Technology Use in English Language Teaching: Insights from TPACK, SAMR, and TAM Frameworks

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ABSTRACT

Keywords:
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The integration of digital technologies in the EFL context has reshaped teaching and learning. Teachers can leverage a variety of digital tools, platforms, and applications to enhance their methods and address diverse learning styles. Despite the widespread acceptance of digital tools among learners, not all teachers fully exploit their potential. Pre-service teachers, in particular, must be prepared for the dynamic nature of technology in education. This paper maps the current state of digital tool use among in-service teachers and explores the attitudes of pre-service teachers towards these tools. The study was conducted at Trnava University in Trnava, Slovakia, examined the perspectives of teachers and pre-service teachers through three frameworks: the Technology Acceptance Model (TAM), the SAMR framework, and the Technological Pedagogical Content Knowledge (TPACK) framework. Data were collected through interviews with in-service teachers and a questionnaire targeting the views of pre-service teachers. The qualitative data were evaluated through thematic coding, and the quantitative data were analysed statistically. Despite the limitations of unbalanced sample (110 pre-service and 4 in-service teachers), the findings indicate notable similarities between the two groups, particularly in their preference for efficient and user-friendly tools. Pre-service teachers emphasise engagement and interactivity, while in-service teachers prioritise tools that support effective classroom management and maintain pedagogical accuracy.

Introduction

Digital tools have had a transformative impact on all aspects of human activity, including language education. While tools can enhance learning, effectiveness depends on pedagogical implementation (e.g., Nguyen & Habók, 2024). Among the most frequently utilised digital

technologies are various hardware and software solutions, including social media, language applications, video conferencing tools, collaborative platforms, assessment tools, and virtual learning environments. Key advantages of these technologies lie in their ability to foster independent and autonomous learning, providing personalised learning opportunities and an extensive repository of authentic language practice materials for learners with diverse needs and learning paces (Liu & Moeller, 2019; Vančová, 2021).

Klimova et al. (2023) confirm the overall efficacy of digital tools and advocate their use beyond the classroom setting. Furthermore, stakeholders and policymakers must collaborate to establish conditions that facilitate the seamless integration of these tools into language learning processes. According to Bui (2022), teachers primarily seek improvements in instructional materials, lesson quality, and professional development, whereas learners are more concerned with increasing participation and enhancing academic performance. Educators' successful implementation of digital tools largely depends on their positive disposition towards technology, their level of competence, and the availability of appropriate resources and infrastructure. More contemporary frameworks, such as SAMR and TPACK, emphasise the need for teachers to engage in continuous professional development, ensuring their pedagogical practices evolve in response to technological advancements.

This study aims to investigate the degree of integration of digital learning tools by in-service and pre-service teachers of English as a Foreign Language (EFL) through evaluation from multiple perspectives using three relevant models and frameworks. The frameworks selected were the Technology Acceptance Model (TAM; Davis, 1989), the TPACK framework (Mishra & Koehler, 2006) and the SAMR framework (Puentedura, 2006). Together, the frameworks contribute a profound understanding of the integration process by highlighting separate dimensions—user acceptance (TAM), essential knowledge (TPACK), and levels of pedagogical integration (SAMR).

Literature review

Fundamental to the successful implementation of digital technology is a correct and effective application, which requires professional and technical assessment by experienced educators. In this regard, teachers play a pivotal role in maximizing the potential of these tools while maintaining a balance between technology and traditional teaching methodologies.

Despite their advantages, the use of digital tools in the educational process is not without limitations. For example, existing research suggests a persistent lack of understanding among educators regarding the utilization of technology for essential aspects of their work, such as assessment (Nguyen & Habók, 2024). According to Basilotta Gómez-Pablos et al. (2022), higher education instructors often lack digital competencies, particularly in the assessment domain, despite the capabilities of digital tools to monitor student progress. Moreover, many educators resort to self-learning due to limited opportunities for collaborative learning with peers, which can hinder their professional development. However, Zhang (2022) asserts that teachers who were familiarised with digital technology are more inclined to integrate digital tools into their teaching practices. Despite this, Fernández-Batanero et al. (2020) argue that digital literacy training tends to focus predominantly on technical proficiency rather than on its pedagogical application, which is crucial for maximizing instructional effectiveness. Confirming these claims, Záhorec et al. (2021) emphasise the importance of equipping future teachers with the skills necessary to utilise technology across diverse teaching scenarios effectively. While digital tools were previously utilized mainly by motivated learners who preferred individual learning, they have become commonplace in blended and online courses. The successful management of these tools demands a competent teacher who can balance the

educational and social needs of learners (Vančová, 2021). Despite this, Akram et al. (2022) observe that online exercises often lack personal interaction and communication, which can make them less engaging compared to traditional exercises.

The COVID-19 pandemic further underscored the significance of digital tools in enhancing students' competencies across multiple learning domains (Pratiwi & Waluyo, 2023). For example, Liashuk (2022) directly highlighted the positive impact of LMS Moodle activities and learners' performance. Thus, while learning opportunities evolve in response to external conditions, teachers' responsibilities toward their learners and their educational needs remain constant and should be addressed appropriately in all circumstances.

The current research addressed individual perceptions. However, a direct link between pre-service teachers' needs and in-service teachers' practices needs to be made. The presented research will focus on investigating the practices and needs of in-service and pre-service teachers in the actual integration of digital tools into the education process. Applying a multi-framework approach will provide a deeper understanding of how digital tools are implemented, accepted and used pedagogically.

Using Technology in Teacher Training

Pre-service teacher training that incorporates technology is crucial for encouraging their future willingness to adopt digital tools. Such incorporation enables the building of a positive relationship with learning technologies. Motivating this group of technology users is essential for effective teaching and learning in the digital age. Farjon et al. (2018) argue that, despite the increased availability of digital tools, an individual's motivation remains the most significant factor influencing successful integration. Conversely, Pozas and Letzel (2023) assert that attitude itself is the primary determining factor. Additionally, Park and Son (2020) highlight that early exposure to technology in the classroom is vital for the effective use of digital tools, even among pre-service teachers who are already technologically proficient. In other words, motivation, attitude and actual use are key determinants of digital tool adoption.

However, Maderick et al. (2015) and Watson and Rockinson-Szapkiw (2021) suggest that pre-service teachers might exhibit a more positive attitude towards technology, possibly due to their limited direct classroom experience or an inaccurate self-assessment of their digital competence. As identified by Ding and Hong (2024), learners' self-efficacy—defined as their belief in their ability to use digital tools effectively—can help overcome emotional barriers to the implementation of technology. Similarly, Maderick et al. (2015) propose that pre-service teachers often underestimate the complexities associated with integrating technology into the classroom, due to their limited practical teaching experience. Moreover, inexperienced learners and teachers may have unrealistic expectations regarding the roles of tools and educators in the learning process. Vančová (2021) summarised findings from previous research, suggesting that the teacher's role is much more complex than it may appear from the learner's perspective. Teachers not only need to ensure the quality of the information and digital tools used but must also be prepared to address and solve various technical, motivational, and social challenges faced by learners. Consequently, teachers in online and digital learning environments must be more engaged than in traditional face-to-face classes, as learners often work independently and require support from peers or instructors. All of these factors may hinder the effective use of digital tools, underscoring the need for pre-service teachers to receive adequate training in their application. Digital tools are particularly advantageous for supporting authentic, task-based teaching methodologies (Yildiz Durak, 2021), which may increase pre-service teachers' interest in implementing them and promote ubiquitous learning. Aydemir and Demirkan (2024) also affirm the benefits of digital tools in various educational settings, while Liza and Andriyanti

(2020) note that the inherently motivational nature of these tools encourages teachers to improve their digital competencies.

