering, and tourism. Second, asynchronous tools like Flipgrid and Padlet supported learner autonomy and flexibility, particularly in scientific and teacher training contexts. Third, immersive technologies such as VR fostered situated learning by simulating real-world professional scenarios, improving pragmatic competence and disciplinary fluency. Fourth, multimedia creativity tools promoted collaborative and persuasive communication, especially in marketing and hospitality ESP settings. The study's novelty lies in its cross-disciplinary focus and attention to tool-function alignment, addressing a major gap in existing ESP research that often isolates technological application from field-specific pedagogical demands. These findings underscore the urgent need for institutional investment in digital infrastructure, continuous teacher training, and context-aware instructional design. Implications extend to curriculum developers and policymakers seeking to bridge the divide between academic language instruction and professional communication. Future research should undertake longitudinal studies to assess the lasting impact of digital tools on workplace readiness, explore the role of AI in tailoring ESP content, and address the digital divide through scalable, culturally responsive innovations. Such efforts will be instrumental in shaping an inclusive and future-responsive ESP ecosystem capable of supporting diverse learners in digitally mediated global environments.

References

- Acharya, S. (2024). Exploring the role of ESP teachers in the modern ELT classroom. *Journal of Language Teaching and Research*, 15(2), 45–60. <https://doi.org/10.17507/jltr.1502.01>
- Aguilar-Pérez, M., Arnó-Macià, E., & Tatzl, D. (2020). Engineering students' perceptions of the role of ESP courses in internationalized universities. *Journal of English for Academic Purposes*, 43, 100811. <https://doi.org/10.1016/j.jeap.2019.100811>
- Agzamovna, T. U. (2024). Bridging language and professional skills: Effective ESP pedagogy for diverse learner needs. *Current Research Journal of Pedagogics*, 5(10), 36–41.
- Ahmadi, M. R. (2018). The use of technology in English language learning: A literature review. *International Journal of Research in English Education*, 3(2), 115–125. <https://doi.org/10.29252/ijree.3.2.115>
- Amjad, M. A., Khan, S., & Ali, R. (2024). Unlocking success: Measuring higher education students' performance through e-books and m-learning. *Computers & Education*, 212, 105678. <https://doi.org/10.1016/j.compedu.2024.105678>
- Anggini, C. U., & Rodliyah, R. S. (2020). ESP students' digital literacy needs: The teachers' perspectives. In *Proceedings of the 2020 International Conference on Distance Education and Learning* (pp. 69–72). Association for Computing Machinery. <https://doi.org/10.1145/3416797.3416846>
- Arifani, Y., & Suryanti, S. (2019). The influence of male and female ESP teachers' creativity toward learners' involvement. *Journal of English for Academic Purposes*, 38, 1–12. <https://doi.org/10.1016/j.jeap.2019.04.001>
- Arnó-Macià, E., Aguilar-Pérez, M., & Tatzl, D. (2020). Engineering students' perceptions of the role of ESP courses in internationalized universities. *English for Specific Purposes*, 58, 58–74.

