



Empowering Pre-Service English Teacher through Digital Learning Ecosystems and Emerging Technologies

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Abstract

The rapid integration of technology into education necessitates that pre-service English teachers possess strong digital skills and adaptability. This study investigates the perspectives and experiences of fifth-semester English education students at a private university in East Jakarta about their use of digital tools. Employing a quantitative research approach, the study used a structured questionnaire to gather data on students' views of digital learning ecosystems, their readiness to adopt new technologies, and the impact on their self-confidence and professional identity. Preliminary study revealed, the respondents have a positive outlook on digital learning, recognizing its potential to boost student engagement, learning efficiency, and creativity. While the study confirms these benefits, it also identifies significant challenges, such as limited resource access, increased digital workload, and classroom management issues. It suggests that engaging in ICT-based practices enhances pre-service teachers' self-confidence and helps shape their professional identity, preparing them for technology-driven classrooms. This research demonstrates that technology integration not only influences pedagogical practices but also cultivates resilience, adaptability, and an innovative mindset. In conclusion, the study underscores the critical importance of integrating digital learning and authentic technological practices into teacher education curricula to empower future English teachers to meet evolving educational demands and foster innovation.

Keywords: Pre-service English teacher, Digital learning ecosystem, Emerging Technologies





Introduction

The Rapid advancement of digital technologies has transformed the landscape of education, requiring pre-service English teachers to acquire digital competence and the ability to integrate technology effectively into teaching practices. Recent studies have highlighted the importance of digital tools such as Duolingo, Quizizz, and Grammarly in improving language learning and professional readiness among pre-service teachers (Chu et al., 2023). Moreover, the emergence of ICT integration and technology-enabled learning has been shown to significantly influence pre-service teachers' pedagogical practices, identity formation, and professional development (Hou et al., 2022). In the context of English language education, digital learning ecosystems and emerging technologies provide not only access to innovative learning materials but also foster engagement, creativity, and critical thinking (Huertas-Abril et al., 2021).

However, challenges such as unequal access to digital resources, increased cognitive load, and classroom management remain prevalent (Köstler & Wolff, 2025). In addition, emerging technologies, including artificial intelligence and gamification, bring new opportunities to empower pre-service teacher in developing confidence and adaptability in technology-driven classrooms (Putu Maha Surya Suardewa et al., 2024). Therefore, this study seeks to investigate the perspectives and experiences of fifth-semester English education students at a private university in East Jakarta regarding their use of digital tools, readiness to adopt emerging technologies, and the impact on their self-confidence and professional identity. This research aims to provide insights into how digital learning ecosystems can empower pre-service English Teacher to meet the evolving demands of education in the 21st century.

Method

This study employs a quantitative research approach using structured questionnaire as the primary instrument for data collection. The questionnaire was adapted from Technology Acceptance Model (TAM) framework (Huu et al., 2024) and modified with indicators and pre-service teachers' digital competence (Chu et al., 2023). The instrument consists of 18 closed-ended items measured on a 5-point Likert scale,

spanning from 1 (Strongly Disagree) to 5 (Strongly Agree), along with three optional open-ended questions to capture more detailed insight.

The population of this study includes Fifth-semester students enrolled in the English Education Department at FKIP UHAMKA, a private university in East Jakarta. Given the relatively small number of students, the study employs a total sampling technique, targeting all students in this cohort. The data collected will be analyzed using descriptive statistic to examine general trends and inferential analysis to identify relationships between constructs such as leadership support, job



relevance, perceived, usefulness, perceived ease of use, and attitudes toward digital learning ecosystems and emerging technologies.

Findings and Discussion

1. Demographic Profile and Technological Background

The respondents were all fifth-semester students from the English Education study program, aged between 19-22 years.

