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Enhancing ESP Instruction through SPADA UNTIRTA: Pre-Service Teachers' Beliefs and Practices in ICT Integration

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Abstract

This study investigates the beliefs and classroom practices of pre-service English teachers in integrating Information and Communication Technology (ICT) into English for Specific Purposes (ESP) instruction through SPADA UNTIRTA, a locally developed online learning platform in Indonesia. Employing a sequential explanatory mixed-methods design, the research combined quantitative data from 60 participants using a validated questionnaire and qualitative insights from interviews with 10 selected respondents. The findings reveal a strong belief among participants in the pedagogical value of ICT, particularly in fostering learner engagement, contextualizing ESP content, and supporting independent learning. However, the actual implementation of ICT in instructional practices remains limited. Barriers include insufficient digital literacy, lack of pedagogical training, inconsistent access to ICT tools, and underutilization of SPADA UNTIRTA due to technical and operational challenges. The study highlights a significant gap between positive perceptions and actual teaching practices, indicating the need for enhanced professional development and curriculum integration of ICT-based pedagogies. It concludes that effective ICT integration requires not only favorable teacher beliefs but also systemic support, including institutional policies, training programs, and adequate digital infrastructure. The study offers recommendations for teacher education institutions to reinforce the alignment between pedagogical beliefs and practice in the digital learning environment.

INTRODUCTION

The digital transformation in education, driven by the convergence of Industry 4.0 and Education 5.0, has elevated the integration of Information and Communication Technology (ICT) from a supplementary tool to a pedagogical necessity. In English language education—particularly English for Specific Purposes (ESP)—ICT enables context-sensitive instruction by providing access to discipline-specific content, fostering learner autonomy, and enhancing professional communication skills (Wang & Bai, 2017). The shift demands not only technical adoption but also a conceptual rethinking of how teaching and learning are designed.

ESP is a learner-centered approach where language instruction is tailored to meet the specific communicative demands of professional or academic domains. This requires teachers to curate authentic materials, simulate real-world communication, and align pedagogy with occupational expectations. ICT serves as an enabler in this process, offering platforms that deliver multimodal, asynchronous, and personalized content (Rahmawati & Hidayati, 2021). Such integration fosters engagement and real-life relevance in ESP classrooms.

In Indonesia, the Ministry of Education introduced SPADA Indonesia (Sistem Pembelajaran Daring) as a strategic response to democratize digital learning in higher education. According to SPADA data (Kemdikbudristek, 2022), over 120 public universities now implement SPADA, yet utilization remains uneven. At Universitas Sultan Ageng Tirtayasa, SPADA UNTIRTA is expected to support digital instruction for pre-service teacher education, including ESP. However, internal institutional data (UNTIRTA, 2023) reveal that fewer than 40% of pre-service English teachers actively use SPADA in course design or delivery—highlighting a disconnection between platform availability and instructional integration.

This study is framed within two interrelated theoretical perspectives: the Teacher Cognition Theory (Borg, 2015), which posits that teachers' beliefs and knowledge deeply influence classroom practice, and the TPACK Framework (Koehler & Mishra, 2009), which emphasizes the intersection of technological, pedagogical, and content knowledge as critical for effective digital teaching. Together, these frameworks provide an analytical lens to explore not only what teachers believe about ICT but also how they translate those beliefs into pedagogical actions in ESP settings.

Numerous recent studies affirm the importance of positive teacher beliefs in shaping technology use. Yulianti, Manan, and Marlina (2022) found that teacher cognition predicts ICT adoption more accurately than institutional mandates. However, belief alone is insufficient. Putra and Zainuddin (2021) identified that even teachers with strong digital beliefs struggle to implement technology effectively due to infrastructural and pedagogical constraints, particularly in specialized domains like ESP.

In the ESP context, the challenge becomes more acute. Dewi and Fatimah (2023) note that while general ICT skills are taught in teacher training, there is little focus on adapting those skills to the specialized vocabulary, discourse structures, and learner expectations of ESP classrooms. The resulting mismatch leaves many pre-service teachers underprepared for digitally mediated ESP instruction, undermining both confidence and competence.

