

TPACK Framework for Online EFL Teacher Training in Higher Education

Yi Huang*

Faculty of Foreign Languages, Anyang Normal University, Anyang, 455000, China

** Corresponding Author.*

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Abstract: As an educational trend, online teaching and training become a widespread phenomenon in educational environment and other areas in the era of artificial intelligence, blockchain, and digitalization, which give the equal opportunities and access easily to life-long learners. Technology will be integral tool in the transmission of knowledge, including pedagogy, content, and contexts in the informationization 2.0. TPACK, which developed from Shulman's PCK, has become a popularized framework in the application of classroom teaching and online instruction, which lead to a more effective quality of education. In this study, we construct EFL teachers' competencies in TPACK framework based on PCK and TPACK. Based on this framework, we design pre-service online teachers training programs and in-service teachers courses in online English Foreign language training on the ZOOM, Microsoft team and other online tools. Besides, the current available online courses in platforms such as Coursera are integrated in our online training system. As a result of this research, pre-service teachers and in-service teachers are performed better in online training from angles of T, P, C, TP, TC, PC, TPACK.

1. Introduction

To promote the Informatization teaching innovation ability of teaching and the technology integration knowledge of teachers is our goals of education reform in the "Internet+Education" platform. The theme of TPACK Teacher education has been paid attention by educational institution and educators, which is the center of the development of education in all levels of schools. The goal of TPACK teacher education is not to indoctrinate or train teachers to behave in prescribed ways, but to educate teachers to reason soundly about their teaching as well as to perform skillfully[1]. Many researchers have done a lot of research on knowledge and skills, process and methods, emotional attitudes and values that is our teaching objectives from three dimensions. The history of teachers' knowledge base in TPACK teacher education have undergone the change from content and pedagogy to the integration of content and pedagogy in teaching and learning. Education is a process of continuous development while teachers' knowledge are in accord with it. The quality education is also goal of our government and UN's sustainable development. Traditional constructivist states that we should be student-centered, regardless of the important role of teachers in education. However, as it is clear that teacher is the transmitter and communicator of knowledge from teacher to learner, we are gradually focused on teachers' knowledge base for teaching. The key

to distinguishing the knowledge base of teaching lies at the intersection of content and pedagogy, in the capacity of a teacher to transform the content knowledge he or she possesses into forms [1]. In his articles, he thinks the knowledge base include seven components: content knowledge, general pedagogical knowledge, curriculum knowledge, pedagogical content knowledge, knowledge of learners and their characteristics, knowledge of educational contexts, and knowledge of educational ends. And Pedagogical content knowledge is the core elements of knowledge base of one teacher, which changes as the times developed. In the era of Industry 4.0 and web 2.0, information and communication technology will be applied in all walks of life, including education and educational research. New technology give rise to new form and model of teaching and learning in classroom, such as the Artificial Intelligence, blended teaching model, online training, corpus-based learning, computer-assisted language learning, multimodality of learner, digital humanities and big data. Nowadays, new liberal arts have been proposed by Ministry of Education of the People's Republic of China in 2020, which derives from Hiram's New Liberal Arts (NLA) that use mindful technology to integrate classroom and out-of-classroom activities. Therefore, we can add new technology to make up a framework of Technological pedagogical content knowledge in figure1. Teachers' TPACK competencies have discussed in many articles, some of which is related to the conceptualization of TPACK, some of which is related to the practical application in classroom. However, few articles have discussed how to train and improve EFL teachers' TPACK competencies. In this day when the COVID-19 broke out, it's best way to conduct a systematic program or course online for the train of EFL teachers according to their need of basic knowledge and competencies. The present paper presents a set of EFL teachers' competencies standard and programs in TPACK model, which is reviewed in the next chapter. First, we will conduct a survey on the status quo and cognition level of EFL teachers. Second, we have constructed the TPACK framework adapted from [2] and EFL teachers' competencies in TPACK framework. Then, we will specify the courses and programs online in the promotion of EFL teachers TPACK competencies for pre-service and in-service teachers. The programs for pre-service lasts at least for one year and the courses for in-service teachers lasts one time a semester. The outcome will be analyzed in questionnaire and interview to EFL teachers for our further study later. On the basis of these online programs and courses, online teacher training using online teaching resources may have a profound influence on the EFL teachers' competencies and teacher education. The whole paper will be discussed in mixed methods so we have a better understanding of the present TPACK for online teacher training at a whole and think out a more suitable model for further research on technology integrated into pedagogy, content et al.

