Developing a TPACK-Based Teacher Training Program Using Authentic Materials on EFL Teachers' Reading Exercise Design Competency and Teaching Self-Efficacy

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Abstract

This research aimed to 1) analyze the teacher training program situation problems using authentic materials on EFL teachers' reading exercise design competency and teaching self-efficacy, 2) develop a teacher training program based on the TPACK framework using authentic materials on EFL teachers' reading exercise design competency and teaching self-efficacy, and 3) evaluate a teacher training program based on the TPACK framework using authentic materials on EFL teachers' reading exercise design competency and teaching self-efficacy. The study involved 30 purposively sampled EFL Thai secondary teachers in Thonburi. Data were collected via competency tests, self-efficacy scales, rubrics, interviews, and observations, then analyzed using statistical and thematic methods. The findings revealed that prior practices relied heavily on simplified texts and Lower-Order Thinking Skills. Post-training, teachers achieved a 'Proficient' level in pedagogical competency, successfully designing structured plans using the P3C2R+GIRD model. Additionally, teaching self-efficacy increased to a "very high" level (M=4.38). However, technology integration skills remained 'Foundational,' suggesting that while the program successfully elevated pedagogy and confidence, further support is needed to achieve transformative technological application.

Keywords: teacher training program, TPACK framework, authentic materials, reading comprehension, exercise design competency

1. Introduction

English has become a prerequisite for global economic advancement and communication, aligning with the United Nations Sustainable Development Goals (SDG 4) for quality education. Despite Thailand prioritizing English competence as a national driver, proficiency levels among Thai learners remain persistently low after over a decade of compulsory education. National assessments highlight underperformance in reading comprehension due to a systemic overreliance on rote learning and insufficient exposure to authentic language use (Karanjakwut et al., 2025). These challenges are exacerbated in resource-limited schools by teacher shortages and a lack of technological integration, necessitating teacher training grounded in robust frameworks like Technological Pedagogical Content Knowledge (TPACK) (Mishra & Koehler, 2006).

While TPACK equips teachers to integrate digital tools with content and pedagogy, sustainable competence also requires institutional support and reflective practice. Chang (2025) notes that fragmented curricula and weak theory-practice alignment often hinder teacher growth. Furthermore, traditional reading instruction in Thailand is heavily dependent on Ministry-approved textbooks that frequently lack cultural inclusivity and fail to connect with students' lived experiences (Promwatcharanon & Suwanarak, 2025). Teachers often lack the digital literacy and training required to design or adapt authentic materials that could promote critical thinking and contextualized reading (Charunsri & Sripicharn, 2023).

The integration of Artificial Intelligence (AI) offers a transformative solution. AI-powered platforms have been shown to enhance reading enjoyment and autonomy by providing adaptive content (Wangdi & Shimray, 2025). However, implementing such innovations relies heavily on teacher self-efficacy. Bandura (1997) suggests that high

self-efficacy leads to the adoption of innovative methods, yet many Thai teachers report low confidence in creating technology-integrated materials (Pongsri et al., 2024). Evidence from randomized trials indicates that short-term training is insufficient; sustainable improvement requires intensive, context-specific models that include mentoring and hands-on design tasks (Chimbutane et al., 2025).

Despite a growing body of research on TPACK, authentic materials, and teacher professional development, a critical and context-specific gap persists at their intersection. Existing TPACK-based training studies in EFL contexts have largely focused on pre-service teachers or general language skills, without specifically targeting the reading exercise design competency of in-service secondary teachers (Cox & Graham, 2009; Chai et al., 2013). Similarly, while studies on authentic materials confirm their motivational and linguistic benefits in EFL instruction, they rarely examine how in-service teachers can be systematically trained to design authentic-material-based reading exercises within a structured pedagogical model such as P3C2R+GIRD (Mara & Mohamad, 2021; Yawiloeng, 2022). Furthermore, although teacher self-efficacy has been studied in relation to technology use and general language instruction, no study to date has simultaneously investigated how a TPACK-integrated program impacts both reading exercise design competency and teaching self-efficacy among Thai EFL secondary teachers—a population facing distinct systemic constraints including limited digital infrastructure, dependence on Ministry-approved materials, and inadequate practical training in authentic material adaptation (Karanjakwut et al., 2025; Promwatcharanon & Suwanarak, 2025). This triple intersection—TPACK-based teacher training, the P3C2R+GIRD reading framework, and authentic material integration, applied to in-service Thai EFL teachers—represents a substantial and unaddressed research gap. Consequently, this study aims to develop and evaluate a comprehensive TPACK-based teacher training program that directly bridges this gap by equipping teachers with systematic tools to design structured, authentic-material-based reading exercises, while simultaneously strengthening their professional self-efficacy. Regarding these identified gaps, the following research questions are set out:

1) What are the current teacher training program situation problems using authentic materials on EFL teachers' reading exercise design competency and teaching self-efficacy?
2) How effective is the TPACK-based teacher training program in improving teachers' competency in designing reading exercises?
3) What changes occur in teachers' self-efficacy in teaching reading comprehension after participating in the training program?
4) What is the quality of reading exercises developed by teachers after completing the training program?
5) What are the teachers' perceptions toward the implementation of the TPACK-based training program?

2. Literature Review

The literature review involves five key domains about reading instruction, TPACK framework in language teaching, authentic materials in language teaching, teacher professional development and self-efficacy, and P3C2R+GIRD Model.

2.1 Reading Instruction in EFL Context

Reading instruction occupies a central role in English as a Foreign Language (EFL) education because it serves as both an input and output skill that enhances learners' linguistic competence, cognitive development, and academic success. In EFL environments, reading provides one of the few authentic exposures to the target language, allowing students to internalize vocabulary, grammar, and discourse structures (Alharbi, 2021). However, effective reading instruction remains a persistent challenge across many EFL contexts, particularly in Asian educational systems where learners often rely on rote learning and translation-based approaches (Yawiloeng, 2022).

One of the most common difficulties EFL learners face is limited vocabulary knowledge, which restricts their ability to process texts. Vocabulary size is widely recognized as a strong predictor of reading comprehension (Howley-Rouse, 2023). Alharbi (2022) found that Saudi EFL learners with broader lexical repertoires demonstrated greater inferential comprehension, whereas those with restricted vocabulary resorted to word-by-word decoding. Similarly, Muliawati et al. (2025) reported that Thai secondary students lacking sufficient lexical knowledge experienced frustration and disengagement. Beyond vocabulary, schema theory posits that readers construct meaning by linking text to prior experiences (Al-Issa, 2006). However, Dokchandra and Boonnoon (2025) observed that Thai learners struggled with Western cultural references because their background knowledge did not align with the text's assumptions.

Effective instruction relies on structured models and assessment. Karanjakwut (2017) introduced the P3C2R+GIRD model as a systematic approach emphasizing scaffolding and guided practice. Regarding assessment, contemporary research advocates for alternatives to standard tests. Schellings and Broekkamp (2011) suggest techniques like think-aloud protocols, while Boubris and Haddam (2020) recommend portfolio reviews. Reem and Nsreen (2025) demonstrated that digital reading-assistant software could provide real-time feedback, supporting learner autonomy. Technology also offers dynamic solutions; however, successful integration requires adherence to the TPACK framework (Mishra & Koehler, 2006) to ensure tools serve instructional objectives. This necessity for a balanced approach to technology leads directly to the detailed examination of teacher knowledge frameworks.

2.2 TPACK Framework in Language Teaching

The Technological Pedagogical and Content Knowledge (TPACK) framework is a critical model for understanding how teachers integrate technology into their pedagogy. Developed by Mishra and Koehler (2006), TPACK builds upon Shulman's (1986) Pedagogical Content Knowledge (PCK) by adding Technological Knowledge (TK). The framework posits that effective teaching emerges from the intersection of content, pedagogy, and technology. In language education, TPACK provides a practical guide for incorporating digital innovations to improve linguistic competence.