Furthermore, limited research has examined how localized platforms like SPADA UNTIRTA are used in ESP instruction. While national discourse celebrates digital innovation, micro-level studies on how pre-service teachers interact with such platforms are scarce (Ramadhani et al., 2019). This disconnect raises questions about whether national policies are being effectively implemented at the grassroots level, and whether teacher education programs are responsive to the realities of classroom digitalization.

Critically, most literature continues to treat English instruction monolithically, failing to differentiate General English (GE) from ESP. This oversimplification ignores the unique pedagogical demands of ESP, where language is not just communicative but professionally functional. Yusri et al. (2022) argue that failing to prepare teachers for this complexity risks reducing the effectiveness of ICT integration to mere tool usage, devoid of content relevance.

The implications of this research gap are substantial. If pre-service teachers' beliefs remain disconnected from practice—due to inadequate training, poor platform support, or conceptual misunderstanding—they risk entering the profession unprepared for the demands of digitally-driven, workplace-oriented English instruction. This misalignment threatens the broader goal of producing globally competitive educators capable of navigating hybrid and digital teaching landscapes.

This study therefore seeks to investigate the alignment between pre-service English teachers' beliefs and actual practices in integrating ICT into ESP instruction through SPADA UNTIRTA. By employing a mixed-methods approach, it aims to uncover systemic barriers, identify enabling conditions, and provide actionable recommendations for curriculum designers and policymakers. Ultimately, the research contributes to building a more pedagogically grounded, technologically empowered generation of future English educators in Indonesia.

METHOD

This study employed a sequential explanatory mixed-methods design, which integrates quantitative and qualitative approaches in two consecutive phases. The mixed-methods approach was selected to capture both the breadth of participants' attitudes through survey data and the depth of their classroom experiences through interviews, allowing for a comprehensive understanding of the phenomenon under investigation (Creswell & Plano Clark, 2018).

The scope of the research involved pre-service English teachers enrolled in the English Education Study Program at Universitas Sultan Ageng Tirtayasa (UNTIRTA), Banten, Indonesia, during the 2024/2025 academic year. These participants were selected due to their direct engagement with ESP courses and institutional exposure to the SPADA UNTIRTA platform, which made them a relevant population for exploring ICT-based instruction.

The main instruments used were a structured questionnaire and a semi-structured interview guide. The questionnaire was designed to measure two primary constructs: (1) teachers' beliefs about ICT integration in ESP teaching and (2) their self-reported instructional practices. The questionnaire items were adapted from recent validated instruments, including those developed by Al-Samarraie et al. (2020) for evaluating teachers' digital instructional readiness, and by Liu et al. (2021) for assessing beliefs and practices in technology-enhanced language learning. Additional items were newly developed to address the specific pedagogical demands of ESP instruction in the Indonesian tertiary context. To ensure content validity, the instrument was reviewed by a panel of experts in English language teaching and educational technology. It was then piloted with a small sample of pre-service

teachers before full deployment. The reliability test yielded a Cronbach's alpha of 0.86, indicating strong internal consistency.

The research was conducted at the Faculty of Teacher Training and Education (FKIP), Universitas Sultan Ageng Tirtayasa, Serang, Banten. Data collection was carried out during the odd semester of the 2024/2025 academic year.

Two data collection techniques were employed. First, the questionnaire was distributed online to 60 pre-service teachers via Google Forms. Second, 10 participants were purposively selected for follow-up semi-structured interviews based on variation in questionnaire responses. These interviews provided deeper insights into their reasoning, experiences, and perceived challenges regarding ICT integration.

The operational definitions of the core variables are as follows:

a. Beliefs refer to the participants' cognitive and affective perceptions of the value, relevance, and practicality of ICT in ESP teaching.
b. Practices refer to the actual use and frequency of ICT tools (e.g., SPADA UNTIRTA, Google Classroom, online games) in planning, delivering, and assessing ESP instruction.

