The Effect of Micro-Lesson Design on TPACK Level Development of Pre-Service English Teachers in China

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Abstract:-In this study, quasi-experimental methods will be used to study the cultivation of pre-service English teachers' teaching ability of technology integration, which is termed TPACK (Technological Pedagogical Content Knowledge). The samples in this study are natural classes of two pre-service English teachers. One group is the experimental group and the other is the control group. Through the two questionnaires of pre-test and post-test, the research objectives will be achieved through data collection and analysis :1. To understand the perception of pre-service English teachers' TPACK level based on the Technology- dimensions. 2. To explore how to construct a practical Micro-Lesson Design to develop the TPACK level of pre-service English teachers. 3. To identify the effect of Micro-Lesson Design on pre-service English teachers' achievement of TPACK level . The results of this study will contribute both theoretically and in practice to improving the integration of technical competence in subject teaching of pre-service English teachers.

Keywords: TPACK, Micro-lesson, Pre-service Teachers

1. INTRODUCTION

Cloud computing, artificial intelligence and AI technology have rapidly penetrated into all fields of human life and production. Information technology has also had a profound impact on the field of education, and education informatization has become an inevitable trend with the rapid development of the Internet, emerging technologies. Compared with previous learners, the students are more willing to hide behind the computer screen to study or think, or lower their head to swipe the mobile phone to get information (Ma, 2017). Under the background of education informatization and teacher professional development, teachers need to constantly improve their informatization teaching abilities.

The Ministry of Education of the People's Republic of China (2012) issued the Ten-year Development Plan for Education Informatization (2011-2020), exploring the comprehensive and deep integration of modern information technology and education. In order to promote the development of education informatization in the new era, the Ministry of Education of the People's Republic of China (2018) issued the "Education Informatization 2.0 Action Plan", which is an action plan to actively promote the sustainable development of education informatization at the national level.

As an international language, English teaching occupies a large proportion in schools, and English is also compulsory in many countries. So the cultivation of pre-service English teachers' teaching ability becomes particularly important.

2. THE RESEARCH THEORY AND OPERATIONAL DEFINITIONS

2.1 The TPACK theory

TPACK (Technological Pedagogical Content Knowledge) focus on the knowledge and ability to integrate technology into specific subject (Mishra, 2006). At the core of TPACK framework, there are three areas of knowledge: Content, Pedagogy and Technology. According to Koehler, et al. (2007), Content (C), is the subject matter that is to be learned/taught. The content to be covered in high-school social studies or algebra is very different from the content to be covered in a graduate course on computer science or art history. Technology (T), broadly encompasses standard technologies such as books and chalk and blackboard, as well as more advanced technologies such as the Internet and digital video, and the different modalities they provide for representing information. Pedagogy (P), includes the process and practice or methods of teaching and learning, including the purpose (s), values, techniques or methods used to teach, and strategies for evaluating student learning (see Figure 1).

However, beyond seeing C, P, and T as being useful constructs in and of themselves, our approach emphasizes the connections and interactions between these three elements. For instance, a consideration of P and C together results in Pedagogical Content Knowledge (PCK). Similarly, T and C taken together produces Technological Content Knowledge (TCK). A consideration of the overlap between T and P results in Technological Pedagogical Knowledge (TPK). Finally, a consideration of all three elements (T, P, and C) results in Technological Pedagogical Content Knowledge (TPCK).
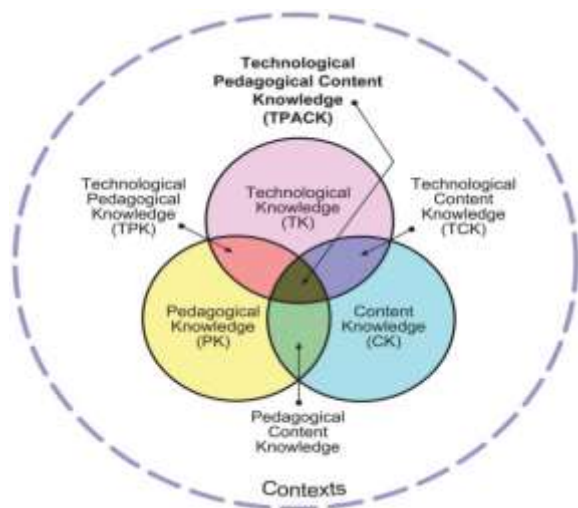
Figure. 1 The TPACK framework

2.2 The SAMT Model

SAMT is a teaching model of technology integration including four levels: substitution, augmentation, modification, and redefinition. And SAMT provides a framework to support educators and instructional designers in creating optimal learning experiences using mobile devices in education (Romrell et al., 2014). The SAMR Model can be understood by the following four classifications of technology use:

• Substitution: The technology provides a substitute without functional change.

