Exploring Technology Integration in Thai Preservice English Teacher Education: Curriculum Analysis and Stakeholder Perspectives

Chaiwat Kaewhanngam[1], Chamnam Para[2]

Abstract

Technology integration in language education has become increasingly crucial, particularly in response to unprecedented educational disruptions. This study examines how Thailand's preservice English teacher education programs prepare future educators for technology integration in language instruction. Using a mixed-methods approach, the research analyzed twenty-eight Bachelor of Education in English curricula from state-accredited universities, combining curriculum content analysis with stakeholder interviews. The investigation focused on two primary dimensions: the structural composition of technology-related coursework and the development of technological pedagogical content knowledge (TPACK). Findings reveal significant variations in how programs approach technology preparation and highlight specific challenges in developing preservice teachers' digital competencies. This study contributes to the broader discourse on technology integration in language teacher education and provides evidence-based recommendations for enhancing preservice English programs in diverse educational contexts.

Keywords: technology integration, preservice English teachers, curriculum analysis, English teacher education, technological pedagogical content knowledge (TPACK)

[1] Lecturer, Department of International Language Teaching, Faculty of Education, Silpakorn University, Thailand
Corresponding author: chaiwat020@gmail.com

[2] Lecturer, Department of Western Languages and Linguistics, Faculty of Humanities and Social Sciences, Mahasarakham University, Thailand

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Introduction

The global shift to digital learning during the COVID-19 pandemic has dramatically transformed the landscape of language instruction, highlighting the critical role of technology integration in education. Despite this transformation, research indicates a persistent gap between the imperative for technological innovation and its actual implementation in language teaching contexts (Chapelle & Voss, 2016; DelliCarpini, 2012; Farr & Murray, 2016; Healey, 2016; Kessler & Hubbard, 2017). This study addresses this gap by investigating how Thai preservice English programs prepare future teachers for technology integration, focusing on curricular structures and stakeholder perspectives.

Thailand serves as a significant example for exploring the integration of technology within preservice English education. Despite notable investments in educational technology through Information Communication and Technology (ICT) initiatives, challenges persist concerning educational quality and the effectiveness of English language instruction (OECD/UNESCO, 2016). The Ministry of Education has introduced strategic initiatives to develop digital infrastructure, integrate technology across various educational sectors, and establish an e-Education Hub (Ministry of Education, 2020).

This study investigates how Thai preservice English programs prepare future teachers for technology integration through a comprehensive analysis of Bachelor of Education in English curricula. The research examines two critical dimensions: the structural composition of technology-related coursework within curricula and novice teachers' perceptions of their technological pedagogical content knowledge (TPACK) development. By analyzing these aspects, this study aims to contribute insights to the discourse on technology integration in language teacher education and provide evidence-based recommendations for enhancing preservice English programs.

Research questions

1. What is the nature and scope of technology-related coursework in preservice English teacher education programs?
2. How do novice teachers perceive their preservice preparation in developing technological pedagogical content knowledge for classroom implementation?

Literature Review

The following literature review synthesizes research in five key areas: theoretical frameworks for technology integration, approaches to technology preparation in teacher education, factors influencing effective implementation, technology integration in Asian educational contexts, and emerging technological demands in language teacher education.

Theoretical Frameworks for Technology Integration in Teacher Education

Several frameworks have been developed to conceptualize effective technology integration in language teacher education. The Technological Pedagogical Content Knowledge (TPACK) framework, introduced by Koehler and Mishra (2005), extends Shulman's (1986) pedagogical content knowledge concept to include technological knowledge. In language education contexts, TPACK has proven particularly valuable because technology must support specific language acquisition processes rather than merely serving as a delivery mechanism (Chapelle & Sauro, 2017; Liu & Kleinssasser, 2015).

The TESOL Technology Standards Framework (Healey et al., 2008) complements TPACK by providing specific benchmarks for technology competencies in language teacher education across four domains: technological knowledge, pedagogical integration, assessment, and professional development. These standards emphasize that language teachers should be able to demonstrate technical competence, apply technology effectively in language instruction, use technology for assessment, and engage in ongoing professional development (Healey, 2016; Hubbard, 2008a). Similarly, UNESCO's ICT Competency Framework for Teachers (UNESCO, 2018) outlines progressive stages of technology integration, from basic digital literacy to knowledge creation, and offers an internationally recognized model for technological competence progression.

These frameworks together create expectations for how language teacher education programs equip graduates for technology-enhanced instruction, transcending basic technical skills to stress pedagogically sound technology integration that enriches language learning. Recent applications of these frameworks by Tafazoli (2022) and Darsih et al. (2024) demonstrate their continued relevance in evaluating teacher preparation, particularly in post-pandemic educational contexts where digital competence has become increasingly essential.

Approaches to Technology Preparation in Preservice Programs

Research on technology preparation in language teacher education reveals several approaches, with the single-course model and the integrated curriculum model being most prevalent. Hubbard (2008b) offers a comprehensive critique of the single-course approach, in which preservice teachers take one dedicated educational technology course. This model often limits teachers' ability to connect technological skills with language pedagogy, treating technology as separate from, rather than integral to, language teaching methodologies. Hegelheimer (2006) similarly argues that isolated technology courses fail to develop the contextualized understanding needed for effective implementation.