- Azizah, S. N., & Triastuti, A. (2024). Embracing multiliteracies challenges: Navigating multimodal literacy in maritime vocational education with the New London Group framework. *Formosa Journal of Sustainable Research*, 3(9), 2059–2072. <https://doi.org/10.55927/fjsr.v3i9.11611>
- Bannister, N., Curle, S., & Yuksel, D. (2023). A Delphi study on generative artificial intelligence and English medium instruction assessment implications. *Assessment & Evaluation in Higher Education*, 49(2), 1–15. <https://doi.org/10.1080/02602938.2023.2274931>
- Bhebe, S., Maphosa, C., & Dube, B. (2023). Sustaining the integration of technology pedagogies in higher education after the COVID-19 pandemic. *Education and Information Technologies*, 28(10), 13421–13444. <https://doi.org/10.1007/s10639-023-11748-y>
- Burgos, M., & Anthony, J. (2024). Digital literacy and language learning: The role of information technology in enhancing English proficiency. *American Journal of Education and Technology*, 3(4), 86–91. <https://doi.org/10.54536/ajet.v3i4.3808>
- Campillo-Ferrer, J. M., & Miralles-Martínez, P. (2023). Impact of an inquiry-oriented proposal for promoting technology-enhanced learning in a post-pandemic higher education context. *Sustainability*, 15(4), 3210. <https://doi.org/10.3390/su15043210>
- Chang, Y. (2024). ESP instruction design based on digital literacy for tourism English learners. *Journal of Hospitality, Leisure, Sport & Tourism Education*, 34, 100492. <https://doi.org/10.1016/j.jhlste.2023.100492>
- Chaovanapricha, T., & Champakaew, W. (2023). Thailand's higher education ESP practitioners: Problems, solutions and a potential practices model. *Asian Journal of Education and Training*, 9(4), 88–97. <https://doi.org/10.20448/edu.v9i4.5037>
- Chaovanapricha, T., & Champakaew, W. (2024). Exploring the multifaceted roles of English for specific purposes practitioners within the transformative paradigm in higher education. *Asian Journal of Education and Training*, 10(3), 131–140. <https://doi.org/10.20448/edu.v10i3.5845>
- Chemir, S., & Kitila, T. (2022). Learners' needs analysis for English for academic purposes in Ethiopian higher education institutions. *Journal of English for Academic Purposes*, 58, 101132. <https://doi.org/10.1016/j.jeap.2022.101132>
- Chen, Y., Liu, H., & Zhang, Y. (2020). An investigation of lecturers' teaching through English medium of instruction—A case of higher education in China. *Asia-Pacific Journal of Second and Foreign Language Education*, 5(1), 1–18. <https://doi.org/10.1186/s40862-020-00093-z>
- Constantinou, F., & Papadima-Sophocleous, S. (2020). The use of digital technology in ESP: Current practices and suggestions for ESP teacher education. *Journal of Teaching English for Specific and Academic Purposes*, 8(2), 135–152. <https://doi.org/10.22190/JTESAP2002135C>
- Costa, F., & Mastellotto, L. (2022). The role of English for specific purposes (ESP) in supporting the linguistic dimension in English-medium instruction (EMI). *Journal of English-Medium Instruction*, 1(1), 53–74. <https://doi.org/10.1075/jemi.21006.cos>
- Danial, H., Mestari, S. A., & Mohammad, T. (2023). Designing ESP learning instruction in management study program: A survey on students' needs. *International Journal of Educational Research and Social Sciences*, 4(1), 223–233. <https://doi.org/10.51601/ijersc.v4i1.612>
- Danko, M., & Dečman, M. (2019). The strategy inventory for second language learning: Tested, adapted, and validated in the Slovenian context. *System*, 86, 102121. <https://doi.org/10.1016/j.system.2019.102121>
- Deliwe, P. (2024). The importance of a learner management system in implementing data-driven instruction in higher education. *Journal of Educational Technology Systems*, 52(3), 345–367. <https://doi.org/10.1177/00472395241232567>
- Dewi, L. M. R. U., Utami, I. G. A. L. P., & Santosa, M. H. (2024). The importance of digital literacy skills in the context of learning English for specific purposes: A systematic review. *Jurnal Indonesia Sosial Teknologi*, 5(8), 3006–3015. <https://doi.org/10.59141/jist.v5i8.1291>

