

Vietnamese EFL Teachers' TPACK and Its Correlation with Their Demographic Variables


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ABSTRACT

Keywords: EFL teachers, TPACK, correlation, demographic variables

As technology and AI continue to develop, the TPACK framework has emerged as a useful tool for measuring teachers' knowledge and skills for teaching with technology. This study looks at the Vietnamese EFL teachers' TPACK and its correlation with their demographic variables. Following a quantitative survey research strategy, the study was conducted at a public university in Hanoi, Vietnam, with 81 EFL teachers participating and a questionnaire as the main data collection instrument. The study found that EFL teachers' gender and the main subjects they teach are related to their TPACK. The study also found that, unlike the original representation with seven domains, EFL teachers' TPACK can be categorized into only two main domains. Accordingly, some implications for teacher professional development are given. The study has also confirmed the complexity of teachers' knowledge in integrating ICT and the unclear boundaries of the constructs in the TPACK model.

Introduction

With the current development of technology and Artificial Intelligence (AI), the issue of measuring teachers' skills and knowledge for teaching with technology is attracting attention from educational researchers. The Technological Pedagogical Content Knowledge (TPACK, Mishra & Koehler, 2006) emerged as a theory that could provide a foundation for addressing this issue. Since its introduction in 2006, the theory has been welcomed by scholars in the field, with numerous journal articles, conference papers, and postgraduate studies being produced (Greene & Jones, 2020; Tseng, Chai, Tan & Park, 2022; Calik & Mirici, 2024). However, the review of related studies points to the need to measure teachers' TPACK in specific disciplines (Calik & Mirici, 2024; Tseng et al., 2022), including English as a Foreign Language (EFL) in-service teachers. Also, Greene and Jones (2020) emphasize the need to conduct research on teachers' TPACK in specific contexts, as TPACK is context-dependent.

Vietnam is a developing country currently striving to become one of the world's fastest-growing economies. In order to achieve this goal, the Vietnamese government issued the

Resolution 57-NQ-TW in December 2024, which considers digital transformation as the “strategic choice” and “top priority” (Baochinhphu.vn, 2025, para.4).

Regarding EFL teaching, the MOET published Official Dispatch 4771/BGDDT in August 2023, outlining the duties involved in integrating technology and digitally transforming the nation's institutions. In response, schools from 65 provinces and cities participated in a nationwide competition on EFL e-lesson plans, and 36,595 lesson plans were submitted. Yet, the implementation of technology in EFL instruction is a complex process with challenges (Nguyen, 2023) that is affected by many factors (Tran, Pham & Dinh, 2023), including the EFL teachers’ knowledge and skills, often referred to as TPACK.

Moreover, research on English teachers’ TPACK in Vietnam has focused on integrating TPACK for teacher development (Quach, Le, Pham, Pham & Nguyen, 2024), high school teachers’ perceptions of their TPACK (Pham, 2022), and high school teachers’ perceptions of integrating TPACK in their teaching practices (Nguyen, 2021).

Research on teachers’ TPACK shows that demographic factors, such as age, gender, and teaching experience, may play a role in their TPACK. However, inconsistencies remain in the research findings, necessitating further investigation into this aspect.

In short, there is a need to investigate teachers’ TPACK in specific disciplines such as EFL. Also, research on TPACK suggests that teachers’ demographic variables, such as age, gender, and teaching experience, are related to their TPACK, but prior findings are inconsistent and may be context-dependent. Therefore, it is necessary to conduct this study in the Vietnamese context with regard to the EFL teachers.

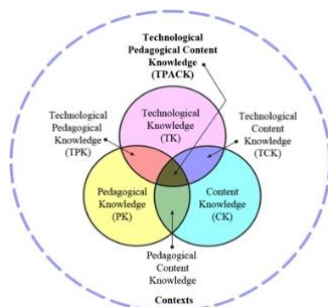
Literature Review

The TPACK framework

Mishra and Koehler (2006) created the TPACK framework based on Shulman's (1986) theory of the relationship between teachers' understanding of what to teach (Content) and how to teach (Pedagogy). They added one knowledge domain, namely Technology Knowledge (TK). The resulting framework consisted of seven knowledge domains: Content Knowledge (CK), Pedagogical Knowledge (PK), Technology Knowledge (TK), Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK). A representation of this framework is shown in Figure 1. Detailed information on the definition of the TPACK domains can be found in the upcoming section.

