

# The Study of Developing Prospective English Teachers' TPACK

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**Abstract:** This study aims to investigate how to develop prospective English teachers' TPACK and thus help them qualify for the effective use of educational technology in their future English teaching. For this purpose, this study selected 30 students majoring English education of the workshop in Xi'an Fanyi University as object, and designed a training program which comprised three modules and nine topics that cover all the factors of TPACK. The program lasted for a whole term of 16 weeks. After the completion of the program, a follow-up survey on those prospective English teachers' satisfaction about the program was carried out, which shows that the program was welcomed and satisfactory.

**Keywords:** TPACK; Prospective teachers; English teaching

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## 1. Introduction

The 13th Five-Year Plan for Education Informatization pointed out: "The integration of information technology and education and teaching has been further deepened, and teachers' information-based teaching ability and students' information literacy have been significantly improved." The Education Informatization 2.0 Action Plan issued by the Ministry of Education in April 2018 emphasizes the need to "shift from improving teachers' and students' IT application ability to comprehensively improving their information literacy". In February 2019, "China's Teaching Modernization 2035" proposed to accelerate education reform in the information age and promote the development of intelligent teaching. In this context, teachers' innovation ability of information-based teaching needs to be improved urgently, and the deep integration of information technology and teaching of various disciplines needs to be further promoted. The professional quality of English teachers has changed accordingly. The ability to integrate English teaching method knowledge, subject content knowledge and information technology knowledge together to promote teaching is a new requirement for English teachers in the information age. In academic circles, this ability is called teachers' TPACK (Technological Pedagogical Content Knowledge integrating technological pedagogical knowledge), which consists of three integral domains: technical knowledge (TK), pedagogical method knowledge (PK) and subject content knowledge (CK). Normal university students, including those majoring education in private universities, are the main force for future teachers. It is of great significance to strengthen the cultivation of their information-based teaching ability and help them meet the requirements of education informatization, teacher professional development and basic education reform. As a well-known private universities in Shaanxi, Xi'an Fanyi University, have cultivated a large number of talents for primary school and middle school English education and teaching in Xi'an and its surrounding areas. However, previous study found that the students' TPACK development is not satisfactory enough. The students are not capable enough to integrate new information technology into teaching in future practice, which requires a nuanced understanding of the complex relationships between technology, pedagogy, and content knowledge. Thus it is necessary and urgent to find a way to develop students' TPACK<sup>[1]</sup>.

## 2. TPACK Framework

TPACK has proven to be a useful model for researchers to understand the integration of educational technology in learning and teaching (Franziska Zimmermann, Insa Melle, and Johannes Huwer 2021)<sup>[2]</sup>. Professor He Kekang believes that TPACK is a new operational model that can integrate information technology into the teaching process of various subjects. It advocates and implements the teaching concept of “meaningful transmission - leading inquiry”. In the process of integrating information technology into subject teaching through TPACK, it is emphasized that teachers must play a leading role in the integration process. As a new teacher knowledge framework, TPACK is formed by Mishra and Koehler in 2005 on the basis of Shulman’s PCK framework by adding the active factor of technology, which is initially referred to as “TPCK”. Mishra changed “TPCK” to “TPACK” at the 9th National Technology Leadership Summit in 2007. It is composed of seven parts: CK(subject knowledge), knowledge of integrated technology), and TCK(subject knowledge of integrated technology), which describes the knowledge of technologies in relation to subject matter content, and TPK (teaching method knowledge of integrated technology), which is the knowledge of the selection and use of technologies to promote learning, technological content knowledge, and lastly TPACK (subject teaching knowledge of integrated technology), which refers to the intersection of all fields and consists of the knowledge of the selection and usage of technologies to promote learning about subject-specific content. These specific domains are additionally bound to their respective context. Since Li Meifeng and Li Yi first introduced the concept of TPCK to China in 2008, the research on TPACK in domestic academic circles has gradually risen, especially with the release of the 10-year Development Plan for Education Information (2011-2020) and other documents, the climax of the research on TPACK has been set off in our country. (Zhou Ying, Mo Zongzhao 2019) First, the research on the current situation and trend of TPACK or the development of TPACK theory. The second is the empirical analysis of the status quo of TPACK, which mainly focuses on the status quo of in-service college teachers, middle school teachers and normal university students. The third is to develop the professional quality and training mode of in-service and pre-service teachers based on the TPACK framework. From the above analysis it found that the current research of TPACK is relatively narrow, and the distribution of disciplines in the research is not balanced, which mainly focuses on science disciplines that are closely related to technology and involve more technology, such as mathematics, chemistry, physics, etc., while disciplines such as English and Chinese are rarely involved. At the same time, the research objects of TPACK are mainly in-service teachers and students of key normal universities. At present, there is a lack of articles specifically studying TPACK for English normal university students, and there is no research on TPACK for undergraduate English education students in private universities.