Furthermore, Torres-Hernández and Gallego-Arrufat (2022) emphasise that pre-service teachers should receive comprehensive training in internet security, ethical considerations, and copyright compliance when utilising software and digital resources. Responsible internet use is another important aspect that pre-service teachers must address in their educational practice. Given the rapidly evolving landscape of language learning and digital tools, assessing the attitudes, skills, practices, and needs of in-service teachers regarding technology is essential. Pre-service teachers are often trained using traditional methodologies, despite their relatively higher digital proficiency. Therefore, it is crucial to monitor their needs throughout their training to ensure educational programs remain aligned with the constantly changing technological environment. Such training must go beyond technical skills, but positive attitudes and motivation should be fostered in teacher training.

Frameworks for Evaluating Digital Tool Integration

The three frameworks and models were selected because they are essential for understanding the degree of integration of digital technologies into the teaching and learning process, ranging from acceptance to implementation and transformation of the educational process. While the TAM will be essential for evaluating the questionnaire, the second instrument, a semi-structured interview, will include questions based on the SAMR and TPACK frameworks. These widely accepted models were considered the most approachable for understanding classroom practices.

Technology Acceptance Model (TAM)

Although the Technology Acceptance Model (TAM), as defined by Davis (1989), was initially developed for broader technological contexts rather than language learning, its core philosophy has been widely applied in educational settings. The model focuses on psychological reasons why technology is accepted and is founded upon two principal components: perceived usefulness (PU) and perceived ease of use (PEU), which determine how technology is accepted by its users. PEU is defined as "the degree to which a person believes that using a particular system would be free of effort,". In contrast, PU refers to "the degree to which a person believes that using a particular system would enhance his or her performance" (Davis, 1989, p. 320). In addition to these key components, two principal aspects influence usefulness and ease of use: attitude towards using technology and behavioural intention to use it. According to Milutinović (2022), behavioural intention is pivotal in determining digital nativeness among pre-service teachers born after 1980. Moreover, Chang et al. (2012) explored an additional component, namely convenience, in relation to the already established factors. Similarly, Hsu and Lin (2021) applied the TAM model to the Mobile-Assisted Language Learning (MALL) environment, investigating psychological constructs derived from action control theory and intrinsic motivation. Their findings indicate that non-preoccupation, non-hesitation, and non-volatility are key psychological factors influencing user behaviour. Additionally, ubiquity value, task relevance, and mobile self-efficacy were identified as crucial determinants of intrinsic motivation. Collectively, these factors predict learners' behavioural tendencies towards digital tool usage. In the MALL context, Kim and Lee (2016) further identified perceived enjoyment, attitude, interactivity, and content reliability as positive aspects, though self-efficacy and interactivity were not deemed significant. Likewise, AlDakhil and AlFadda (2022) applied the model to the Busuu application, confirming its role in fostering learner autonomy. However, digital technologies cannot fully substitute human teachers (Vančová, 2021).

Education research has extensively embraced the model, with peak interest observed in 2014 (Granić & Marangunić, 2019), particularly within Asian and European contexts, where studies predominantly focus on tertiary-level students. According to the literature, the TAM framework has been validated across diverse language education contexts, including Virtual Reality applications. For instance, Barrett et al. (2020) argue that improving a tool's interface could enhance its perceived ease of use. In another study, Alfadda and Mahdi (2021) examined Zoom concerning the TAM and self-efficacy, whereas Fathali and Okada (2018) investigated learners' motivation to use technology outside the classroom, incorporating the principles of self-determination theory.

Overall, the TAM model has been proven effective in predicting the future use of digital technologies by language learners, including those in higher education (Shahid et al., 2023). According to Urip et al. (2021), teachers must take the initiative to train themselves to use technology effectively in their teaching practice. By doing so, they can better support learners and cultivate positive attitudes towards technology use, a factor considered more important than access to equipment. Similarly, Ölmez and Ulutaş (2023) emphasise that teacher preparation programmes should adapt to reflect the growing need for technology integration in language education. The difference between TAM and the following two frameworks lies in its pedagogically non-specific investigation of factors involved in the actual use of technology in wider spheres of life, in contrast to the degree of their integration into the educational process.

TPACK Framework

The Technological Pedagogical Content Knowledge (TPACK) framework, first introduced by Mishra and Koehler (2006), focuses on integrating technological, pedagogical, and content knowledge into language learning. It predominantly explains the role of technology in education and how it can be utilised, which may influence policymakers and stakeholders. The framework requires teachers to have different types of knowledge, which are interrelated yet distinct in the context of classroom technology use.

- **Content Knowledge (CK)** refers to teachers' knowledge of pronunciation, grammar, vocabulary, and other linguistic elements relevant to their subject.
- **Pedagogical Knowledge (PK)** encompasses teachers' understanding of instructional techniques and methodologies, such as communicative language teaching. This knowledge must be applied across all stages of lesson planning, curriculum development, implementation, and evaluation while considering psycholinguistic processes.
- **Technological Knowledge (TK)** relates to an educator's understanding of both traditional (e.g., books, whiteboards) and digital technologies, including software and hardware. Teachers must continuously develop this knowledge in response to technological advancements.

The intersection of the principal knowledge types include:

- **Pedagogical Content Knowledge (PCK)** which involves an awareness of how best to teach specific subject content, including adapting methods to suit different learners' needs and ensuring meaningful learning experiences.
- **Technological Content Knowledge (TCK)** which concerns the effective use of technology to enhance content delivery, leading to greater flexibility and efficiency in language teaching.
- **Technological Pedagogical Knowledge (TPK)** refers to the ability to select and utilise technological tools appropriately to support both teaching and classroom management.

Technological Pedagogical Content Knowledge (TPACK) then represents an understanding of how technology can be integrated meaningfully into teaching, including selecting appropriate

digital tools and adapting pedagogical strategies to optimise learning outcomes.

Teachers should apply these knowledge domains to ensure that instructional practices align with technological advancements, mitigate any shortcomings of digital tools in education, and effectively train educators in their appropriate use. Koh and Divaharan (2021) proposed the TPACK-Developing Instructional Model, which they implemented in pre-service teacher training for primary education. This model consists of three stages: (1) fostering acceptance and technical proficiency, (2) pedagogical modelling, and (3) pedagogical application. Their findings indicate that participants primarily developed technological and psychological-pedagogical knowledge, with future research needed to explore pedagogical modelling, product critique, and knowledge-sharing.

Various studies have examined the application of the TPACK framework in language education. Tai et al. (2015) demonstrated that TPACK implementation can enhance writing skills, though their study highlighted the challenges of peer evaluation. Meanwhile, Setawan et al. (2018) utilised a project-based blended learning approach to train pre-service teachers, integrating various technologies within a flipped classroom model. Tseng et al. (2023) conducted a comprehensive review of TPACK application among language educators, revealing that while teachers often struggle to differentiate between the seven knowledge types and predominantly employ technology in teacher-centred settings, the framework remains an effective and beneficial tool. Furthermore, Drajati et al. (2018) found that TPACK can support the development of multimodal literacy, 21st-century learning skills, and digital media competency. As a whole, TPACK acknowledges that none of its aspects (content, pedagogy, technology) is more vital than the others and successful integration of technology depends on universally trained teachers.