For data analysis, quantitative data were analyzed using descriptive statistics (frequency, percentage, mean) via SPSS version 26. Qualitative interview data were analyzed thematically using the six-phase procedure developed by Braun and Clarke (2006): familiarization with the data, initial coding, searching for themes, reviewing themes, defining and naming themes, and producing the report. This approach facilitated the identification of patterns across participants' narratives and allowed for triangulation with survey results to enhance validity.

FINDINGS

This section presents the findings of the study in three categories: (1) beliefs toward ICT integration in ESP instruction, analyzed by subdimensions; (2) practices of ICT implementation; and (3) qualitative themes from interview analysis. This structured presentation aims to provide a comprehensive view of how pre-service teachers understand, apply, and reflect on the role of ICT within the context of English for Specific Purposes instruction. The first part focuses on their attitudinal orientation, broken down into perceived usefulness, self-efficacy, and pedagogical competence. The second part examines the frequency and type of digital tools used in classroom settings, offering a realistic picture of current instructional practices. The third part deepens the findings through thematic analysis, capturing participants' personal narratives, challenges, and institutional expectations. Together, these data sources provide a holistic understanding of the interplay between belief, behavior, and context in shaping digital pedagogical readiness.

1. Beliefs toward ICT Integration in ESP Instruction

Quantitative results from 60 pre-service English teachers revealed generally positive attitudes toward ICT, analyzed across three sub-dimensions: perceived usefulness, self-efficacy, and pedagogical competence. The majority of respondents either agreed or strongly agreed with statements indicating that ICT plays a valuable role in ESP instruction. Perceived usefulness emerged as the most consistently positive dimension, reflecting participants' acknowledgment of ICT's relevance in enhancing student engagement and access to authentic ESP materials. In contrast, responses related to self-efficacy and pedagogical competence showed greater variability, suggesting that while teachers value ICT conceptually, many still lack the confidence or instructional strategies to apply it effectively. This disparity points to a potential misalignment between belief and implementation readiness. Table 1 presents the percentage distribution of agreement levels for each dimension.

Table 1. Beliefs toward ICT Integration by Dimension

Dimension	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Perceived Usefulness	38	47	10	5	0
Self-Efficacy	22	40	25	10	3
Pedagogical Competence	18	42	28	10	2

These results show a clear difference between how much participants value ICT and how well they can actually use it in ESP teaching. Most of them agree that ICT is useful, but fewer feel confident about using it in ways that match the goals of ESP classes. Many gave neutral or negative responses when being asked about their teaching skills with ICT, which may mean they have not had enough training or examples of how to use technology for ESP. This shows that teacher training should not just explain what ICT tools are, but also teach how to use them effectively in specific language teaching situations. If this training is missing, the gap between what teachers believe and what they actually do in the classroom will likely continue, making digital programs like SPADA UNTIRTA less effective.

2. Practices of ICT Integration in the ESP Classroom

Despite favorable beliefs, the actual use of ICT in ESP teaching remains varied and, in many cases, inconsistent with the teachers' stated pedagogical convictions. This distinction suggests that belief alone is insufficient to drive consistent implementation without adequate scaffolding in digital pedagogy. Factors such as user familiarity, accessibility, and ease of integration appear to play a more decisive role in determining tool selection than alignment with instructional goals. In this context, the practical choices made by pre-service teachers often reflect pragmatic responses to resource availability and confidence levels rather than strategic pedagogical planning.

Table 2 presents how frequently various ICT tools are used in practice. Notably, informal and general-purpose tools such as WhatsApp and Google Classroom were more frequently used than the institutional SPADA UNTIRTA platform, which was specifically developed to support structured, asynchronous learning in higher education.

Table 2. Frequency of ICT Tool Use in ESP Teaching

ICT Tools Used	Frequently (%)	Occasionally (%)	Rarely/Never (%)
SPADA UNTIRTA	28	40	32
Google Classroom	42	38	20
YouTube/Videos	33	50	17
Online Quizzes (e.g., Quizzes, Kahoot)	20	45	35
Chat-based Platforms (e.g., WhatsApp)	65	25	10

The data imply that while teachers are comfortable using mainstream tools, there is hesitation or difficulty in utilizing more structured learning management systems designed for ESP instruction, such as SPADA UNTIRTA. This preference may stem from limited training on how to adapt platform features to ESP learning outcomes or from negative past experiences navigating complex digital environments. Moreover, it reflects a broader challenge in digital education—namely, that institutional platforms often lack the flexibility, familiarity, or immediacy of more informal tools, even when they are pedagogically superior. Therefore, unless SPADA is accompanied by targeted pedagogical modeling and technical mentoring, its potential to support high-quality ESP instruction may remain underused. These findings highlight the urgent need for contextualized digital training within teacher preparation programs, enabling future educators to align tool selection with instructional purpose rather than convenience alone.