Figure 1

The Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006)



EFL teachers' TPACK

Content Knowledge (CK)

Mishra and Koehler (2006, p. 1026) define Content Knowledge (CK) as “knowledge about the subject matter that is to be learned or taught”. According to Kang, Ni, and Li (2010), an EFL teacher's CK consists of 1) Language components: pronunciation, phonetics, speech patterns, and cultural awareness; 2) language skills: vocabulary, conversations, and problem-solving through language; 3) contrasting and comparing between nations that speak English and those that don't.

Pedagogical Knowledge (PK)

Mishra and Koehler (2006) further hold that Pedagogical Knowledge (PK) includes “a generic form of knowledge that is involved in all issues of student learning, classroom management, lesson plan development and use, and student evaluation” (p.1026). In light of the definition, an EFL teacher PK covers these aspects.

Pedagogical Content Knowledge (PCK)

Mishra and Koehler (2006) contend that "knowing what teaching approaches fit the content, and likewise, knowing how elements of the content can be arranged for better teaching" (p.1027) should be part of a teacher's Pedagogical Content Knowledge (PCK). Mishra and Koehler (2006) emphasize that this kind of knowledge also encompasses information about students and their characteristics.

Murray and Christinson (2010) list several PCK components of an EFL teacher including: 1) an understanding of "target language [English] input and how to modify this input" (p. 172) to accommodate various learners; 2) an awareness of "learners' interaction" (p. 173); 3) an ability to choose effective teaching strategies in an EFL context as long as these strategies are suitable for students.

Technological Knowledge (TK)

According to Mishra and Koehler (2006), Technological Knowledge (TK) encompasses the "abilities to learn and adapt to new technology" (p.1027) as well as the "skills to operate technologies such as installing or removing devices/software programs, or creating and archiving documents." (p.1028). An EFL teacher's TK includes using common technology apps, troubleshooting simple technical issues, and staying current with emerging technologies.

Technological Content Knowledge (TCK)

Mishra and Koehler (2006) posit that Technological Content Knowledge (TCK) is knowledge about “the manner in which technology and content are reciprocally related” (p. 1028). As such, they propose that technology could be used to alter how the subject matter is delivered by defining this knowledge domain in this manner. TCK of an EFL teacher thus includes the following: 1) Teachers' knowledge of ICT tools to teach General English; 2) Teachers' knowledge of ICT tools to teach English linguistics; 3) Teachers' knowledge about ICT tools to teach English culture.

Technological Pedagogical Knowledge (TPK)

Technological Pedagogical Knowledge (TPK), as defined by Mishra and Koehler (2006), is knowledge of “the existence, components and capabilities of various technologies as they are used in teaching and learning settings, and knowing how teaching might change as a result of using particular technologies” (p. 1028). The EFL teacher TPK can be considered to encompass

1) Teachers' knowledge about ICT learning theories; 2) Teachers' knowledge of how to use ICT to accommodate various learning types; 3) Teachers' knowledge of class management when using ICT; 4) Teachers' knowledge of ICT-based lesson preparation; and 5) Teachers' knowledge of assessment of ICT learning.

Technological Pedagogical Content Knowledge (TPACK)

Finally, Mishra and Koehler (2006) put forward that Technological Pedagogical Content Knowledge (TPACK) requires:

...an understanding of the representation of concepts using technologies, pedagogical techniques that utilise technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology, and knowledge of how technologies can be utilised to build on existing knowledge and to develop new epistemologies or strengthen old ones. (p. 1029)

Thus, the TPACK of an EFL teacher can include 1) knowledge of theory of technology-based EFL instruction, encompassing "communicative competence of learners ... and learner interactions [in using technology to learn]..." (Chapelle, 2009, p. 750), 2) knowledge "to design real-life tasks for students to learn English" using ICT (Kang et al., 2010, p. 3877), 3) Teacher ability to evaluate ICT tools, "tasks and [students'] performance" (Compton, 2009, p. 85).