•Augmentation: The technology provides a substitute but with functional improvements.

• Modification: The technology allows the educational activity to be redesigned.

• Redefinition: The technology allows for the creation of tasks that could not have been done without the use of the technology.

2.3 The Pre-service teachers

Pre-service teachers have the similar meaning with the words "normal students ", " student teacher " and " candidate teacher ". Majority of them will be teachers in primary and secondary schools after graduation. Pre-service teachers in this study mainly refer to the students majoring in normal colleges and universities who are trained as candidate teachers in primary and secondary schools in the future.

2.4 The Micro-lesson

Micro-course is a new teaching pattern and teaching philosophy combined with the Internet (Yabin & Hongen, 2016). Micro-lesson can be traced to the micro video used by Khan, Bergmann and Sams. The core content of "micro lesson" is classroom teaching videos, and it also includes teaching design, material courseware, teaching reflection, practice test, student feedback, teacher comments and other auxiliary teaching resources related to the teaching theme. Micro-lesson is not cutting out a video clip from the traditional classroom video, it is educational technology product carefully designed through specific processes, often includes 5 to 10-minute micro video, micro-lesson teaching plan, micro courseware, micro resource and so on (Liang & Luo, 2015).

In summary, micro courses only teach one or two knowledge points, without complex curriculum system, and without numerous teaching objectives and objects, seemingly without systematization and comprehensiveness, which is called "fragmentation" by many people. The micro lesson in this study refers to a teaching video micro-course of about 10 minutes, which is a teaching design task assigned to the research objects by the researcher.

3. THE PROPOSED METHOD

1.Research purpose

The purpose of this study is to develop English pre-service teachers' ability to integrate technology to subject teaching. Therefore, TPACK framework was chosen to assess the technology ability of English pre-service teachers. Similarly, the micro-lesson design will be used as an independent variable, TPACK level as a dependent variable. Accordingly, the purpose of the study entails:

i. To understand the perception of pre-service English teachers' TPACK level based on the Technology- dimensions.

ii. To explore how to construct a practical Micro-Lesson Design to develop the TPACK level of pre-service English teachers.

iii. To identify the effect of Micro-Lesson Design on pre-service English teachers' achievement of TPACK level .

2.Research population

After getting agreement of ethic from related college, this study is intended to take the senior pre-service English teachers in a college in China as the population of the research. About 60 senior pre-service English teachers in two classes will be chosen. One class is experimental group, and the other is control group. The reason for choosing pre-service English teachers is that they have already studied English teaching methodology courses and educational technology courses. Meanwhile, the pre-service English teachers are those who are about to graduate and begin their education jobs, and they are in urgent need of improving the level of information-based teaching.

3.Research questions

To achieve the purpose of the research, the following questioned are prepared:

(1).What's the perception of TPACK based on the Technology- dimensions of pre-service English teachers?

(2).How can the Micro-Lesson Design be constructed to affect the pre-service English teachers' TPACK level based on the Technology- dimensions?

(3). How does Micro-Lesson Design affect the development of pre-service English teachers' TPACK level based on the Technology- dimensions?

4. QUSI-EXPERIMENT

This study adopts a mixed method of quantitative and qualitative. A Quasi-experimental will be carried in the research. Questionnaire scale (Schmidt, 2009) will be used to carry out relevant research.

The Quasi-experimental will be employed in the research. More specifically, nonequivalent control group pretest/posttest design is used, which refers to a design in which at least two nonequivalent groups are given a pretest, then a treatment, and then a posttest measure (Jackson, 2008).

In the research, there are two groups of participants who are senior pre-service English teachers in a college in China. One is an experimental group and the other is the control group. Before the experiment, the researcher will review the literature and choose the theories, method instruments, authoritative questionnaire-TPACK scale, and other related materials. In the present study, the Quasi-experimental will be performed in three phrases: 1. Pre-test, 2. Treatment of Micro-lesson Design, and 3. Post-test. Research design is shown in Figure 2 below.
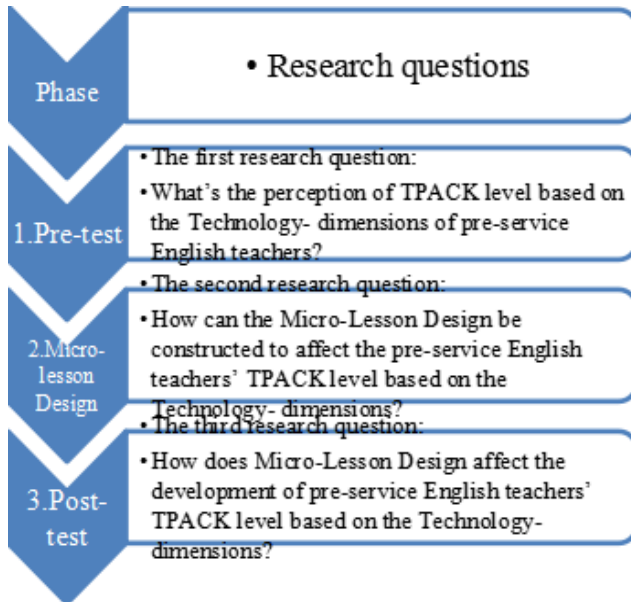