3. Qualitative Insights from Interviews

To further elaborate on the quantitative findings, semi-structured interviews were conducted with 10 purposively selected participants. The interview protocol aimed to explore participants' experiences, perceived challenges, and suggestions for improving ICT integration in ESP instruction. Thematic analysis of the interview transcripts resulted in the identification of three dominant themes that reflect the underlying beliefs, constraints, and expectations of pre-service teachers regarding digital pedagogy. These themes not only reinforce the survey results but also provide deeper insight into the complexities they face in real instructional settings.

Figure 1 presents the distribution of these emerging themes based on the frequency and emphasis found in participants' narratives. The visual representation highlights the relative weight of each thematic category and allows for a clearer understanding of where the most pressing concerns are concentrated.

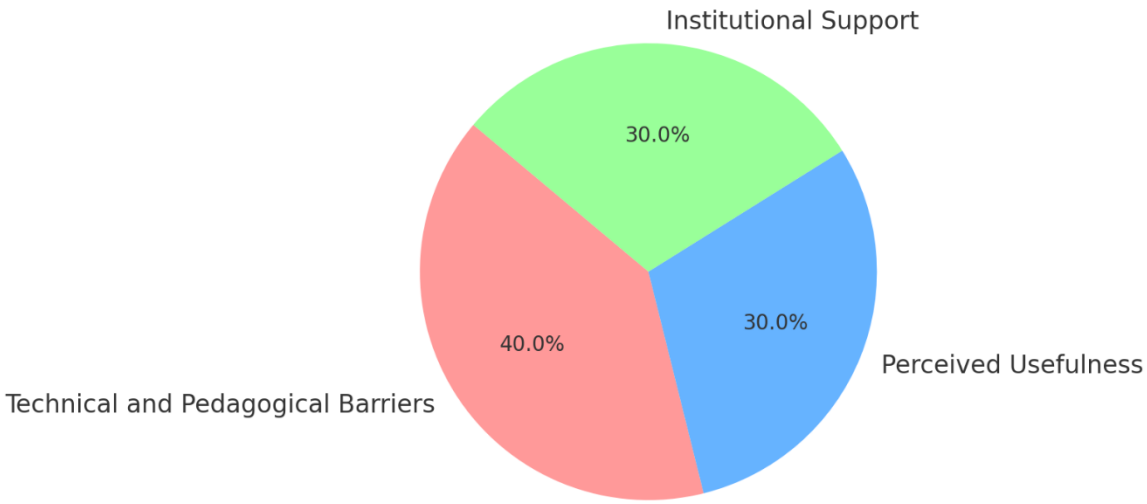

Figure 1. Emerging Themes from Interview Analysis

As shown in the figure, Technical and Pedagogical Barriers emerged as the most frequently mentioned theme (40%). Participants reported challenges such as difficulties in navigating the SPADA UNTIRTA platform, limited prior exposure to ESP-specific digital tools, and lack of pedagogical training tailored to online or blended ESP instruction. These concerns indicate that many pre-service teachers are entering the practicum phase without adequate preparation for managing subject-specific digital instruction.

Perceived Usefulness accounted for 30% of thematic references, indicating that participants recognized the potential of ICT to enhance ESP instruction by providing access to authentic materials, improving student engagement, and enabling flexible learning modes. However, their favorable attitudes were often overshadowed by technical limitations and instructional uncertainty.

The remaining 30% was classified under Institutional Support, where respondents expressed the need for more consistent and structured assistance from the university. This included technical guidance, access to expert mentoring, professional development workshops, and integration of ICT components into their teacher training curriculum. Participants voiced concerns about the gap between institutional expectations and the lack of concrete support mechanisms.

