

EXPLORING TPACK (TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE) COMPETENCY OF HAI DUONG PROVINCE HIGHSCHOOL ENGLISH TEACHERS

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ARTICLE INFO	ABSTRACT
<p>Received: 30/4/2023</p> <p>Revised: 29/11/2023</p> <p>Published: 29/11/2023</p>	<p>This study was conducted with the hope that from the results obtained, we can evaluate the online teaching capacity of high school English teachers in Hai Duong province in terms of TPACK (Technological Pedagogical Content Knowledge) and investigate the challenges that teachers are facing. This research was conducted with the participation of 30 English teachers of 5 high schools in Hai Duong province in the second semester of the 2021-2022 school year. The survey method is a descriptive research method that collects data on participant characteristics. The results show that teachers' technological knowledge, pedagogical content knowledge, and technological content knowledge are high. These three knowledge areas are considered key components of TPACK, and the high average scores indicate that teachers in Hai Duong province have good capacity in integrating technology into their teaching practices. Finally, some implications, limitations, and suggestions for further research were included in this study.</p>
<p>KEYWORDS</p> <p>Online teaching</p> <p>TPACK</p> <p>Competency</p> <p>Technological</p> <p>Knowledge</p>	

KHÁM PHÁ NĂNG LỰC DẠY HỌC THEO TPACK CỦA GIÁO VIÊN TIẾNG ANH CẤP THPT TẠI HẢI DƯƠNG

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THÔNG TIN BÀI BÁO	TÓM TẮT
<p>Ngày nhận bài: 30/4/2023</p> <p>Ngày hoàn thiện: 29/11/2023</p> <p>Ngày đăng: 29/11/2023</p>	<p>Nghiên cứu này được thực hiện với mong muốn từ kết quả thu được có thể đánh giá năng lực dạy học trực tuyến của giáo viên tiếng Anh cấp THPT tỉnh Hải Dương về TPACK (Kiến thức nội dung sư phạm công nghệ) và điều tra những thách thức mà giáo viên đang phải đối mặt. Nghiên cứu này được thực hiện với sự tham gia của 30 giáo viên tiếng Anh của 5 trường THPT trên địa bàn tỉnh Hải Dương trong học kỳ 2 năm học 2021-2022. Phương pháp khảo sát là phương pháp nghiên cứu mô tả nhằm thu thập dữ liệu về đặc điểm của người tham gia. Kết quả cho thấy kiến thức công nghệ, kiến thức nội dung sư phạm và kiến thức nội dung công nghệ của giáo viên là cao. Ba lĩnh vực kiến thức này được coi là thành phần chính của TPACK, và điểm số trung bình cao cho thấy các giáo viên ở tỉnh Hải Dương có năng lực tốt trong việc tích hợp công nghệ vào thực tiễn giảng dạy của họ. Cuối cùng, một số hàm ý, hạn chế và gợi ý cho các nghiên cứu tiếp theo đã được đưa vào nghiên cứu này.</p>
<p>TỪ KHÓA</p> <p>Dạy học trực tuyến</p> <p>TPACK</p> <p>Năng lực</p> <p>Công nghệ</p> <p>Kiến thức</p>	

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1. Introduction

Online teaching competence refers to the knowledge, skills, and attitudes necessary for educators to design, deliver, and assess effective online learning experiences for their students. As the COVID-19 pandemic and advancements in digital technologies continue to drive the need for online teaching, educators must possess technical proficiency in online platforms and tools, pedagogical expertise in designing effective online instruction, and communication skills to engage with learners.

In the early years of educational technology, technological skills were taught free from pedagogical and content knowledge [1], [2]. Then, it was understood that pure technology alone could not help to develop pedagogical and content knowledge and their integration into teaching and learning process was taken into consideration [3]. On this way, technological knowledge was adapted to the pedagogical knowledge which was proposed and Technological Pedagogical and Content Knowledge (TPACK) came out as a new model [4].

The TPACK framework is a widely accepted model for understanding and implementing online teaching competencies [5]. TPACK is vital in assisting teachers to select and use hardware and software tools in a pedagogically appropriate and effective manner. Despite its essential connection to subject content, only a few studies have explored how TPACK could be further developed for specific learning domains.

The TPACK framework consists of three interrelated components: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK). CK refers to the subject matter knowledge that teachers have in their respective disciplines, while PK refers to the knowledge and skills that teachers have in teaching and learning strategies [6]. TK refers to the knowledge and skills that teachers have in using technology to enhance teaching and learning.