The SAMR Framework

The Substitution-Augmentation-Modification-Redefinition (SAMR) framework was developed by Dr. Ruben Puentedura (2006) to facilitate the integration of technology in education. It consists of four hierarchical levels. It explains to what extent the traditional education is transformed through technology.

- **Substitution** – replacing traditional tools with digital alternatives without significant change (e.g., using digital documents instead of printed materials).
- **Augmentation** – implementing digital tools with functional improvements (e.g., text-to-speech software, grammar checkers, and language learning apps).
- **Modification** – significantly altering learning tasks to incorporate technology (e.g., collaborative writing, online discussions, or AI-assisted explanations).
- **Redefinition** – creating learning experiences that would be impossible without technology (e.g., virtual exchanges, augmented reality, or AI-powered chatbots).

The most dominant aspect of the models is its orientation to transformation of educational process. Blundell et al. (2022) perceive the model as the most prevalent yet frequently criticised compared to other models and thus conducted a scoping review of the model and its perception in an educational context due to the lack of a comprehensive review. They identified that the model does not consider the dynamic nature of learning, as well as educational context and perceives learning as a product rather than a process.

Research suggests that educators tend to apply the lower levels of SAMR more frequently to improve accessibility and efficiency. In contrast, the higher levels, which encourage collaboration and real-world skill development, are used less frequently (Al-Khalidi & Nizwa, 2021). While some researchers have highlighted the effectiveness of the SAMR model, others have critiqued its lack of clear guidance for moving between levels (Nguyen & Habók, 2024). Lyddon (2019) proposed a five-stage self-reflection model to help educators systematically

select and eliminate digital tools, though he remains critical of the model's heavy emphasis on technological aspects.

A comparison of selected frameworks and models relevant to this research reveals significant differences between them. While TAM focuses on more psychological aspects of why technology is used, TPACK identifies why technology is integrated into the educational process. Finally, SAMR is the most practical from the perspective of technology integration, referring to the extent to which technology is integrated to provide a multifaceted perspective on the level of technology integration.

Research Questions

Based on the literature review of selected aspects of technology integration as well as frameworks crucial to the process, the following research aims and objectives have been formulated.

1. How do in-service teachers currently integrate digital tools into their teaching?
2. What is the level of acceptance of digital technologies among pre-service teachers in their professional training?
3. What are the specific needs of pre-service teachers concerning the use of digital tools in their training?

Methods

Pedagogical Setting & Participants

The research took place at the Department of English Language and Literature, Trnava University in Trnava, Slovakia, with two different groups of participants recruited for the study. A total of 110 English pre-service teachers responded to the questionnaire. Of the sample, 61.81% (n = 68) were studying at the bachelor's level, while the remaining 35.53% (n = 43) were enrolled at the master's level. Overall, the distribution of participants reflects the disparity in student numbers across different levels of education. Furthermore, pre-service teachers are frequently invited to participate in questionnaire-based research and tend to be selective in their engagement. However, it can be assumed that the participating pre-service teachers generally have a positive attitude toward the use of digital technology.

The second group of participants consisted of in-service teachers in higher education (n = 4) who provided insight into their practices and the degree of digital tool implementation in their classrooms. The in-service teachers are a convenient sample. As a consequence, the data collected from this sample group only allow for illustrations typical for case studies rather than making broad generalizations. The years of their teaching experience range from 15 to 35 and professional profiles include a teacher of linguistic courses and culture (T1), a teacher of linguistic courses (T2), a teacher of teaching methodology and literature (T3), and a teacher of literature and education courses (T4). The participants were invited due to their extensive experience in teaching with digital technology, which predates the emergency online teaching caused by the COVID-19 pandemic. This selection of informants reflects the findings of Watson and Rockinson-Szapkiw (2021) that less-experienced teachers may hold uninformed opinions about actual practices.

Design of the Study

The research employed a combination of two data collection methods: a quantitative questionnaire designed for pre-service English teachers and a qualitative interview for in-service teachers, as both approaches offer benefits in providing a comprehensive view of the

research problem (Mackey & Gass, 2011). This mixed-methods approach ensured that the complex perspectives regarding the level of embracement of digital tools by in-service teachers and the perspectives of pre-service teachers on digital learning tools will be presented in the following sections.

All participants were informed about the nature of the study, the anonymity of their identities, and the non-traceability of their identities. The interviews were conducted individually via MS Teams and recorded with the informants' consent. The recordings are stored in a password-protected digital environment. The same principles were followed for the questionnaire responses. The questionnaire was fully anonymous, and participation was voluntary, conducted in accordance with university guidelines for ethical research.

Data Collection & Analysis

The study used two methods of data collection: a quantitative questionnaire and a qualitative semi-structured interview. The research instruments were designed based on the findings cited in the literature review of the paper, as well as other relevant sources. All research materials were developed in the participants' mother tongues for clarity, and the responses were translated by Deepl.com (2025) for their presentation in this paper. All questions are outlined in the findings section.

The questionnaire was developed using the structure of similarly designed research instruments dealing with the TAM or analysing learners' preferences (e.g. Ho & Lim, 2021; Lee et al., 2024; Siyuan et al., 2024). The questionnaire consisted of three main parts: (1) background information on participants, (2) quantitatively constructed items regarding the participants' preferences and the main topic of the questionnaire based on the TAM model. The questionnaire items included a Likert-scale item, multiple-choice items, checkboxes with multiple selections in the item, and (3), a voluntary open question with space to share additional thoughts on the topic. The questionnaire items were formulated based on three components of the TAM model – Ease of Use, Perceived Usefulness and Behavioural Intention. The questionnaire was sent to two department colleagues for review and piloting. The final questionnaire version was uploaded using Google Forms in February 2025, and the pre-service teachers were invited to participate via email. The collected data were evaluated statistically.

The semi-structured interview questions were based on components of the SAMR and TPACK items, and they covered the areas of (1) the reasons for using technology, (2) its type and implementation, (3) the training required and needed to overcome challenges and maximise the benefits. The interview data were transcribed and manually thematically coded to identify both shared and unique practices among teachers. The supportive quotes are used to illustrate the findings. The in-service teachers' interviews were conducted individually online via MS Teams in November 2024. The participating in-service teachers have an existing history of systematically organising blended courses before the emergency remote online learning in 2020.

Results/Findings and discussion

Reliability of the questionnaire was evaluated statistically. Quantitative research refers to instrument consistency (Mackey & Gass, 2011, p. 128). The Cronbach's Alpha was calculated for all three categories of TAM-based questionnaire items individually. It yielded acceptable scores ranging from "acceptable" for Ease of Use items to "good" for Behavioural Intention and "very good" for Perceived Usefulness (Siswaningsih et al., 2017; Taber, 2018).

Factor analysis suitability was calculated by Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) measure and Bartlett's test of sphericity (Field, 2024, chapter 17.6.3). The

calculated value of the KMO of 0.881 means the data appropriateness for factor analysis, and the significance of Barlett's test (p < .001) supports these findings (Table 1).