These qualitative findings corroborate the survey results, demonstrating that although pre-service teachers exhibit favorable attitudes toward ICT, their ability to apply such tools effectively in the context of ESP is hindered by practical, pedagogical, and systemic limitations. The alignment between themes and quantitative dimensions particularly in areas related to self-efficacy and pedagogical competence—underscores the need for teacher education programs to adopt a more holistic and embedded approach to digital literacy, one that explicitly connects beliefs, tools, and teaching practices within the specialized context of ESP.

DISCUSSION

Belief and Practice Relationship

The findings of this study confirm a well-documented phenomenon in teacher education, namely the gap between pedagogical beliefs and actual teaching practices. While pre-service English teachers at Universitas Sultan Ageng Tirtayasa (UNTIRTA) demonstrated strong positive beliefs toward the use of Information and Communication Technology (ICT) in English for Specific Purposes (ESP) instruction, particularly in the dimension of perceived usefulness, their actual classroom implementation, especially through the SPADA UNTIRTA platform, remained inconsistent. This distinction is in line with Borg's theory of teacher cognition, which explains that beliefs influence but do not always determine instructional behavior, especially when contextual and experiential factors interfere.

The findings of this study confirm a common issue in teacher education, which is the gap between what teachers believe and what they actually do in the classroom. Pre-service English teachers at Universitas Sultan Ageng Tirtayasa (UNTIRTA) showed strong positive beliefs about using Information and Communication Technology (ICT) in English for Specific Purposes (ESP) classes, especially in terms of perceived usefulness. However, their actual use of ICT in teaching, especially through the SPADA UNTIRTA platform, was not always consistent. This supports Borg's theory of teacher cognition, which explains that beliefs can influence teaching practices, but they do not always lead directly to action, especially when teachers face challenges in their environment or lack experience.

This interpretation is further supported by Bandura's theory of social cognitive development, which emphasizes that self-efficacy, or a teacher's confidence in their ability to use ICT effectively, plays a critical role in turning belief into action. In this study, while participants highly valued the potential of ICT, their levels of confidence and pedagogical readiness were comparatively lower. This suggests that positive attitudes toward ICT alone are not sufficient for effective classroom implementation.

Many participants expressed uncertainty about how to apply their beliefs in practical teaching tasks, such as designing ESP lesson plans, choosing appropriate digital tools, or conducting assessments through online platforms. This difficulty may reflect a lack of structured opportunities within their training programs to experience, apply, and refine their use of technology in authentic teaching situations. As a result, their beliefs remain abstract and aspirational, rather than practical and operational.

To address this misalignment, teacher education programs must embed meaningful, task-based digital training that is contextualized to the demands of ESP instruction. Pre-service teachers should be encouraged to not only explore digital tools theoretically but also to engage in guided practice, reflection, and peer feedback. Only through such integrated and practical exposure can the transformation from belief into professional classroom behavior be realized effectively.

Barriers to ICT Implementation

Although tools such as WhatsApp and Google Classroom were frequently used, more structured platforms like SPADA UNTIRTA remained underutilized. This finding mirrors prior studies indicating that user-friendly, informal tools are more accessible and thus preferred in the absence of formal training or institutional pressure (Saputro et al., 2019). Participants noted that SPADA's technical layout and lack of ESP-specific design features created additional barriers to effective use. For instance, several respondents mentioned that the navigation system was unintuitive, and the available templates did not support the types of communicative tasks typically required in ESP instruction.

These findings are consistent with Ertmer and Ottenbreit-Leftwich's framework of internal and external barriers to technology integration, where both mindset and environment co-determine practice. Internally, pre-service teachers may feel unprepared or intimidated by the platform, while externally, the lack of technical assistance, clear user guidelines, or exemplar lesson models using SPADA adds to their reluctance.

The presence of these barriers also implies a partial failure of policy-to-practice alignment. While the Ministry of Education has mandated digital transformation through SPADA, operationalizing it at the instructional level requires more than infrastructure. It demands a cohesive strategy that includes systematic onboarding, regular troubleshooting mechanisms, and the integration of platform usage into coursework and practicum design. Without these layers of support, SPADA risks being seen merely as a compliance tool rather than a meaningful pedagogical resource.