## 3. The Current State of Prospective English Teachers’ TPACK

In this paper, junior students majoring English education in Xi ‘an Fanyi University were selected as the research object. The English major of Fanyi University is a national first-class undergraduate major, which has trained a large number of excellent teachers for basic English education in the surrounding areas of Xi ‘an. The examination of TPACK ability of students in this major has certain reference significance for other private colleges and universities. The selected students majoring in English education have completed three years of English language training and English culture learning, and have learned English Teaching Methodology, English Teachers’ Spoken English, Foreign Language Teaching and Psychology, English Curriculum and Teaching Theory, Foreign Language Teaching and Information Technology and other professional courses, but have not yet had English internship experiences in primary and secondary schools. From the perspective of TPACK, they have certain Content Knowledge (CK), Technological Knowledge (TK), Pedagogical Knowledge (PK) and Pedagogical Content Knowledge (PCK), but their Technological Content Knowledge (TCK), Pedagogical Technological Knowledge (TPK) , and the integrated technology of Technological Pedagogical Content Knowledge (TPACK) is still in the initial stage of development. They lack the experience of applying these knowledge in teaching practice. Combined with TPACK framework and students’ actual situation, this study will analyze from the following three dimensions: information-based English teaching design ability, application and implementation ability of information-based English teaching resources, and information-based English teaching evaluation ability<sup>[3]</sup>.

(1) Information-based English teaching design ability. It refers to teachers’ ability to use information technology to design English teaching process and teaching resources. In the theoretical framework of TPACK, it corresponds to TPK, which is mainly embodied in teachers’ use of information technology to design teaching activities. The questionnaire survey shows that 82.3% of the students know the concept of Mooc, on-line teaching, blended-teaching, ect, mainly because during the recurring outbreak COVID-19, a lot of universities and colleges mainly have adopted the mode of on-line teaching and blended-teaching. However, referring to students’ own ability to design blended-teaching or on-line teaching with the help of Mooc or Spoc resources, only a very small number of students (less than 8%) respond that they believe they are capable of that.

(2) Application and implementation ability of information-based English teaching resources. This ability corresponds to TCK and TPACK in the framework. The former refers to the ability to process and design teaching resources; the latter comprises the knowledge of the selection and usage of technologies to promote learning about subject-specific content. The results of the questionnaire show that PowerPoint is the most proficient information teaching resource software for English majors. 90.2% of the students believe they have the proficiency in using Powerpoint, while for other software such as Seewo whiteboard and Focsky, they admit they are not proficient in them; some even have never used them. 60% of the students think they are proficient in using photo processing software, such as Meitu. 28% are proficient in audio processing software, such as Jian Ying; 22.5% can use video processing software, such as Format Factory, but few can use animation soft wares or drawing software. At the same time, regarding the ability of using technologies to organize and monitor group work and individual study during teaching process, 63.2% of the students respond that they are not sure how to do that.

