

The Effect of Micro-Lesson Design on Normal English Teachers' Information Teaching Ability Under TPACK Framework in China

Xiaoqing Sun^{1,2}; Abdul Rahim Bin Hamdan²

1. Hulunbuir University, Hulunbuir, 028000, China

2. Universiti Pendidikan Sultan Idris, Tanjung Malim 35900, Perak, Malaysia

Abstract: This study uses the quasi-experimental method to study the development of informatization teaching ability of pre-service English teachers. The two groups of samples of the research are the natural classes of pre-service English teachers. One is the experimental group and the other is the control group. After two pre-test and post-test questionnaires, the research problems will be solved through data collection and analysis: 1. To understand the current situation of English pre-service teachers' TPACK ability and the problems in the training process. 2. To identify the effects of Micro-Lesson Design on pre-service English teachers' achievement in TPACK ability. The results of this study will increase the theoretical and practical contributions to improving the informatization ability of pre-service English teachers.

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

1. INTRODUCTION

In the information age, information technology has penetrated into all aspects of the field of education, promoting profound changes in teaching and learning methods. The COVID19 pandemic brought home the importance of technology in teaching and learning (Mishra & Warr, 2021). More teachers organize teaching with the help of information technology, which can better enable students to understand the knowledge taught by teachers (Li, 2017). So, how to improve teachers' information teaching ability in order to better carry out teaching has been an important topic of current academic research. In the teacher education system, pre-service teacher education plays an important role in the training of high-quality teachers. It is an essential professional quality for normal university students to integrate technology into teaching, which has become the core content of the professional development of pre-service teachers in the information age (Li, 2020).

The quality of pre-service teacher education affects the development and stability of teachers in a country to a great extent. Therefore, pre-service teacher education must also keep in line with the development of the Times. In another word, pre-service English teachers should have strong information technology ability in teaching.

In China, the first study on the "information teaching ability" was Liu Ruiru's Study on Strategies for Improving the Information Teaching Ability of University Teachers in Underdeveloped Areas in 2004 (Liu, 2004). Since 2015, teachers' information teaching ability has attracted more and more attention from scholars, and has become the core and focus of the research field of teacher professional development. More and more researchers focus on information teaching ability of pre-service teachers.

In the development of educational informatization, the United States has always been at the forefront of various countries and regions. In the late 1990s, the U.S. Department of Education released a paper on the subject called the National Educational Technology Plan: Preparing American Students

for the 21st Century. The UK is one of the world's leading countries in information and communication technology education. In the 1990s, the UK launched the Information and Communication Technology Training Programme (ICT).

2. THE RESEARCH THEORY AND OPERATIONAL DEFINITIONS

2.1 The TPACK theory

TPACK (Technological Pedagogical Content Knowledge) refers to the integration of technical teaching Knowledge to subject teaching, which has been used by many scholars to study the promotion of teacher information technology. The technology, pedagogy, and content knowledge (TPACK) framework is recommended to be used as a way to think about effective technology integration (Harris, Mishra, & Koehler, 2009) so as to cultivate more excellent teachers to meet the development of information technology for the motherland.

And TPACK has emerged as a useful frame for describing and understanding the goals for technology use in preservice teacher education (Schmidt, et. al., 2009).

According to Mishra and Koehler (2006), the TPACK framework consists of seven types of knowledge associated with the integration of technology in instruction (see Figure 1): technological knowledge (TK), pedagogical knowledge (PK), content knowledge (CK), pedagogical content knowledge (PCK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), and TPACK. TPACK itself focuses on teachers' knowledge and use of technology, pedagogy, and content interactively that is, meaningful uses of technology to support instructional practices within a particular content area.