Studies on the correlation between teachers' demographics and their TPACK

Studies on the correlation between teachers' demographics and their TPACK have been paid attention to by the scholarly community; however, the results are not consistent.

To begin with, gender and teachers' TPACK have some relationship, though the findings are somewhat conflicting. For example, Ali and Hawk (2024) found that female teachers had a larger TPACK score than male teachers. Roussnos and Jimoyiannis (2019) reported that both female and male teachers in their study demonstrated confidence in some TPACK domains, such as CK and PK. Yang and Yang (2025) found that among female EFL Chinese teachers, some displayed a high level of TPACK, while others showed medium or low levels. Interestingly, the male teacher rated his TPACK level as low. Nguyen (2021), however, found no gender differences in the self-assessed TPACK of 120 Vietnamese high school EFL teachers.

Age seems to be related to teachers' TPACK in general and to specific TPACK domains in particular. For example, Yang and Yang (2025) found that both a teacher over 50 years old and a 29-year-old teacher were not confident in their TPACK, whereas other teachers aged 30 to 38 rated their TPACK as high or medium. Yang, Jeyaraj, Ahmad, and Yang (2024) found that EFL teachers in their 30s had greater confidence in their TPACK. They also found that older teachers lacked the TK in applying ICT in their classroom practice. Absari, Priyanto, and Muslikhin (2020) claimed that age plays a role in teachers' development of TK.

In terms of years of teaching, Ali and Hawk (2024) showed that teachers' experience "relates to the core and interrelated knowledge domains of TPACK" (p.3565) because the younger teachers rated their TK and TPK higher than the more experienced ones. The teachers, however, rated their levels in other TPACK domains as lower than those of the more experienced teachers. Unlike Ali and Hawk (2024), Roussnos and Jimoyiannis (2019) found no relationship between teachers' experience and their TPACK in general or in any TPACK domains. Similarly, Alian and Alhaj (2024) found that novice and experienced EFL teachers at Saudi Arabian universities did not differ in their ratings of TPACK knowledge. Nguyen (2021), however, found that EFL teachers with less than 6 years and more than 20 years of teaching experience seemed less

confident in their TPACK. The teachers in the Yang and Yang (2025) study who were novices showed both low and high levels of TPACK, whereas those with 7 to 21 years of experience reported a medium level of TPACK. Similarly, Bingimlas (2018) found a significant difference between teachers' TK and their teaching experience. In a similar vein, Qaddumi, Smith, Masd, Bakeer, and Abu-ulbe (2022) found that teachers with less than 10 years of teaching experience showed greater confidence in their TK.

Regarding teachers' educational backgrounds, Yang and Yang (2025) found that all EFL teachers in their study who held a Master's degree rated their TPACK at varying levels, ranging from low to high. Similarly, Yang, Jeyaraj, Ahmad and Yang (2024) found that although all of the Chinese teachers in their study held a Master's degree, their ratings of TPACK were different. Haryati, Yuliasri, Nurkamto, and Fitriati (2024) found that Indonesian EFL teachers with a "higher educational background" (p. 212) had higher TPACK.

Finally, regarding the main teaching area, Bingimlas (2018) found differences in TPACK levels among teachers teaching different courses. On the contrary, Haryati et al. (2024) reported that the EFL teachers in their study did not differ in their TK and CK-TPK in their use of technology applications to teach reading skills.

In short, the review of studies on the relationship between teachers' demographic variables and their TPACK yields several findings that suggest the need for further investigation into this aspect.

Research Questions

To fulfill the purpose of the study, the survey sought to answer the following research questions:

1. What is the EFL teachers' level of TPACK?
2. What is the correlation between the teachers' TPACK and their demographic variables?

Methods

Research context and participants

The research context is a public university in Hanoi, Vietnam, with a history of more than 60 years. The university has been offering foreign language and English as a medium of Instruction (EMI) courses for both language and non-language majors. The study involved 81 EFL teachers from the English Department and the English for Specific Purposes (ESP) Department (formerly the Foundation Studies Department).

