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Examining EFL Pre-service Teachers' TPACK trough Self-report, Lesson Plans and Actual Practice

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Abstract

Technological Pedagogical Content Knowledge (TPACK) has been proposed as a conceptual framework to describe the knowledge base teachers need for effective technology integration. The present study aimed to determine EFL pre-service teachers' TPACK trough self-report, lesson plans and actual practice. This study used a wide range of approaches (self-report, lesson plan assessment and classroom observations) to measure TPACK of EFL pre-service teachers in order to examine EFL pre-service teachers' ability to apply and foster the interplay between content, pedagogy and technology in their classrooms. The results of self-reported data (as measured by TPACK survey), lesson plan assessment and classroom observations showed high scores for all domains. The EFL pre-service teachers' actual practice aligned with their self-reported and their lesson plans.

Keywords: *TPACK, pre-service teacher development, EFL pre-service teacher*

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Introduction

As technologies have arrived to the classroom in the 21st century, teacher education programs have been challenged to prepare teachers equipped with the necessary knowledge and skills to integrate technology into their teaching. Pre-service teacher education plays an essential role in determining the effectiveness of technology in education. Therefore, it is important for pre-service teachers to know what technological tools to use, how to properly use them, and how to make them pedagogically appropriate to the discipline. However, little is known about whether pre-service teachers can translate their gained TPACK into their classroom practices during their school placements.

Mishra and Koehler (2006) have advocated a conceptual framework, Technological Pedagogical Content Knowledge (TPACK), in teacher education to describe the knowledge teachers need for effective technology integration. Since then, the TPACK framework has had subsequent impacts on teacher education and influenced related theory, research and practice. It appears that TPACK can be assessed in different ways and at different times, taking into account diverse students and various educational contexts (Koehler & Mishra, 2008). "Because the TPACK framework is complex with several constructs working in relationship to each other it has been suggested that just one data source would not be sufficient to measure teachers' TPACK. Data should be collected from different sources because external assessment of practices, triangulated with the teachers' self-reports, help us better understand the nature of their TPACK" (Harris et al., 2010).TPACK can be assessed in different ways and at different times depends on educational contexts (Koehler & Mishra, 2008).

Thus, the present study was designed to investigate teachers' TPACK based on data collected from questionnaires, lesson plan analysis and classroom observations in order to shed important light on what specific characteristics contribute to teachers' ability to apply and foster the interplay between content, pedagogy and technology in classrooms.

TPACK

Technology is a rapidly developing and changing phenomenon, resulting in great challenges and changes for education. Effective adoption of new technologies in classroom settings requires pre-service teachers not only to have the knowledge about the technology but also to have experienced successful models of computer integration in a teaching and learning environment. Teacher educators need to help pre-service teachers for integrating different media into instructional settings such as coursework, materials, and lessons. Koehler and Mishra (2005, 2007, 2009) state that the TPACK framework consists of seven domains: Technology Knowledge (TK),Pedagogy Knowledge (PK), Content Knowledge (CK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), Pedagogical Content Knowledge (PCK), and Technological Pedagogical Content Knowledge (TPACK).