Moreover, the underutilization of SPADA suggests that pre-service teachers may be relying on digital improvisation rather than structured instructional planning. This habit can lead to inconsistent learning experiences for students and a lack of alignment with course outcomes, especially in specialized subjects like ESP that require targeted competencies. Therefore, overcoming these implementation barriers is not solely a matter of technology adoption, but one of building institutional ecosystems that connect access, ability, and pedagogical vision.

The Role of Institutional Support

Interview data reinforced the significance of institutional scaffolding. One-third of participants' thematic references focused on the lack of structured training, technical support, and curricular alignment in preparing them for digital ESP teaching. This aligns with Fullan's (2007) perspective on educational change, which argues that transformation in teaching practices must be supported by institutional leadership, clear policies, and a culture of innovation. Without strategic and coordinated efforts at the institutional level, even well-designed digital initiatives may fail to reach classroom-level implementation.

The absence of consistent professional development opportunities, particularly those tailored to ESP contexts, left many pre-service teachers feeling unprepared to translate digital access into meaningful instructional design. Some participants also highlighted the lack of integration between coursework on ICT and ESP content, suggesting that digital tools were taught in isolation rather than embedded in subject-specific pedagogy. This fragmentation limits the opportunity for pre-service teachers to develop holistic competence in technology-enhanced language teaching.

The results also echo the findings of Hamer et al. (2022), who reported that although SPADA UNTIRTA improves self-regulated learning, its underutilization in ESP contexts is due to the absence of pedagogical orientation and user mentoring. These findings point to a structural disconnect between institutional expectations and the lived experiences of teacher candidates. Without a strong institutional framework to guide digital pedagogy, teacher autonomy is compromised, and innovation is reduced to improvisation.

In this context, institutional support must go beyond providing infrastructure or access to platforms. It should include embedded mentoring systems, continuous formative feedback, and faculty modeling of effective digital ESP instruction. Moreover, policies should be aligned across curriculum development, practicum supervision, and platform usage so that digital integration becomes a natural and expected part of teacher preparation. When institutions actively model, support, and evaluate digital pedagogical practices, pre-service teachers are more likely to develop confidence, clarity, and creativity in using ICT for ESP instruction.

Implications for ESP Teacher Education

The results of this study show that teacher education programs need to improve how they train future teachers to use technology in English for Specific Purposes (ESP). At the moment, many programs teach general computer skills, but do not connect them well with how to teach specific subjects like ESP. The TPACK model from Koehler and Mishra (2009) shows that good use of technology happens when teachers combine knowledge of content, teaching methods, and technology. However, this combination is often missing in ESP teacher training.

To improve this, teacher education programs should teach digital tools together with ESP teaching content. For example, future teachers could create lesson plans or online modules using SPADA that meet the language needs of students preparing for specific jobs or fields. This kind of activity helps students as well as teachers learn how to use digital tools while thinking about real teaching goals.

It is also important to give future teachers chances to practice teaching with technology in their ESP courses. They can try designing online ESP lessons, giving short practice lessons using SPADA, and giving feedback to their classmates. These activities can help them feel more confident and improve their teaching skills. As shown in other studies, teachers grow when they are guided, supported by peers, and given time to reflect.

In addition, programs should look at how these changes affect students. While this study focused on teachers, the real goal is to improve student learning. When digital tools are used well, students can become more interested in learning, better understand the material, and improve their language skills for academic or career purposes. Teacher education programs should also help future teachers learn how to check student progress and listen to student feedback, so they can improve their teaching based on what students need.

Lastly, schools and universities should change their policies to support this way of teaching. If the use of technology is not part of how student teachers are graded or evaluated, they may not take it seriously. Using real teaching tasks and student results in assessments can make ICT training more meaningful and useful for future teaching.

In short, teaching ESP with technology is not just about using tools. It is about preparing future teachers to use those tools in ways that help students learn better. Giving them the skills, practice, and support they need will help them become effective and confident ESP teachers in a digital world.