The integrated approach, documented by Farr and Murray (2020), embeds technology throughout preservice curricula, allowing teachers to develop technological pedagogical content knowledge in multiple contexts. This approach helps preservice teachers view technology as inherent to language pedagogy rather than an optional add-on (Kessler, 2018; Torsani, 2016). Research by DelliCarpini (2012) and Caws and Heift (2016) demonstrates that such integration enhances preservice teachers' self-efficacy and technological implementation capabilities.

Studies examining preservice teachers' experiences with technology preparation highlight a persistent gap between preparation and practice. Yeh's (2018) research with preservice English teachers revealed limited opportunities to observe and implement technology during clinical experiences. Peters (2006) further documented this theory-practice disconnect, who found that preservice teachers struggle to apply general technology skills to language-specific teaching scenarios. Soule and Papadima-Sophocleous (2019) similarly identified challenges in transferring technology knowledge from university coursework to classroom practice.

The limitations of current approaches have led researchers to advocate for more comprehensive models. Kessler and Hubbard (2017) propose a "technology infusion approach" that integrates digital literacy development throughout preservice curricula. Tai (2015) documents the effectiveness of a "TPACK-in-action" model that combines workshops, classroom observations, and guided practice to develop contextualized technology competence. These models represent promising alternatives to traditional approaches, emphasizing the importance of contextual, experiential engagement with technological pedagogical content knowledge during preservice preparation.

Factors Influencing Effective Technology Integration

Research has identified several factors that influence the effectiveness of technology preparation in preservice programs. Hubbard (2008b) outlines seven potential barriers: inertia, ignorance, insufficient time, insufficient infrastructure, insufficient standards, lack of established methodology, and lack of experienced educators. This framework helps explain why technological innovation in teacher education often progresses slowly despite recognizing its importance.

Faculty expertise has been identified as a particularly critical factor. The TESOL Technology Standards Framework attributes deficiencies in technology preparation to "insufficient interest, training, and experience among teacher educators" (Healey et al., 2008, p. 143). This observation is supported by studies documenting limited technological pedagogical content knowledge among teacher educators (Hubbard & Ioannou-Georgiou, 2017). Faculty lacking expertise in computer-assisted language learning (CALL) may rely on general rather than language-specific technology applications or avoid technology integration entirely.

Institutional factors also significantly influence technology preparation. Kessler (2006) found that programmatic constraints, including limited time in the curriculum and competing priorities, often restrict opportunities for technology integration. These constraints are particularly relevant given Thailand's recent transition from five-year to four-year teacher education programs, which necessitates difficult decisions about curricular priorities. Research by Alhamami and Costello (2019) and Habibi et al. (2019) further highlights how institutional policies, technological infrastructure, and assessment practices shape opportunities for technology integration in teacher education.

Pre-service teachers' attitudes and beliefs also influence their technology development. Zhang and Deroo (2017) found that preservice teachers' technological self-efficacy significantly predicted their willingness to implement digital tools. Similarly, Khatoony and Nezhadmehr (2020) documented how preservice teachers' perceptions of technology's value in language teaching influenced their engagement with technical training. These findings suggest that technology preparation must address skills, beliefs, and attitudes toward digital pedagogy.

Technology Integration in Asian Educational Contexts

While extensive research has explored technology integration in Western contexts, studies of preservice English teacher education in Asian settings provide significant comparative insights. Wang and Liu's (2009) study in Taiwan revealed that technology instruction was often limited to elective courses, which restricted accessibility and indicated that technology proficiency was seen as supplementary rather than crucial to language teacher preparation. These findings reflect broader trends observed across Asian contexts, where technology integration frequently encounters contextual challenges related to infrastructure, educational traditions, and institutional priorities.

In Thailand, specifically, educational technology has received significant attention from policymakers. The OECD/UNESCO (2016) report highlights Thailand's substantial investment in Information and Communication Technology (ICT) initiatives, with teacher education central to broader educational reform efforts. The National Electronics and Computer Technology Center (2011) established a comprehensive framework for technology development, stressing the importance of digital literacy in educational settings. The Ministry of Education (2020) has recently implemented strategic initiatives to develop digital infrastructure and integrate technology across educational sectors.

Research on technology integration in Thai language teacher education has highlighted several challenges. Boonmoh and Kulavichian (2023) documented varying levels of technology implementation among preservice English teachers during their teaching internships, identifying factors such as school infrastructure, mentor teacher modeling, and preservice teachers' technological self-efficacy as significant influences. Similar challenges have been documented by Lestari and Asari (2022), who found that Thai preservice English teachers faced difficulties implementing digital tools during teaching practicums, particularly in schools with limited technological resources.

Thailand's transition from five-year to four-year teacher education programs, as documented by Rupavijetra and Rupavijetra (2022), represents a significant context for examining technology integration. This structural change aimed to align Thai teacher education with international standards while adapting to changing educational contexts. The condensed timeframe necessitates critically examining how technology preparation is positioned within the new curriculum framework, particularly given competing priorities for limited credits.

Emerging Technologies and Changing Demands

The rapid evolution of educational technologies has significantly transformed expectations for language teacher preparation. The COVID-19 pandemic particularly accelerated demands for technological competence among language teachers, highlighting gaps in preservice preparation for online and hybrid instruction (Boonmoh & Sanmuang, 2024; Lestari & Asari, 2022). These unexpected challenges underscored the necessity of equipping teachers for current technologies and adapting to swiftly changing technological landscapes.