- Dzięcioł-Pędich, A., & Dudzik, A. (2021). Technology in support of developing speaking skills in ESP courses. *English for Specific Purposes*, 63, 1–15. <https://doi.org/10.1016/j.esp.2021.03.003>
- El-Garawany, Y. (2021). Glogging in the ESP classroom: Developing tourism studies students' EFL persuasive writing. *Journal of Language Teaching and Research*, 12(5), 789–798. <https://doi.org/10.17507/jltr.1205.13>
- Fitria, T. N. (2023). English lecturers' difficulties in teaching English for specific purposes (ESP) in various higher education in Indonesia. *Journal of English Teaching and Learning Issues*, 6(1), 65–76. <https://doi.org/10.21043/jetli.v6i1.19178>
- Ghafar, Z. N. (2022). English for specific purposes in English language teaching: Design, development, and environment-related challenges: An overview. *Canadian Journal of Language and Literature Studies*, 2(6), 41–49. <https://doi.org/10.53103/cjlls.v2i6.72>
- Godwin-Jones, R. (2015). The evolving roles of language teachers: Trained coders, local researchers, global citizens. *Language Learning & Technology*, 19(1), 10–22. ltjournal.org+2scholarspace.manoa.hawaii.edu+2scholarspace.manoa.hawaii.edu+2
- Hronová, K., & Knihová, L. (2020). Digital media in ESP instruction for marketing communication. *Journal of Teaching English for Specific and Academic Purposes*, 8(3), 245–260. <https://doi.org/10.22190/JTESAP2003245H>
- Husamiddinova, G. S., & Valieva, M. F. (2023). Use of different tools in teaching a foreign language in ESP lessons. *International Journal of Emerging Technologies in Learning*, 18(7), 123–139. <https://doi.org/10.3991/ijet.v18i07.38955>
- Kakoulli-Constantinou, E., & Papadima-Sophocleous, S. (2020). The use of digital technology in ESP: Current practices and suggestions for ESP teacher education. *Journal of Teaching English for Specific and Academic Purposes*, 8(1), 17–29. espeap.junis.ni.ac.rs
- Karapetyan, A. (2021). Conventional ESP activities in a digital format. *Journal of Language and Education*, 7(3), 45–58. <https://doi.org/10.17323/jle.2021.12145>
- Khalil, A., Elfatih, M., & Hellalet, N. (2024). Needs analysis in English for Moroccan applied mathematics graduate students at Ibn Zohr University. *International Journal of Linguistics and Translation Studies*, 5(3), 273–291. <https://doi.org/10.36892/ijlts.v5i3.499>
- Kukulska-Hulme, A. (2012). How should the higher education workforce adapt to advancements in technology for teaching and learning? *The Internet and Higher Education*, 15(4), 247–254. sciencepublishinggroup.com
- Li, F., & Li, H. (2023). Book review: The Routledge handbook of second language acquisition and technology. *Frontiers in Psychology*, 14, Article 1224826. <https://doi.org/10.3389/fpsyg.2023.1224826>
- Liu, X., Zhang, L., & Wang, Y. (2019). Research on ESP teaching reform by internet technology and implementation strategies in higher vocational education. *Journal of Educational Technology Development and Exchange*, 12(4), 88–102. <https://doi.org/10.18785/jetde.1204.07>
- Nishijo, M. (2022). Exploring the social construction of football coaching by a professional football coach: Toward the development of English pedagogical resources for sports. *Journal of Teaching English for Specific and Academic Purposes*, 9(1), 89–100. <https://doi.org/10.22190/jtesap2201089n>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, Article n71. research.monash.edu
- Remizantseva, K. V., & Ablyazov, T. I. (2019). Generation Z and digital tools in teaching foreign languages. In *Proceedings of the International Conference on Digital Technologies and Applications in Library and Information Science* (pp. 60–66). Atlantis Press. <https://doi.org/10.2991/icdtli-19.2019.60>
- Sakti, N. S. S., Sarkiah, S., Sukma, S., Amaluddin, A., & Efendi, R. (2024). Redefining ESP: Bridging the gap between traditional methods and modern educational needs. *Klasikal: Journal of Education, Language Teaching and Science*, 6(3), 806–813.

- Salaberri-Ramiro, M. S., & Sánchez-Pérez, M. M. (2021). Students' perceptions of the use of English in higher-education bilingual programs. *Latin American Journal of Content & Language Integrated Learning*, 14(2), 263–291.
- Suwandi, S. (2023). English language skills for Islamic economic students: Expectation versus reality. *New Horizons in English Studies*, 8, 73–90. <https://doi.org/10.17951/nh.2023.8.73-90>
- Yeung, M., & Mah, E. (2024). From EAP to ESP. *TESL Canada Journal*, 40(1), 137–150. <https://doi.org/10.18806/tesl.v40i1.1388>
- Zou, D., Zhang, R., Xie, H., & Wang, F. L. (2021). Digital game-based learning of information literacy: Effects of gameplay modes on university students' learning performance, motivation, self-efficacy and flow experiences. *Australasian Journal of Educational Technology*, 37(2), 152–170. <https://doi.org/10.14742/ajet.6682>