Developing TPACK requires systematic professional development. Cox and Graham (2009) argued that teachers must engage in reflective practice and collaborative learning to internalize TPACK principles. Effective programs emphasize the alignment between technology and pedagogical objectives. Chai et al. (2013) found that design-based learning promotes deeper understanding of TPACK in practice. However, sustainable development depends on institutional support. Chang (2025) observed that in China, sustainable competence development relied on both institutional backing and self-regulated learning.

Implementation yields benefits such as enhanced engagement and learner autonomy (Jung & Ottenbreit-Leftwich, 2019), as well as support for constructivist learning where technology serves as a mediating artifact (Chai et al., 2013). Yet, challenges persist. Pareto and Willermark (2018) identified limited digital literacy and unequal access as primary barriers. In Thailand, disparities in internet connectivity remain an issue (Promwatcharanon & Suwanarak, 2025). Furthermore, negative perceptions can hinder adoption (Cox & Graham, 2009). Addressing these challenges requires pedagogical mentoring to help teachers effectively utilize resources, such as authentic materials, in their instruction.

2.3 Authentic Materials in Language Teaching

Authentic materials offer significant benefits. Mara and Mohamad (2021) highlight that they contain diverse vocabulary and complex structures that expand linguistic repertoire. This aligns with Krashen’s Input Hypothesis, where authentic materials provide comprehensible input (Chen, 2022). They also foster motivation; Kitjaroonchai et al. (2024) found that Thai students using authentic materials reported higher enjoyment than those using standardized texts.

However, challenges exist, particularly regarding linguistic complexity which can hinder lower-proficiency learners (Yawiloeng, 2022). Teachers must adapt materials by simplifying vocabulary or providing glossaries (Mara & Mohamad, 2021). Selection is also critical; inappropriate choices can reduce motivation (Alamri, 2025). The digital age mitigates some access issues, allowing teachers to tailor materials to learner interests (Yawiloeng, 2022).

The integration of digital tools aligns with the TPACK framework (Mishra & Koehler, 2006), enabling teachers to curate resources pedagogically. Wangdi and Shimray (2025) found that AI-based platforms like ReadTheory improved comprehension by adjusting complexity, while Kitjaroonchai et al. (2024) noted that digital authentic materials enhanced fluency. Effective implementation requires teacher training. Karanjakwut et al. (2025) showed that teachers often lack confidence in adapting resources. Therefore, sustained professional learning that combines theory with hands-on experimentation is essential (Chai et al., 2013).

2.4 Teacher Professional Development and Self-Efficacy

Teacher professional development (TPD) is pivotal for educational quality (Guskey, 2002). Central to TPD is teacher self-efficacy, defined by Bandura (1997) as the belief in one’s capability to execute teaching tasks. High efficacy fosters innovation, whereas low efficacy leads to resistance (Tschannen-Moran & Hoy, 2001). In EFL education, TPACK-based training is essential for meeting diverse needs.

Effective TPD is content-focused, active, and coherent (Garet et al., 2001). Traditional "one-shot" workshops often fail due to a lack of follow-up (Desimone, 2009). In contrast, collaborative design-based development leads to deeper

TPACK understanding (Chai et al., 2013). In contexts like Thailand, where teachers face systemic constraints (Kewara & Prabjandee, 2018), TPD must empower innovation within existing limitations.

Empirical studies confirm these links. Garet et al. (2001) found that intensive professional learning improved performance. Karanjakwut et al. (2025) showed that the EPIRIS model training improved both competence and confidence. However, Chimbutane et al. (2025) cautioned that brief training without mentoring produces minimal effects. Wangdi and Shimray (2025) demonstrated that training on AI platforms boosted confidence, while Kitjaroonchai et al. (2024) found similar results for adapting authentic materials. Barriers such as digital inequality (Pareto & Willermark, 2018) and resistance to change (Cox & Graham, 2009) persist. To overcome these, reflective practice—both reflection-in-action and reflection-on-action (Schön as cited in Pitsoe and Maila, 2013)—and collaboration are vital strategies.

2.5 P3C2R+GIRD Model

The P3C2R+GIRD model is a structured approach to reading comprehension developed by Karanjakwut (2017) to move beyond translation-based methods. It integrates top-down and bottom-up processing through six stages. First, providing collocations addresses lexical barriers (Karanjakwut, 2017). Second, prediction questions activate schema (Carrell & Eisterhold, 1983). Third, selecting engaging, authentic texts promotes intrinsic motivation (Day et al., 1998; Mara & Mohamad, 2021). The fourth stage involves constructing questions based on the GIRD framework (Gist, Inference, Reference, Detail), which parallels Bloom's Taxonomy (Anderson & Krathwohl, 2001). Fifth, reinforcing vocabulary consolidates linguistic features (Karanjakwut, 2017). Finally, assessing comprehension promotes metacognitive awareness. The model is underpinned by Cognitive Load Theory (Sweller, 1994) and Interactive Reading Theory (Rumelhart as cited in Dwivedi et al., 2018).

Empirical studies support the model. Karanjakwut (2017) demonstrated significant gains in comprehension scores compared to traditional methods. Mara and Mohamad (2021) observed increased cultural awareness when authentic texts were used. Kitjaroonchai et al. (2024) found that combining digital authentic materials with the model enhanced vocabulary retention.

Despite the proven effectiveness of the P3C2R+GIRD model, gaps remain. Most studies focus on secondary learners in Southeast Asia, and few have compared the model with other frameworks or examined longitudinal impacts. Additionally, there is insufficient evidence on teachers' ability to implement it independently without training.

Crucially, while TPACK, authentic materials, and reading strategies have been studied separately, few investigations have explored how a TPACK-based training program integrating authentic materials within the P3C2R+GIRD model influences teacher competency. This study aims to bridge this gap by developing a comprehensive training program. By equipping teachers with the skills to use authentic materials and digital tools within a structured framework, the research seeks to holistically strengthen EFL teachers' reading exercise design competency and teaching self-efficacy.

3. Methods

The study details the research design, population, variables, instruments, procedures, data collection, analysis, and ethical considerations.

3.1 Research Design

This study employed a mixed-methods, quasi-experimental one-group pre-test-post-test design. Quantitative and qualitative data were integrated to evaluate both the effectiveness of the training program and its implementation process in school contexts. The quantitative strand measured changes in competency and self-efficacy through pre- and post-tests and rubric-based assessments. The qualitative strand utilized interviews, observations, and reflective logs to gain in-depth understanding of teachers' experiences and challenges.

The design followed four main phases: 1) Preparation Phase (needs assessment and instrument validation), 2) Training Phase (program implementation), 3) Implementation Phase (classroom application with mentoring), and 4) Evaluation Phase (post-tests and analysis).