2. From the Tpkct to Tpack

Teachers' technological pedagogical content knowledge (TPACK) has been recognized as the most crucial influential factor for teachers' successful integration of technology into their instruction [4]. Some of these articles design 5-likert questionnaire to check the mean and SD of TK, CK, PK, TCK, PCK, TPK, TPCK, others design a course for the development of TPACK for teachers' teaching and analyze the outcome of after-course and pre-test situation. They can help us to have a basic knowledge of what knowledge base as a teacher, what we can do to improve the teachers' TPACK level or competencies and the development from PCK to TPCK and then ICT-TPACK. Some modifications of TPCK including domain-general TPACK and domain-specific TPACK can be expressed as Technological Pedagogical Content Knowledge [5] in Figure 1. Angeli & Valanides (2009, 2008) depicted ICT-TPCK as a strand of TPCK and is described as the ways knowledge about tools and their affordances, pedagogy, content, learners, and context are synthesized into an understanding of how particular topics that are difficult to be understood by learners or difficult to be represented by teachers can be transformed and taught more effectively with technology in ways

that signify its added value [4] [5].

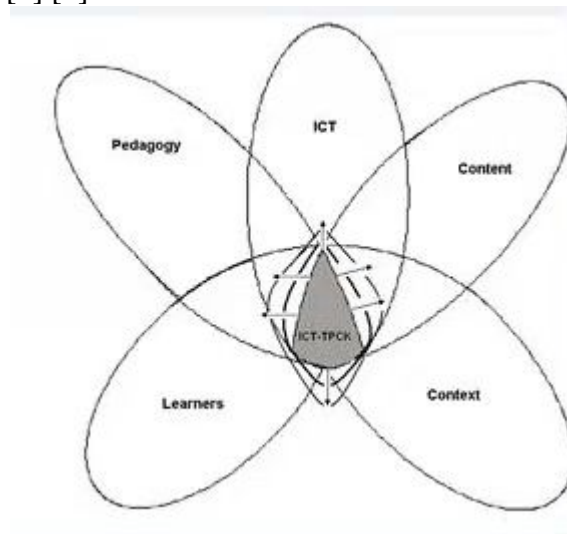


Figure 1 ICT-TPACK (Angeli & Valanides, 2009)

As for the TPCK, we put forward a TPCK framework including three basic components: content, pedagogy, technology. In the Figure 2, seven components in the TPCK which is necessary knowledge bases of competencies for teachers:

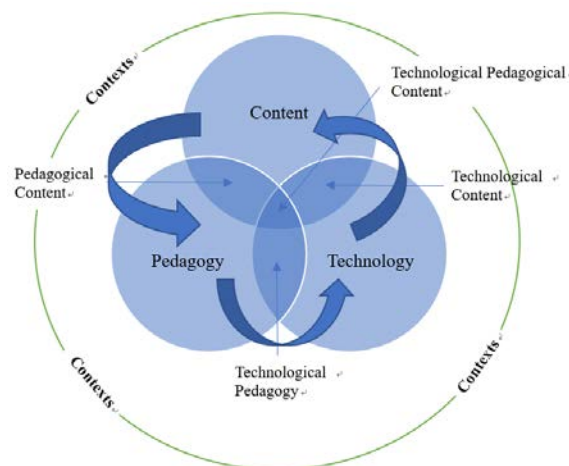


Figure 2 TPACK Framework

The comparison between Shulman’s PCK, TPCK and ICT-TPCK have been clarified in this article. TPCK and TPACK have a slightly difference when the 9th Annual National Technology Leadership Summit was to revisit TPCK for this important concept. The fundamental points of TPACK (Technology, Pedagogy and Content) lies on an integrated whole, a “Total PACKage” [6], rather than adding A, not an isolated component of three knowledge bases. From the discussion we have talk about above in the literature TPACK framework emphasize the integration while ICT-TPCK emphasize the transformation. In this study, I construct the TPACK framework in figure 2, which pay attention to both the integration and transformation among content, pedagogy and technology in seven components within the context including demographic, socio-contextual, and learners’ factors. In this regard, we can have a clear understanding of having essential TPACK competencies for teachers, so do EFL teachers. We can have a competency list for EFL teachers in Table 1 in accordance with TPACK framework in figure 2 and ICT-TPCK in Figure 1

