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RESEARCH ARTICLE

Exploring the Profiles of College EFL Novice Teachers and Experienced Teachers' TPACK in China

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ABSTRACT

The development of information technology requires that teachers' educational technology ability should be increased. In the field of education, TPACK has become an important framework for measuring teachers' educational technology competence, and novice English teachers, as the main force of future English teachers, directly influence the quality of English informatics teaching. However, the current reality is that teachers lack technological literacy and many of them have a vague understanding of the integration of technology and education. The primary objectives of this study are to investigate the current TPACK status of both novice and experienced college EFL teachers, TPACK levels between novice and experienced teachers in seven dimensions. The study analyses the reasons for the differences of TPACK levels between the two groups of teachers. The mixed research method was applied in this study. From the quantitative data result, we cannot find there is significant difference in TPACK level between novice teachers and experienced teachers. Upon the qualitative data analysis, the study provides practical suggestions for enhancing the TPACK development of college EFL teachers, ultimately contributing to their professional growth and the effective integration of technology in language education in China.

Contribution/Originality: This study contributes to the existing literature by providing a comparative analysis of the TPACK levels of novice and experienced EFL teachers within the unique context of local universities in Hebei Province, China. The study sheds light on the challenges and opportunities faced by teachers at different

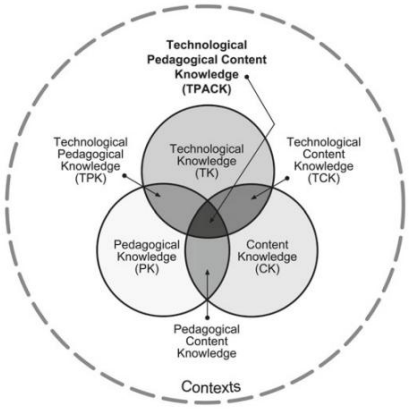
career stages, offering practical implications for teacher training programs and professional development initiatives tailored to the needs of EFL educators.

1. Introduction

With the in-depth development of information technology in the field of education, teacher competency has gradually become an important knowledge for enhancing teachers' professional competence in education. In the context of promoting the modernization and development of education, the application of information technology is a necessary professional ability for teachers, and the training of teachers in the new era should focus on the improvement of information literacy (Rahimi, 2023).

The rapid advancement of technology requires an examination of its effects on education and teachers' beliefs. Koehler and Mishra (2009) introduced the TPACK framework, detailing its components, as illustrated in Figure 1. This framework includes three core areas of knowledge: technology, subject matter, and pedagogy, and four complex areas of knowledge: technological pedagogical knowledge, technological content knowledge, pedagogical content knowledge, and technological pedagogical content knowledge.

Figure 1: TPACK framework proposed by Mishra and Koehler (2006)



The TPACK constructs are elements that make up teacher knowledge for effective technology integration. TPACK is designed as a seven-component model that elucidates the connections between technology knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK) (Mishra & Koehler, 2006). TPACK represents a pedagogical approach to teaching content using the most suitable technology for the subject matter.

Su, Zhong, and Ng (2022) indicated the importance of English teachers' TPACK levels in promoting English teaching quality and teachers' professional development. TPACK has now become a new model of English teaching in China, and novice English teachers, as the main force of future English teachers, directly influence the quality of English informatics teaching. However, despite the importance of TPACK for teachers, some scholars have explored and researched TPACK English teaching in China and concluded that although Chinese English teachers have accepted the concept of TPACK, they have not mastered and flexibly applied it in English teaching (Liu, 2023; Long, 2022).

As to how to promote the deep integration of information technology and education teaching, Zhang, Chen, and Zhang (2022) argues that the key point lies in the cognitive

ability and information technology capability of teachers. However, the current reality is that teachers lack technological literacy and many of them have a vague understanding of the integration of technology and education. This requires that teachers have the ability and responsibility to integrate new technologies into their fields, and that teacher education programs keep pace with the new era in China.

1.1. Research Objectives

The primary objective of this study is to investigate the TPACK levels of novice and experienced college EFL teachers in China. Specifically, the study aims at:
Determining the current TPACK status of both novice and experienced college EFL teachers.

Comparing the TPACK levels between novice and experienced teachers in seven dimensions (TK, CK, PK, PCK, TCK, TPK, and TPACK).

Analyzing the reasons for differences of TPACK levels between the two groups of teachers.
According to the above research objectives, the following research questions were made:

i. What are the current TPACK status of both novice and experienced college EFL teachers.
ii. What are the differences of the TPACK levels between novice and experienced teachers
iii. How EFL novice teachers and experienced teachers perceive their TPACK abilities.