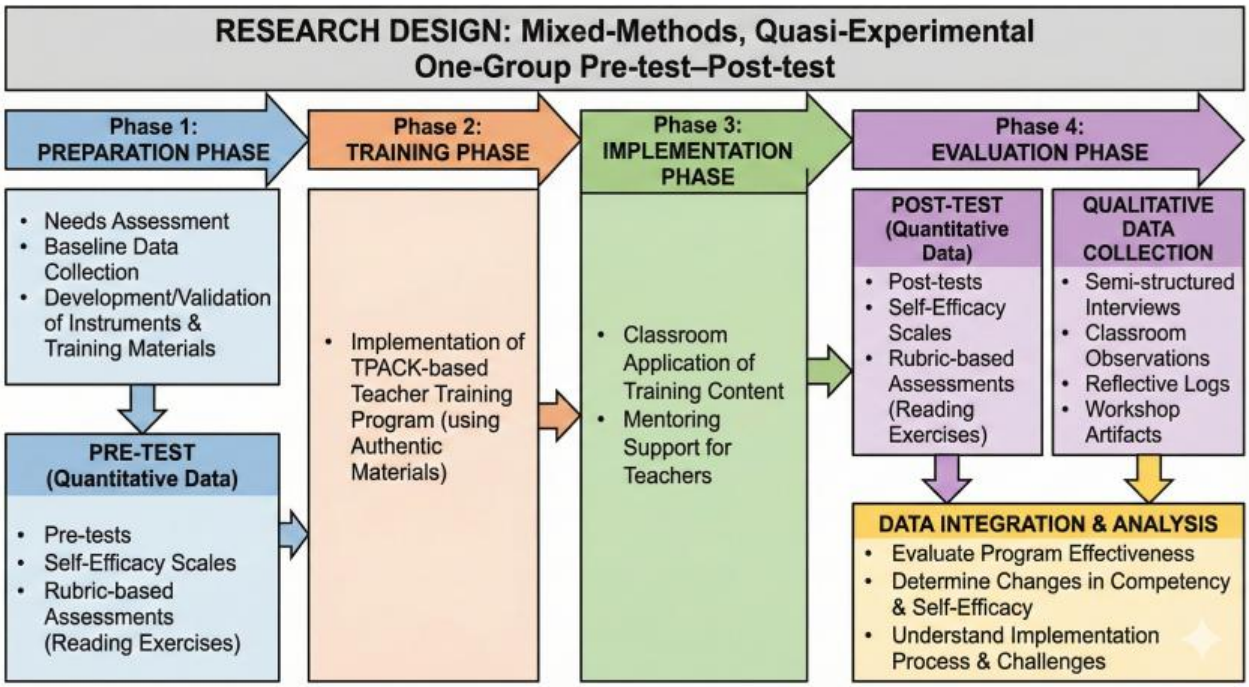

Figure 1. Research Design

3.2 Population and Sample

3.2.1 Population

The population comprised all secondary school EFL teachers in Thonburi District, Bangkok, who are responsible for teaching English at lower- and upper-secondary levels and designing reading exercises.

3.2.2 Sample

The sample consisted of 30 secondary school EFL teachers from government schools in Thonburi District. The inclusion criteria were: 1) Currently teaching EFL at secondary schools in Thonburi District; 2) Having at least two years of experience; 3) Being responsible for designing reading instruction; 4) Willingness to participate in all procedures; 5) Possessing foundational digital literacy sufficient for the training demands, operationally defined as: (a) ability to use internet browsers and conduct online searches; (b) familiarity with word processing and presentation software (e.g., Microsoft Word, PowerPoint, or equivalent); and (c) having access to and basic experience with an AI-assisted tool or chatbot (e.g., ChatGPT, Gemini) at least at the level of inputting text prompts and reviewing outputs. This threshold was set to ensure participants could engage meaningfully with the TPACK-based activities and AI-integrated tasks in the training program without requiring prior expertise in advanced digital tools. Teachers unable to commit to the schedule were excluded. Purposive sampling was employed to select participants meeting the inclusion criteria. This method was deemed appropriate given the developmental nature of the study and the requirement for committed participants interested in technology integration and reading instruction.

3.3 Research Variables

The study defined the following variables:

1. Independent Variable: The TPACK-Based Teacher Training Program Using Authentic Materials, utilizing the TPACK framework, authentic materials, and the P3C2R+GIRD model.

2. Dependent Variables: EFL teachers' reading exercise design competency and their teaching self-efficacy in reading instruction.

3. Content Variables: TPACK introduction, authentic materials selection, P3C2R+GIRD application, and exercise design practice.

4. Control Conditions: Internal consistency was enhanced by using identical pre- and post-tests, standardized training

schedules, and standardized assessment rubrics with multiple raters.

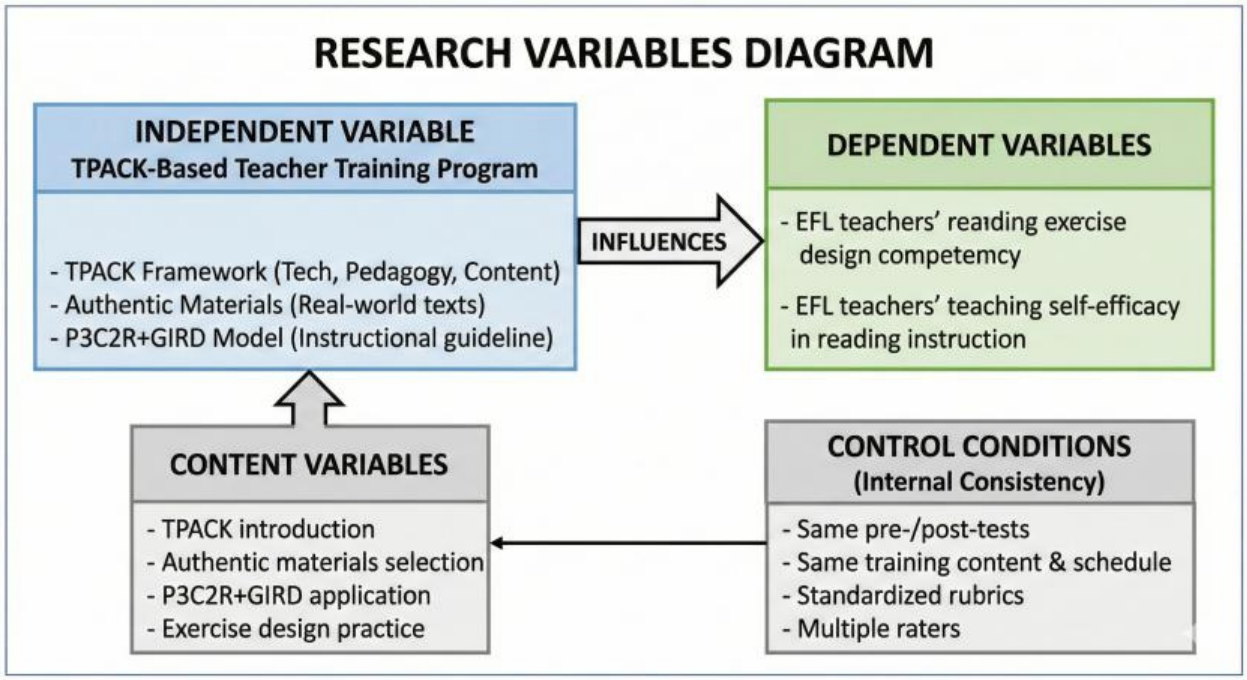

Figure 2. The Research Variables

3.4 Research Instruments

Six instruments were developed or adapted, undergoing systematic validation and reliability checks.

3.4.1 Reading Exercise Design Competency Test

This test assesses teachers' ability to design exercises using the P3C2R+GIRD model and TPACK framework, covering pre-, during-, and post-reading strategies. Content validity was established by three experts, yielding an IOC of 0.98.

3.4.2 Teacher Self-Efficacy Scale for Reading Instruction

This scale adapts Bandura's construct to assess confidence in designing and delivering reading instruction using authentic materials and technology. The average IOC was 0.93. Reliability was excellent, with a Cronbach's alpha of .93.

3.4.3 Reading Exercise Assessment Rubric

This instrument measures the quality of teacher-designed reading exercises post-training. The IOC result was 0.90.

3.4.4 Technology Integration Assessment Rubric

This rubric assesses the appropriateness and pedagogical integration of digital tools in reading exercises. The IOC result was 0.98.