Table 1.
Results of KMO and Bartlett's Test

Results of KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.881
Bartlett's Test of Sphericity	Approx. Chi-Square	1417.470
	df	300
	Sig.	<.001

Overall, the results of individual statistical analyses have demonstrated the reliability and validity of the research instrument.

The first section of the questionnaire sought to identify key characteristics of the sample. The initial question, which focused on participants' self-assessment of their computer skills, was designed to assess the reliability of their responses regarding various aspects of digital tools. The findings indicate that most participants had adequate experience using computers (Beginner = 7, 6.4%; Intermediate = 85, 77.3%), while 18 participants (16.4%) reported expert-level computer skills. Consequently, it can be inferred that the data collected are well-informed and grounded in participants' extensive experience rather than incidental interactions with digital tools.

Next, participants were asked to indicate or estimate their exposure to digital tools designed for learning English. The majority reported using such tools daily or at least once a week. Fewer than 10% of participants used them less than once per week. One participant explicitly linked their frequency of use to the stage of the academic year:

- Daily = 54 (48.6%)
- 2–3 times per week = 29 (26.1%)
- Once a week = 14 (12.6%)
- Less than once a week = 12 (10.8%)
- 4–5 times per week = 1 (0.9%)
- Depending on the period in the academic year = 1 (0.9%)

Finally, the pre-service teachers' data identifying the use of hardware and software instruments were collected. Participants could choose as many instruments as possible. Therefore, the sum of percentages will exceed one hundred per cent. Table 2 identifies all the hardware and software solutions the pre-service teachers typically use.

Table 2.
Hardware and Software Use Breakdown of Sample

Type	Percentage (%)	Total Number
Computer	90	99
Tablet	48.2	53
Smartphone	75.5	83

E-reader	15.5	17

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Mobile applications	75	84
University courses	25	28
Websites with exercises	55.4	62
Videos	84.5	95
Podcasts	62.5	70
AI-powered applications	41.4	46
Exercises recommended by teachers	58	65
Computer games	0.9	1
Social media	0.9	1

The second part of the questionnaire contained a Likert scale item with twenty-five statements. The pre-service teachers could express the degree of their agreement (1 = disagree strongly, 2 = disagree, 3 = neutral, 4 = agree, 5 = agree strongly). The statements were formulated based on three components of the TAM model – Ease of Use, Perceived Usefulness and Behavioural intention due to their relevance to the research questions. The results of the item are presented in Table 3.

Table 3.
Pre-service teachers' (n = 110) perception of language learning digital tools

Item	Mean	SD	Skew	Kurt
Ease of use (Cronbach's Alpha = 0.660)				
EoU1 They do not create time pressure, as working in a classroom can.	3.627	1.021	-0.667	0.037
EoU2 They are comfortable supporting my learning.	4.327	0.740	-1.692	4.686
EoU3 They help me effectively address my educational needs.	3.827	0.855	-0.733	0.588
Behavioural intention (Cronbach's Alpha = 0.828)				
BI1 They help me with time management in my studies.	3.945	0.965	-0.885	0.498
BI2They have become an integral part of my learning.	4.00	0.995	-0.795	-0.122
BI3 They help me prioritize important study tasks.	3.418	1.026	-0.190	-0.784
BI4 They help me better organize my time and keep track of my studies.	3.663	1.034	-0.550	-0.466
BI5 They help me organize my tasks and create a study schedule for the academic period.	3.490	1.106	-0.245	-1.025
BI6 They help me track my progress compared to other users.	3.145	1.106	0.061	-0.682
Perceived usefulness (Cronbach's Alpha = 0.906)				

PU1 They encourage me to think independently.	3.572	0.933	-0.353	-0.133
PU2 They provide quality feedback.	3.436	0.943	-0.313	-0.390
PU3 They provide instant feedback.	4.009	0.763	-1.347	2.969
PU4 They are interesting and engaging.	4.009	0.872	-1.030	1.557
PU5 They provide quality information and exercises.	3.836	0.829	-0.567	0.496
PU6 They provide enough learning materials.	3,727	1.021	-0.531	-0.377
PU7 They support flexible learning.	4.218	0.721	-1.101	2.927
PU8 I enjoy using them for learning.	4.190	0.772	-1.075	2.126
PU9They connect theory with practice.	3.663	0,941	-0.486	-0.321
PU10 They clearly explain the study material.	3.7	0.904	-0.276	-0.302
PU11 They are suitable for developing language knowledge and communication skills.	4.054	0.8332	-0.878	1.069
PU12 They help me think critically.	3.327	1.1005	-0.202	-0.403
PU13 They help me reinforce my knowledge after in-person classes.	3.990	0.818	-1.006	1.559

The mean values of all Likert scale items range from 3.145 for BI6 (average; 2.61 – 3.40) through high (3.41 – 4.20) to very high for EoU = 4.327 (4.21 – 5.00; Abu-Baker et al., 2019). A detailed examination of the mean score values for individual groups of Likert scale items reveals a strong inclination among students towards digital learning technologies.

Within the Ease of Use category, the highest-rated item pertained to students' comfort in using these tools, which also emerged as the most highly scored statement across the entire set. Conversely, students demonstrated a relatively weaker understanding of the ability of digital tools to aid in time and task management. Nevertheless, the tools were acknowledged as valuable for addressing learning needs and supporting self-paced study.

The second category, Behavioural Intention, reflects students' actual engagement with digital tools and the extent to which these tools are integrated into their learning routines. The lowest-scoring statement concerned using technology to compare individual progress with peers. However, digital tools have become essential to pre-service teachers' studies, particularly in helping students manage tasks efficiently.

Finally, pre-service teachers highly appreciate the enjoyment that digital tools bring to their learning experiences and their capacity to provide rapid and high-quality feedback, as well as enhance flexibility in their study habits. Conversely, students appear to underestimate these tools for fostering critical and independent thinking, as reflected in the corresponding questionnaire items.

Finally, current use and future needs of participants were explored and the results are presented in Table 4.

Table 4.
Current use and future intentions to use educational digital tools

Type	Percentage (%)	Total Number
Reading	8.1	9
Writing	9.9	11
Speaking	10.8	12
Listening	26.1	29
Grammar	22.5	25
Theoretical information	20.7	23
Vocabulary	0.9	1
Productive skills	0.9	1
The use of AI	61,1	66
Designing educational programmes using digital tools	39.8	43
Designing learning applications	22.2	24
Using digital tools in language schools	0.9	1
Learning language theories with applications	0.9	1

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Currently, pre-service teachers focus on the skills and language components that students prefer to practise. Most participants primarily use digital tools for listening practice, acquiring theoretical knowledge, or engaging in grammar training. In contrast, digital tools are used to a significantly lesser extent for developing reading, writing, or speaking skills. Some participants also identified vocabulary acquisition and productive skills as separate learning objectives.

Regarding future professional development, pre-service teachers expressed a desire to align with current trends, particularly in acquiring training on how to integrate AI into language teaching. Additionally, they highlighted the need to learn how to incorporate existing digital tools into their teaching practice. A smaller number of participants expressed interest in developing their own digital tools. Individual respondents also suggested a preference for learning how to use digital tools in language school settings or for acquiring theoretical knowledge about language through applications.

The answers from the questionnaire's sole open item were organised thematically and indicate several interesting trends. Overall, participants have a positive but realistic view of technology. While pre-service teachers appreciate the affordances, they do not rely exclusively on technology.