The university's English department trains students majoring in English to become translators, interpreters, or English instructors after graduation. All teachers from the General English, English Literature, Interpretation and Translation, Language Theories, and English Culture Divisions are considered EFL teachers.

The ESP Department was founded in 2005 to train non-English-major students who will later pursue their Bachelor's degrees in Computer Science, Business Administration, Tourism, and International Studies using EMI. All the teachers from this department are also referred to as EFL teachers in this study.

Regarding the sampling strategy, the EFL teachers were selected using purposive sampling (Mertens, 2005), that is, they had to be teaching English at the university at the time of the

study. Also, they were informed that they could participate in the study on a voluntary basis and withdraw at any time.

Research design and procedures

Research methodology

This is a descriptive correlational study. Descriptive research, according to Cohen et al. (2018), is concerned with relationships and/or beliefs of the people involved in a process. The research strategy was a survey, which offered some advantages, such as being economical and efficient, as it could reach a large sample in a short period of time. Also, the choice of a survey to collect data could help reduce the researchers' influence on the study because the survey served the purpose of maintaining "etic perspective, i.e, maintaining a distance from the native point of view in the interest of achieving more objectivity" (Babbie, 2008, p. 319). Because this study aimed to explore teachers' TPACK and its correlations with teachers' demographic variables, a descriptive correlational survey approach was deemed appropriate.

Data collection

Given the purpose of this research project, a self-report questionnaire was selected. A questionnaire is pertinent to descriptive research in education, which, as suggested by Gay and Airasia (2003, p.277), is "concerned with assessing attitudes, opinions, preferences, demographics, practices and procedures".

The EFL teachers' TPACK scale was designed in light of the seven TPACK constructs and existing literature on the knowledge and ICT of English teachers reviewed in previous sections. The teacher participants were asked to provide ratings of their TPACK knowledge on a 4-point Likert scale from Not at all (1), Little (2), Moderate (3), and Much (4). There was a total of 24 items around the seven TPACK constructs, with 3 CK items, 5 PK items, 3 PCK items, 3 TK items, 3 TCK items, 4 TPK items, and 3 TPACK items. The language used in the questionnaire was English.

Face validity of the questionnaire items, which refers to whether "the measure apparently reflects the content of the concept in question" (Bryman, 2012, p. 171), was ensured with the involvement of an EFL teacher. Feedback was then used to revise the wording of the questionnaire items. A pilot study was then conducted with 22 EFL teachers, including some from Vietnam. Responses from the pilot were "briefly analyzed", and "blank answers [were] looked for" (Mertens, 2005, p. 183). Regarding reliability, a statistician offered his support in verifying the accuracy of the results and data entry. A Cronbach's alpha of .944 was obtained for the questionnaire items, confirming their internal consistency.

The questionnaire was then disseminated to 140 EFL teachers from the two departments at the university, of whom 81 returned, yielding a response rate of 58%. This rate is considered acceptable for data analysis in the field of education (Babbie, 2008).

Data analysis techniques

The data collected were analyzed quantitatively using the IBM Statistical Package for Social Sciences (SPSS) version 21. First, descriptive statistics, such as percentages, mean scores, and standard deviations, were calculated for the EFL teachers' TPACK levels. Next, Spearman's Rho Coefficients were calculated to examine the correlation between EFL teachers' TPACK and their demographics. The decision to use Spearman's Rho was based on the fact that the teachers' demographic factors and their TPACK were not continuous variables (Pallant, 2013). An exploratory factor analysis of instructors' TPACK was conducted prior to Spearman's Rho calculations to reduce the number of items.

Ethical considerations

The study was conducted in accordance with ethical principles. First, participants could not be identified because they remained anonymous in the questionnaire. Next, participants were assured they could withdraw at any time during the study, thereby ensuring their voluntary participation. Finally, participants provided informed consent because each questionnaire was accompanied by a Plain Language Statement about the study, allowing them to decide whether to complete and return the questionnaire. The return of the questionnaire implied participants' consent.

Results/ Findings

EFL teachers' demographic information

Initially, the questionnaire requested demographic data from the EFL teachers. Their sex, qualifications, and primary teaching area are shown in Table 1, and their age and teaching experience are shown in Table 2.