3.4.5 Semi-Structured Interview Protocol

This protocol measures teachers' perceptions of the training program. The protocol was developed by the researcher to address Research Question *5* and consisted of *16* open-ended and semi-structured questions organised into five thematic clusters: (*1)* overall experience and perceived value of the TPACK-based training; (*2)* changes in confidence and repertoire for technology integration, including AI tool use; (*3)* approaches to selecting and adapting authentic materials post-training; (*4)* application of the P*3*C*2*R+GIRD model in classroom practice; and (*5)* perceived facilitators of and barriers to implementation, including contextual constraints such as instructional time, infrastructure, and student readiness. Representative guiding questions included: "How has the training changed the way you design reading exercises?", "Which digital tools do you now use, and how do you decide which tool is

appropriate for a given task?", and "What challenges have you encountered when applying the P3C2R+GIRD model in your classroom?" The protocol was validated by three experts in language education and teacher professional development, who reviewed it for content coverage, question clarity, and alignment with the study's conceptual framework. Expert feedback was incorporated before administration. Interviews were conducted individually with ten purposively selected participants following the Evaluation Phase, audio-recorded with participants' consent, and lasted approximately 30 to 45 minutes each. The selection of ten participants was guided by maximum variation sampling across school type, years of experience, and self-efficacy score range, to ensure diverse perspectives. All recordings were transcribed verbatim and subjected to thematic analysis as described in Section 3.7.2.

3.4.6 Classroom Observation Form

This form records descriptive and reflective notes on classroom events to measure competency and self-efficacy changes. The form was employed from Creswell (2007, p.137).

3.5 Development of the TPACK-Based Teacher Training Program

The program was developed using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation).

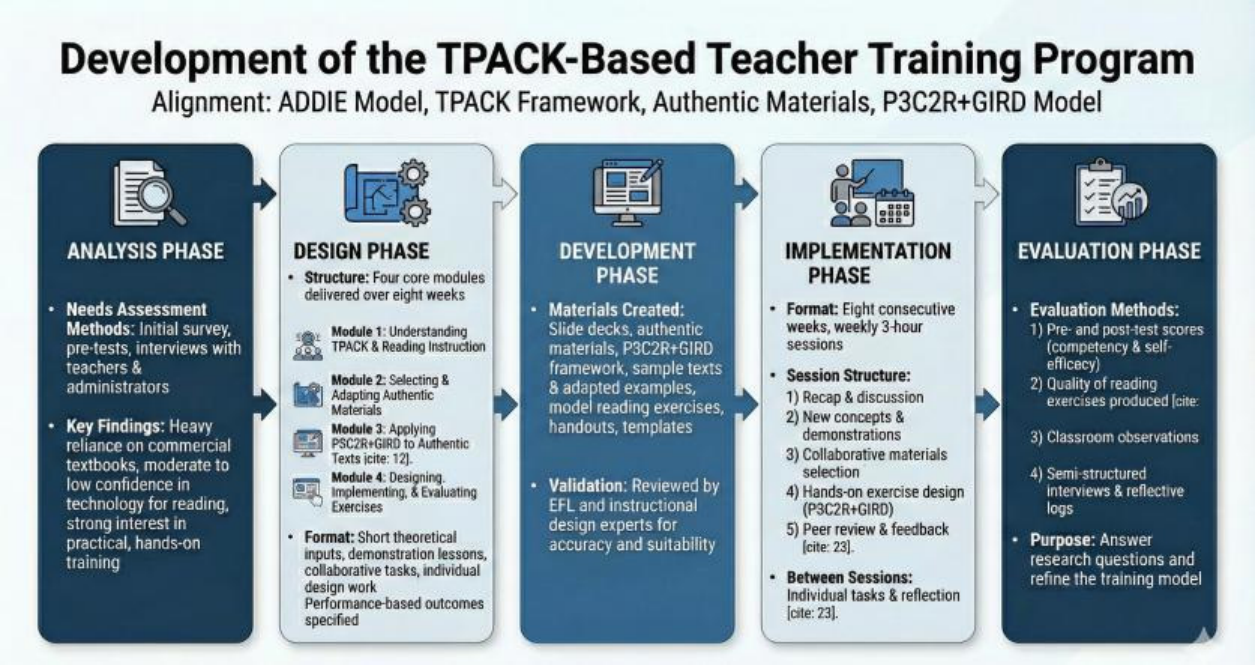

Figure 3. Summary of Development of the TPACK-Based Teacher Training Program

To elaborate, in the Analysis Phase, a needs assessment confirmed heavy reliance on commercial textbooks and a need for practical training in technology and authentic materials. In the Design Phase, the program comprised four modules covering TPACK, authentic materials, the P3C2R+GIRD model, and exercise design. In the Development Phase, materials included slide decks, sample texts, and model exercises were created and validated by experts. In the Implementation Phase, the program was run for eight weeks with 3-hour sessions involving demonstration, collaboration, hands-on design, and peer review. In the Evaluation Phase, effectiveness was evaluated via pre- and post-tests, product quality, observations, and interviews.

3.6 Data Collection

The beginning of the research started from Preparation Phase, data collected included needs assessment and pre-tests to understand baseline competency and self-efficacy (Research Question 1). For the Training Phase, data collection investigated the training's effect on competency and self-efficacy (Research Questions 2-3) using tests and scales. Then the data were gathered in the Implementation Phase to explore changes in self-efficacy and the quality of teacher-developed exercises (Research Questions 3-4) using observations and rubrics. The data were collected for last time from Evaluation Phase with post-training interviews with ten purposively selected teachers to provide

insights into program implementation (Research Question 5).

3.7 Data Analysis

3.7.1 Quantitative Data Analysis

Competency and self-efficacy scores were analyzed using descriptive statistics (means, SD) and inferential statistics (paired-samples t-tests, Cohen's d). Rubric data were also analyzed using paired-samples t-tests and reliability checks (Cronbach's alpha, Cohen's Kappa).

3.7.2 Qualitative Data Analysis

Interviews, observations, and logs were analyzed using thematic analysis. The process involved coding meaningful segments, grouping codes into themes, and triangulating data with quantitative findings to provide rich descriptions of changes and challenges.

3.8 Ethical Considerations

This study was approved by the Internal Review Board of Bansomdejchaopraya Rajabhat University (See Appendix 1) in terms of the research process, research instruments, data collection and data analysis. Ethical principles were strictly observed. Participants provided informed consent, understanding their voluntary involvement and right to withdraw. Confidentiality was ensured by anonymizing data and restricting access. Risks were minimal, and data will be securely destroyed per institutional policy.

4. Research Findings

The study aimed to analyze the teacher training program situation problem using authentic materials on EFL teachers' reading exercise design competency and teaching self-efficacy, to develop a teacher training program based on the TPACK framework using authentic materials on EFL teachers' reading exercise design competency and teaching self-efficacy, and to evaluate a teacher training program based on the TPACK framework using authentic materials on EFL teachers' reading exercise design competency and teaching self-efficacy.

4.1 Current Situation of Reading Exercise Design Competency

Research Question 1: What are the current teacher training program situation problems using authentic materials on EFL teachers' reading exercise design competency and teaching self-efficacy?

This report presents a qualitative analysis of reading exercises and lesson plans submitted by participants in an EFL teacher training program. The analysis aimed to identify challenges regarding authentic material use, exercise design competency, and inferred teaching self-efficacy.

4.1.1 Analysis of Source Material Selection

The strategic use of authentic materials is a cornerstone of modern EFL instruction. However, the analysis revealed a significant challenge in this area.