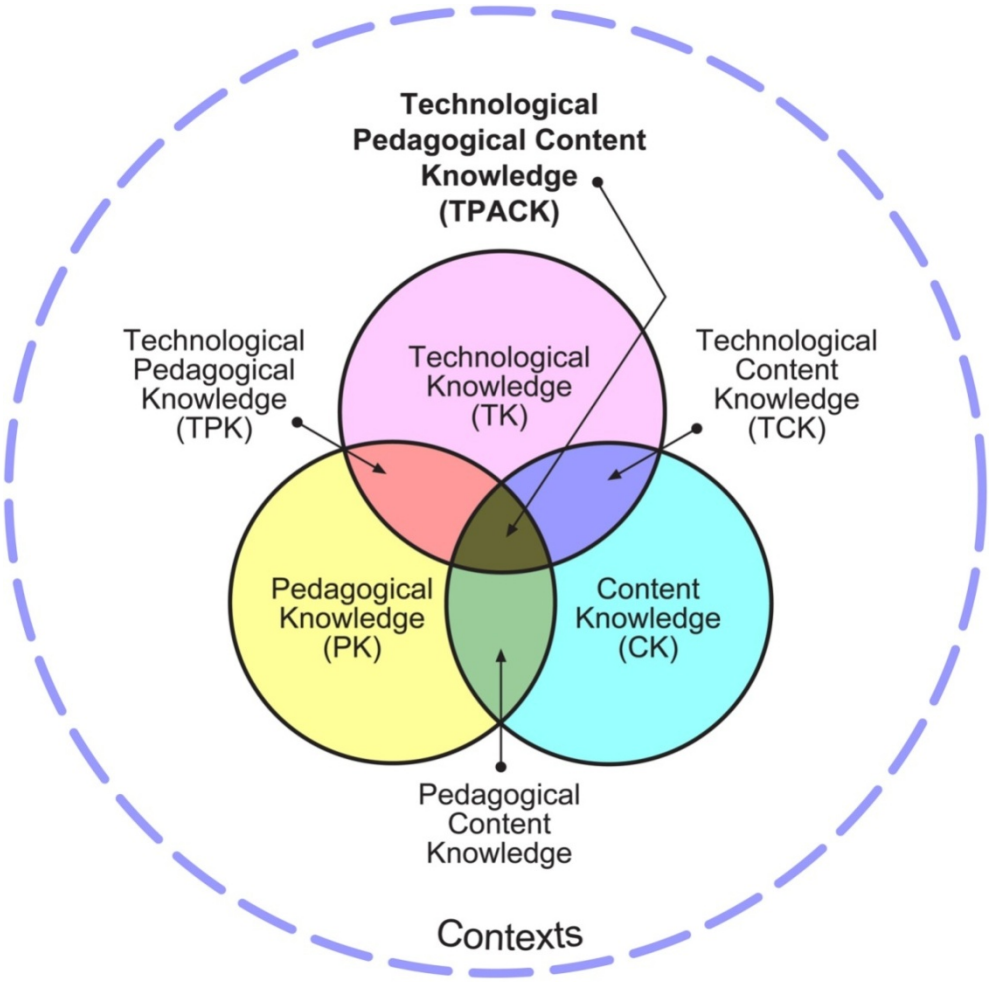

Figure 1. TPACK framework

(1) Technology Knowledge (TK) is teachers' knowledge about how to use technology in the classroom. Teachers have to understand information technology broadly enough to apply it productively in their classrooms and also have the knowledge how to adapt the purpose of technologies so that they can be used in a technology enhanced way.

(2) Pedagogy Knowledge (PK) is teachers' knowledge about the processes and practices of teaching and learning. It includes knowledge about techniques used in the classroom; the nature of learners; and strategies for evaluating student understanding.

(3) Content Knowledge (CK) is teachers' knowledge about the subject matter to be learned or taught. It includes knowledge of concepts, theories, conceptual frameworks as well as knowledge about accepted ways of developing knowledge.

(4) Technological Content Knowledge (TCK) is teachers' knowledge of using technology with different learning subjects. Teachers must have a deep understanding of the manner in which the subject matter can be changed by the application of particular technologies. They also need to understand which specific technologies are suited for addressing subject-matter learning in their domains.

(5) Technological Pedagogical Knowledge (TPK) is teachers' knowledge of using technology with different teaching methods. Teachers must understand how teaching and learning change when particular technologies are used in particular ways. TPK includes knowing the pedagogical affordances and constraints of a range of technological tools as they relate to disciplinarily and developmentally appropriate pedagogical designs and strategies.

(6) Pedagogical Content Knowledge (PCK) is teachers' knowledge of subject-oriented teaching methods. Teachers need to know how to apply the knowledge of pedagogy to the teaching of

specific content.PCK covers teaching, learning, curriculum, assessment and the links among curriculum, assessment, and pedagogy.

(7) TPACK (Technological Pedagogical Content Knowledge)is teachers' knowledge of using technology with different teaching methods in accordance with subject content.

To be effective teachers technology use, teachers must understand the concepts using technologies; pedagogical techniques that use 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 used to build on existing knowledge to develop new epistemologies or strengthen old ones.

Method

Context

The present study was conducted in Faculty of Education, Mahasarakham University, Thailand. The five-year English Education Program has approximately 200 undergraduate students. The components of the undergraduate program consist of professional courses including methodological and pedagogical approaches to English as foreign language teaching as well as English language courses. The program also organizes practice teaching in selected schools. Related to technology, EFL pre-service teachers receive two courses: Information Technology Innovation and Educational Communication and Learning Management Innovation and Design. Information Technology Innovation and Educational and Communication Course received in the first semester of the freshman year, focuses on the development of basic computer skills such as learning how to use office programs and select software and how to use the Internet effectively. Learning Management Innovation and Design Course, offered in the first semester of the third year, in general, aims to teach EFL pre-service teachers how to teach English using technology.

Participants

Participants were senior 33 EFL pre-service teachers (6 male, 27 female) of English Education Program enrolled in Practicum Course. Practicum is an activity at which pre-service teachers are expected to integrate educational theory and knowledge with the practical realities of the classroom. Thus, all of them were placed to the schools to do their practicum in the final year of the program.