3. Methodology

English as a Foreign Language (EFL) as the important subject matter in elementary, high school, and universities and colleges. In the present time of globalization, information explosion, English teachers have the central role in the integration of TPACK knowledge into teaching competencies. The lack of teacher and student training are some of the principal reasons why technology is still not used to its full potential in language learning. In this study, we will design an EFL teachers' TPACK program according to the basic competencies in Table 1. Online teaching tool foster the convenience of teacher training. The programs courses lasts two years for pre-service EFL teachers include in Table 2. The courses will on the first, second and third semester, and the final semester is the process of internship in schools.

Table 1: EFL Teachers' Competencies in TPACK Framework

Factors/Constructs	EFL Teachers' competencies
(1) C	<ul style="list-style-type: none"> ◆ Language competencies ◆ Culture & Literature ◆ Textbook Interpretation
(2) P	<ul style="list-style-type: none"> ● Multimodal approach ● SPOCS, CLIL ● Education, Psychology, Educational Psychology
(3) T	■ PPT, Word, Excel, ZOOM, Tencent Meeting, what's app, telegram, Microsoft team,
(4) TP	◇ Inquire-based instruction; CALIL; Multimodal teaching; blended teaching; online game teaching; interactive teaching via software
(5) TC	➤ Digitalization: audio book, podcasts, MALL, CALL
(6) PC	🌈 interactive teaching, communicative teaching, task-based instruction, inquire-based instruction on English materials and curriculum
(7) TPACK	<ul style="list-style-type: none"> 🌲 Face-to-Face, semi-, blended teaching: in fixed place (classroom, library, study places, meeting room) 🌸 Fully online teaching: Teaching and Learning via online courses or Cloud study platform, such as Coursera, edX, Udacity, TED, NetEase Online Open Courses, China universities MOOC, UMOOCs, xuetangX, ThaiMOOC,

In the Table 1, we construct the EFL teachers' TPACK competencies from seven dimensions among content, pedagogy, technology, technological pedagogy, technological content, pedagogical content, technological, pedagogical content knowledge. Obtaining knowledge is basic prerequisite for EFL teachers to be a proficient expert teacher. However, it is not sufficient to have these knowledges and we should apply these in classroom. To apply technology into PCK is the goal, not learning technology. In the Factor C, EFL teachers need have advanced CSE level including language comprehension, language expression, pragmatic ability, language knowledge, interpreting and translation, language use strategies, the acronym of China's Standards of English Language Ability in table 2. Besides, cultural awareness and interpreting materials and textbooks are included in this factor. CSE levels English ability development stages Level Advanced stage Level 9 Level 8 Level 7 Intermediate stage Level 6 Level 5 Level 4 Elementary stage Level 3 Level 2 Level 1. Teachers need to achieve advanced Stage in CSE levels in the program of online teacher training. Besides, as an English teacher, it's necessary to have multilingual competencies in classroom teaching, which make the students learn in an immersion English class and promote the brain cognition and understanding levels.

Table 2: CSE Levels

English ability development stages	Level
Advanced Stage	Level 9
	Level 8
	Level 7
Intermediate Stage	Level 6
	Level 5
	Level 4
Elementary Stage	Level 3
	Level 2
	Level 1

For the English pedagogy, the teacher can apply SPOCS and multimodal approach to promote the teaching level. Technology is play an important increasingly role in integration and transformation of knowledge and competencies via technological tools online. Furthermore, TP, TC, PC and TPACK for EFL teachers arise from the single construct T, P, C in the course of integration. So ESL TPACK competencies including language and culture, language teaching technological tools, CALIL, and integration training of T, C, P. However, the TPACK competencies cannot be achieved at one stake. Continuous learning and teaching can make a student teacher become a proficient teacher in EFL classroom. The theoretical online learning must be transformed into the actual application of teaching competencies under the condition that the teacher have developed from student teacher, pre-service teacher and in-service. In addition, It's necessary to be a lifelong learner for teachers. As R.N. Tagore said, a teacher can never truly teach unless he is still learning himself. Continuous pre-service program and in-service training can help teachers have up-to-date knowledge of new problems, new methods, new techniques in education. Therefore, we design the multi-layer wheel diagram in TPACK which represent TPACK competencies from elementary to advanced stage in Figure 3. The three kind of colors reflect the content, pedagogy, technology. The inner circle represents the advanced stage in integration of T, P, C on account of continuous training. Online teacher training may be an effective way to improve TPACK competencies for EFL teacher during the COVID-19 and afterword.