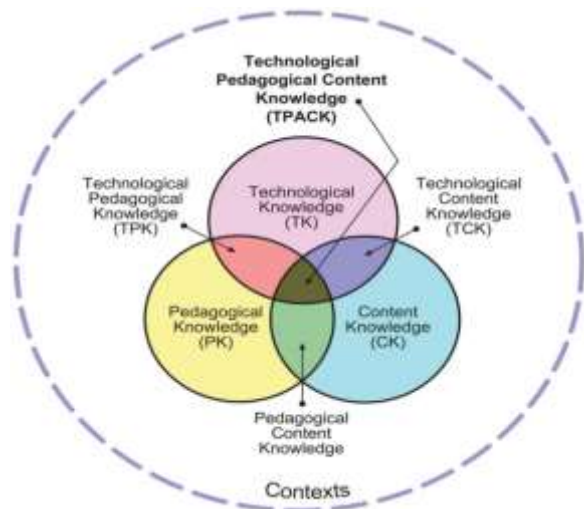


Figure. 1 The TPACK framework

2.2 The Pre-service teachers

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. Their employment goal is clear, that is, mainly engaged in primary and secondary schools or educational institutions teaching management work, as the national education cause of teacher resources for training.

2.3 The Informational Teaching Ability

Information-based teaching has put forward new requirements to teachers, and requires teachers to have the ability of information-based teaching. According to literature analysis, there has not been a unified definition of information-based teaching ability so far, and scholars have put forward different definitions from different perspectives: Zhang Ying and other scholars believe that information teaching ability is the ability of teachers to engage in teaching activities under the guidance of scientific theories and with the help of information technology in an information environment, and finally achieve teaching objectives and complete teaching tasks (ZhangYing, 2016).

Although scholars have different definitions of information teaching ability, their essence is roughly the same, which is to promote the teaching process with the help of information technology and information resources. In the era of education information, teachers are required to have corresponding teaching ability, that is, information teaching ability.

2.4 The Micro-lesson

The Definition of Micro Lesson Abroad, the concept is first proposed by the senior teaching designer, David Penrose in New Mexico States of the US, he thinks that the purpose of the study is to use the method of Constructivism in the short time. In China, the concept of “micro lesson” is proposed by professor Hu Tiesheng (Hu, 2011) of Foshan, Guangdong province. In summary, the common point of Micro-lesson is obviously, that is: 1) based on video, 2) time length is short. The difference is the productive method video of the video, or through the PPT software to convert, or through the recording screen and video software to record a video. Professor Jiao Jianli (2013) pointed that TPACK is the realization of information technology and curriculum integration, also the knowledge framework of teacher professional development. The development of TPACK is of great significance to the effective use of technology for teaching and micro teaching.

3. THE PROPOSED METHODOLOGY

3.1 The Research purpose

The purpose of this study is to investigate whether differences in use of micro-lesson Design are related to pre-service English teachers' TPACK ability, and the following is two objectives of the study,

- i. To understand the current situation of English pre-service teachers' TPACK ability and the problems in the training process:
- ii. To identify the effects of Micro-Lesson Design on pre-service English teachers' achievement in TPACK ability .

3.2 The Research population

Two classes of final-year normal college pre-service students majoring in English (pre-service English teachers) from a normal college in China will be selected as the research candidates/objects. The reason for selecting them is that they have taken educational technology courses and as many English teaching methods courses as possible, and have acquired certain modern educational technology ability and subject teaching methods and methods ability. Two classes will be chosen to carry out the experimental design. And one is the experimental group and the other is the controlled group. The number of each group is over 30.

3.3 The Research questions

In the era of big data, the development of pre-service English teachers' information teaching ability is directly related to the level of English teaching in the future basic stage. Therefore, this research studies the development of pre-service English teachers' information teaching ability. What's more, this study attempts to build a classroom micro-lesson teaching design that can improve the information teaching ability of pre-service English teachers. Based on above, two research questions are put forward,

- 1). What's the level of pre-service English teachers' information teaching ability under the TPACK framework ?
- 2). What's the effect of Micro-lesson design on pre-service English teachers' information teaching ability under TPACK framework in the college of China?

3.4 The Research methods

This study will adopt the quantitative method: quasi-experimental design. In the quasi-experimental design, IV is Micro-lesson Design and DV is pre-service teachers' information teaching ability. The data collected through the questionnaire/scale in pre- and post- test will be analyzed by descriptive and inferential statistics in SPSS. And some tools will be used to collect the research data, such as Literature analysis, Interview, Questionnaire.

- 1). Literature analysis: Through literature analysis, the researcher will study domestic and foreign research literature to determine the specific research content. Through literature analysis, the researcher will seek the theoretical basis for the development of Micro-lesson Design construction in the research.
- 2). Interview: In order to verify the results of the questionnaire survey and the experience and feelings of the research participants in the process of experimental teaching, and at the same time to obtain more specific and reliable information, the research will conduct in-depth interview.