Artificial Intelligence (AI) and other advanced technologies represent a new frontier in language teacher preparation. Research by Boonmoh and Kulavichian (2023) indicates that these technologies require reconfigured approaches to language teacher education, emphasizing how teachers can effectively leverage AI tools while preserving pedagogical impact. Similar arguments have been made regarding Augmented Reality (AR), Virtual Reality (VR), and Big Data applications in language education, highlighting the necessity for more forward-thinking teacher preparation (Çalışkan & Caner, 2022; Farr & Murray, 2016).

International frameworks increasingly acknowledge the necessity of preparing teachers for emerging technologies. The UNESCO ICT Competency Framework for Teachers (2018) highlights teachers' skills in selecting, evaluating, and implementing new digital tools in their instructional practice. Likewise, the TESOL Technology Standards recognize the importance of language teachers developing adaptive expertise beyond specific tools to include broader technological literacies (Healey et al., 2008).

Recent research by Syaifudin and Rensburg (2018) highlights the importance of aligning technology training with local teaching contexts, especially in areas where basic digital infrastructure may be limited. This context-sensitive approach aligns with Kessler and Hubbard's (2017) recommendation that technology preparations should concentrate on developing critical evaluation skills for emerging technologies, rather than tool-specific training. These viewpoints indicate that effective preparation must balance immediate practical needs with long-term adaptability to technological change.

Research Gap and Study Rationale

This literature review reveals a significant gap in understanding technology integration in preservice English teacher education in Asia. While extensive literature exists on graduate-level programs in Western contexts (Kessler, 2006 Peters, 2006; Soule & Papadima-Sophocleous, 2019; Yeh, 2018), comprehensive analyses of technology preparation at the

undergraduate level in Southeast Asian settings remain scarce. Although Wang and Liu's (2009) research in Taiwan provided valuable insights into technology integration in Asian teacher education programs, similar comprehensive studies in Thai contexts are notably absent. Thailand presents a compelling case for examining technology integration in preservice English education. Despite policy emphasis on educational technology, the country continues to face challenges in educational quality and English language instruction effectiveness, as evidenced by persistently low English proficiency rankings (EF Education First, 2024; OECD/UNESCO, 2016).

These challenges suggest exploring how teacher education programs prepare graduates to effectively utilize technology for improving English language instruction. This research is especially timely considering Thailand's recent shift to four-year teacher education programs and the growing focus on technological competence. By analyzing curriculum structures and stakeholder perspectives, this study offers a comprehensive understanding of current methods for technology preparation. It identifies potential pathways for enhancing TPACK development in preservice English teacher education. The findings contribute to the theoretical understanding of technology integration in language teacher education and practical strategies for curriculum development in various educational contexts.

Methodology

Research Design and Theoretical Framework

This study employed a sequential mixed-methods design (Creswell, 2018) to examine technology integration in Thai preservice English teacher education programs. This design acknowledges that multiple methods are often necessary to fully understand complex educational phenomena (Johnson & Onwuegbuzie, 2004). This approach aligns with Teddlie and Tashakkori's (2009) assertion that integrating quantitative and qualitative methods provides complementary insights into educational practices.

The research progressed through four methodologically interconnected phases: expert interviews, curriculum content analysis of five-year programs, in-service teacher focus groups, and analysis of new four-year curricula. This design facilitated a comprehensive examination of curriculum content and stakeholder perspectives regarding technology integration preparation in preservice English teacher education programs. Integrating various data sources enabled triangulation, enhancing the validity and reliability of findings while offering a more nuanced understanding of the research problem (Dörnyei, 2007).

Curriculum content analysis was performed using Krippendorff's (2018) systematic approach to content analysis in educational research, focusing on explicit statements and implied meanings. The analysis combined quantitative elements (frequency counts of course types) and qualitative interpretation (thematic analysis of course descriptions), which is consistent with the qualitative content analysis approach in educational research.

Research Setting and Participants

Institutional Context

Most preservice English education programs in Thailand operate under state universities and follow the Teachers' Council of Thailand's Teacher Qualification Framework (OECD/UNESCO, 2016). The study examined two distinct program structures: the five-year ELT undergraduate programs implemented between 2015 and 2019 (the final cohort graduating in May 2020) and the new four-year programs introduced in 2019-2020 (the first cohort graduating in May 2024).

Selection of Curricula

Using stratified random sampling, 33 Bachelor of Education (English) curricula were selected from accredited public universities. Selection criteria included: (1) official Bachelor of Education (English) programs accredited by the Teachers' Council of Thailand; (2) programs that had been implemented for at least one complete cycle; (3) representation across Thailand's geographical regions; and (4) accessibility of complete curriculum documents. The final sample included 28 curricula from five-year programs and 4 curricula from four-year programs, representing institutions across Thailand's geographical regions (see Table 1).

Table 1: Distribution of curricula studied by region and program type

Program Type	Region	Number of Curricula Studied
5-year program (2015–2019)	Central/Western	9
	Eastern	3
	Northern	6
	Northeastern	6
	Southern	4
Total (5-year program)		**28**
4-year program (2020–2023)	Central/Western	1

Program Type	Region	Number of Curricula Studied
	Eastern	1
	Northern	1
	Northeastern	1
	Southern	1
Total (4-year program)		**5**

Participant Selection

The study included two participating groups chosen through purposive sampling for their relevant expertise and experience:

1. Language Education Experts (n=5): These participants had a minimum of 20 years of experience in ELT teacher education, current involvement in curriculum development, research experience in technology integration, and familiarity with both five-year and four-year program structures. They participated in initial interviews to establish analytical criteria for curriculum evaluation.
2. In-service Teachers (n=15): Recent graduates (within past five years) from the examined programs who were currently employed as English teachers, had experience implementing technology in their teaching, and represented diverse teaching contexts (urban/rural, primary/secondary). These participants provided perspectives on their preservice preparation through focus group discussions.