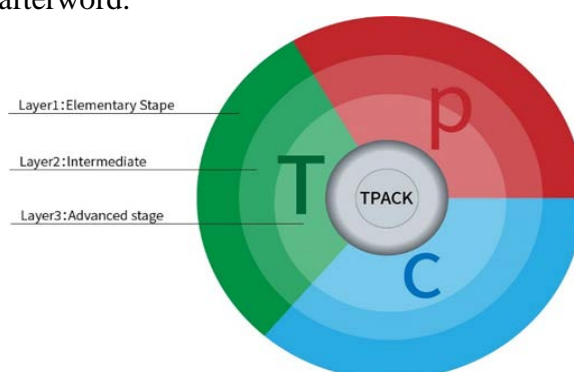


Figure 3 The Multilayer Wheel Diagram in TPACK

4. Results

Based on the table 1, we designed a pre-service online training programs for EFL teachers in higher education, which lasts at least one year. The study recording can be showed in percentage

e-bar, which can be studied by you up to 100 percentage. All pre-service teachers need to participate in the online training in part-time study mode. The whole programs for pre-service EFL teachers include 17 courses, which relates to all TPACK knowledge. The courses will be held online teaching by ZOOM and Tencent Meeting, online seminar by Microsoft team, private contact by What's app.

Table 3: EFL Pre-service Online Teachers Training Courses

Course Name	Course Type	Credit	Mode
Curriculum and Teaching Theory	Public Compulsory	2	Online teaching
Principles of Pedagogy	Public Compulsory	2	Online teaching
Theory and Practical Research on the Socialism with Chinese Characteristics	Public Compulsory	2	Online teaching
Research Methods of Primary and Secondary Education	Public Compulsory	2	Online teaching
Teenagers' Psychological Development and Education	Public Compulsory	2	Online teaching
Special Topics in English Language and Literature	Specialized Compulsory	2	Online teaching
Language Teaching and Teaching Principles	Specialized Compulsory	2	Online teaching
Measurement and Evaluation of English Subject Education	Specialized Compulsory	2	Online Seminar
Analysis of English Curriculum and Textbooks	Specialized Compulsory	2	Online teaching
Special Topics in British and American Culture	Specialized Elective	2	Online teaching
Theory and Practice of English Chinese Translation	Specialized Elective	2	Online teaching
The Basis of Chinese Language and Literature	Specialized Elective	2	Online teaching
English Thesis Writing and Standardization	Specialized Elective	2	Online teaching, Discussion and assessment
Marxism and Social Science Methodology	Public Elective	1	Online teaching
Internship	Public Compulsory	4	Practice
Modern Educational technology	Public Compulsory	2	Online teaching
Multimodal education	Specialized Compulsory	2	Online teaching and presentation

Pre-service and in-service teachers should study at these online resources with ESL TPACK knowledge. And we also have compensated for shortage knowledge at these websites in terms of the training courses in Table 3. We will record the schedule of participates. After finishing these courses, the participants can have 100 percentage process bar and a pre-test, while-test and after-test will be conducted according to the teaching content in Table 3. In addition, the teachers need to prepare a diary to record their teaching log and reflections.

We create the integrated training platform including the courses by online live stream for pre-service EFL teachers and some recourses such as MOOC, Coursera, and XuetangX. The teacher can mange their own time to decide which, when and how these online resources are studied to meet their personalized demand in different process and previous knowledge reserves.