Different majors have been interested in TPACK because each subject matter has technological dimensions. Although some fields like science and mathematics have large amount of literature on this issue, studies related to TPACK in language teaching area have been quite rare. Few recent studies can be considered to be the first steps in combining two subjects, language teaching and TPACK. Furthermore, it can be stated that studies related to TPACK in Hai Duong context generally focus on developing TPACK scales and proving the reliability and validity of these scales rather than analyzing the subject matter in detail [7] - [10]. So, the researcher would like to investigate the online teaching competencies in terms of TPACK competency of the English teachers at high schools in Hai Duong province as well as the challenges they encountered when teaching online during the COVID pandemic. Therefore, the study had the two following research questions:

1. What are the online teaching competencies of the English teachers in terms of TPACK?
2. What are the challenges that the teachers encounter in teaching online?

2. Methodology

2.1. Research design

The researcher used descriptive method in this study to collect data about the TPACK competency level of the English teachers. Survey method was a descriptive research method to collect data about the characteristics of the participants.

2.2. Subjects of the study

The study was conducted with the hope that the result gained could evaluate the online teaching competency of high school English teachers in Hai Duong province. In order to achieve the goals, the researcher conducted the study with the participation of 30 teachers who were 17 males and 13 females from 5 high schools, Hai Duong province in the second semester of the school year 2021-2022.

2.3. Data collection instruments

The study used a combination of two data collection instruments:

Questionnaire

This study was utilized the TPACK Competency Survey created by L. Archambault and Crippen [11]. The survey comprised of 24 items and a five-point Likert scale that ranges from "poor" (1) to "excellent" (5). The 24 questions were categorized into six sub-sections, each corresponding to a different aspect: technology knowledge, content knowledge, pedagogical knowledge, pedagogical content knowledge, technological pedagogical knowledge, and technological content.

Interview

The researcher used a structured interview format, allowing for flexibility in questioning and the addition of further questions based on the interviewee's responses.

2.4. Data collection procedure

The researcher sent the questionnaire to the participants through direct submission via Google form after the survey was done.

2.5. Data analysis procedure

For the questionnaire items, all the obtained quantitative data were examined statistically via EXCEL Microsoft.

For the interviews, the data was transcribed by the researcher.

3. Findings and discussion

3.1. Findings from the questionnaire

3.1.1. Technological Knowledge (TK)

Table 1 presented the results of a survey on the technology knowledge of the teachers in the study.

Table 1. Survey on technology knowledge of teachers

ITEMS	Mean	SD
TK1 My aptitude for resolving hardware-related technical issues	3.68	0.45
TK2 My capacity to resolve numerous software-related computer problems	3.28	0.55
TK3 My capacity to assist pupils in resolving computer-related technical issues	2.52	0.29

Table 1 showed that the teachers' knowledge and ability to handle technology problems were quite good.

Based on the results of the processed data, it seemed that the teachers in this study had a good ability to fix technical problems related to hardware, with an average score of 3.68 and a standard deviation of 0.45. This suggested that the teachers had strong troubleshooting skills and were able to resolve technical issues related to hardware effectively.

Next, the ability of the teachers to deal with and overcome the students' problems and problems accounted for the lowest percentage with an average score of 2.52 and standard deviation of 0.29. Therefore, it could be seen that this ability of the teacher was the worst compared to the other two abilities.

3.1.2. Content Knowledge (CK)

Table 2 showed the mean scores and standard deviations of the participants' responses for content knowledge of teachers in the survey. The teacher's planning ability and the ability to create materials that were in line with the standards had a significant difference in mean scores. However, the standard deviations for both of these areas were very small, only 0.01, indicating that there was not much variability in the scores among the teachers. This suggested that while

the overall level of content knowledge among the teachers was good, there might still be room for improvement in these specific areas. It also indicated that the teachers' abilities in these areas were fairly consistent across the group.

Table 2. Survey on content knowledge of teachers

Items	Mean	SD
CK4 My capacity to organize the order of the concepts I teach in my lesson	2.64	0.21
CK5 My capacity to choose the range of concepts to be covered in my class	2.56	0.43
CK6 My capacity to produce goods that correspond to particular MEB criteria	2.2	0.20

3.1.3. Pedagogical Knowledge (PK)

Table 3 presented the results of a survey on the pedagogical knowledge of the teachers.