3). Questionnaire: Questionnaire is mainly used in this study to investigate the status quo of information teaching ability of pre-service English teachers and to collect data before and after the experiment, that is pre- and post-test, so as to provide data for the comparative analysis of experimental results.

3.5 The Design of questionnaire

In this study, Questionnaire (TPACK scale) will be used as instruments to collect data. Since the TPACK scale was developed by researchers in other countries, the reliability and validity of the questionnaire will be tested before it is officially put into the survey. The questionnaire will be sent to the QQ group of the students in the class, and then the students are told to fill in the questionnaire carefully according to their actual situation.

4. THE QUSI-EXPERIMENT

1.Design of Quasi-experimental method

There will be two groups, one is experimental group (about 30 students) and the other is the control group (about 30 students). The whole period of the quasi-experiment is 8 weeks. Before the experiment, research objects in both groups will participate in the TPACK Scale questionnaire. After that, the experimental group will receive 6 weeks of learning about information teaching content, and then will complete a task of micro-lesson design. The control group will not receive additional information content learning. After learning practice, research objects in both groups will participate in the TPACK Scale questionnaire again. Descriptive and inferential analyses of pre - and post-test data will be performed.

2.Pilot Study

The researcher will conduct a pilot study of the TPACK scale to ensure the validity and reliability of the instrument. In pilot study, 50-60 senior pre-service English university students who have similar background to the population in actual study will be chosen.

3.Pre-test

After reliability and validity analysis, this modified scale will be used to carry out pre-test for the participants. The purpose is to explore the TPACK level of present pre-service English teachers. The data collected in pre-survey is also used to compare with the data from the post survey.

4.Micro - Lesson practice

For Micro Lesson practice, the researcher will do a 8-week Micro-lesson teaching experiment. The Micro-lesson practice will be used in the experimental group, while the controlled group will be taught by the traditional teaching methods. During the first 7-week research practice, several themes will run through it, such as: The basic connotation of micro lesson Topic; Micro teaching design and teaching courseware ; Knowledge of media and processing ;The software operation ; Photography and camera technology ;Teaching art in technology integration; The basic connotation of micro lesson and so on. These topics will be addressed through a combination of teacher teaching and student participation. In week 7, participants are asked to make a micro lesson through pair or group work.

5.Post-survey

Post-survey is carried in week 8. The researcher will apply the same TPACK scale to carry out the post survey when the micro-lecture training is finished. The researcher will compare the data from pre-survey with the data from the post survey.

Then the effects of this micro-lesson practice in enhancing pre-service English teachers' information teaching ability will be tested.

6.Data collection

The data collected through the questionnaire/scale in pre- and post- test will be analyzed by descriptive and inferential statistics in SPSS. And some instruments will be used to collect the research data, such as Literature analysis, Interview, Questionnaire.

7.Data Analysis

In order to answer the first question, "What's the level of pre-service English teachers' information teaching ability under the TPACK framework ?", analyses of the resulting data will be performed using both descriptive and inferential statistics.

In order to answer the second question, " What's the effect of Micro-lesson design on pre-service English teachers' information teaching ability under TPACK framework in the college of China?", descriptive and inferential statistics of pre- and post-test will be carried out. And also, discourse analysis of the reflections and comments collected will be adopted besides the use of pre and post-test.

5. ACKNOWLEDGEMENT

Project: Inner Mongolia Autonomous Region Educational Science "14th Five-Year Plan" Project: "Research on the Development of Pre-service Teachers' Informatization Teaching Ability in the Big Data Era (Fund No.: 2022)"

Project: The 14th Five-Year Plan of Education Science of Inner Mongolia Autonomous Region Project: Research on the Development of Pre-service Teachers' Informatization Teaching Ability in the Era of Big Data (Fund No. : NGJGH2022229)