The students addressed specifically AI models, which they view realistically as another tool following natural technological progress and development and curricula should change with the times and digital progress:

- *Artificial intelligence is very useful when someone needs a straightforward explanation of a topic and Google does not provide quick or easily readable results. AI tools like ChatGPT can be helpful in this regard; however, one cannot expect them to provide a detailed understanding or an explanation worthy of top marks. They are good for a*

quick orientation, though. It is simply another tool. Until now, students and teachers had only search engines at their disposal, and now they have those search engines along with an additional explanatory module. I wouldn't overestimate the impact of AI on education because, without reform of teaching methods and concepts […], education will not change. However, teachers must understand what AI is, roughly how it works, and that they teach students how to use this tool correctly—not to write entire homework assignments or essays for them. (S83)

- *As classrooms are gradually being digitalised and new technologies are being introduced, we are encountering situations where teachers do not know how to integrate them effectively into their lessons. In my opinion, it would be crucial to focus on the digitalisation of teaching materials, which would certainly be motivational and beneficial for students, particularly in language learning. (S81)*

Pre-service teachers are also appreciative of human teachers:

- *I believe that these technologies should be used in today's society to maintain students' attention and enrich lessons, but I do not agree with replacing teachers with artificial intelligence. (S62)*

- *Digital technologies make learning more convenient, as they are always accessible when needed. Nevertheless, I still prefer classroom teaching and direct communication with teachers and classmates. I believe that mutual support and interaction with others are more beneficial for acquiring language skills, developing critical thinking, shaping young people's character, and receiving comprehensive feedback. (S14)*

- *I use technology for general education across various fields, from biology and engineering to philosophy and theology, all in English, along with communication in English with people from abroad. (S63)*

Digital technologies can create more inclusive learning environment for students with learning difficulties and compensate for the deficiencies of the traditional class. This point was also addressed by Teacher 3 later in the paper:
- *Digital technologies are also a great help to me because I have specific learning difficulties, and they make it easier for me to stay organised. (S29)*

The final point was made by a student who uses hardware solutions provide them with ubiquitous learning in and out of classroom, as noted by Teacher 2:
- *I primarily use a tablet for my studies, both during in-person lessons and when studying at home. It is somewhat motivational for my generation and the modern era to have everything in one place. It is also very convenient to always have it in my bag and to study while travelling home or for leisure, such as when spending a few hours on a train. Since I started using it, I have been preparing for lessons regularly, something I did not do in my previous studies. (S91)*

Interview Results

The collected data from the semi-structured interview were transcribed and manually thematically coded. The emerged themes are presented below.

Use of Digital Tools by In-Service Teachers

The first set of questions aimed to identify the digital tools utilised by the participating in-service teachers. All participants reported using official platforms such as LMS Moodle and MS Teams, which facilitate course management primarily for "practical reasons" (T4), including the ability to share materials and create interactive tasks (T1, T2), as well as for "archiving" and "ensuring accessibility for all students" (T3). Furthermore, all participants had prior experience with identical or highly similar tools (T1). The practicality of these platforms lies in their capacity to centralise learning materials and archive tests, documents, and assignments for future reference (e.g. "*I find it easier to share materials because it's all in one place, and I can also create interactive tasks there*" – T1). Only one participant (T3) opted for a commercial service due to its greater storage capacity and reliability.

The second set of questions focused on teachers' preferences regarding the use of digital tools or materials for specific educational purposes. Despite the diversity of disciplines they teach, all participants agreed on the use of videos in their classrooms to illustrate linguistic or cultural phenomena (T1, T2), incorporate online lectures from other universities (T2, T3), and compare literary texts with their audiovisual adaptations (T4). Additionally, T4 utilises podcasts as a basis for discussions on literary works, while T3 employs various tools for specific topics, such as comparing online translation services to facilitate critical evaluation of translation quality. T1 integrates interactive maps to enhance students' geographical and historical awareness.

Assisting Students in Using Digital Tools

Teachers were asked how they support students in using these tools. T4 noted: *"I know that you need to be visible, that you need to help, to answer, to communicate. I try to answer, I try to respond to what they write"*. T1 and T2, who work with older students, reported that their learners generally do not encounter significant difficulties. However, they provide assistance or encouragement in cases of technical issues. T3 ensures that students have access to reliable tools within faculty premises. Teachers 1, 3, and 4 highlighted the role of digital tools in compensating for physical limitations in the faculty environment (e.g. acoustic and technological constraints). However, T2 noted: *"Honestly not really take it into account, because what I notice then is that a lot of them have, they just have their laptops open or on their smartphones, so in that class directly, I'm not doing it very much as a substitute for some, to make up for something that we, that technically we couldn't do for faculty for such a thing that I'm not doing it."*

Integration of Digital Tools in Teaching

The next round of questions addressed how digital tools are integrated into teaching practices, particularly concerning the SAMR framework. Teachers reported varying degrees of implementation. T4 reflected on their evolving perspective:

"When I had another job, I was literally fascinated by the technical possibilities. But now that I've been using them a little longer and figuring out how they could be used in literature, that amazement has subsided a little" (T4).

Teachers use digital tools to supplement traditional resources rather than for creative writing or evaluating students' performance. T1 and T2 primarily employ digital platforms to extend classroom activities, facilitating material distribution and exercise creation. While T1 prioritises learner motivation and engagement when selecting activities, T2 focuses on the educational aspect, considering digital tasks as supplementary and voluntary. Conversely, T3 utilises digital tools mainly for course management, enabling effective supervision of large student groups. However, T4 relies on his own evaluation rather than AI when dealing with students'

assignments: *"with literature they usually write some analysis and stuff, so I have to read this, that, that, that, I don't know how he would evaluate it"*.

All teachers agreed that learning materials' quality and pedagogical value precede other considerations. Digital tools are also used to communicate with students (T1, T2, T4) and foster collaborative learning (T3). However, T1 noted limited student engagement with online forums, while T4 questioned whether students perceive teachers as forum moderators. Teachers generally expect students to take responsibility for engaging with the digital resources provided (e.g. "*they should have a little bit of independent and responsible thinking,*" T4).

Digital Tools and Special Educational Needs

T3 highlighted the role of digital tools in creating inclusive learning environments for students with sensory impairments:

"We have colleagues with communication disorders, so they also use these transcribers and different transcriptions. Without these tools, it would be possible to teach them, but it would be much more complicated. So, for me personally, these digital tools make my life very simple" (T3). Similarly, T1 aims to engage multiple senses when using digital resources to enhance learning experiences (*"I try to incorporate both the auditory channel and the visual channel as much as possible, at least the two"*).

Challenges and Sustainability of Blended Learning

Initially, teachers found developing and adapting materials for online environments time-consuming. However, they now consider the ongoing maintenance of blended courses comparable to preparing face-to-face lessons. Teachers emphasised the importance of maintaining visibility through direct communication and continuous feedback. T3 also mentioned offering consultations, as her students do not work under her direct supervision. As noted in the first round of questions, all participants had prior experience with digital tools before the COVID-19 pandemic, owing to their natural inclination towards technology. However, their approaches to learning and implementing these tools varied. During the shift to emergency remote learning, T1 sought online solutions through trial and error, whereas T3 preferred an intuitive, self-guided approach rather than relying on tutorials. T2 acknowledged not fully utilising the tools' potential but expressed willingness to explore further opportunities.