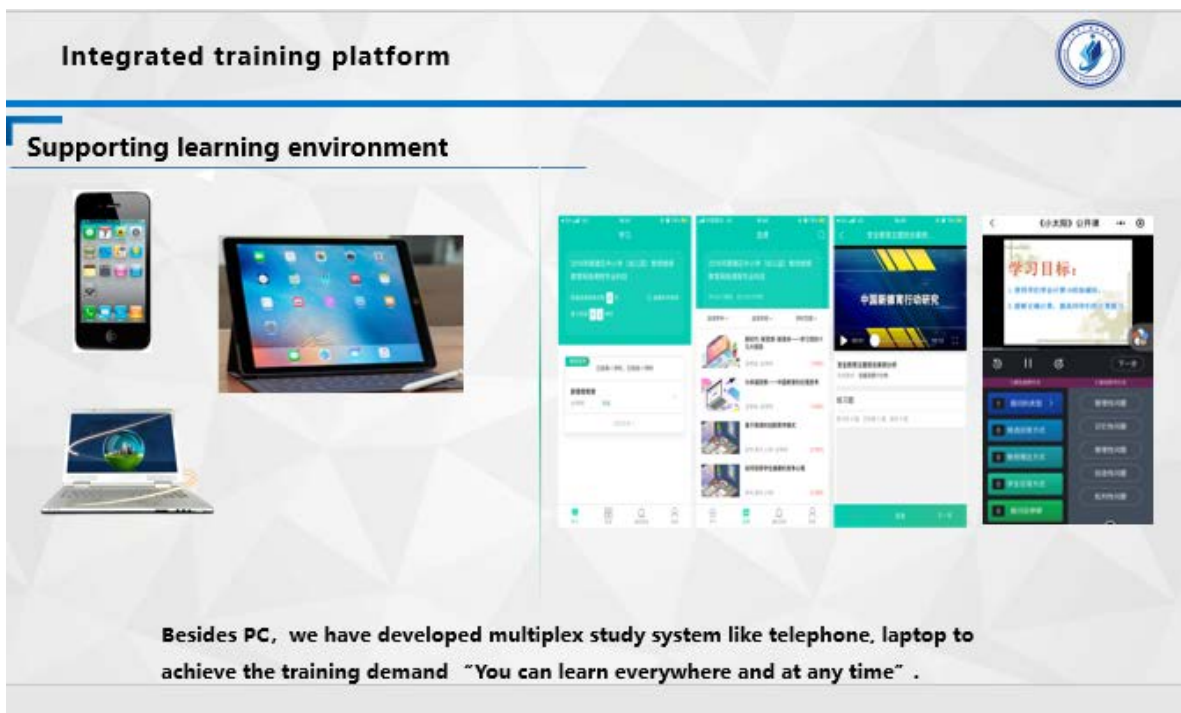


Figure 4 ICT Competencies Promotion Project

Integrated learning platform in Figure 4 is implemented by China on April 18, 2018 in the education informatization 2.0 Action Plan, aiming at transforming from the application in Information and Technology competency to information technology literacy, from fusion application to integration and innovation. It emphasizes the education resources, technology integration, education technology, creative and innovative education, artificial intelligence thinking. It is online trained for in-service teacher, in accord with TPACK competencies. You can study online at <http://hn.southteacher.com/>.

Some Online Learning Resources are as followed:

<https://www.enetedu.com/Course2/Index> Higher Education Institutions Teacher Online Training Center in China

<https://www.icourse163.org/> iCourse, Chinese University MOOC)

<https://www.edx.org/> edX is an American massive open online course provider created

<https://www.coursera.org/> Coursera Inc. is an American massive open online course provider

<https://www.xuetangx.com/> XuetaangX is a massive open online course platform in China. It offers online courses in multiple disciplines and also certificate and degree programs.

<https://open.163.com/> NetEase Online Open Courses

NetEase Online Open Courses was founded as an online educational platform that enables Chinese learners to access high-quality courses whenever they want and wherever they want.

Besides the comprehensive and well-designed education resources introduced from partners like TED, BBC, Khan Academy, and Coursera, the platform has also set up an independent channel for personal presentations, which are suitable for learners with different ages, occupations and interests.

5. Conclusions

EFL pre-service online teachers training courses for pre-service and information technology 2.0

action plan for in-service teacher may output a satisfactory outcome according to EFL teachers' TPACK framework. The pre-service teachers training program is a whole system for the integration of TPACK. According to actual knowledge training online, most teachers ascertain that information 2.0 training necessarily promote the level of technological knowledge and they apply it into classroom teaching more skilled. The integrated technology make the pedagogy and content more concrete, understandable and convenience, getting rid of the limitation of time and space in classroom. In the further study, we may continue our research on EFL teachers TPACK knowledge in the actual educational situation.

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