Data Collection Procedures

Phase 1: Expert Interviews

Semi-structured interviews with five experts established the initial criteria for curriculum analysis. The interview protocol comprised four sections: current technology integration practices, perceived challenges, future needs, and recommendations for teacher preparation. Each 60- to 90-minute interview was audio-recorded, transcribed, and validated through member checking. Two external experts reviewed the interview protocol to minimize researcher bias during interviews.

Phase 2: Five-Year Curriculum Analysis

Content analysis examined two primary categories within each curriculum:

1. Specialized Education Courses (pedagogical courses)

2. Specialized English Major Courses (subject-matter courses)

The analysis focused on identifying technology integration components, credit distribution, course requirements, and subject matter within each curriculum. Background information for all programs was collected. This contextual information provided insight into how programs prioritized technology integration within their broader educational objectives.

Phase 3: In-Service Teacher Focus Groups

Three focus groups explored in-service teachers' perceptions of their technology preparation. Each group comprised five participants selected to ensure diversity in teaching contexts and geographical locations. The 90-minute online sessions followed a semi-structured discussion guide on preparation experiences, implementation challenges, and professional development needs. To reduce potential bias, a neutral moderator with experience in qualitative research but without direct involvement in ELT teacher education facilitated the discussions. Sessions were recorded with participant consent, transcribed, and analyzed thematically. Member checking was employed by sharing preliminary findings with participants for validation.

Phase 4: Four-Year Curriculum Analysis

This phase examined new curricula implemented in 2019-2020, focusing on how these programs foster digital competencies, integrate emerging technologies, and meet contemporary educational demands. The analysis utilized various foundational resources, including technology competency frameworks for language teachers and the UNESCO ICT Competency Framework for Teachers (OECD/UNESCO, 2016; Healey et al., 2008; UNESCO, 2018).

Data Analysis Procedures

The study utilized descriptive and thematic content analysis, adhering to established methodological frameworks. Specifically, the descriptive analysis followed Bowen's (2009) document analysis approach, emphasizing systematic content evaluation by quantifying specific elements. This method is particularly appropriate for analyzing curriculum structures, as it facilitates the comparison of multiple documents using standardized metrics. The thematic analysis followed a six-phase approach: familiarization with data, initial code generation, theme identification, theme review, definition, and report production.

The coding process for curriculum analysis followed a systematic approach that began with preliminary coding based on expert interview findings, followed by iterative refinement. Initially, broad categories, such as "technology integration" and "TPACK development," were established. These categories were refined into specific codes, like "general technology skills" and "language-specific technology applications," through multiple readings of the curricula. For example, while analyzing course descriptions, phrases such as "digital tools for language assessment" were coded under "language-specific technology applications," whereas "basic computer operations" were categorized as "general technology skills."

The research team collaboratively developed a codebook, providing explicit definitions and examples for each code to ensure consistency. Two independent analyses were conducted at a four-week interval to maintain coding reliability. Results were organized to reflect course distributions and technology integration approaches across the sampled curricula while preserving the rich contextual understanding essential to interpretive analysis.

Validity and Reliability

Two researchers independently conducted content analysis with a four-week gap to ensure rigor, achieving an inter-rater reliability of 0.98. Validity was strengthened through data triangulation, member checking, and peer review by two experienced researchers, following qualitative research standards in language education (Mirhosseini, 2020)

Several limitations warrant consideration. Access to complete curriculum documents was sometimes restricted, particularly for newer programs. Due to the recent transition from five-year to four-year programs, only five universities had made their complete curricula publicly available during data collection. While this limited the sample size for four-year programs, these initial curricula provided valuable insights into emerging trends in technology integration.

Findings

This study examined how Thai preservice English teacher education programs prepare future teachers for technology integration. The findings are organized according to the two research questions: (1) the nature and scope of technology-related coursework and (2) novice teachers' perceptions of their technological pedagogical content knowledge (TPACK) development.

Research Question 1: The Nature and Scope of Technology-Related Coursework Technology Integration in Five-Year Bachelor of Education (English) Programs (2015-2019)

Table 2 presents the distribution of technology-related courses across the General Teaching Profession and English Major categories in the 28 examined curricula. This overview reveals the relative emphasis on technology preparation within different program components.

Table 2: Distribution of Technology-Related Courses in Preservice English Teacher Programs (n=28)

Course Category	Required Courses	Elective Courses	No Courses Offered
General Teaching Profession	10.8% (3 universities)	89.2% (25 universities)	-
English Major Courses	14.2% (4 universities)	42.9% (12 universities)	42.9% (12 universities)

Table 2 shows that most technology-related courses in the General Teaching Profession category are offered electives (89.2%), with only 10.8% of universities requiring such courses. Within the English Major category, 42.9% of universities do not offer technology-related courses, while 14.2% require them and 42.9% offer them as electives.

A significant finding is that all technology courses in the General Teaching Profession category are taught by Educational Technology departments rather than English Language Teaching (ELT) departments. This departmental separation has implications for how technology is contextualized for language teaching purposes.

Table 3 shows the number of technology-related courses available to students in both categories, reflecting the overall technology preparation these programs provide.