Benefits and Challenges of Digital Tools

The primary advantage of digital tools, as highlighted by T3, is their facilitation of individualised learning: *"I am an advocate of individualised active learning"* (T3).

However, T3 and T4 identified challenges, particularly the need for closer collaboration with the university IT department. They noted that technical decisions are sometimes made without considering teachers' needs, although communication has helped address some issues.

Evaluation of Digital Tool Implementation within the SAMR Framework

An analysis of digital tool integration suggests that the extent of implementation varies among teachers. Preliminary findings indicate that T1 and T4 have reached the redefinition stage by designing immersive learning experiences that foster collaboration and active engagement.

The level of technological integration based on the SAMR framework is comprehensively presented in Table 5.

Table 5.

The degree of digital technology implementation by individual participating in-service teachers

	T1	T 2	T3	T4
Substitution	PDFs	PDFs	PDFs, books	PDFs
Augmentation	online quizzes, exercises, worksheets	online quizzes, exercises, worksheets	online quizzes, exercises, worksheets	audiobooks and podcasts
Modification	collaborative feedback	not observed	collaborative feedback	collaborative feedback
Redefinition	interactive maps with real-life depictions of the places	not observed	collaborative digital projects	not observed

The content and pedagogical knowledge of the in-service teachers acquired by the participants in the pre-technological era has not been a subject of this investigation. However, technological knowledge and its subbranches have been developed predominantly through training, self-study, or experience during the in-service stage of their careers. The self-reported and self-assessed knowledge is based on practical examples of their application, as evidenced by the reported selection of the various tools suitable for the respective disciplines' educational goals and the ability to evaluate the quality and content of the tools. On the other hand, not all teachers thoroughly explore the potential and report the need for additional training in more sophisticated digital technologies.

Discussion

Digital tools have undeniably transformed the landscape of language learning, as underscored by Klimova et al. (2023) and Liu and Moller (2019). Their integration into educational settings has reshaped teaching methodologies and enhanced learner engagement, presenting both opportunities and challenges for educators. The findings of the presented paper highlight the extent to which in-service and pre-service teachers of English as a foreign language accept and integrate digital technologies into their teaching. This conclusion aligns with recent research that indicates a greater availability of digital tools compared to previous years. The study shows that pre-service teachers generally embrace technology, following Davis' (1989) Technology Acceptance Model (TAM), particularly due to its ease of use and perceived usefulness. This acceptance leads to modifications in their study and learning behaviors, now fully supported by a diverse range of digital technologies tailored for multiple needs. However, learners continue to value the role of teachers and do not wish to replace them with digital tools, consistent with Vančová's (2021) findings. The participating pre-service teachers have displayed an informed understanding of digital tools, utilizing them frequently to achieve specific learning objectives based on their experience and familiarity. Interviews with in-service teachers corroborate Bui's

(2022) assertion regarding the necessity of continuous professional development in enhancing teaching methods. While these educators generally express positive attitudes toward technology, in line with the findings of Pozas and Letzel (2023), they also exhibit reluctance to depend entirely on digital tools for assessment. This cautious approach aligns with concerns raised by Basilotta Gómez-Pablos et al. (2022) and Nguyen and Habók (2024). Furthermore, teachers acknowledge that their integration of digital tools into instruction began in the past, influenced by various circumstances that shaped their digital literacy, as noted by Záhorec et al. (2021). Additionally, the findings reveal that in-service teachers fully recognize the importance of learner autonomy in the learning process, a perspective supported by Farjon et al. (2018) and Vančová (2021, p. 50). Their acknowledgment of students' responsibility for their learning highlights the evolving role of educators in fostering digital literacy and promoting independent learning strategies. One area where pre-service teachers still need awareness is the necessity of managing courses. All in-service teachers concur that digital tools are indispensable for course management and for archiving their work. Teachers adapt existing materials to the digital environment, illustrating varying degrees of SAMR adaptation in their teaching practices, which both in-service and pre-service teachers could share. Notably, overall, there are no significant discrepancies between the perspectives of in-service and pre-service teachers. On the contrary, both groups perceive digital tools as valuable extensions of their work and recognize the benefits of their integration. In-service teachers understand that their technology use in classrooms does not go unnoticed and approach it responsibly, considering the educational needs of their learners and the pedagogical appropriateness of the tools. Furthermore, they anticipate that learners will seek their guidance when necessary. Conversely, pre-service teachers express a desire for more training in digital educational technologies.

Recommendations

The research data reveal several interesting points that could enhance the integration of digital technology into the training of pre-service English teachers in an EFL context. Firstly, interviews with teachers indicated that those who are open to technology effectively utilize it in their teaching and demonstrations for future educators. However, they still require motivation and support from responsible institutions, which should provide both training and adequate resources. Additionally, collaboration between more experienced teachers and their colleagues—through sharing examples of good practices and conducting observations—could significantly improve digital skills within existing technological frameworks at workplaces, ultimately resulting in enhanced study programs for pre-service teachers. Regarding the responses from pre-service teachers, there is a clear desire to update existing curricula to reflect current trends in the digitalization of teaching. This update should focus on the use of AI-powered tools and the design of their own digital resources. Furthermore, students should have increased opportunities to implement technologies in their teaching practice. Importantly, pre-service teachers should not be trained solely in using digital tools; they should also learn to critically evaluate these tools for their usefulness, suitability, and content quality. Properly selected tools can enhance learners' motivation and participation in developing digital literacy. Another valuable suggestion is to facilitate virtual exchanges, allowing pre-service teachers to use these tools and practices within an international community, thereby establishing contacts for future collaboration once they begin their teaching careers.

Conclusion

The development of new digital technologies and ongoing research could help us understand how to best prepare future teachers for their roles in the language classroom. This study

compares the acceptance and integration of digital tools in language learning by examining questionnaire data from both pre-service English teachers and in-service teachers who train future educators. Both groups are expected to support digital technologies and recognize their benefits. Both teachers and learners experience enhanced teaching or learning outcomes, although their perspectives may differ due to varying levels of experience. In-service teachers typically emphasise the convenience and ease of use of digital tools. At the same time, pre-service learners also value the effectiveness of these tools in engaging them in their learning. These differing perceptions are not contradictory; rather, they are complementary and can serve as a foundation for future improvements in language classrooms.

This study has investigated the relationship between the integration of digital tools by a relatively small sample of in-service and pre-service teachers in teaching and learning from multiple perspectives. One major limitation of this study lies in the small sample size of in-service teachers (N=4), indicating that the results should be regarded as exploratory and cannot be generalized. It would be valuable to include teachers who primarily design face-to-face courses and do not implement digital tools to the same extent as the participants in this study. Additionally, observing the practices of the teachers involved in this research could prove beneficial, either through direct observation or by organising workshops for their colleagues at the university. Such an approach would provide a broader perspective on implementing digital tools within the same technical and spatial context. Concerning the student sample, conducting more in-depth qualitative interviews with a smaller group of pre-service teachers would be valuable. This would enable a deeper exploration of their preferences, future needs, and practical examples of how they utilise technology outside the classroom. These insights could inspire their peers and provide teachers with informed professional advice drawn from years of teaching experience to enhance their pedagogical practices. Ultimately, such efforts would contribute to a more comprehensive understanding of the evolving relationship between technology and language teaching.