CONCLUSION

This study investigated the beliefs and practices of pre-service English teachers regarding ICT integration in English for Specific Purposes (ESP) instruction through the SPADA UNTIRTA platform. The findings revealed a significant alignment in perceived usefulness, yet a disconnect between belief and practice emerged in the areas of self-efficacy and pedagogical competence. Although participants recognized the value of ICT in enhancing ESP learning, their actual classroom application remained inconsistent and limited.

The study's core contribution lies in its demonstration that favorable beliefs alone are insufficient to ensure effective ICT integration. Practical implementation is shaped by a constellation of factors, including teacher confidence, pedagogical knowledge, institutional training, and digital infrastructure. This interplay reflects the complex dynamics captured by the TPACK and Teacher Cognition frameworks.

More importantly, the study underscores the need for a paradigm shift in teacher education programs—from treating ICT as an isolated competency to embedding it meaningfully within ESP pedagogy. Unless digital teaching is integrated into discipline-specific courses and supported by institutional structures, the potential of platforms like SPADA UNTIRTA will remain underutilized.

This study offers empirical grounding for the development of more responsive, context-specific strategies to prepare future ESP educators. By addressing the belief–practice gap, institutions can ensure that pre-service teachers are not only digitally literate but also pedagogically capable of delivering high-quality, technology-enhanced ESP instruction. Future research is encouraged to examine longitudinal impacts of SPADA-based training models on actual classroom practices and student learning outcomes in ESP contexts.

Recommendations

The findings from this study highlight the urgent need for targeted reforms in ESP teacher education, particularly in how digital pedagogy is introduced, modeled, and assessed. First, ICT integration should be embedded into ESP-specific coursework through authentic, task-based assignments using platforms like SPADA UNTIRTA. Instead of separating digital training as a standalone module, institutions should ensure that pre-service teachers engage with technology within the context of subject-matter instruction.

Second, practicum programs should include structured opportunities for pre-service teachers to apply digital tools in simulated or real ESP teaching environments. These could include designing asynchronous modules, conducting micro-teaching with peer feedback, or integrating ICT-based assessments aligned with ESP objectives. Such experiences not only enhance pedagogical competence but also foster reflective teaching practices.

Third, academic leadership should support institutional frameworks that provide continuous training and technical mentoring. The availability of help desks, model teaching repositories, and collaborative workshops would help reduce technical barriers and build teacher confidence. Moreover, assessment rubrics and course learning outcomes should explicitly reward the strategic use of ICT in ESP contexts, ensuring that digital integration is seen not as optional, but as a core professional skill.

Finally, interdepartmental collaboration is essential. Faculty members in English education, ICT units, and curriculum development teams must work together to ensure coherence between pedagogical vision, platform functionality, and institutional policies. When pre-service teachers receive consistent messages and modeling across academic units, the transition from belief to practice becomes more attainable and sustainable.

Limitations and Further Research

Despite its contributions, this study acknowledges several limitations. The research was conducted with a relatively small sample size limited to one public university in Indonesia, which may restrict the generalizability of the findings. Future research should include participants from multiple institutions across different regions to better capture contextual diversity in ESP teacher preparation and ICT infrastructure.

Additionally, the reliance on self-reported data introduces the possibility of social desirability bias. While efforts were made to ensure anonymity and encourage honest responses, participants may have overstated their practices or beliefs. Complementary classroom observations or digital portfolio analyses could provide more objective evidence of ICT usage in future studies.

This study also focused primarily on SPADA UNTIRTA as the digital platform of reference. While this local LMS reflects national policy implementation, it may not represent the range of platforms used in other teacher education settings. Future research could compare SPADA with other

LMS environments to evaluate whether technical design, training availability, or pedagogical flexibility influence integration differently.

Finally, further research is encouraged to explore the long-term impact of ICT-integrated teacher training on graduates' classroom practices after entering the profession. Longitudinal studies tracking pre-service teachers into their in-service careers would provide valuable insights into how early beliefs and training experiences influence sustained pedagogical behavior in real-world ESP instruction.

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