Table 1

EFL Teachers' Sex, Qualifications, and Primary Teaching Area

N	Sex		Highest qualification			Primary teaching area	
	Female	Male	Bachelor's	Master's	PhD	General English skills	Other subjects
63	18	12	67	1	60	14	
78%	22%	15%	84%	1%	81%	19%	
Total	81		80			74	

Table 1 shows that women accounted for the majority of EFL teachers (around 78%), with men accounting for the remaining 22%. A significant percentage (84%) of them (n=80) had a Master's degree as their highest qualification. About 15% had a bachelor's degree, while only 1% had a doctorate. Additionally, about one-fifth taught other subjects, whereas the majority (81%) taught four language skills.

Table 2

EFL Teachers' Age and Teaching Experience

	Age	Teaching experience (in years)
Mean (SD)	31.7 (7.0)	8.7 (7.0)
Minimum-Maximum	24 - 59	2 - 38
Number	76	78

Table 2 shows that the EFL teachers in this study had an average age of 31.7 (SD=7.0) and an average number of years of teaching experience of 8.7 (SD=7.0) (n=78, with 3 missing cases). Nevertheless, the teachers' ages ranged from 24 to 59 years. Likewise, there was significant variation in years of teaching experience, ranging from 2 to 38.

In brief, the majority of EFL teachers were female, held a Master's degree, taught speaking,

writing, listening, and reading, and varied widely in teaching experience and age. Men accounted for a very small percentage of those who taught other subjects such as literature, language theories, interpretation, and translation.

EFL Teacher ratings of their TPACK

The next section of the questionnaire asked the EFL teachers to rate their level of TPACK. The findings on their TPACK ratings, centered around the 7 domains, are shown in Table 3.

Table 3

EFL teachers' ratings of their TPACK

(1-Not at all, 2- Little, 3-Moderate, 4- Much)

Item (N*=81)	M*	SD*
CK1-English language knowledge	3.52	0.55
PK3-Classrmanagement knowledge	3.43	0.55
PK4-Lesson planning knowledge	3.43	0.55
TK1-Common ICT tools knowledge	3.38	0.75
PK5-Asessment knowledge	3.37	0.51
PCK1-Knowledge to modify language input	3.32	0.59
CK2-Linguistic knowledge	3.27	0.63
PCK2-Student interaction knowledge	3.17	0.61
PK2-Learning styles knowledge	3.12	0.60
PK1-Learning theories knowledge	3.05	0.67
TK3- Ability to stay current with technology	3.05	0.71
TK2-Technical problem-solving skills	3.02	0.87
CK3-English speaking countries culture knowledge	3.02	0.65
TCK1-ICT tools for English language knowledge	2.84	0.66
TPK4-Lesson preparation using ICT knowledge	2.84	0.64
TPK3-Classroom management using ICT knowledge	2.74	0.63
TPACK2-Task- designing using ICT knowledge	2.70	0.66
TPK5-Student learning assessment with ICT knowledge	2.70	0.66
TPACK1-Student learning English with ICT knowledge	2.65	0.73
TCK2-ICT tools for English linguistics knowledge	2.64	0.71
TCK3-ICT tools for English culture knowledge	2.63	0.78
TPK2-Different learning styles with ICT catering knowledge	2.58	0.69
TPK1-ICT learning theories knowledge	2.43	0.67
TPACK3-Software evaluation knowledge	2.36	0.68

* Note: N= Sample size, M= Mean score, SD= Standard Deviation

Table 3 shows that the EFL teachers generally reported knowledge across all seven TPACK categories; however, the range of knowledge they reported in these domains varied (mean ratings ranged from 2.36 to 3.52, SDs varied). In general, they reported having more CK, PK, and PCK than TCK, TPK, and TPACK. With a rating of the third highest (M=3.38, SD=0.75), the TK item "Common ICT tools knowledge" was the exception.

In detail, the highest rating was for a CK item 'English language knowledge', with M being 3.52 (SD=0.55). Next, the second-highest ratings were for two items in the PK domain: 'Classroom management knowledge' (M=3.43, SD=0.55) and 'Lesson planning knowledge' (M=3.43, SD=0.55). The item that received the third-highest rating was a TK item, 'Common ICT tools knowledge' (M=3.38, SD=0.75).