Table 3: Total Number of Technology-Related Courses Available in Five-Year Programs (n=28)

Total Courses Available	Required Courses	Elective Courses
4 Courses	3.6% (1 university)	3.6% (1 university)
3 Courses	-	3.6% (1 university)
2 Courses	3.6% (1 university)	17.8% (5 universities)
1 Course	14.2% (4 universities)	46.4% (13 universities)
No Course	78.6% (22 universities)	28.6% (8 universities)

Table 3 reveals that 78.6% of the programs have no required technology-related courses, indicating that most preservice English teachers could graduate without mandatory technology courses. Where elective courses are available, nearly half of the universities (46.4%) offer only one technology-related elective course, typically carrying 2-3 credits.

Technology Integration in Four-Year Bachelor of Education (English) Programs (2020-2023)

Following Thailand's transition from five-year to four-year teacher education programs in 2019, this study examined how the new curricula address technology integration. Table 4 presents the structure of these new programs across five universities.

Table 4: Components of New B.Ed. (English) Curricula (2020-2023)

Curriculum Component	University 1	University 2	University 3	University 4	University 5
General Education	30	30	30	30	30
General Teaching Profession	36	40	34	36	40
English Major	69	70	60	63	60
Elective	6	6	6	6	6
Total Credits	141	146	130	135	136

Table 5 shows the distribution of technology-related courses in these new programs, revealing patterns in how technology preparation is structured in the curriculum.

Table 5: Technology-Related Courses in New Four-Year Programs (n=5)

Course Category	Required Courses	Elective Courses	No Courses
General Teaching Profession	100% (5 universities)	0%	0%
English Major	0%	80% (4 universities)	20% (1 university)

All five universities require technology courses in the General Teaching Profession category in the new four-year curricula. However, technology courses specific to English language teaching remain predominantly elective, with 80% of universities offering them only as optional components and one university providing no such courses.

Content Analysis of Technology Integration in New Curricula

Our analysis of course descriptions in the new curricula examined six key dimensions of technology integration. Table 6 summarizes these findings, showing the number of universities that include each dimension in their curriculum.

Table 6: Technology Integration Dimensions in New Four-Year Curricula (n=5)

Technology Integration Dimension	Present in General Teaching Profession	Present in English Major
1. Safe, Effective, and Responsible Use of Digital Technology	5 universities (100%)	4 universities (80%)
2. Culturally Inclusive and Equitable Use of Digital Technology	1 university (20%)	0 universities (0%)
3. Technological Pedagogical Content Knowledge Development	4 universities (80%)	5 universities (100%)
4. Digital Technology for Future Work and Skills	1 university (20%)	2 universities (40%)
5. Digital Technology for Lifelong Learning	2 universities (40%)	1 university (20%)
6. Digital Technology for Online Language Teaching	0 universities (0%)	0 universities (0%)

A particularly significant finding related to culturally inclusive technology use appears in only one program. The course *"Digital Innovation for Language Learning"* (ENG3901) at University 5 explicitly incorporates individual differences and learner accommodation concepts. The course description states: "...to develop learners to be intellectual and innovators compatible with the context, individual differences, and learners with special needs..." This represents one of the few instances where cultural inclusivity and differentiated instruction through technology are explicitly addressed.

Regarding emerging technologies, Table 7 presents findings on including exponential technologies in the curricula.

Table 7: Exponential Technologies in New Four-Year Curricula (n=5)

Exponential Technology	Present in General Teaching Profession	Present in English Major
Artificial Intelligence (AI)	5 universities (100%)	3 universities (60%)
Augmented/Virtual Reality (AR/VR)	0 universities (0%)	0 universities (0%)
Blockchain	0 universities (0%)	0 universities (0%)
Big Data/Data Science	0 universities (0%)	0 universities (0%)
Internet of Things (IoT)	5 universities (100%)	4 universities (80%)

All five universities include AI and IoT in their General Teaching courses. AR/VR, Blockchain, and Big Data are not in the examined curricula. Only three universities in the English Major category cover AI applications in language teaching.

Research Question 2: Novice Teachers' Perceptions of TPACK Development

The analysis of interviews with 15 novice in-service teachers revealed four key themes regarding their perceptions of technological pedagogical content knowledge development in their preservice programs.

Theme 1: Limited Access to Specialized TPACK Courses

Participants consistently reported insufficient access to specialized technology courses focused on language teaching. This aligns with our curriculum analysis finding that only 14.2% of five-year programs required technology courses in the English Major category, while 42.9% offered no such courses. Even in the new four-year programs, specialized technology courses remain predominantly elective (80%) in the English Major category.

One participant described this limitation in detail:

> *"My university had a general technology course for all students at the faculty. The lecturer taught general tools that were not specific to our majors. When I started teaching English, I had no idea how to use digital tools specifically for language acquisition or assessment. Though English major electives existed, they weren't available to us due to scheduling conflicts with our practicum. This left me completely unprepared for online teaching during the pandemic."*
> (Teacher 2, secondary school English teacher, 3 years of experience)

Another participant emphasized how this affected their professional preparation:

> *"I took only one technology course in language teaching. Though we covered many topics, we lacked practice time. Half the course was spent on basic tools and half on new ones. There wasn't enough opportunity to develop proficiency with any of them. When I started teaching, I didn't know how to select appropriate technology for different language skills."* (Teacher 9, primary school English teacher, 2 years of experience)

Theme 2: Disconnect Between General Technology Courses and ELT Practice

Participants frequently noted that required technology courses were taught by faculty from Educational Technology departments rather than ELT specialists, creating a disconnect between the technology skills and their application in language teaching contexts. This mirrors our curriculum analysis finding that 100% of technology courses in the General Teaching Profession category were taught by Educational Technology departments rather than ELT faculty, highlighting a systematic separation between technological and pedagogical content knowledge.