References

Abu-Baker, M. I. K., Abu-Zaid, M. K. S., Alsawalqah, H., Al-Shamayleh, Y., & Al-Shboul, B. (2019). The Impact of the Implementation of Capability Maturity Model Integration on User Satisfaction: Case Study on Software Companies in Jordan. *J. Softw.*, *14*(7), 293-311. https://doi.org/10.17706/jsw.14.7.293-311

Akram, H., Abdelrady, A. H., Al-Adwan, A. S., & Ramzan, M. (2022). Teachers' perceptions of technology integration in teaching-learning practices: A systematic review. *Frontiers in psychology*, *13*, 920317. https://doi.org/10.3389/fpsyg.2022.920317

AlDakhil, M., & AlFadda, H. (2022). EFL learners' perceptions regarding the use of Busuu application in language learning: evaluating the Technology Acceptance Model (TAM). *English Language Teaching*, *15*(1), 1-15. https://doi.org/10.5539/elt.v15n1p1

Alfadda, H. A., & Mahdi, H. S. (2021). Measuring students' use of zoom application in language course based on the technology acceptance model (TAM). *Journal of psycholinguistic research*, *50*(4), 883-900. https://doi.org/10.1007/s10936-020-09752-1

Al-Khalidi, I., & Nizwa, O. (2021). Examining Teachers' Beliefs on Developing a Digital Pedagogical Framework Based on the SAMR Model for Undergraduate English Language Learning. *International Journal of English Language Education*, *9*(1), 106-125. https://doi.org/10.5296/ijele.v9i1.18306

Aydemir, S., & Demirkan, Ö. (2024). The Effect of Digital Material Applications on Preservice Teachers' Self-Efficacy towards Educational Technology Standards. *International Journal of Educational Researchers*, *15*(4), 43-68. https://doi.org/10.29329/ijer.2024.1085.3

Basilotta-Gómez-Pablos, V., Matarranz, M., Casado-Aranda, L. A., & Otto, A. (2022). Teachers' digital competencies in higher education: a systematic literature review. *International journal of educational technology in higher education*, *19*(1), 1-16. https://doi.org/10.1186/s41239-021-00312-8

Barrett, A., Pack, A., Guo, Y., & Wang, N. (2023). Technology acceptance model and multi-user virtual reality learning environments for Chinese language education. *Interactive Learning Environments*, *31*(3), 1665-1682. https://doi.org/10.1080/10494820.2020.1855209

Blundell, C. N., Mukherjee, M., & Nykvist, S. (2022). A scoping review of the application of the SAMR model in research. *Computers and Education Open*, *3*, 100093. https://doi.org/10.1016/j.caeo.2022.100093

Bui, T. H. (2022). English teachers' integration of digital technologies in the classroom. *International Journal of Educational Research Open*, *3*, 100204. https://doi.org/10.1016/j.ijedro.2022.100204

Chang, C. C., Yan, C. F., & Tseng, J. S. (2012). Perceived convenience in an extended technology acceptance model: Mobile technology and English learning for college students. *Australasian Journal of Educational Technology*, *28*(5), 809-826. https://doi.org/10.1111/bjet.13165

Cepeda-Moya, V. E. & Argudo Serrano, J. C. (2022). Teachers' and students' perceptions on introducing the SAMR model into their classroom. Revista Arbitrada Interdisciplinaria KOINONIA Año VII. Vol VII. N°1. Edición Especial. 2022. https://doi.org/10.35381/r.k.v7i1.1679

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008

DeepL. (2025). *DeepL Translator* (Version 1.0) [Software]. https://www.deepl.com/translator

Ding, L., & Hong, Z. (2024). On the relationship between pre-service teachers' sense of self-efficacy and emotions in the integration of technology in their teacher developmental programs. *The Asia-Pacific Education Researcher*, *33*(4), 869-878. https://doi.org/10.1007/s40299-023-00758-6

Drajati, N. A., Tan, L., Haryati, S., Rochsantiningsih, D., & Zainnuri, H. (2018). Investigating English language teachers in developing TPACK and multimodal literacy. *Indonesian Journal of Applied Linguistics*, *7*(3), 575-582. https://doi.org/10.17509/ijal.v7i3.9806

Farjon, D., Smits, A., & Voogt, J. (2019). Technology integration of pre-service teachers explained by attitudes and beliefs, competency, access, and experience. *Computers & Education*, *130*, 81-93. https://doi.org/10.1016/j.compedu.2018.11.010

Fathali, S., & Okada, T. (2018). Technology acceptance model in technology-enhanced OCLL contexts: A self-determination theory approach. *Australasian Journal of Educational Technology*, *34*(4), 138-154. https://doi.org/10.14742/ajet.3629

Fernández-Batanero, J. M., Montenegro-Rueda, M., Fernández-Cerero, J., & García-Martínez, I. (2022). Digital competences for teacher professional development. Systematic review. *European Journal of Teacher Education*, *45*(4), 513-531. https://doi.org/10.1080/02619768.2020.1827389

Field, A. (2024). *Discovering statistics using IBM SPSS statistics* (6th ed.). Sage.

Granić, A., & Marangunić, N. (2019). Technology acceptance model in educational context: A systematic literature review. *British Journal of Educational Technology*, *50*(5), 2572-2593. https://doi.org/10.1111/bjet.12864

Ho, Y. Y., & Lim, L. (2021). Targeting student learning needs: The development and preliminary validation of the Learning Needs Questionnaire for a diverse university student population. *Higher Education Research & Development*, *40*(7), 1452-1465. https://doi.org/10.1080/07294360.2020.1818062

Hsu, H. T., & Lin, C. C. (2022). Extending the technology acceptance model of college learners' mobile-assisted language learning by incorporating psychological constructs. *British Journal of Educational Technology*, *53*(2), 286-306. https://doi.org/10.14742/ajet.818

Jackson, A., & Shyamsundar, S. (2022). Integration of MS Teams as an LMS Tool for Language Classroom: An Analysis using SAMR Model. *International Journal of Humanities and Education Development (IJHED)*, *4*(6), 91-95. https://doi.org/10.22161/jhed.4.6.9

Kim, G. M., & Lee, S. J. (2016). Korean students' intentions to use mobile-assisted language learning: Applying the technology acceptance model. *International Journal of Contents*, *12*(3), 47-53. https://doi.org/10.5392/IJoC.2016.12.3.047

Klimova, B., Pikhart, M., Polakova, P., Cerna, M., Yayilgan, S. Y., & Shaikh, S. (2023). A systematic review on the use of emerging technologies in teaching English as an applied language at the university level. *Systems*, *11*(1), 1-15. https://doi.org/10.3390/systems11010042

Koh, J. H., & Divaharan, H. (2011). Developing pre-service teachers' technology integration expertise through the TPACK-developing instructional model. *Journal of Educational Computing Research*, *44*(1), 35-58. https://doi.org/10.2190/EC.44.1.c

Lee, K. W., Ngui, W., Yu, C. X., & August, A. L. (2024). Pre-service Teachers' Perceptions of Digital Portfolio in Enhancing Learning Experiences During Teaching Practice. *Computer-Assisted Language Learning Electronic Journal*, *25*(2), 91-108.