In contrast, the participants gave extremely poor ratings to a variety of items related to TPK, TCK, and TPACK. The TPACK item "Software evaluation knowledge" received the lowest rating of all (M=2.36, SD=0.68). The other TPK items: "Different learning styles with ICT catering knowledge" (M=2.58, SD=0.69) and "ICT learning theories knowledge" (M=2.43, SD=0.67) received the second lowest rating, followed by two TCK items- "ICT tools for English culture knowledge" (M=2.63, SD=0.78) and "ICT tools for English linguistics knowledge" (M=2.64, SD=0.71). In addition, the teachers gave low scores across a wide range of TPK, TCK, and TPACK items, with a mean score below 3.0.

In conclusion, CK, PK, and PCK items were reported by the EFL teachers to have higher degrees of knowledge than TCK, TPK, and TPACK items. The findings indicate that the EFL teachers thought they knew much better about the CK, PK, and PCK domains. On the other hand, they claimed that their understanding of TCK, TPK, and TPACK was lacking.

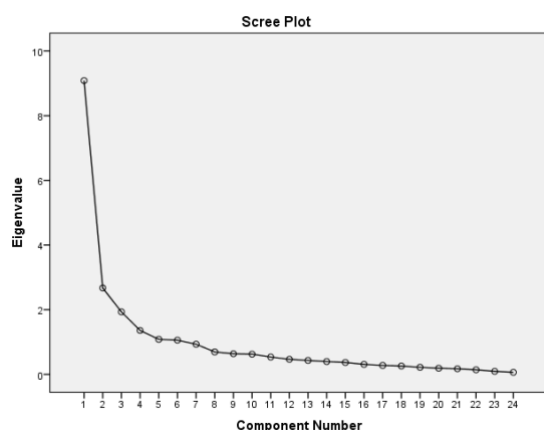
Exploratory factor analysis on teacher TPACK

The TPACK questionnaire's potential for factorability was examined using KMO and Barlett's test of sphericity. Barlett's test of sphericity was .000 and the KMO was .799, indicating that this section is appropriate for factor analysis (Pallant, 2013). To examine the relationships among the items, the correlation matrix for this component of the questionnaire was also analyzed. Several of the matrix's elements showed correlations higher than .3, indicating that the section was appropriate for factor analysis (Field, 2013; Pallant, 2013).

Principal Component Analysis (PCA) with the Direct Oblimin technique was subsequently used, with item loadings suppressed to 0.4 due to the small sample size. Plotting the initial data against a scree test revealed six Eigenvalues larger than 1, as seen in Figure 1.

Figure 1

EFL teachers' TPACK scree plot



An examination of the above plot revealed a break that occurred before Components 3, 4, or 5, suggesting a two-, three-, or four-component solution. After another analysis, the number of elements was forced to be 2, 3, and 4. The component structures could not be interpreted, though, because the rotation for components three and four failed. A two-component solution

was therefore chosen. With Component 1 accounting for 37.85% and Component 2 for 11.13% of the variation, this solution explained 48.98% of the overall variance.

Following the rotation stage, each component was given a name, and in order to verify internal consistency, a Cronbach's alpha was computed for each tentative component. Loadings upon rotation are displayed in Table 4, indicating the presence of two components: "Technology-Related Knowledge Domain" (TKD) and "Non-technology Related Knowledge Domain" (NTKD). These two components had Cronbach's alphas of .910 and .876 ($>.7$), respectively, indicating satisfactory internal consistency. None of the TK items loaded on either component, as their loadings were below .4.