Instruments and Data Analysis

This study used three data collection techniques to examine EFL pre-service teachers' TPACK.TPACK survey administered to all EFL pre-service teachers participating in this study. The TPACK survey adapted from Schmidt, Baran, Thompson, Koehler, Mishra and Shin (2009) was distributed to the EFL pre-service teachers to identify their self-reported TPACK .The EFL pre-service teachers designed TPACK based English lesson plans. Then the designed TPACK-based English lesson plans were implemented in their classrooms. The lessons they designed were analyzed based on the adapted *Technology Integration Assessment Rubric* from Harris, Grandgenett & Hofer (2010). During implementing their lesson plans, the EFL pre-service teachers were observed by the researcher using an observation checklist adapted from Schmidt, Baran, Thompson, Koehler, Mishra & Shin (2009).Data from TPACK survey, lesson plans and observations were analyzed by computing means and standard deviations. Findings from TPACK survey were used for cross examining the results of the findings from observations.

Findings

The scores based on the TPACK framework of EFL pre-service teachers' self-reported beliefs of their TPACK competencies in teaching with technology. The highest mean score was 3.98 for TPK and the lowest 3.64 for CK, as Table 1.

The EFL pre-service teachers' lesson plans were assessed on three components addressing TCK, TPK, and TPACK. Table 2shows three knowledge domains (TCK, TPK, and TPACK).TCK demonstrated a highest means score of all (3.78) followed by TPK (3.76).TPACK demonstrated a lowest means score of all (3.64, 3.55), as Table 2.

Table 1. Mean scores of self-report

TPACK Sub-scales	Mean	SD
TK	3.77	0.23
CK	3.64	0.28
PK	3.82	0.61
PCK	3.76	0.32
TPK	3.98	0.26
TCK	3.78	0.27
TPACK	3.72	0.22

Table 2. Mean scores of lesson plan assessment

Criteria	Mean	SD
Curriculum Goals & Technology(TCK) (Curriculum-based technology use)	3.78	0.42
Instructional Strategies & Technologies TPK (Using technology in teaching/learning)	3.76	0.46
Technology Selection (s) TPACK (Compatibility with curriculum goals &instructional strategies)	3.64	0.31
"Fit" TPACK(Content, pedagogy and technology together)	3.55	0.31

Table 3 presents the scores based on the TPACK framework of EFL pre-service teachers' actual teaching behavior of their TPACK competencies in teaching with technology. The highest score was 3.88 for TPK and the lowest3.75 for CK.

Table 3. Mean scores of actual teaching

TPACK Sub-scales	Mean	SD
TK	3.82	0.22
CK	3.75	0.22
PK	3.79	0.24
PCK	3.85	0.28
TPK	3.88	0.25
TCK	3.84	0.21
TPACK	3.76	0.22

Table 4 shows the comparison between the self-report and what was observed in the implementation. The figure indicates that the EFL pre-service teachers' self-report differs from what is observed in practice. For all the domains apart from TPK, the scores for the observed in actual practice exceeded that of self-report.

Table 4. Comparing EFL pre-service teachers' self-report and actual practice

TPACK Sub-scales	Self-report	Actual teaching
TK	3.77	3.82
CK	3.64	3.75
PK	3.82	3.79
PCK	3.76	3.85
TPK	3.98	3.88
TCK	3.78	3.84
TPACK	3.72	3.76

Conclusion and Discussion

The results of self-reported data (as measured by TPACK survey), lesson plan assessment and classroom observations showed high scores for all domains. Analysis of lesson plan documents showed a well presented theoretical development of the EFL pre-service teachers' technology integration skills. The EFL pre-service teachers' actual practice seemed to have aligned with their self-reported and their lesson plans. The actual practice got closer to self-report survey data to assessing teachers' ability to apply their technological, pedagogical and content knowledge than the lesson plans. The results also indicated that teachers' lesson plans are slightly different from what they actually reflect in the classroom situation. All the domains of TPACK apart from TPK reported higher scores in the EFL pre-service teachers' actual practices as compared to their self-report.

The findings of this study revealed that the participants had high levels of TPACK (Mean > 3.5). This implies that EFL pre-service teacher education program have proved to be successful in training teachers with highly developed TPACK knowledge that provides them with skills and knowledge of technology to be implemented in their practical teaching. Each individual TPACK assessment has its limitations. For example, self-report surveys may be prone to student under- or over-reporting, and lesson plans may not provide enough detail to examine TPACK. As a result, TPACK should be examined in a variety of ways to be truly useful for program refinement. This study suggests that a research methodology combining several data sources is promising for glimpsing the picture of TPACK development as it evolves within students.

The findings of the present study are in parallel to the findings of similar studies conducted by Ansyari (2012) and Kurt, Akyel, Kocoglu & Mishra (2014). In these studies pre-service teachers had the opportunity to apply what they learned from coursework to practice during their field experiences. It was found out that pre-service teachers developed an understanding of the interrelationship of the three components and began to adjust technology, content and pedagogy to fit each other. Kurt, Akyel, Koçoğlu & Mishra (2014) discuss that field experiences help pre-service teachers to understand the importance of planning and preparation, the value of specific instructional strategies and comprehend the complexities involved in teaching with technology. Therefore, the teacher education program that the courses offered to pre-service teachers for technology integration should combine coursework with fieldwork.

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