Table 1. Categorization of Reading Passages Used by Participants (Teachers)

Passage Theme / Title	Number of Submissions
Simplified Biography: Lisa from Blackpink	24
Health & Wellness: The Importance of Sleep	2
Social Commentary: Social Media and Human Connection	1
Current Events: Thailand at the Olympics	1
Other Simplified or Informational Texts (e.g., T-Pop, Kindness, Animals, Halloween)	10

Table 1 indicates an overwhelming reliance on a simplified biographical passage about Lisa, which explicitly defined vocabulary and was scaffolded for learners rather than being authentic. This suggests trainees may misunderstand authentic materials or lack the confidence to adapt them. Only a small number utilized authentic texts without pedagogical scaffolding, such as passages on sleep or social media.

4.1.2 Competency in Reading Exercise and Question Design

The analysis reveals a strong preference for Lower-Order Thinking Skills (LOTS) questions over Higher-Order

Thinking Skills (HOTS).

Table 2. Analysis of Task and Question Types by Cognitive Level

Cognitive Level & Task Type	Description	Observed Frequency
Lower-Order Thinking Skills (LOTS)		
Vocabulary Matching	Matching keywords from the text to their definitions or synonyms.	Very High
Multiple-Choice (Fact Recall)	Selecting the correct answer from a list of options based on explicit information in the text.	Very High
True/False Statements	Determining the factual accuracy of a statement based directly on the passage.	High
Higher-Order Thinking Skills (HOTS)		
Inference Questions	Answering questions that require reading between the lines and drawing conclusions not explicitly stated.	Low to Moderate
Short Answer (Opinion/Reflection)	Responding to open-ended prompts that ask for personal opinions, connections, or reflections.	Low to Moderate
Creative/ Application Tasks	Engaging in tasks that require using information from the text to create something new (e.g., writing a paragraph, designing a poster).	Low

The findings show a clear predominance of LOTS-based tasks, such as vocabulary matching and fact-recall, which establish a factual baseline but fail to scaffold critical engagement. While exceptions existed, such as creative poster tasks or inference questions, the general over-reliance on LOTS indicates a significant weakness in exercise design competency.

4.1.3 Consistency in Pedagogical Structure

The analysis revealed stark inconsistency in applying the standard pre-, while-, and post-reading framework. While some exemplary plans clearly delineated objectives and timed stages, a common format consisted of a passage followed immediately by questions with no supporting structure. This minimalist approach reduces the exercise to a test, omitting crucial pre-reading activation and post-reading synthesis.

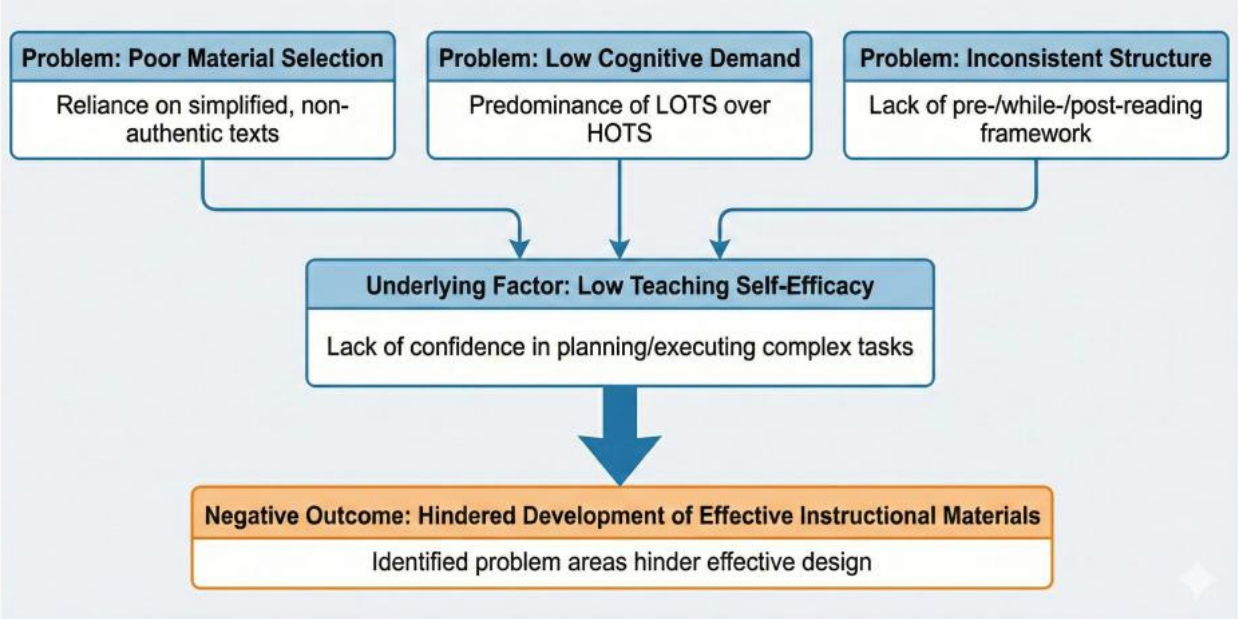

Figure 4. Current Situation of Reading Exercise Design Competency

4.1.4 Challenges to Teaching Self-Efficacy

Patterns in material selection and design suggest a significant gap in self-efficacy. The reliance on simplified texts and easy-to-grade questions may reflect low confidence in managing complex materials or assessing subjective tasks. Conversely, detailed lesson plans signal strong belief in the ability to manage a complete instructional cycle.

4.1.5 Level of Reading Exercise Design Competency

Overall competency is predominantly at the 'Capable' level. While 'Proficient' teachers designed integrated lesson plans with balanced questioning, a significant number at the 'Foundation' level created exercises that rarely moved beyond literal comprehension or failed to adhere to task requirements.

4.2 Effectiveness of the TPACK-Based Teacher Training Program

Research Question 2: How effective is the TPACK-based teacher training program in improving teachers' competency in designing reading exercises?

The program was effective in improving pedagogical competency but less so in technological integration skills. The cohort achieved a level described as Proficient in Pedagogical Design, with Foundational TPACK Integration.

4.2.1 Analysis of Teacher-Designed Reading Exercises

1) Analysis of Vocabulary Elicitation*:* Teachers effectively implemented pre-reading stages, primarily through collocation matching aligned with the pedagogical model. However, these activities missed opportunities for technology integration, such as interactive whiteboards or digital flashcards.

2) Analysis of Prediction Questions: Prediction questions effectively activated prior knowledge, yet lacked collaborative digital tools like Google Jamboard, relying instead on individual responses.

3) Analysis of Comprehension Questions (GIRD): Teachers demonstrated competence in designing balanced questions across Gist, Inference, Reference, and Detail categories.

Table 3. Analysis of Question Types

Source Document	Question Type Assessed	Qualitative Analysis
Teacher 1	Gist, Detail, Inference, Reference	Well-balanced; inference question correctly asks for conclusions based on evidence.
Teacher 13	Gist, Detail, Inference, Reference	Strong distribution; inference requires synthesizing information to explain concepts.
Teacher 2	Gist, Detail, Inference, Reference	Balanced; inference question about values requires higher-order thinking.
Teacher 6	Gist, Detail, Inference, Reference	Covers all types; inference appropriately moves beyond literal comprehension.

Despite strong GIRD structuring, the technology component was largely absent, missing opportunities for online quiz platforms to provide immediate feedback.

4) Analysis of Vocabulary and Grammar Boosting: This section was well-executed using fill-in-the-blank exercises and word form tables. However, these static worksheets missed opportunities for interactive grammar games or collaborative editing.

5) Analysis of Comprehension Rechecking: Nearly all submissions included a "Rechecking" section with a new, thematically linked passage to test skill transfer. While a major strength pedagogically, the delivery remained conventional rather than utilizing digital texts or forms.

4.3 Changes in Self-Efficacy towards Teaching Reading Comprehension

Research Question 3: What changes occur in teachers' self-efficacy in teaching reading comprehension after participating in the training program?