Table 3. Survey on pedagogical knowledge of the teachers

Items	Mean	SD
PK7 My capacity to link multiple concepts to children using a variety of teaching techniques	2.4	0.41
PK8 My capacity to modify my instruction in light of pupil performance and feedback	2.96	0.45

In this section, only 2 possibilities were mentioned regarding PK content. As shown in Table 3, the ability of teachers to adjust teaching methods based on student performance/ feedback had significant higher mean and standard deviation (Mean = 2.96; SD = 0.45) compared with the ability to use a variety of teaching strategies to relate different concepts to students (Mean = 2.4; SD = 0.41). Therefore, most teachers were very good at adapting teaching methods based on student performance.

3.1.4. Pedagogical Content Knowledge (PCK)

Table 4 displayed the outcomes of a survey that evaluated the pedagogical content knowledge of the teachers, indicating the average scores and standard deviations of each assessed domain, such as comprehension of subject-specific teaching methods and understanding of students.

Table 4. Survey on pedagogical content knowledge of the teachers

Items	Mean	SD
PCK9 My ability to create lesson plans with ease and a passion for the subject	4.08	0.79
PCK10 My capacity to choose the approach that will best teach a given idea	3.44	0.54
PCK11 My capacity to help pupils see the relationships between diverse concepts in a curriculum	4.72	0.65
PCK12 My capacity to differentiate between students' correct and bad attempts at problem-solving	3.92	0.81
PCK13 My capacity to foresee potential student misunderstandings about a given topic	4.12	0.88

The ability assisting students in noticing connections between various concepts in a curriculum was with the highest mean score of 4.72 and standard deviation of 0.65. Therefore, the teachers had the best pedagogical ability on this subject. With the pedagogical ability: predicting likely student misconceptions within a particular topic, the teacher also achieved the good level (Mean = 4.12; SD = 0.88). Next, the teachers were also likely to be good at producing lesson plans with an appreciation for the topic with a mean score of 4.08 and a standard deviation of 0.79.

3.1.5. Technological Pedagogical Knowledge (TPK)

Table 5 presented the results of the survey on the technological pedagogical knowledge of the teachers.

Table 5. Survey on technological pedagogical knowledge of the teachers

Items	Mean	SD
TPK14 My capacity to promote participation among students	4.36	0.74
TPK15 My capacity to use various teaching strategies when teaching English	3.48	0.42
TPK16 My capacity to foster an environment where students can acquire new skills and knowledge	4.44	0.65

Table 5 indicated the descriptive statistics of the survey in terms of sub factors of technological pedagogical knowledge.

According to the data, a lot of teachers had a good ability to create an environment which allowed students to build new knowledge and skills (Mean = 4.44; SD = 0.65). In addition, the mean for ability to implement different methods of teaching English was 3.48. This data proved that the knowledge of senior English teachers about the technological pedagogical knowledge use was at a good level; however, they needed further training and assistance in terms of this sub factor.

3.1.6. Technological Content Knowledge (TCK)

Table 6 displayed the results of the survey on technological content knowledge of the teachers. The table provided information on the mean scores and standard deviations for each of the areas of technological content knowledge assessed in the survey, including knowledge of basic computer operations, multimedia software applications, and technological equipment.

Table 6. Survey on technological content knowledge of the teachers

Items	Mean	SD
TCK17 My capacity to control student interaction	3.84	0.68
TCK18 My capacity to offer instruction using a variety of courseware programs (e.g., Blackboard, Centra, Moodle)	3.84	0.71
TCK19 My aptitude for using technology tools (such as multimedia and visual demonstrations, etc.) to demonstrate specific concepts in my content area)	2.88	0.34
TCK20 My capacity to apply curriculum in a setting	4.16	0.69
TPACK21 My capacity to fulfill the general requirements of teaching English	3.56	0.66
TPACK22 My capacity to use technology to provide convincing representations of content that diverge from what is learned in school	2.48	0.40
TPACK23 My capacity to alter education using technology for student assessment	3.2	0.66
TPACK24 My ability to use technology to predict students' skill/understanding of a particular topic	2.72	0.21

The mean and standard deviation (SD) scores were presented for each item. The highest mean scores were obtained for TCK17 and TCK20, indicating that teachers felt more confident in controlling student interaction and applying curriculum in a setting. TCK18 and TPACK21 had similarly high mean scores, reflecting the teachers' ability to offer instruction using a variety of courseware programs and fulfill general requirements of teaching English. TPACK23 had a moderate mean score, indicating teachers' capacity to alter education using technology for student assessment. However, TCK19, TPACK22, and TPACK24 had lower mean scores, suggesting that the teachers might need more support in using technology tools to demonstrate specific concepts in their content area, providing convincing representations of content that diverge from what was learned in school, and using technology to predict students' skill/understanding of a particular topic.