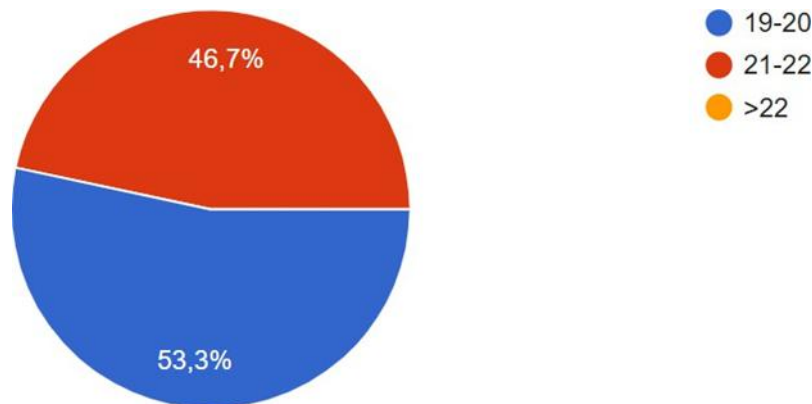


Figure 1. age of respondents

According to the statistics in Figure 1, the majority of respondents (53.3%) were between the ages of 19 and 20, and 46.7% were between the ages of 21 and 22. This suggests that the majority of individuals fall within the normal age range of fifth-semester university students. Because participants have comparable educational backgrounds and exposure to online learning environments, this homogeneity helps to ensure that responses are consistent. The research may now concentrate more on students' attitudes and opinions regarding the use of technology in English language learning rather than demographic variance, as age does not seem to be a key differentiating factor in this study.

Crucially, a significant majority (93.3%) reported having prior experience using emerging technologies like AI tools, gamification, and mobile apps in learning or teaching.

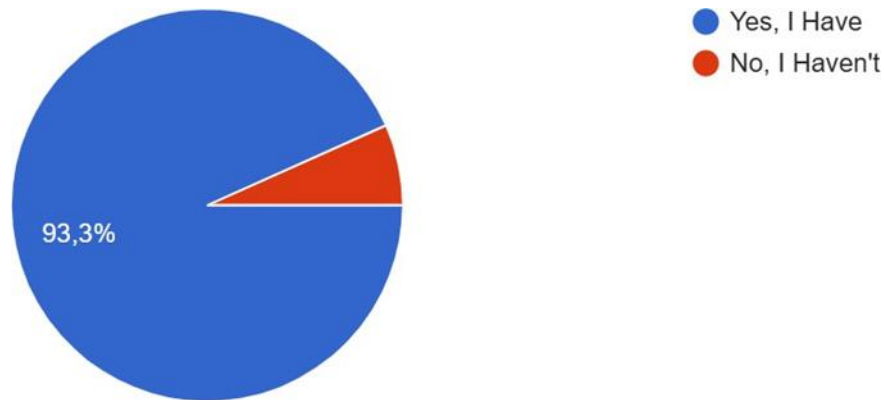


Figure 2. experience using emerging technologies like AI tools, gamification, and mobile apps in learning or teaching.

The data in Figure 2 indicates that a significant majority of respondents (93.3%) have prior experience in utilizing emerging technologies such as AI tools, gamification, and mobile applications in their learning or teaching activities. This finding suggests a high level of digital exposure and adaptability among participants, reflecting the growing integration of technology in educational environments. The small percentage (6.7%) of respondents who have not yet used these technologies highlights that while digital adoption is widespread, there remains a minority who may require further support, training, or access to digital resources.

However, a smaller percentage (73.3%) had formally taken a course in educational technology. This gap between practical, self-driven usage and formal pedagogical training is a critical point of discussion, indicating that while students are proactive in adopting technology, there may be an unmet need for structured guidance on its effective pedagogical integration.

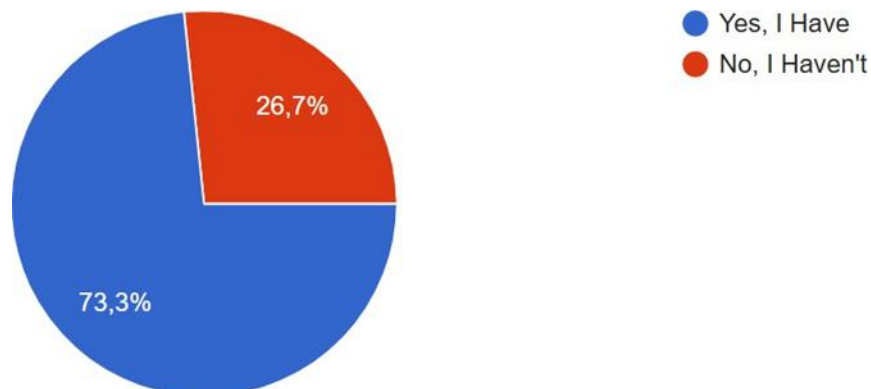


Figure 3. formally taken a course in educational technology

The data presented in Figure 3 illustrates that a majority of the respondents (73.3%) have formally taken a course in educational technology, while 26.7% reported that they have not. This indicates that most