Based on the findings, the author will propose an effective way to improve the TPACK ability of college EFL teachers, both novice and experienced.

2. Literature Review

Teacher education and professional development play a crucial role in ensuring the effectiveness of educators and the quality of education. Educational technologies transform teaching and learning processes, while professional development empowers teachers to effectively integrate these technologies into their practices. Wang (2022) identified digital literacy development as a critical component in initial EFL teacher education, particularly in distance learning environments, which can help prepare teachers to meet the demands of contemporary classrooms. Zhang and Chen (2022) emphasized that beyond digital competence and language teaching skills, EFL teachers require bi-level digital competencies to cultivate students' 21st-century digital skills effectively. These findings indicate that addressing the declining quality of teacher education students in China requires targeted interventions to enhance their digital and pedagogical skills, aligning with global trends in teacher training and competency development.

TPACK, as the core of information technology integration in education, reflects the foundation of teachers' professional development abilities. The concept of TPACK was introduced based on Shulman's Pedagogical Content Knowledge (PCK). Mishra and Koehler (2006) formalized the TPACK framework, which consists of three core knowledge areas (technology, subject matter, and pedagogy) and four complex knowledge areas.

Foreign scholars (Sternberg & Horvath,1995; Farrell, 2012) define novice teachers and experienced teachers almost by the working years of teachers, that is, novice teachers, including teacher training interns, and teachers who have been teaching in schools for less than 4 years. The experienced teachers are teachers who have been teaching for more than 3 years or more than 5 years. Most domestic researchers define different types of teachers from the two aspects of working age and professional title. For example, domestic scholars generally believe that teachers whose teaching age is less than 5 years are called novice teachers (Lian & Meng, 2003). In this study, novice teachers are defined as teachers with teaching experience of 5 years or less; Experienced teachers are those with more than 5 years of teaching experience.

Meyer (2004) conducted a case study on pre-service teachers, first-year novice teachers, and expert teachers to investigate the role of prior knowledge in teaching practices. The study utilized a combination of text analysis, classroom observation, and interviews to explore how teachers' understanding of knowledge influences their teaching effectiveness. The results revealed that novice teachers often struggle with understanding and utilizing transcendental knowledge—such as theoretical frameworks—effectively in the classroom. This gap in understanding limits their ability to implement constructivist teaching methods and make informed teaching decisions. In contrast, expert teachers demonstrated a deep, rich knowledge base that allowed them to draw upon students' prior knowledge, fostering more effective teaching strategies. Meyer's (2004) study highlights the importance of prior knowledge in the development of teaching expertise and suggests that novice teachers would benefit from explicit instruction on the role of theoretical knowledge in teaching practice.

Chen (2020) explored the TPACK framework among high school English teachers in Yunnan Province. By combining a survey and interviews, he examined how teachers' integration of technology, pedagogy, and content knowledge influenced their teaching practices. The study revealed that while the overall TPACK levels of teachers were above average, there remained considerable room for improvement. Factors such as age, teaching experience, professional title, and previous training were found to have a significant impact on teachers' TPACK development. Older and more experienced teachers tended to have stronger pedagogical knowledge but were less adept at integrating technology into their teaching, whereas younger teachers demonstrated higher proficiency in using technology but lacked depth in content knowledge. Chen's (2020) study underscores the need for targeted professional development that addresses the specific gaps in TPACK, particularly in terms of integrating technological tools with pedagogy and content.

In a similar vein, Wang (2022) examined the knowledge characteristics of English teachers in senior high schools using a combination of questionnaires, interviews, and case studies. His findings indicated that teachers' professional knowledge development was often unbalanced, with a slow pace of knowledge updating. Many teachers displayed awareness of the need for professional growth but lacked the concrete actions to update their knowledge and teaching practices. This gap in professional development was especially evident in the integration of newer pedagogical strategies and technological tools. He proposed that reflective practice, cooperative learning, and professional teacher education programs be implemented to address these gaps. The study pointed out that the professional development actions of teachers often lag behind their recognition of the need for improvement, indicating a disconnect between awareness and actual practice.

The above studies contribute significantly to understanding the role of teachers' knowledge, particularly in terms of their TPACK development. However, these studies primarily focus on high school English teachers, with limited research on TPACK development of EFL teachers in college. While there has been a growing body of research on the TPACK framework in various educational contexts, there remains a need for further exploration of subject-based, region-specific, and contextual studies to understand how teachers' knowledge evolves in different settings. For instance, the integration of TPACK in EFL of college has received less attention in China, and more research is needed to explore how teachers in these fields adapt and implement the TPACK framework.