Self-efficacy was measured using a 20-item scale. Post-training results indicate very high overall self-efficacy (M=4.38).

Table 4. Teachers' Self-Efficacy in Reading Instruction after the Training Program (N=29)

Domain	*M*	*SD*	Interpretation
Pre-reading instruction	4.41	0.53	Very high
During-reading guidance	4.44	0.49	Very high
Post-reading activities	4.40	0.52	Very high
Authentic material use	4.24	0.68	Very high
Technology integration (TPACK)	4.40	0.52	Very high
Classroom management and engagement	4.37	0.51	Very high
Overall self-efficacy	**4.38**	**0.49**	**Very high**

Teachers reported the highest confidence in during-reading guidance (*M*=4.44), indicating strong beliefs in their ability to model comprehension and ask probing questions. High scores in pre- and post-reading instruction suggest confidence across the full reading cycle. Although technology integration was rated very high (*M*=4.40), authentic material use had the lowest mean (*M*=4.24) and higher variation, suggesting some teachers still find this area challenging.

4.4 Teachers' Quality of Self-Developed Reading Exercises

Research Question 4: What is the quality of reading exercises developed by teachers after completing the training program?

The teachers' self-developed reading exercises were analyzed using two raters and the preset rubric score criteria to increase the interrater reliability and find out its quality as shown in Tables 5 and 6.

4.4.1 Teachers' Quality of Self-Developed Reading Exercises Using Reading Exercise Assessment Rubric

Evaluations by two raters indicate an "Authoritative" overall quality with a mean score of 81.04.

Table 5. Quality of Teacher-Developed Reading Exercises after the Training Program (Means are based on the average of two raters' scores.)

Assessment Criterion	Maximum Score	Mean Score (*M*)	Interpretation / Performance Description
1. Vocabulary Schemata Elicitation	10	9.0	Excellent pre-reading vocabulary activation
2. Prediction Question	5	4.0	Clear and relevant prediction prompts
3. Comprehension Questions	40	35.0	High-quality, balanced tasks
4. Vocabulary and Grammar Boosting	25	15.0	Proficient but needs greater variety
5. Comprehension Rechecking	20	18.0	Effective transfer and tasks
TOTAL	**100**	**81.0**	**Authoritative overall quality**

From Table 5, when considering each criterion, raters agreed that teachers excelled in vocabulary elicitation and comprehension questions, consistently developing balanced GIRD sets. Comprehension rechecking was also a major strength. However, vocabulary and grammar boosting scored lower, as activities often lacked variety.

4.4.2 Teachers' Quality of Self-Developed Reading Exercises Using Technology Integration Assessment Rubric

Scores on the technology rubric were generally lower than the pedagogical rubric.

Table 6. Overall Quality of Teacher-Developed Reading Exercises (N=30)

Level	Frequency (*N*)	Percentage (%)
Outstanding Integration	2	6.7
Strong Integration	4	13.3
Moderate Integration	16	53.3
Limited Integration	7	23.3
Poor Integration	1	3.3
Total	**30**	**100**

Table 6 shows that more than half of the exercises (53.3%) were rated as Moderate Integration, indicating that most teachers were able to apply the training content at an adequate level but still required further refinement to reach strong or exemplary practice. A smaller proportion of exercises achieved Strong (13.3%) or Outstanding (6.7%) integration, demonstrating that some teachers successfully transformed the training into high-quality, technology-enhanced materials that could serve as models of best practice. At the same time, about one-quarter of the exercises (23.3%) were categorized as Limited Integration, and one exercise (3.3%) fell into the Poor Integration level. These results suggest that, while the majority of teachers moved beyond minimal use of technology, a substantial group continued to rely on relatively basic or superficial technology use, requiring further support to design more interactive and pedagogically aligned reading tasks. Because two raters evaluated each exercise, the quality levels reported in Table 6 can be considered a more reliable representation of teachers' performance than single-rater judgments.

Table 7. Average Scores by Assessment Criterion (Maximum = 5)

Assessment Criterion	Average Score (*M*)
Technological Appropriateness	2.5
Pedagogical Integration	2.8
Authentic Material Use	3.5
Interactivity and Engagement	2.2
Innovation and Creativity	2.4

Teachers were most successful in Authentic Material Use (M=3.5), reflecting effective text selection. However, low scores in Interactivity (M=2.2) and Innovation (M=2.4) indicate that technology was often used as a static display medium rather than for active engagement.

4.5 Teachers' Perceptions towards the Use of the TPACK-Based Training Program

Research Question 5: What are the teachers' perceptions toward the implementation of the TPACK-based training program?

Analysis of semi-structured interviews revealed eight overarching themes regarding the program's impact and implementation.

4.5.1 Theme 1: Experience with the TPACK-Based Training

Teachers described the training as practical and relevant, appreciating the clear, step-by-step process for using AI within a sound pedagogical framework. It helped move them from intuitive design to a systematic approach.

Several teachers remarked that the training helped them move from "intuitive" or experience-based design of reading tasks to a more systematic and theoretically grounded approach. One teacher commented:

> "Today I learned a clear step-by-step way to use AI to generate reading tests, from planning the prompts to creating the test. I feel that my reading instruction process is now much more systematic." (Teacher 3)

Participants also appreciated the way the workshop connected theory and practice, especially in relation to reading

comprehension and exam-oriented tasks. As another teacher explained:

> "The training linked theory with practice very well. Before, I designed reading tests based on my own experience, but now I understand that there are principles supporting what we do, not just habit." (Teacher 1)

Teachers who were responsible for reading or analytical reading courses felt that the content was especially relevant to their daily work, as it addressed concrete challenges such as selecting passages, designing questions, and aligning tasks with national examinations.

4.5.2 Theme 2: Confidence and Repertoire for Technology Integration

Participants reported increased confidence and a broader repertoire of tools (e.g., ChatGPT for text, Gemini for images). They emphasized that AI outputs require human proofreading, indicating critical use rather than blind trust.

Teachers mentioned that they now used multiple AI tools strategically, such as ChatGPT for textual tasks and Gemini or other image-generation tools for visuals:

> "After the training, I feel much more confident using AI. With ChatGPT, Gemini, and Google AI, I now see which tool suits which task—for example, I use ChatGPT for text analysis and Gemini for image generation." (Teacher 4)

They also reported a better understanding of prompt engineering. Rather than giving very general commands, they now specify student level, text type, question type, and number of items, which in turn produces more appropriate outputs for classroom use.

However, teachers consistently emphasised that AI outputs require human checking and refinement. As one teacher noted:

> "Even though we use AI, every time it gives an answer we still have to proofread it. Maybe about 95% is usable, but the remaining 5% we still need to adjust ourselves." (Teacher 2)

This indicates that the training did not lead to blind trust in AI, but rather to an informed, critical use of technological tools embedded within the TPACK framework.

4.5.3 Theme 3: Principled Selection and Adaptation of Authentic Materials

Post-training, teachers applied clearer criteria for selection, including student proficiency, learning objectives, and contextual relevance, rather than just convenience.

One teacher explained:

> "When I select authentic reading materials, I first look at the students' grade level and then at the learning indicators for that unit—what vocabulary and reading skills they should gain from the text." (Teacher 3)

Another highlighted the importance of contextual relevance:

> "I also consider the learners' context—what kind of students they are and what topics they're interested in. If the content is close to their lives, they will be more interested and find it easier to understand." (Teacher 5)

AI was described as a supporting tool for adapting authentic texts—simplifying language, adjusting length, or generating parallel passages at different difficulty levels—while teachers maintained control over final selection and editing.