(3) Information-based English teaching evaluation ability. Evaluation plays an enormous role in the teaching-learning process. It helps teachers and learners to improve teaching and learning. Effective evaluation can help to supervise the quality and effect of classroom teaching, and adjust and control the information-based teaching activities. So as prospective English teachers, students must learn to evaluate their students' learning. They should actively learn to use the technology-aid software to evaluate students. However, according the survey, 60.3% of our research objects respond that they are not familiar with the technology-aid evaluation forms. During the profession-related lessons, the practices have put more emphasis on teaching process, but neglect the ways and methods to evaluate<sup>[4]</sup>.

#### 4. Developing Prospective English Teachers' TPACK

In order to find a way to develop prospective English teachers' TPACK, this study designed a workshop program, in which 30 students majoring in English education received a semester's training focusing on TPACK development and fished tasks accordingly.

##### 4.1 The Content and Implementation of the Program

The program comprises three modules: Module 1 focuses on theories and methods of foreign language teaching in the new era, which consists of three topics: Key competence of English subject, Integrated teaching, learning and evaluation, English learning based on activities; Module 2 focuses on information-based teaching, which comprises multimedia courseware design, on-line teaching and blended teaching, Information-based teaching evaluation; Module 3 focus on teaching observation and practice, which consists of teaching case observation, teaching case salon, and micro-teaching practice.

Module	Content (topic)	TPACK factors
Theories and methods of foreign language teaching	1. Key competence of English subject 2. Integrated teaching, learning and evaluation 3. English learning based on activities	CK, PK
Information-based teaching	1. Multimedia courseware design 2. on-line teaching and blended teaching 3. Information-based teaching evaluation	TK, TCK, CK, PK
Teaching observation and practice	1. Teaching case observation 2. Teaching case salon 3. Micro-teaching practice	CK, TK, PK, TCK, TPK, PCK and TPACK

The training in the program combines on-line and off-line lessons, which lasts for a whole term of 16 weeks. The on-line lessons comprises the introduction and explanation of the basic concept of the teaching theories and methods. After finishing the lessons on-line, the trainees hand in their reflections and their questions on line. While in off-line lessons, which take the form of workshop or salons, the trainees could combine theories learning with teaching practice. Especially in Module 3, through the whole process of teaching case observation →discussion→initial micro-lesson planning →lesson displaying→feedback →modification →lesson display →reflection, they get comprehensive understanding of teaching theories, methods and information technology.

##### 4.2 The Effect of the Program Implementation

In order to better understand the implementation effect of the workshop training program and improve the project design, thus it

could benefit more prospective English teachers, we issued questionnaires about each module to survey the trainees' satisfaction with the training content and activity arrangement. We adopted "not helpful at all", "somewhat helpful", "helpful" and "very helpful" as indicators of their satisfaction with training. According to the data, those trainees' satisfaction with the training is high, with 71.3% of the students thinking it "very helpful", and 28.7% "helpful" respectively.

### **4.3 Suggestions on Improving Prospective English Teachers' TPACK**

Firstly, from the perspective of the university and teachers, they could establish the inter-subjects course group within the English major, namely the "English education course group", which combines such courses as English Teaching Methodology, English Teachers' Spoken English, Foreign Language Teaching and Psychology, English Curriculum and Teaching Theory, Foreign Language Teaching and Information Technology, so that teachers of the courses could work together to assist those students obtain more comprehensive understanding of English knowledge, pedagogical knowledge and teaching technologies. At the same time, teachers could provide more various forms of interaction and participation in the training programs, such as discussion, participation, interaction, group cooperation, observation and discussion, and so on<sup>[5]</sup>.

Secondly, from the perspective of the students, as prospective English teachers, they should realize that knowledge about information technology is one of the basic requirements that constitutes teachers' knowledge framework of information technology. They should pay attention to their own technical knowledge learning and put forward high requirements for their information-based teaching TPACK ability. They should actively take part in necessary technical training sessions, learn from teachers and peers with high technical level, and try to combine their teaching practice with new technology, so as to promote their TPACK.

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