Table 4

Summary of Factor Analysis on EFL Teachers' TPACK

N=81	Rotated loadings	
	Technology-Related Knowledge Domain	Non-Technology Related Knowledge Domain
TPK5- Student learning assessment using ICT knowledge	.843	-.268
TPACK1- Student learning English with ICT knowledge	.810	-.043
TPACK2- Task-designing using ICT knowledge	.788	.007
TPK2- Different learning styles with ICT catering knowledge	.785	-.005
TPK3- Classroom management using ICT knowledge	.777	-.156
TCK1- ICT tools for English language knowledge	.724	.157
TPK1-ICT learning theories knowledge	.649	.169
TPK4- Lesson preparation using ICT knowledge	.620	-.004
TCK2- ICT tools for English linguistics knowledge	.620	.222
TPACK3-Software evaluation knowledge	.568	.092
TCK3- ICT tools for English culture knowledge	.500	.320
TK3- Ability to stay current with technology	.382	.277
TK2-Technical problem-solving skills	.312	.308
PK1-Learning theories knowledge	-.028	.793
PK2- Learning styles knowledge	-.046	.750
PCK2-Student interaction knowledge	-.088	.707
CK2-Linguistic knowledge	.009	.704
CK3- English-speaking countries culture knowledge	-.206	.694
CK1-English language knowledge	.100	.644
PK3- Class management knowledge	.176	.636
PCK1- Knowledge to modify language input	.286	.517
PK4-Lesson planning knowledge	.311	.494
PK5-Asessment knowledge	.259	.446
TK1- Common ICT tools knowledge	.349	.399
Eigenvalues	9.08	2.67
% variance	37.85%	11.13%
Cronbach's alpha	.910	.876

In short, exploratory factor analysis indicates two groups of EFL teachers' self-reported TPACK: 'Technology-Related Knowledge Domain' and 'Non-Technology Related Knowledge Domain'. In addition, no TK items were loaded on either domain. This exploratory factor analysis was conducted to examine patterns in teachers' TPACK and to assess correlations between their TPACK and demographic variables. This is detailed in the section below.

Correlation between EFL teacher TPACK and their demographic variables

After an exploratory factor analysis of teacher TPACK, the correlations between TPACK and demographic variables were obtained and presented in Table 5.

Table 5

Spearman Rhos for Teachers' demographics and their TPACK

	Sex ^a	Teaching experience ^e	Age	Highest qualification ^{s^b}	Main teaching area ^c
	N=81	N=78	N=76	N=80	N=74
Technology-Related Knowledge Domain	.278*	.264*	.207	.043	.391**
Non-technology Related Knowledge Domain	.365**	.396**	.345*	.191	.512**

* $p < .05$, two tails; ** $p < .01$, two tails, ^aSex: Female = 1, Male = 2, ^bHighest qualifications: Bachelor's=1, Master's=2, PhD=3, ^cMain teaching area: Language skills=1, Others=2

Table 5 demonstrates that three demographic variables, namely teachers' sex, years of teaching experience, and main teaching area, had statistically significant correlations with their "Technology-Related Knowledge" domain ($\rho = .278$, $.264$, $p < .05$; $\rho = .391$, $p < .01$, respectively). Furthermore, these correlations were positive.

It appears that, compared to female teachers, male teachers reported having more "Technology-Related Knowledge." In a similar vein, teachers with more years of experience reported having greater "Technology-Related Knowledge." Additionally, compared to teachers who taught the four language skills, those who taught other skills tended to report having greater "Technology-Related Knowledge." On the other hand, there was no statistically significant correlation between this Knowledge Domain and characteristics such as age and highest qualification.

With the exception of the highest qualification, all factors were shown to have a statistically significant relationship with the "Non-Technology Related Knowledge Domain" ($\rho > .3$, $p < .01$), whereas the highest qualification showed a negative relationship. It seems that, compared with female teachers, male teachers possessed greater "Non-Technology Related Knowledge." Additionally, those with more years of experience and being older seemed to possess more knowledge of this type. Likewise, teachers who taught other skills reported having more "Non-Technology Related Knowledge."

In conclusion, the Spearman Rhos results show relationships between EFL teachers' TPACK and their demographic characteristics: teacher gender, teaching years, and main teaching area are positively correlated with their TPACK (both technology-related and non-technology-related domains). Meanwhile, their age is positively correlated with the teachers' non-technology-related knowledge domain.