A participant explained this challenge:

> *"I couldn't connect my technology courses to language teaching. Both courses - Information Technology in Education and Multimedia in Education - were taught by non-ELT lecturers, making it hard to see the relevance to ELT. The examples used were generic educational scenarios, not language teaching situations. I wish the ELT faculty had taught these courses so they could show us how to use technology specifically for language development activities."* (Teacher 15, high school English teacher, 4 years of experience)

This departmental separation created difficulties for teachers in transferring general technology knowledge to specific language teaching applications. As one participant noted:

> *"Our technology instructor didn't understand the unique needs of language classrooms. We learned how to create general multimedia presentations but not how to design digital activities for vocabulary acquisition or listening comprehension. I had to figure that out independently during my first-year teaching."* (Teacher 7, middle school English teacher, 3 years of experience)

Theme 3: Insufficient Technology Integration Across the Curriculum

Participants reported minimal technology integration across their pedagogy courses, limiting their exposure to models of effective technology use in language teaching. Most indicated that technology was treated as a separate subject rather than an integrated component of language pedagogy.

One participant described this compartmentalized approach:

> *"Teachers of other pedagogy courses in my ELT program did not use much technology in the class. They only used slides or YouTube. Most classes focused on pedagogy and theories in teaching different skills, but we did not learn much about integrating technologies in other pedagogy courses. There was no modeling of how technology could transform language teaching. Even in our teaching methods courses, technology was just mentioned as an optional resource, not as an integral part of effective*

language instruction." (Teacher 11, elementary school English teacher, 2 years of experience)

Theme 4: Limited Exposure to Current and Emerging Technologies

Participants consistently expressed concerns about the outdated nature of the technological tools and applications introduced in their preservice programs. Many reported feeling unprepared to use the digital tools expected in modern language classrooms. This experience directly connects to our curriculum analysis finding that while AI and IoT are included in most programs (100% and 80-100%, respectively), other important emerging technologies like AR/VR, Blockchain, and Big Data are completely absent (0%) from all curricula examined. Moreover, our finding that no universities (0%) include courses on digital technology for online language teaching explains teachers' reported struggles with virtual instruction.

One participant detailed this challenge:

"University courses were outdated, mainly focusing on YouTube, websites, and PowerPoint. They didn't introduce modern technologies like AR/VR, AI, and robotics that the private sector uses. When I started at my current school, they expected me to use interactive language learning apps and online assessment tools I'd never seen before. My university training from just three years ago was already obsolete. When newer tools were mentioned in our courses, we never got to practice with them in realistic teaching scenarios." (Teacher 11, elementary school English teacher, 2 years of experience)

These findings reveal significant gaps in how preservice English teacher education programs in Thailand prepare graduates for technology integration in language teaching. The curriculum analysis demonstrates structural limitations—including few required technology courses in English Major programs, departmental separation between technology and language pedagogy, and limited coverage of emerging technologies and inclusive digital practices.

The teacher interviews highlight how structural issues in the curriculum affect graduates' implementation of technology in the classroom. The alignment between curriculum

analysis and teacher feedback indicates that current program structures may not fully prepare teachers for technology-integrated language instruction in modern educational settings.

Discussion

This study investigated how preservice programs prepare graduates to integrate technology into language teaching. Using content analysis, the research examined Bachelor of Education (English) curricula in Thailand, serving as a case study to highlight the growing societal demands and expectations for preparing future teachers with robust technological pedagogical content knowledge (TPACK). The mixed methods approach combined curriculum document analysis with stakeholder interviews, allowing for a more comprehensive understanding of program structures and implementation challenges.

Technology-Related Courses in the Curricula of Preservice English Programs

Analysis of preservice English teacher education curricula reveals significant gaps in technology preparation. Most programs (89.2%) offer only a single general technology course, with few universities (14.2%) requiring TPACK-focused courses. Notably, 42.9% of programs lack computer-assisted language learning (CALL) courses, suggesting inadequate preparation for technology integration in language teaching. This quantitative finding aligns with the qualitative data from in-service teachers who consistently reported feeling underprepared for implementing technology in their classrooms. One participant noted, "My university has one general technology course for all students at the Faculty of Education. The lecturer taught general tools that were not specific to our majors."

These results reflect a pattern observed in previous studies showing preservice English teachers often lack adequate opportunities to practice technology integration before graduating. CALL courses frequently compete with other pedagogical priorities in TESOL curricula, leading many programs to "leave it out and [have] advised interested students to take a general educational technology course" (Chapelle, 2006, p. IX). However, our findings indicate that this approach results in a significant gap between technical skills and pedagogical application, as in-service teachers face difficulties translating general technology knowledge into language-specific teaching practices.

The findings indicate a discrepancy between the expectations from Thailand's investment in educational technology initiatives over the last two decades (OECD/UNESCO, 2016) and the actual progress observed. Despite national policies promoting technology

integration, the analysis shows limited advancement in preservice curriculum development. This suggests that policy implementation faces significant challenges at the institutional level, where established departmental structures and curricular traditions may impede reform efforts.