Liashuk, X. (2022). Relation between Moodle activity and student performance in the context of EFL training in higher education. *Journal of Language and Cultural Education*, *10*(1), 25-37. https://doi.org/10.2478/jolace-2022-0003

Lisa, A., Faridi, A., Bharati, D. A. L., & Saleh, M. (2021). A TPACK-in Practice Model for Enhancing EFL Students' Readiness to Teach with Ed-Tech Apps. *International Journal of Interactive Mobile Technologies, 15(17)*. https://doi.org/10.3991/ijim.v15i17.23465

Liu, X., & Moeller, A. J. (2019). Promoting learner engagement through interactive digital tools. *Mobile Technologies*, *15*(17), 156-176. https://doi.org/10.3991/ijim.v15i17.23465

Liza, K., & Andriyanti, E. (2020). Digital literacy scale of English pre-service teachers and their perceived readiness toward the application of digital technologies. *Journal of Education and Learning (EduLearn)*, *14*(1), 74-79. https://doi.org/10.11591/edulearn.v14i1.13925

Lyddon, P. A. (2019). A reflective approach to digital technology implementation in language teaching: Expanding pedagogical capacity by rethinking substitution, augmentation, modification, and redefinition. *TESL Canada Journal*, *36*(3), 186-200. https://doi.org/10.18806/tesl.v36i3.1327

Mackey, A., & Gass, S. M. (Eds.). (2011). *Research methods in second language acquisition: A practical guide*. John Wiley & Sons.

Milutinović, V. (2022). Examining the influence of pre-service teachers' digital native traits on their technology acceptance: A Serbian perspective. *Education and Information Technologies*, *27*(5), 6483-6511. https://doi.org/10.1007/s10639-022-10887-y

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers college record*, *108*(6), 1017-1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Nair, R. S., & Chuan, T. C. (2021). Integrating technology that uses modified SAMR model as a pedagogical framework in evaluating learning performance of undergraduates. *The Educational Review, USA*, *5*(10), 373-384. https://doi.org/10.26855/er.2021.10.001

Nguyen, L. A. T., & Habók, A. (2024). Tools for assessing teacher digital literacy: a review. *Journal of Computers in Education*, *11*(1), 305-346. https://doi.org/10.1007/s40692-022-00257-5

Nyayu, S. Y., Heru, S., & Masagus, S. (2019). The Use of Technology Integration SAMR Model

in Teaching English. *IDEAS: Journal on English Language Teaching and Learning, Linguistics and Literature*, *7*(1), 43-47. https://doi.org/10.24256/ideas.v7i1.720

Ölmez, R., & Ulutaş, N. K. (2023). The role of Technology Acceptance Model (TAM) in developing Turkish Pre-Service EFL teachers' technology adoption. *RumeliDE Dil ve Edebiyat Araştırmaları Dergisi*, (33), 1253-1272. https://doi.org/10.29000/rumelide.1286022

Paneru, D. R. (2018). Information communication technologies in teaching English as a foreign language: Analysing EFL teachers' TPACK in Czech elementary schools. *CEPS journal*, *8*(3), 141-163. https://doi.org/10.25656/01:16009

Park, M., & Son, J. B. (2022). Pre-service EFL teachers' readiness in computer-assisted language learning and teaching. *Asia Pacific Journal of Education*, *42*(2), 320-334. https://doi.org/10.1080/02188791.2020.1815649

Pozas, M., & Letzel, V. (2023). "Do you think you have what it takes?"–exploring predictors of pre-service teachers' prospective ICT use. *Technology, Knowledge and Learning*, *28*(2), 823-841. https://doi.org/10.1007/s10758-021-09551-0

Pratiwi, D. I., & Waluyo, B. (2023). Autonomous Learning and the Use of Digital Technologies in Online English Classrooms in Higher Education. *Contemporary Educational Technology*, *15*(2), 1-16. https://doi.org/10.30935/cedtech/13094

Puentedura, R. R. (2006). *Transformation, Technology, and Education.* Hippasus. Retrieved from http://www.hippasus.com

Setiawan, I. (2018). *Exploring a teacher educator's experiences in modeling TPACK to create English language multimedia in technology courses* (Doctoral dissertation, Universitas Negeri Makassar). https://doi.org/10.17507/jltr.0905.19

Shahid, C., Gurmani, M. T., Rehman, S. U., & Saif, L. (2023). The role of technology in English language learning in online classes at tertiary level. *Journal of Social Sciences Review*, *3*(2), 232-247. https://doi.org/10.54183/jssr.v3i2.215

Siswaningsih, W., Firman, H., & Khoirunnisa, A. (2017, February). Development of two-tier diagnostic test pictorial-based for identifying high school students misconceptions on the mole concept. In *Journal of Physics: conference series*, 812(1), 1-7. IOP Publishing. - https://doi.org/10.1088/1742-6596/812/1/012117

Siyuan, C., & Wah, L. K. (2024). Blended Learning Approach in Learning English Communication Skills for Japanese College Students. Computer-Assisted Language Learning Electronic Journal, 25(2), 47-70.

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in science education*, 48(6), 1273-1296. https://doi.org/10.1007/s11165-016-9602-2

Tai, H. C., Pan, M. Y., & Lee, B. O. (2015). Applying Technological Pedagogical and Content Knowledge (TPACK) model to develop an online English writing course for nursing students. *Nurse education today*, *35*(6), 782-788. https://doi.org/10.1016/j.nedt.2015.02.016

Torres-Hernández, N., & Gallego-Arrufat, M. J. (2022). Indicators to assess preservice teachers' digital competence in security: A systematic review. Education and information technologies, 27(6), 8583-8602. https://doi.org/10.1007/s10639-022-10978-w

Tseng, J. J., Chai, C. S., Tan, L., & Park, M. (2022). A critical review of research on technological pedagogical and content knowledge (TPACK) in language teaching. *Computer Assisted Language Learning*, *35*(4), 948-971. https://doi.org/10.1080/09588221.2020.1868531

Urip, S., Reli, H., Faruq, U. M., & Mujiyono, W. (2022). Determinants of technology acceptance model (TAM) towards ICT use for English language learning. *Journal of Language and Education*, *8*(2 (30)), 17-30. https://doi.org/10.17323/jle.2022.12467

Vančová, H. (2021). *Teaching English pronunciation using technology*. Kirsch Verlag.

Wahyuni, S., Mujiyanto, J., Rukmini, D., & Fitriati, S. W. (2020). Teachers' Technology Integration into English Instructions: SAMR Model. *Proceedings of the International Conference on Science and Education and Technology (ISET 2019)*. https://doi.org/10.2991/assehr.k.200620.109

Watson, J. H., & Rockinson-Szapkiw, A. (2021). Predicting preservice teachers' intention to use technology-enabled learning. *Computers & Education*, *168*, 104207. https://doi.org/10.1016/j.compedu.2021.104207

Yildiz Durak, H. (2021). Preparing pre-service teachers to integrate teaching technologies into their classrooms: Examining the effects of teaching environments based on open-ended, hands-on and authentic tasks. *Education and Information Technologies*, *26*(5), 5365-5387. https://doi.org/10.1007/s10639-021-10511-5

Záhorec, J., Hašková, A., & Munk, M. (2021). Self-Reflection of Digital Literacy of Primary and Secondary School Teachers: Case Study of Slovakia. *European Journal of Contemporary Education*, *10*(2), 496-508. https://doi.org/10.13187/ejced.2021.2.496

Zhang, W. (2022). The role of technology-based education and teacher professional development in English as a foreign language classes. *Frontiers in Psychology*, *13*, 910315. https://doi.org/10.3389/fpsyg.2022.910315

Biodata

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