fifth-semester students in the English Education Department at UHAMKA have already received formal exposure to the theoretical and practical aspects of educational technology. This finding aligns with the current emphasis on digital literacy and the integration of technology in teacher education programs.

2. Leadership, Institutional Support, and Readiness for Digital Integration

This study employed a quantitative approach to investigate the perceptions of pre-service English teachers at UHAMKA regarding digital learning ecosystems and emerging technologies, based on constructs from the Technology Acceptance Model (TAM). (Aithal & Aithal, 2023) The data collected from 15 fifth-semester students via a Likert-scale questionnaire and open-ended questions reveal a complex interplay between recognition of value and encountered barriers. The findings are structured and discussed according to the research constructs.

1) Leadership & Institutional Support

The data indicates a moderate level of perceived institutional support (Mean range: 3.40 - 3.67). While respondents generally agreed that lecturers encourage technology use and that facilities are provided, this construct received the lowest mean scores among all. Item 3, concerning the supportiveness of the overall academic environment for exploring new technologies, had the lowest mean (M=3.40). This suggests that while the basic infrastructure and encouragement exist, the environment may not be fully perceived as actively fostering innovation and deep exploration. This finding aligns with challenges noted in the qualitative data, where a need for more structured training was emphasized. It appears that providing tools is not synonymous with creating a fully supportive ecosystem for technological empowerment (Zeng et al., 2025).

2) Job Relevance

This construct garnered the highest level of agreement from the respondents (Mean range: 3.80 - 4.07). As summarized in Table 1, the belief that "mastering digital technologies will enhance my competitiveness as a future English teacher" (Item 6) received the highest mean score overall (M=4.07). This strong consensus underscores that pre-service teachers view digital competence not as an optional add-on but as a crucial, career-defining skill. This aligns with global discourse on 21st-century teaching competencies and confirms the foundational premise of the study that digital empowerment is intrinsically linked to professional relevance (Instefjord & Munthe, 2017).

Table 1. Descriptive Statistics of Pre-Service Teachers' Perceptions (N=15)

Type	No.	Item Statement	Mean	Std. Deviation





Leadership & Institutional Support	1	Lecturers or mentors encourage me...	3.67	0.488
	2	The faculty provides facilities...	3.67	0.724
	3	I feel that the academic environment...	3.40	0.632
Job Relevance	4	Mastering digital learning ecosystems is essential...	3.87	0.743
	5	Emerging technologies are relevant...	3.80	0.676
	6	Mastering digital technologies will enhance my competitiveness...	4.07	0.799
Perceived Usefulness	7	...help me improve my pedagogical skills...	3.87	0.743
	8	...support the improvement of English language skills...	3.87	0.743
	9	...increase my motivation and confidence...	3.87	0.743
	10	...makes the teaching and learning process more effective...	3.93	0.704
Perceived Ease of Use	11	I find it easy to use LMS...	3.67	0.724
	12	I can adapt quickly when given new technological tools...	3.67	0.724
	13	...can be easily integrated into English language teaching plans.	3.67	0.617
	14	I feel comfortable using digital technologies...	3.67	0.488





Attitude Toward Using	15	...makes learning more engaging.	3.87	0.640
	16	I am enthusiastic about exploring new technologies...	3.60	0.632
	17	I intend to integrate digital learning ecosystems...	3.53	0.516
	18	...is enjoyable for me.	3.87	0.516