Thai programs show notable differences in their approach to technology preparation compared with international contexts. Studies from the United States (Kessler, 2018), Australia (Farr & Murray, 2016), and Taiwan (Tai, 2015) reveal more systematic approaches to technology integration. For instance, Taiwan's teacher education programs require a minimum of three technology-focused courses specifically tailored to language teaching contexts, with at least one course dedicated to emerging technologies. Similarly, Australian programs have increasingly embedded technology across subject-specific courses rather than isolating them in generic technology modules. These international comparisons highlight alternative approaches that Thai programs might consider adopting, particularly integrating technology throughout the curriculum rather than restricting it to isolated courses.

Preservice English Teachers' Technological Pedagogical Content Knowledge

Analysis of the interview data revealed three critical dimensions that influence the development of technological pedagogical content knowledge (TPACK) among preservice English teachers. First, the data highlighted the importance of technology-focused coursework delivered specifically by ELT faculty or CALL specialists, ensuring disciplinary alignment and pedagogical relevance. Second, findings emphasized the systematic integration of technological pedagogy across the ELT curriculum, facilitating the development of cohesive approaches to technology-enhanced language instruction. Third, the results underscored the necessity of incorporating current content knowledge that reflects contemporary technological advances and their applications in language education. The qualitative interviews with in-service teachers offered essential insights into the practical manifestation of these dimensions, indicating that standalone technology courses lacking disciplinary relevance had a minimal impact on classroom implementation.

Our analysis identifies a notable structural barrier: the institutional separation between Educational Technology and English Language Teaching (ELT) departments. This division creates a pedagogical disconnect, isolating technology instruction from language teaching contexts. Graduate experience revealed critical gaps in ELT-specific technology preparation, with courses mainly offered by non-ELT departments. This arrangement impeded the

translation of general technology knowledge into language teaching, aligning with Hubbard's (2008b) identification of educator expertise as the "single, most critical obstacle" (p.178) in CALL implementation. This finding extends Hubbard's observation by revealing the institutional structures perpetuating this obstacle.

Integrating quantitative curriculum analysis with qualitative stakeholder perspectives shows that this departmental division has real-world implications. In-service teachers expressed challenges in applying generalized technology skills to language teaching contexts, with one participant stating: "I couldn't connect my technology courses to language teaching. Both courses were taught by non-ELT lecturers, making it difficult to see the relevance to ELT."

The TESOL Technology Standards Framework (Healey et al., 2008) attributed such deficiencies to "insufficient interest, training, and experience among teacher educators" (p.143). The OECD/UNESCO (2016) report noted that Thailand's increased technology use doesn't guarantee better pedagogical implementation, with programs emphasizing basic over advanced applications. This aligns with Hubbard and Iouannou-Georgiou's (2017) finding that teachers adapt non-specialized applications for language instruction due to limited CALL expertise in ELT faculty, highlighting the need for ELT-specific technology preparation.

Integrated Pedagogy Across Preservice Programs

The findings revealed a critical need for systematic technology integration within language teaching pedagogy courses in preservice programs. Participants emphasized the importance of a gradual, technology-integrated approach across the curriculum. This aligns with Hubbard's (2008b) observation that while "the use of technology in language teaching would come up in all classes in situations where technological options make sense... a fully integrated program does not yet seem to exist" (p. 182). The mixed-methods approach revealed that this lack of integration directly affects practice, as teachers reported being unable to connect their technological knowledge with pedagogical application in their classrooms.

Another unexpected finding was that the transition from five-year to four-year programs has not led to increased technology integration, despite the opportunity for curriculum redesign. This contradicts the expectation that curriculum revisions would incorporate more current approaches to technology preparation. Instead, our analysis of the newer four-year curricula showed persistent gaps in critical areas such as digital safety, ethics, cultural inclusivity, and engagement with emerging technologies.

Structural Barriers and Implications for Curriculum Reform

Our analysis revealed barriers to effective technology integration in Thai preservice English programs. Beyond the departmental divisions mentioned earlier, the reduction from five-year to four-year programs has intensified competition for curricular space, with technology courses often marginalized as electives rather than core requirements. The absence of ELT faculty with specialized CALL expertise also limits the development of discipline-specific technology integration approaches.

These structural factors help explain why implementation remains inconsistent and often superficial despite recognizing technology's importance. This study's mixed-methods approach was particularly valuable in identifying these barriers, as the qualitative stakeholder interviews provided context for understanding the quantitative patterns observed in the curriculum analysis.

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The findings have significant implications for curriculum design in teacher education programs. Based on our analysis, we recommend several approaches to enhance technology integration:

1. Collaborative teaching models: Establish teaching teams comprising ELT and Educational Technology specialists to co-develop and co-teach TPACK-focused courses, addressing the departmental divide.
2. Embedded technology components: Integrate technology modules into all methodology courses rather than isolating them in standalone technology courses, ensuring discipline-specific application.
3. Progressive competency framework: Develop a technology competency framework that builds from basic skills to advanced pedagogical applications across the four-year curriculum, aligned with international standards like TESOL Technology Standards.
4. Emerging technology exposure: Incorporate technologies such as AI-assisted language learning, augmented reality, and virtual reality into practicum experiences, addressing the gap in advanced technology preparation identified in our analysis.

5. School partnerships: Establish connections with schools that exemplify effective technology integration to provide authentic learning contexts for preservice teachers, bridging theory and practice.