Figure. 1 Research Design

1.Pre-test

After pilot study, a pretest is carried out to understand the perception of TPACK level of pre-service English students and allows us to assess whether the groups are equivalent on the dependent measure before the treatment is given to the experimental group (Jackson, 2008). Authoritative TPACK questionnaire (Schmidt, 2009) will be completed by all the participants in both control group and experimental group at the first week of the experiment. And then the data will be collected. In the pre-test phase, the objective is expected to achieve. That is to answer the first question of the research: "What's the perception of TPACK level regarding TPACK level based on the Technology- dimensions of pre-service English teachers?"

2.Micro-lesson Design

Micro-lesson Design will be used as IV (independent variable) to affect TPACK level (DV: dependent variable) of the participants in the phase. The phrase of Micro-lesson Design will last 12 weeks. In the first 8 weeks, the participants will be taught some knowledge and skills related technology in order that they can integrate technology to subjects in the following task: Design a micro-lesson based on technology. During the 9th week to 10th week, participants will have group discussions on the design of micro-lessons. Then in the 11th week and 12th week, It is time for participants to present the Micro-lessons that are required to design on Dingding online teaching platform in groups. The objective of the phrase is to answer the second research question: "How can the Micro-Lesson Design be constructed to affect the pre-service English teachers' TPACK level based

on the Technology- dimensions?". The research will answer the second research question based on SAMR teaching model and TPACK theory. Finally, SAMR-TPACK module will be developed to answer the second research question.

3.Post-survey

For Post-survey, based on the results of pretest and posttest, researchers can assess any changes that may have occurred in each group after treatment by comparing the pretest measures for each group with their posttest measures. Thus, not only can we compare performance between the two groups on both pretest and posttest measures, but we can compare performance within each group from the pretest to the posttest (Jackson, 2008). In post-survey, Questionnaire scale used in pre-survey will be employed again to test the TPACK level of participants as posttest of the quasi-experiment. The objective of the phrase is to answer the third research question: "How does Micro-Lesson Design affect pre-service English teachers' TPACK level regarding TPACK level based on the Technology- dimensions?".

4.Data collection

The data will be collected through the questionnaire in pre- and post- test. And also some instruments will be used to collect the research data, such as Literature analysis, Interview, Questionnaire.

5.Data Analysis

This study is performed based on three phases: pre-test, Micro-lesson Design, post-test. Meanwhile, three research questions are put forward. The first phase will mainly focus on the first research question; the second phase will answer the third research question; and the third phase will focus on the second research question.

For the first research question: "What's the perception of TPACK level of pre-service English teachers?". The authoritative TPACK scale will be used to collect the data of pre-service English teachers. SPSS will be employed to analyze the data by descriptive analysis, such as mean.

For the second research question: " How can the Micro-Lesson Design be constructed to affect the pre-service English teachers' TPACK level based on the Technology-dimensions?", the research will answer the second research question based on SAMR teaching model and TPACK theory. Finally, SAMR-TPACK module will be developed to answer the third research question. The data will be analyzed by content analysis.

For the third question: "How does Micro-Lesson Design affect the development of pre-service English teachers' TPACK level based on the Technology- dimensions?", data in posttest will also be collected by questionnaire used in pretest. And there will be two hypothesis to be tested in order to answer the third question. One Hypothesis H1 "There will be significant difference regarding TPACK level based on the Technology-dimensions within Experimental Group from pretest to posttest after Micro-lesson Design on pre-service English teachers." will be verified by Independent sample T test. Independent-groups T test refers to a parametric inferential test for comparing sample means of two independent groups of scores (Jackson, 2008). And the other Hypothesis H1 " There will be significant difference regarding TPACK level based on the Technology- dimensions from pretest to posttest for the experimental group than for the control group." will be verified by Correlated-groups T test. Correlated-groups T test refers to a parametric inferential test

used to compare the means of two related (within- or matched participants) samples (Jackson, 2008).

5. ACKNOWLEDGEMENT

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