6. REFERENCES

- [1] Archambault, L., & Crippen, K. (2009). K-12 Distance Educators at Work: Who's Teaching Online Across the United States. *Journal of Research on Technology in Education*, 41(4), 363-391.
- [2] Baier, F. & Kunter, M.(2020). Construction and validation of a test to assess (pre-service) teachers' technological pedagogical knowledge (TPK). *Studies in Educational Evaluation*, 67 .
- [3] Bonafini, F. C.& Lee, Y. (2021). Investigating Prospective Teachers' TPACK and their Use
- [4] Of Mathematical Action Technologies as they Create Screencast Video Lessons on iPads. *TechTrends*, 65, 303-319.
- [5] Koehler, M. J., Mishra, P., & Yahya, K. (2007). Tracing the development of teacher knowledge in a design seminar: Integrating content, pedagogy and technology. *Learning, Technology and Culture, Computers & Education*, 49, 740-762.
- [6] Harris, K. , Mishra, K. & Koehler, M. (2009). Teachers' Technological Pedagogical Content Knowledge and Learning Activity Types: Curriculum-based Technology Integration Reframed. *Journal of Research on Technology in Education*, 41(4), 393-416.
- [7] Hu, T. (2011). 'Micr-Lecture': The New Trend of Regional Educational Information Resources

- Development. Environmental Construction and Resource Development, 10.
- [9] Liu, R. R. (2004). Research on the Strategies of Improving the Information-based Teaching Ability of College Teachers in Underdeveloped Areas. *Exploration of Education*, 7, 108–109.
- [10] Lachner, A. , Fabian, A. , Franke, U., Preiß, JX., Jacob, L., Führer, C., Paravicini, W. , Randler C., & Thomas, P. (2021). Fostering pre-service teachers' technological pedagogical content knowledge (TPACK): A quasi-experimental field study, *Computers & Education*, 174.
- [11] Li, M. Z., (2020). Strategies for improving the information-based teaching ability of pre-service English teachers under the framework of TPACK. *Journal of Chengdu Normal University*, 36(9), 43-50.
- [12] Li, Y. D. (2017). Research on rational construction of pre-service teachers' information teaching ability under TPACK Framework. P.D. Thesis. Sichuan: China West Normal University.
- [13] Liang, X. L., & Luo, J. H. (2015). Micro-lesson design: A typical learning activity to develop pre-service mathematics teachers' TPACK framework. *International Conference of Educational Innovation through Technology-(EITT)*, 259-263.
- [14] Ma, J. J. (2017). The Study on the progress of the Normal Students' technological Pedagogical Content Knowledge based on the case of Micro-course development. P.D. Thesis. Jinan: China Shandong Normal University.
- [15] Mishra, P., &Koehler, M.J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108 (6), 1017-1054
- [16] Mishra, P., & Warr, M. (2021). Contextualizing TPACK within systems and cultures of practice. *Computers in Human Behavior*, 117.
- [17] Schmid, M., Brianza, E., & Petko, D.(2021). Self-reported technological pedagogical content knowledge (TPACK) of pre-service teachers in relation to digital technology use in lesson plans. *Computers in Human Behavior*, 115.
- [18] Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, T. S. (2009). Technological Pedagogical Content Knowledge (TPACK): The Development and Validation of an Assessment Instrument for Preservice Teachers. *Journal of Research on Technology in Education*. 42(2), 123-149.
- [19] Tondeur, J. , Aesaert, K., Prestridge, S., & Consuegra, E.(2018). *Computers & Education*, 122, (32-42).
- [20] Tseng, J.-J., Lien, Y.-J., & Chen, H.-J. (2019). How pre-service English teachers enact TPACK in the context of web-conferencing teaching: A design thinking approach. *Computers & Education* 128, 171–182.
- [21] Wekerle, C., & Kollar, I.(2021). Fostering pre-service teachers' situation-specific technological pedagogical knowledge – Does learning by mapping and learning from worked examples help?. *Computers in Human Behavior*, 115.
- [22] Xu, P. Y.(2020). A Study on the Relationship between Technology Integration Self-efficacy and TPACK of Pre-service English Teachers. P.D. Thesis, Shandong Normal University, Jinan, China.
- [23] XU, Y. B., & PENG, .G (2016). Research on Micro-lesson Resource Service Platform and
- [24] Resources Scheduling Model. *International Journal of Grid and Distributed Computing*, 9 (5), 265-272.
- [25] Zhang Ying (2016). Investigation on the development of university teachers' informationized teaching ability in the era of Internet, *Adult Education in China*, 17, 69-71.