These recommendations respond directly to the gaps identified in our curriculum analysis and the challenges reported by in-service teachers. Teacher education programs can better prepare graduates for the technological demands of contemporary language classrooms by addressing the content of technology preparation and the structural barriers to its implementation.

Updated Content Knowledge in Technology-Related Courses

The new 4-year curricula show no increase in technology-related courses from previous programs. English Major courses lack content in digital safety, ethics, cultural inclusivity, lifelong learning, and online teaching. Programs emphasize basic technological skills while neglecting advanced technologies like AR, VR, AI, and Big Data, with participants reporting minimal exposure to these innovations in language teaching.

These findings align with prior studies highlighting outdated and insufficient content in technology-related courses within preservice English programs (Farr & Murray, 2016; Healey, 2016; Hegelheimer, 2006; Kessler, 2006; Peters, 2006; Yeh, 2018; Zhang & Deroo, 2017). While these deficiencies have been documented across contexts, our findings suggest they may be particularly pronounced in Thailand, where the rapidly advancing technological landscape contrasts sharply with relatively static teacher preparation approaches.

Scholars suggest introducing technology standards for language teachers to improve teacher preparation. Hubbard (2008b) emphasizes the necessity of establishing technology standards for CALL courses, noting that insufficient standards hinder effective practices. UNESCO ICT Competency Standards for Teachers and TESOL Technology Standards are pivotal frameworks that should be systematically integrated into language teacher education. These standards serve as benchmarks for competency, provide guidelines for best practices (Kessler, 2016), and address essential areas like digital safety, resilience, ethics, and culturally inclusive technology, which are internationally recognized as critical for digital literacy.

Implications for Policy and Practice

The findings of this study have broader implications for educational policy in Thailand and similar contexts. The disconnect between national technology initiatives and preservice

teacher preparation suggests more coordinated policy approaches targeting teacher education curricula. This might include establishing more detailed standards for technology integration in teacher education programs and providing resources for faculty development in technological pedagogical content knowledge.

For teacher educators, the findings highlight the importance of modeling technology integration within subject-specific contexts rather than teaching technology as a separate skill set. This aligns with recent research emphasizing the contextual nature of effective technology use in language teaching (Boonmoh & Sanmuang, 2024; Tafazoli, 2022).

In the rapidly evolving educational technology landscape, with artificial intelligence and other advanced tools becoming increasingly prevalent, addressing these curricular gaps takes on new urgency. As the analysis of stakeholder perspectives showed, teachers who graduate without adequate preparation in these areas face significant challenges in adapting to technological innovations in their professional practice. By integrating technological, pedagogical, and content knowledge within teacher education curricula, programs can better prepare graduates to navigate the complex demands of contemporary language teaching and respond effectively to future technological developments.

Conclusion

The post-COVID-19 educational landscape has heightened the imperative for effective technology integration in language teaching. This study reveals significant gaps in how Thai preservice English programs prepare future teachers for this technological environment, particularly in developing technological pedagogical content knowledge (TPACK) and facilitating engagement with emerging tools such as Artificial Intelligence. These findings contribute to theoretical understanding and policy development in several aspects. Theoretically, this study extends the TPACK framework by highlighting the unique contextual factors affecting its implementation in Southeast Asian ELT settings. It suggests that effective TPACK development requires systematic integration by domain-specific experts rather than isolated coursework. Our findings necessitate a theoretical shift from viewing technology integration as an isolated competency to understanding it as an embedded dimension of language teacher identity, challenging existing preparation models that separate technological skills from pedagogical knowledge. This research also contributes to emerging theories of educational digital transformation by demonstrating how institutional structures facilitate or impede technological innovation in language teacher education.

Several methodological limitations warrant consideration. The study's reliance on content analysis of course descriptions, rather than comprehensive programmatic evaluation, may not fully capture the breadth of preservice preparation. Additionally, restricted access to detailed syllabi from curricula implemented during 2020-2023 constrained the depth of analysis. Future research would benefit from incorporating classroom observations and performance assessments to provide a more nuanced understanding of technology integration in post-pandemic teacher preparation. The findings suggest educational reforms should include mandatory TPACK courses led by ELT specialists, technology integration in pedagogy, and digital safety and cultural inclusivity training. The Teachers' Council of Thailand should establish specific technological competency standards for language teachers that align with international frameworks while addressing local contextual needs. Universities should prioritize funding for faculty development in educational technology for ELT departments, infrastructure supporting hands-on experience with emerging technologies, and collaborative research between ELT and Educational Technology departments. Certification requirements should be revised to include demonstrated proficiency in technology integration specific to language teaching. Relevant agencies should form formal partnerships with technology industry leaders to ensure preservice programs can access current tools and practices. This study helps to understand the challenges in preparing language teachers for technologically enhanced instruction, offering a basis for reforms that can better equip future teachers to handle the evolving landscape of language education technology in the post-pandemic era.

The Authors

Chaiwat Kaewphanngam is a lecturer at the Faculty of Education, Silpakorn University. His expertise includes technology-enhanced learning, pre-service and in-service teacher education and training, and human resource development. He received an M.A. in Applied Linguistics from Mahidol University and an M.Ed. in Internal Educational Development from Teachers College, Columbia University.

Chamnan Para teaches at the Department of Western Languages and Linguistics, Mahasarakham University. Educated in English and Applied Linguistics from Mahasarakham, Mahidol, and the University of Bristol, he focuses on TESOL and Applied Linguistics, with research interests in Thai-English translation (law, business, sciences), ESP teaching (science, business), and language assessment.

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