4.5.4 Theme 4: Application of the P3C2R+GIRD Model

The model was perceived as classroom-friendly, helping teachers structure lessons with clear stages for vocabulary, prediction, and re-checking.

Teachers reported that the model helped them guide students through vocabulary preparation, prediction, careful reading, and comprehension checking:

> "The P3C2R+GIRD model has very clear stages: students first look at vocabulary, predict the text, then read and answer questions. It helps them grasp the main ideas better than when we just told them to read and answer straight away." (Teacher 1)

Importantly, the model encouraged teachers to add re-checking steps to verify comprehension rather than assuming that completion of questions equated to understanding:

> "Before, we simply let students read and answer questions. Now we add steps to re-check vocabulary and grammar and then design a new test to see whether they really understand the text." (Teacher 2)

Teachers integrated AI at multiple points in the model—e.g., to generate pre-reading vocabulary lists, create prediction prompts, and design post-reading questions—commenting that this made the model more manageable within their limited preparation time. They also found that the model supported more engaging pre-reading activities, such as prediction games or image-based brainstorming, which helped tackle students' reluctance to read.

4.5.5 Theme 5: Changes in Reading Instruction Practices

Practices shifted from simple "read and answer" patterns to process-oriented approaches with explicit stages. Teachers also used AI to create exam-aligned items, though they noted concerns about students' ethical use of AI. One teacher contrasted past and current practices:

> "Previously, reading lessons were just reading a passage and doing the test. Now we have clear pre-reading, while-reading, and post-reading stages, so students don't feel that they are only being forced to do tests." (Teacher 4)

Another change concerned the design of exam-oriented reading tasks. Teachers used AI to help create passages and items that more closely mirror national examinations:

> "When designing reading tests, we use AI to help generate items that are closer to O-NET or A-Level in terms of vocabulary level and question types, so students become more familiar with real exams." (Teacher 3)

In terms of student responses, teachers observed that the more structured, activity-based approach tended to increase engagement, especially when combined with games, rewards, and AI-generated visuals. At the same time, they expressed concern about students' over-reliance on AI outside class, particularly for homework:

> "Sometimes I assign homework that should take about an hour, but with AI students finish in ten minutes by just pasting the questions into AI. So the learning may not be as effective as it should be." (Teacher 5)

Thus, while the training led to more engaging and structured reading instruction, it also made teachers more aware of the need to guide students in using AI ethically and productively.

4.5.6 Theme 6: Confidence and Professional Identity

Teachers reported increased professional confidence, feeling more capable of designing tasks aligned with curriculum goals. AI was viewed as a tool to expand their "idea space".

Teachers noted that they now feel more capable of designing reading tasks that are aligned with both curriculum goals and exam requirements:

> "I now feel much more confident in designing reading tests. With AI techniques and a clear model, my tests are no longer repetitive but align more closely with the skills I want to assess." (Teacher 2)

AI was seen as expanding teachers' idea space rather than replacing their expertise. One teacher described AI as a source of inspiration:

> "Sometimes I get stuck and can't think of questions, but when I put keywords into AI it suggests questions I never thought of. It makes me feel that my idea space is much wider now." (Teacher 1)

Taken together, these accounts suggest that the TPACK-based training did not simply increase technical skills, but also contributed to teachers' self-efficacy and their identity as knowledgeable reading instructors who can leverage technology in sophisticated ways.

4.5.7 Theme 7: Facilitators and Barriers

Facilitators included AI as a time-saver, while barriers included limited instructional time (50-minute periods), unequal technology access, and students' mixed proficiency levels.

On the facilitating side, teachers cited the availability of basic technological infrastructure (computers, projectors, internet) and the role of AI as a time-saving, idea-generating tool:

> "Previously, it took a very long time to create a set of reading questions, but now AI helps organise my ideas and check spelling, so I work faster and feel more confident." (Teacher 3)

However, teachers also highlighted several barriers:

1) Limited instructional time – Typical 50-minute periods were perceived as insufficient to complete all stages of the P3C2R+GIRD model, especially for longer texts.

2) Unequal access to technology – Some classrooms lacked projectors or reliable internet, forcing teachers to rely on printed worksheets and limiting the use of live AI-supported activities.

3) Students' language foundation and motivation – Weak vocabulary and mixed proficiency levels made it challenging to implement higher-order reading tasks.

As one teacher explained:

> "The main obstacles are the 50-minute lesson time and students' limited vocabulary. Some classes also lack projectors or technology, so we cannot fully implement the model." (Teacher 4)

Another teacher emphasized the challenge of mixed-ability classes:

> "Not all students in a class are 100% engaged. We have to design activities so that both strong and weak learners can learn together, which takes a lot of planning and design time." (Teacher 5)

These findings indicate that, while the TPACK-based training equipped teachers with new tools and models, contextual constraints such as time, infrastructure, and learner characteristics continue to shape actual classroom implementation.

4.5.8 Theme 8: Improving the Program

Recommendations included requests for more hands-on practice time, extending training to other skills (listening/speaking), and providing written prompt guides.

First, participants consistently expressed a desire for more time and slower pacing. They felt that the current session contained rich content, but that they had limited opportunities for hands-on practice:

> "I would like more training time. The content today was very good, but I couldn't always type the prompts in time. If we had follow-up workshops or multiple days, we could practise using it more." (Teacher 1)

Second, teachers recommended expanding the focus beyond reading to other skills and assessment:

> "Next time, it would be great to have training on listening, speaking, writing, and assessment with AI. Many of us are still not clear on how to use AI to design assessment tools." (Teacher 3)

Third, they requested step-by-step written guides, including example prompts and visual summaries of key models, to support implementation after the workshop:

> "If we had slides or handouts summarising the steps 1–2–3 with sample prompts to review at school, it would help us use AI more fluently without having to memorise everything." (Teacher 2)

These recommendations suggest that teachers value the program highly, but need ongoing support and extended opportunities to deepen their skills and to apply the TPACK-based, AI-assisted approach to a broader range of language skills and assessment tasks.

In summary, the training was highly beneficial, enhancing confidence and promoting process-oriented instruction, though contextual constraints remain a challenge for full implementation.

5. Discussion

5.1 Current Situation and Material Selection Challenges

The initial findings revealed a prevalent reliance among teachers on simplified, non-authentic texts and Lower-Order Thinking Skills (LOTS) questions. This tendency contradicts the theoretical advocacy for authentic materials, which are posited to provide the rich, comprehensible input necessary for language acquisition. The teachers' avoidance of authentic texts likely stems from the "linguistic complexity" barrier identified by Yawiloeng (2022), which can intimidate educators lacking specific adaptation strategies. Furthermore, the dominance of rote-recall questions reflects the systemic issues in Thai EFL contexts highlighted by Karanjakwut et al. (2025), where traditional methods

persist despite national policy shifts. These pre-training patterns were corroborated by the teachers themselves during post-training interviews. One teacher candidly acknowledged the gap between prior practice and principled design: "Before, I designed reading tests based on my own experience, but now I understand that there are principles supporting what we do, not just habit" (Teacher 1). This reflection illustrates how reliance on intuition, rather than structured frameworks, can perpetuate the very LOTS-dominated, inauthentic practices observed in the needs assessment. These results underscore the critical necessity of the intervention, confirming that without structured support, teachers struggle to bridge the gap between theoretical benefits of authenticity and practical classroom application.