3. Research Methods

The research is conducted in 10 colleges in Hebei Province, China, all of which have established collaboration with the researcher. This study employs a mixed research design to investigate the TPACK level of college EFL novice teachers and experienced teachers. Firstly, the quantitative research method was used to investigate the TPACK level and the differences between EFL novice teachers and experienced teachers. Then the qualitative research method was used to indicate the reasons for the differences of TPACK levels between the two groups of teachers. As for the qualitative research, the one-on-one interview was conducted, each interview lasted for 2-3 minutes.

In this study, the two groups of teachers, EFL novice teachers and experienced teachers are independent variables, the TPACK level of each element, namely, TK, PK, CK, TCK, PCK, PCK, and TPACK are the dependent variables.

The total number of EFL teachers across these 10 colleges is 138, consisting of 59 novice teachers and 79 experienced teachers. Based on the sampling guidelines provided by Krejcie and Morgan (1970), a sample of 100 EFL teachers will be selected to participate in the survey. The stratified sampling method will be used to select 50 novice EFL teachers and 50 experienced EFL teachers. The quantitative data is collected through a questionnaire survey. In terms of qualitative interviews, semi-structured interviews will be conducted with 5 novice EFL teachers and 5 experienced EFL teachers respectively.

The quantitative data was gathered through Questionnaire Star Platform. The instrument used in this study is a quantitative questionnaire, which is divided into seven dimensions to assess the seven aspects of the teachers' TPACK levels, which are teachers' TK, PK, CK, TCK, TPK, PCK, and TPACK. The instrument was developed based on the questionnaire designed by Chai, Koh, and Tsai (2011) and adapted to the context of EFL teachers in China. The questionnaire includes both Likert-scale items to capture a comprehensive view of teachers' knowledge and practices. The scale 1-5 in the Lietke scale corresponds to the teachers' level of TPACK (1-strongly disagree, 2-disagree, 3- Neither Agree or Disagree, 4-agree, and 5-strongly agree).

Once the data were collected, they were analyzed using SPSS software. Descriptive statistics were used to summarize the demographic information. To assess the TPACK levels, the T-test was applied to compare the differences between novice and experienced teachers in terms of their TPACK levels.

Additionally, thematic analysis was conducted to explore the reasons for the differences of TPACK levels between the two groups of teachers.

4. Results

4.1. Demographic Profile of the Respondents

In this study, just as Table 1 shows, the total sample size was 100, of which 50(50%) were EFL novice teachers and 50(50%) were EFL experienced teachers, 61 (61%) were females and 39 (39%) were males. The gender ratios were close, but there were slightly more males than females. The distribution of participants' majors covered four options, namely English Education (45 or 45%), Business English (28 or 28%), Applied English (27 or 27%).

Table 1: Demographic Frequency Analysis

Item	Options	Frequency	Percentage (%)
Type	EFL novice teachers	50	50%
	EFL experienced teachers	50	50%
Gender	Female	68	68%
	Male	32	32%
Major	English Education	45	45%
	Business English	28	28%
	Applied English	27	27%

4.2. Analysis of the TPACK level of EFL novice and experienced teachers in colleges

According to descriptive statistical analysis (Table 2 shows), the total average TPACK of novice and experienced EFL teachers is 6.685; The differences in the seven dimensions can be sorted as follows: PCK>PK>TPACK>TPK>TCK>CK>TK. The highest dimension is subject teaching knowledge, indicating that English teachers have solid course knowledge and high professional level. However, compared with other dimensions, the score of technical knowledge is lower than the average, indicating that most teachers cannot adapt to the general background of education informatization. The score of TCK dimension of integrated technology is lower than that of other dimensions, indicating that teachers' level of selecting appropriate information technology to support subject knowledge teaching needs to be improved.

Table 2: Analysis of TPACK level between novice teachers and experienced teachers

Variable	novice teacher		experienced teacher		MD	t
	M	SD	M	SD		
TK	6.12	1.88	6.52	2.46	0.40	0.326
CK	7.36	2.12	5.50	1.87	1.86	2.125*
PK	6.34	2.13	6.67	2.45	0.33	0.413
PCK	6.32	1.97	6.69	2.32	0.37	0.521
TCK	6.01	1.94	6.91	2.14	0.80	0.714
TPK	6.34	1.89	6.86	2.51	0.52	0.612
TPACK	6.53	1.92	6.95	2.35	0.42	0.556

Table 2 shows the TPACK level between novice teachers and experienced teachers. The results of independent sample T-test showed that there were significant differences in CK dimension between novice teachers and experienced teachers ($t=2.125$, $df=20$, $p<0.05$): CK dimension of novice teachers was higher than that of experienced teachers (MD=1.86).