Discussion

Regarding the EFL instructors' TPACK, the questionnaire results show that they rated their knowledge of PK, PCK, and CK as greater than their knowledge of TK, TCK, TPK, and TPACK. The results are comparable to those of Jordan (2011) who confirmed that teachers have "more confidence in Content Knowledge (CK)" (p. 22). The results further support the findings of Archambault and Crippen's (2009) study, which revealed that teachers appeared to believe they were proficient in their subject matter and teaching skills while utilizing ICT. The reasons for this might be the training the EFL teachers received when they were still student-teachers: the EFL teachers in this study received more training in English subject knowledge but little training in technology-related issues. Another explanation might be that the implementation of ICT in EFL teaching in the research context was relatively recent, so during this process, the EFL teachers were more likely to stick to the non-ICT teaching tradition they were used to, which focused more on subject knowledge.

According to the results of the exploratory factor analysis, there was no correlation between the TK and the other six categories. However, the remaining six knowledge domains showed underlying tendencies: all CK, PK, and PCK constructs fell under the Non-Technology-related Knowledge Domain (NTKD), while the three TCK, TPK, and TPACK categories fell under the Technology-related Knowledge Domain (TKD).

The results of the factor analysis align with other research, in which the same ambiguity regarding the definition and classification of items across various TPACK constructs has been noted (Archambault & Barnett, 2010; Brandley-Dias & Ertmer, 2013). The findings imply that the EFL teachers in this research context could only differentiate between knowledge to teach with and without technology. Another reason might be that these EFL teachers perceived knowledge of teaching English with technology as a specialized type of knowledge, separate from their knowledge of teaching English in a traditional way. The findings also confirm the complexity of teachers' knowledge when integrating technology into their practices, as teachers need more than one type of knowledge to teach with technology.

Regarding the correlations between EFL teachers' demographic factors and their TPACK, this study found that male teachers were more confident in both TPACK domains. The findings are similar to Jang and Tsai (2013), but are different compared to Ali and Hawk (2024) who found that the female teachers had a bigger TPACK amount than male ones related findings, or Roussnos and Jimoyiannis (2019) who claimed that both the female and male teachers showed their confidence in some TPACK domains such as CK and PK, and Yang and Yang (2025) who established that the male teacher rated his level of TPACK as low.

It was further found that EFL teachers' TPACK and their teaching experience showed strong, positive associations. This result contrasts with the findings of Lee and Tsai (2010), Alian and Alhaj (2024), and Yang and Yang (2025).

The main teaching area was also found to be positively correlated with teachers' technology- and non-technology-related domains. However, age was reported to correlate only with teachers' non-technology-related domain. Meanwhile, the teacher's highest qualification is unrelated to their TPACK. Therefore, as the findings indicate, these demographic variables are complex in relation to teacher TPACK. Thus, the results confirm the complexity of teachers' ICT use (Mishra & Koehler, 2006).

Conclusion and recommendations

This study has been conducted at a public university in Hanoi, Vietnam, with the participation of 81 EFL teachers. It was found that the teachers reported having more CK, PK, and PCK than TCK, TPK, and TPACK. Regarding the correlations between teachers' TPACK and their demographic variables, gender, and age showed positive correlations with TPACK. In other words, male and older teachers reported higher TPACK than female and younger teachers.

It is thus recommended that the institution provide assistance by offering professional development courses for female and young teachers. It could also be proposed that male educators serve as formal mentors to other "novice teachers" regarding their TPACK knowledge and experience. Additionally, these teachers could start informal support groups to help other teachers use ICT. These support groups might organize brief workshops where more experienced teachers could demonstrate how to use ICT in EFL instruction or help teachers share ideas on how to use ICT, thus helping expand their TPACK knowledge in action. These workshops might eventually be posted online so that educators who want to include ICT into their lessons can refer to them whenever they need to.

As in some previous studies, this study also found that teachers' gender appears to be a complex variable in relation to their TPACK. Therefore, to gain a deeper understanding of the relationship between teachers' gender and their TPACK, future studies could examine this relationship more thoroughly across a wider range of research settings.

There are some limitations, such as the small sample size, which limits the findings to the context, the use of a single data collection tool, and the reliance on teachers' self-reported data. It is therefore suggested that future research could be carried out with a bigger sample size, following a mixed-methods research methodology and being more longitudinal, so a more comprehensive picture of the teachers' TPACK and the relationship with their demographic variables could be obtained.

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