5.2 Effectiveness of the TPACK-Based Training Program

The intervention demonstrated a bifurcated success: while pedagogical competency in designing reading exercises reached a "Proficient" to "Authoritative" level, technological integration remained largely "Moderate" or "Foundational." The success in pedagogical design validates the P3C2R+GIRD model as an effective scaffolding framework, supporting Karanjakwut's (2017) assertion that structured stages enhance comprehension instruction. Teachers successfully moved from intuitive methods to systematic planning. This shift was confirmed in teachers' own accounts: "The P3C2R+GIRD model has very clear stages: students first look at vocabulary, predict the text, then read and answer questions. It helps them grasp the main ideas better than when we just told them to read and answer straight away" (Teacher 1). Similarly, another participant highlighted how the model changed post-reading practice: "Before, we simply let students read and answer questions. Now we add steps to re-check vocabulary and grammar and then design a new test to see whether they really understand the text" (Teacher 2). However, the lag in deep technological integration—where tools were used more for display than interactive engagement—aligns with findings by Pareto and Willermark (2018), who noted that digital literacy and resource access are persistent barriers to TPACK growth. This limitation was also felt directly by participants: "Some classrooms lack projectors or reliable internet, forcing teachers to rely on printed worksheets and limiting the use of live AI-supported activities" (Teacher 4). This suggests that while the training successfully conveyed the "Pedagogical" (PK) and "Content" (CK) components of the framework, the complex intersection of "Technological Pedagogical Knowledge" (TPK) requires more intensive, practice-based intervention than a short-term program can provide.

5.3 Enhancement of Teaching Self-Efficacy

A significant outcome was the increase in teaching self-efficacy to a "very high" level (M=4.38). This finding supports Bandura's (1997) social cognitive theory, which posits that mastery experiences—such as the successful design of a lesson plan during the workshop—are the most powerful source of efficacy beliefs. The results mirror Valizadeh (2021), who found that strategy-based training significantly boosted teacher confidence. This was borne out in teachers' own words: "I now feel much more confident in designing reading tests. With AI techniques and a clear model, my tests are no longer repetitive but align more closely with the skills I want to assess" (Teacher 2). Another participant described a sense of professional empowerment: "Sometimes I get stuck and can't think of questions, but when I put keywords into AI it suggests questions I never thought of. It makes me feel that my idea space is much wider now" (Teacher 1). These accounts suggest that the training produced not merely a technical upskilling, but a genuine shift in professional identity and confidence. Notably, the high efficacy in "during-reading guidance" suggests that the P3C2R+GIRD model provided the procedural clarity teachers needed to feel competent. However, the slightly lower efficacy in "authentic material use" (M=4.24) indicates that the cognitive load of selecting and adapting real-world texts remains a challenge, necessitating ongoing support.

5.4 Usefulness of the P3C2R+GIRD Model in Practice

An interesting finding that warrants further examination is the discrepancy between the teachers' pedagogical advancements and their technological integration skills. While participants successfully achieved a 'Proficient' level in pedagogical competency—demonstrating strong capabilities in applying the P3C2R+GIRD model—their technology integration skills remained at a 'Foundational' level. This variance can likely be attributed to the distinct learning curves associated with these two domains. Pedagogical shifts often build upon teachers' pre-existing instructional knowledge, making an eight-week training program sufficient for observable growth. In contrast, mastering new digital tools and AI applications requires extended, iterative practice that a short-term intervention may not fully provide. Participants themselves were acutely aware of this gap and articulated the need for more time and practice. As one teacher explained: "I would like more training time. The content today was very good, but I couldn't always type the prompts in time. If we had follow-up workshops or multiple days, we could practise using it more" (Teacher 1). Encouragingly, teachers also demonstrated a critical, rather than passive, orientation toward AI tools: "Even though we use AI, every time it gives an answer, we still have to proofread it. Maybe about 95% is

usable, but the remaining 5% we still need to adjust ourselves" (Teacher 2). This awareness indicates that while technology skills remained at a foundational level in execution, the conceptual groundwork for informed, reflective TPACK integration has been laid. Furthermore, this outcome may reflect broader systemic constraints within the educational context; factors such as limited school infrastructure, restricted access to reliable hardware, and a lack of ongoing IT support often act as significant barriers to higher-level technology integration. This observation aligns with the findings of Pareto and Willermark (2018), who emphasized that translating basic digital literacy into advanced Technological Pedagogical Content Knowledge (TPACK) requires sustained, contextualized support that extends well beyond initial training phases. Therefore, while the current program successfully elevated teaching self-efficacy and pedagogical design, achieving transformative technological application will likely require supplementary, long-term interventions coupled with robust institutional backing.

6. Limitations

While the findings of this study provide valuable insights into the effectiveness of the TPACK-based training program, several limitations must be acknowledged. Primarily, the use of a one-group pre-test-post-test design limits the ability to establish definitive causal conclusions. Because the study did not include a control group, it is difficult to entirely rule out the potential influence of external factors—such as concurrent professional development activities, institutional changes, or natural maturation during the training period—on the observed improvements in teachers' competency and self-efficacy. Furthermore, the findings are based on a relatively small, purposively selected sample of 30 EFL secondary teachers in a specific region (Thonburi), which may constrain the generalizability of the results to other educational contexts. Future research would benefit from employing randomized controlled trials or quasi-experimental designs with matched control groups, alongside larger and more diverse samples, to further validate the impact of this training program.

7. Conclusion

This study concludes that the TPACK-based training program successfully addressed critical deficits in EFL reading instruction, specifically the reliance on simplified texts and rote learning. The intervention significantly elevated teachers' pedagogical exercise design competency to a 'Proficient' level and boosted teaching self-efficacy to a 'Very High' degree (M=4.38), effectively validating the P3C2R+GIRD model as a robust framework for systematic instruction. However, a distinct gap remains between pedagogical soundness and digital sophistication; technological integration largely remained at a 'Foundational' or 'Moderate' level, with tools often used for display rather than interactive meaning-making.

To bridge this "digital-pedagogical" divide, it is recommended that future professional development move beyond short-term workshops toward sustained, longitudinal mentoring that fosters deep technological appropriation. Specifically, training should be extended to allow for intensive hands-on practice and expanded to include other language skills such as listening and speaking, as requested by participants. Furthermore, sustainable implementation requires addressing systemic barriers, particularly limited instructional time and unequal infrastructure. Ultimately, while the program provides a reproducible model for enhancing teacher competence, achieving transformative classroom practice necessitates a holistic approach that combines continuous professional support with necessary structural reforms.

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Appendix A

Certificate of Approval by BSRU Internal Review Board

REC-BSRU COA No. 681103

คณะกรรมการจริยธรรมการวิจัยในมนุษย์
สถาบันวิจัยและพัฒนา มหาวิทยาลัยราชภัฏบ้านสมเด็จเจ้าพระยา
1061 ซอยอิสรภาพ15 ถนนอิสรภาพ แขวงหิรัญรูจี เขตธนบุรี กรุงเทพ 10600 โทรศัพท์ 0 2473 7000 ต่อ 1600-1601 หรือ 1603

เอกสารรับรองโครงการวิจัย

คณะกรรมการจริยธรรมการวิจัยในมนุษย์ สถาบันวิจัยและพัฒนา มหาวิทยาลัยราชภัฏบ้านสมเด็จเจ้าพระยา ดำเนินการให้การรับรองโครงการวิจัยตามแนวทางหลักจริยธรรมการวิจัยในมนุษย์ที่เป็นมาตรฐานสากล ได้แก่ Declaration of Helsinki, The Belmont Report, CIOMS Guideline และInternational Conference on Harmonization in Good Clinical Practice หรือ ICH-GCP

ชื่อโครงการ	: การพัฒนาโปรแกรมการฝึกอบรมครูตามกรอบแนวคิด TPACK โดยใช้สื่อสภาพจริงที่มีต่อสมรรถนะการออกแบบแบบฝึกการอ่านและการรับรู้ความสามารถของตนเองในการสอนของครูผู้สอนภาษาอังกฤษเป็นภาษาต่างประเทศ
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ลงนาม .....
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Data sharing statement

No additional data are available.