English teachers' overall cognition of TPACK is good, among which the experienced teachers' TPACK is at the integration level, while the novice teachers are at the application level. The overall level of TK, PK, PCK, TCK, TPK and TPACK of experienced teachers was higher than that of novice teachers (only CK level was lower than that of novice teachers). This shows that novice teachers still lack in the integration of technology and teaching methods. They have not effectively mastered the ability to use technology in teaching. This shows that most of the new teachers cannot adapt to the general background of education informatization, and the level of selecting suitable subject knowledge teaching supported by information technology needs to be improved. However, the level of novice teachers in CK dimension is higher, indicating that English teachers have a solid course knowledge and a higher professional level. The above findings answered the research question 1 and research question 2.

4.2. The qualitative result

In the qualitative part, qualitative data of the interview were analyzed using thematic analysis and the data analysis tool NVivo was used.

Experienced teachers possess a solid grounding in both pedagogy and content knowledge. They regard technology as something that can augment their teaching rather than depending on it as a support they can't do without. They focused on using technology to supplement their pedagogical practices.

Novice teachers consider TPACK more as a learning aid that assists them in structuring their lessons. They utilize technology to shore up the aspects where they may be deficient in pedagogy. By relying on it, they aim to design lessons that can capture students' attention and strengthen their content knowledge. They view TPACK as a means of making lessons more engaging through the use of digital tools.

In summary, the two groups' perception on TPACK differs, the experienced teacher used technology to supplement their pedagogical practices, but novice teachers just used TPACK as a means of way to shore up their deficient in teaching. Additionally, both groups value the holistic nature of TPACK, but it is difficult for them to integrate the seven elements into their practical performance.

5. Conclusion

There is no significant difference in TPACK level between novice teachers and experienced teachers, which is an unexpected finding of this study. Through interviews with teachers, the author makes the following inferences about the reasons for the lack of significant difference in TPACK level between novice teachers and experienced teachers:

Teacher education programs may not emphasize technological integration sufficiently, meaning both novice and experienced teachers might not have been trained in this area. Traditional pedagogical skills may have been prioritized over technological fluency. And, the fast pace of technological advancements may mean that experienced teachers haven't kept up, while novice teachers are only starting to learn about the technologies available. This results in both groups having similar TPACK levels due to the constant need to update skills.

Both novice and experienced teachers might not have had ample opportunities for ongoing professional development focused on technology integration. Schools may lack resources or initiatives for continuous learning in this area, causing stagnation in TPACK levels.

Experienced teachers may rely on established teaching methods and be resistant to adopting new technologies, while novice teachers may focus on mastering basic pedagogical techniques first. As a result, both groups might be at a similar TPACK level, albeit for different reasons.

The institutions of education should encourage teachers to continue to carry out in-service education or set up relevant systematic in-service training courses to help teachers deepen their understanding and learning of information technology, improve their ability to apply relevant technical knowledge, and enhance their confidence in technology learning and use. It is necessary to provide incentives for teachers to continually improve their TPACK, such as recognition, certifications, or career advancement opportunities. This can motivate both groups to engage in ongoing learning. The systematic and comprehensive application of training programs should be ensured when training in-service teachers' TPACK. The overall development and improvement of TPACK depends on the efforts of novice teachers and expert teachers themselves. Teachers should actively participate in different levels and different forms of teaching ability competitions, such as intramural, inter-campus, provincial and other teaching ability competitions. In this series of activities, teachers can integrate content knowledge, teaching method knowledge and technical knowledge organically.

In conclusion, the dynamic nature of the TPACK framework reminds educators not to simply "add" technology to teaching content and pedagogical knowledge, but to cultivate and develop TPACK ability by connecting each dimension of the seven dimensions as a "community".

Ethics Approval and Consent to Participate

The researchers used the research ethics provided by the Research Ethics Committee of Universiti Teknologi MARA (UITM). All procedures performed in this study involving human participants were conducted in accordance with the ethical standards of the institutional research committee. Informed consent was obtained from all participants according to the Application Form for Ethics Approval.

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Conflict of Interest

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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