3) Perceived Usefulness and Ease of Use

Perceived Utility (PU) and Perceived Ease of Use (PEOU), the two fundamental TAM constructs were strongly affirmed. PU items received high scores (Means: 3.87 - 3.93), indicating that respondents believe these technologies significantly improve pedagogical skills, language competency, motivation, and overall effectiveness. The qualitative data on benefits, such as "flexibility," "personalization," and access to "authentic materials," provide concrete examples of this perceived usefulness (Lu et al., 2025). PEOU scores were consistently positive but slightly lower (Mean: 3.67 for all items). This indicates that while respondents feel comfortable and adaptable, there is not a strong consensus that these tools are extremely easy to use or integrate. This nuance is critical. It bridges the quantitative data with the qualitative findings, where "lack of digital literacy," "adaptation," and "unstable internet" were cited as key challenges. This suggests that current levels of ease-of-use are sufficient to recognize the value but may be a barrier to seamless and confident integration, reinforcing the need for targeted training (Can & Karacan, 2021).

4) Attitude Toward Using

Overall attitudes were positive (Mean range: 3.53 - 3.87). Respondents find digital learning enjoyable and engaging. However, the score for behavioral intention to integrate technology in the future (Item 17, M=3.53) is the second-lowest of all Likert items. This subtle dip is telling. It suggests a gap between a positive general attitude and a firm intention to apply these tools in their own teaching practice. This intention-behavior gap can be explained by the discussed challenges in PEOU and institutional support; perceived barriers may be tempering the translation of a positive attitude into a firm behavioral intention (Huu et al., 2024).

5) Thematic Insights from Open-Ended Responses

To complement the quantitative findings, the survey included an open-ended question that asked students to articulate the greatest benefit of using digital learning ecosystems in English language learning. A thematic analysis of the responses highlighted two major categories: the enhancement of learning accessibility and efficiency and the improvement of engagement and pedagogical quality.

a) Accessibility and Efficiency:

A prominent theme was the significant improvement in access to learning resources and the





streamlining of the learning process. Students frequently highlighted how digital ecosystems break down barriers to information and simplify their academic tasks.

b) Engagement and Pedagogical Quality:

Beyond mere convenience, students identified profound benefits related to the quality and nature of the learning experience. They valued the interactive, personalized, and modern approaches that digital tools facilitate.

Taken together, these responses demonstrate that pre-service teachers value digital learning ecosystems not only for their practical utility in making learning more efficient and accessible but also for their transformative potential in creating more dynamic, engaging, and effective pedagogical experiences. To illustrate these themes more clearly, Table 3 presents a summary of categories alongside representative responses.

Table 3. Thematic Analysis of Open-Ended Responses on the Benefits of Digital Learning Ecosystems

Theme	Representative Responses
Accessibility & Efficiency	"make a study easier." "teachers or students will be able to access materials more easily." "The benefits of using digital learning are that learning becomes easier and more modern."
Engagement & Pedagogical Quality..	"They offer personalized and interactive learning experiences that boost engagement and improve language skills." "more access to authentic materials, interactive tools, and collaborative platforms that make learning English more engaging and flexible."

Conclusion

In summary, this study confirms that strategic exposure to and practice with digital learning ecosystems successfully empowers pre-service English teachers by fostering the resilience, adaptability, and innovative mindset required in the 21st-century classroom. The findings underscore the non-negotiable importance of continuing to weave authentic, critical, and supported





technological experiences throughout the teacher education curriculum. By doing so, institutions like UHAMKA can ensure that their graduates are not only ready to enter the field of English language teaching but are fully prepared to lead its evolution.

Implications, Limitations, and Future Research

This study provides significant insights with clear implications. Theoretically, it strongly validates the Technology Acceptance Model (TAM), demonstrating that pre-service teachers' high intention to use technology is driven by its perceived usefulness, ease of use, and professional relevance, all amplified by a supportive institutional environment.

Practically, teacher education programs should:

- 1) Enhance pedagogical integration by moving beyond basic digital literacy to training in critical evaluation and lesson design with technology.
- 2) Leverage institutional support through dedicated digital teaching labs and communities of practice.
- 3) Foster a mindset of innovation and ethical use, preparing teachers to use technology creatively while upholding academic integrity.
- 4) The study's limitations include a small sample size from a single university, a high-achieving cohort that may not be fully representative, and potential bias from self-reported data.
- 5) Encourage continuous professional development by integrating technology-related workshops and micro-credentials.
- 6) Promote interdisciplinary collaboration between education faculties and technology experts to co-develop digital learning models and research projects.





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