3.2. Discussion

3.2.1. Research question 1: What is TPACK competency of the English teachers?

In Pamuk's study on technology integration among information and technology teachers using TPACK, it was discovered that the participants' learning experiences were hindering their ability to effectively integrate technology [12]. However, TPACK training programs were found to boost the teachers' theoretical, methodological, and technological competency. The English teachers involved in the study had positive attitudes towards all sub-factors of TPACK, demonstrating consideration for pedagogical and content characteristics when using technology. Despite their high level of technological pedagogical knowledge (TPK), their content knowledge (CK) was observed to be at a lower level. This suggests that the English teachers had a medium level of knowledge about content and technology use, but required further training and assistance to use technology more effectively. Similar findings were reported by Terpstra [13], who found

that the teachers had higher technological knowledge than technological pedagogical knowledge, and higher technological pedagogical knowledge than technological pedagogical content knowledge. Terpstra emphasized that an interaction between technological, pedagogical, and content knowledge emerged when English teachers recognized the advantages of TPACK in a given subject area.

Upon analyzing the data collected, it was discovered that TPACK and its sub-factors had a significant correlation. However, the correlation between technology and pedagogy, as well as technology and content, was relatively low. This particular finding was not in line with the results of a previous study conducted by Archambault and Crippen [11], where the participants showed high levels of pedagogical and content knowledge, but lower confidence in the technological aspect. The difference could be due to the fact that the teachers in this study were already accustomed to using technology in English teaching, resulting in a higher correlation between technological and pedagogical knowledge.

The finding also suggests that the relationship between technology and pedagogy was complex and multidimensional. The teachers needed to possess not only technological knowledge but also pedagogical skills to successfully integrate technology into their teaching practice. Additionally, they needed to be able to adapt to new technologies and effectively use technological tools to enhance their pedagogical strategies.

In conclusion, the finding that there was a higher correlation between technological and pedagogical knowledge in the study could be due to the fact that the teachers involved were already experienced in using technology in their English teaching. This highlights the importance of providing teachers with ongoing opportunities for professional development and training to help them develop their technological and pedagogical skills and stay current with new technological trends and advancements.

3.2.2. Research question 2: What are the challenges that the teachers encounter in teaching online?

For this question, the researcher addressed the initial issue of the obstacles faced by the teachers in distributing assessments during online learning in order to enhance student performance and track their progress. The data presented and analyzed were obtained from the interview with three high school teachers from different schools.

The first problem identified in the context of online teaching was the application of information technology. While technology has become an essential component of modern education, its integration into online teaching could present challenges for teachers. Online teaching required the use of various technology tools, such as online learning platforms, video conferencing software, and other digital tools [11]. Teachers needed to have a solid understanding of these tools to deliver effective online instruction, which could be time-consuming and require additional training [14].

The second problem identified in the study was the issue of engaging students and time management among teachers during online learning. The analysis of the data revealed that the teachers struggled to manage their time effectively while teaching online. With the lack of a structured schedule, it could be difficult for the teachers to plan and prioritize their tasks effectively. The teachers also faced the challenge of organizing their workspaces at home, which could be distracting and hinder their productivity.

The final challenge that teachers faced in online teaching was a lack of technical skills. For many teachers, the sudden shift to online teaching required them to learn new technological skills and tools quickly. This could be a daunting task, particularly for those who were not comfortable with technology. The teachers might struggle to navigate new online platforms, use new software, and integrate technology effectively into their teaching. The lack of technical skills could also create additional stress for the teachers and affect their confidence in delivering effective online instruction [15]. Addressing this challenge required support from schools and

districts in providing adequate training and resources to help the teachers develop the technical skills necessary for successful online teaching.

4. Conclusion and implications

The findings suggest that the teachers in Hai Duong province had a good level of competence in integrating technology into their teaching practice, as indicated by their high scores in technological knowledge, pedagogical content knowledge, and technological content knowledge. However, the study also identified some challenges that teachers faced, which needed to be addressed to further enhance their online teaching competency.

The study had implications for teacher training programs and professional development initiatives that would aim to improve the integration of technology into teaching practices. Moreover, the results of this study could serve as a benchmark for future research on the integration of technology into teaching practices, not only in Hai Duong province but also in other contexts.

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