

Research on Multimodal English Teaching Based on TPACK Framework in the Digital Era

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Abstract. Technological Pedagogical Content Knowledge (TPACK) is an emerging knowledge system essential for teachers to integrate disciplinary teaching with information technology. The new media environment has spawned the multimodal English teaching model. Multimodal English teaching in the new media environment perfectly integrates modern new media technology and multimodal discourse analysis theory. The combination of the two can optimize teaching effectiveness to a greater extent. Therefore, combining the TPACK framework with the multimodal English teaching model to improve teaching effectiveness of college English course has been the pressing need. By using the methods of classroom observation and face-to-face interview of College English Teachers, this paper aims to explore the current situation, existing problems and causes of the use of TPACK under the multimodal education model of these teachers' teaching practice and provide corresponding improvement strategies to promote teaching effectiveness, cultivate talents that meet the needs of the times, and promote the professional development of teachers. To promote College English Teachers TPACK ability in multimodal English teaching model, specialized and categorized training needs to be launched by universities and institution and building a professional learning community for college English teachers is also a good way to improve their TPACK theoretical understanding and facilitate peer communication in their daily teaching. Meanwhile, combination of multimodality and localization will better cater to the specific needs of teaching in different regions.

Keywords: TPACK; Multimodal teaching; College English Teachers, Teaching and learning

1. Introduction

With the implementation of "Internet plus" action, educational informationization has become the main direction of China's education reform. *The Educational Informationization 2.0 Action* proposes an important educational concept of "adhering to integrated innovation and promoting the deep integration of new technologies with education and teaching". At the same time, The rapid development of information technology has brought earth-shaking changes to classroom teaching. In the past decade, mobile education, flipped classrooms, and blended learning have achieved fruitful results in the new era of teaching reform, relying on various online platforms and portable electronic devices. Traditional teaching methods and tools, driven by technological development, have undergone tremendous changes and brought new challenges to teachers. Therefore, college English teachers not only need to have basic information literacy such as information technology awareness, information technology knowledge, and information technology ability, but also need to have an overall literacy that combines information literacy and teaching ability. As a new teaching framework for teacher development, Technological Pedagogical Content Knowledge (TPACK) has become an essential knowledge system and an important standard for evaluating teaching abilities of college English teachers.

At the same time, the popularization of multimedia information technology and the development of multimodal research have prompted scholars to interpret language learning processes beyond traditional perspectives such as "generative psycholinguistics" and "interactive socio-cultural", and to pay attention to other representational modes (speech, vision, music, gestures, etc.) and various media (books, CDs, poses, sounds, etc.) [1] Many studies have attempted to prove that the experiential

meaning formed through multimodal learning can enhance learners' internalization of knowledge and skills, improve memory persistence, and thus enhance learning effectiveness [2].

It can be said that the basic process and fundamental purpose of foreign language teaching is to enhance students' foreign language communication skills in real contexts through multimodal interaction. Therefore, the significance of the TPACK framework and the characteristics of multimodal teaching models have attracted widespread attention in the field of language education. Therefore, the significance of the TPACK framework and the characteristics of multimodal teaching models have attracted widespread attention in the field of language education. Multimodal English teaching in the new media environment perfectly integrates modern new media technology and multimodal discourse analysis theory. The combination of the two can optimize teaching effectiveness to a greater extent. Multimodal theory can provide rationale for language teaching design and enrich teaching models, using diverse forms of language symbols to jointly promote language teaching.

2. Literature Review

2.1 Multimodal Teaching Mode. The research on multimodal foreign language teaching theory began in the 1990s. Stein proposed a multimodal teaching method, believing that curriculum, teaching, and evaluation should be centered around the modal characteristics of the learning environment, and that all communication activities in the classroom are multimodal. [3] Royce proposed the "multimodal teaching methodology" and applied it to reading and writing, listening and speaking, and vocabulary teaching. [4] Thompson described her multimodal teaching internship in graduate programs in the United States, emphasizing the importance of teachers' understanding and application of various multimodal discourses, as well as how various symbolic patterns encourage students to establish new ways of thinking and interaction in classroom contexts. [5] Boche&Henning emphasized the importance of multimodal teaching in the context of technology entering the campus, and applied multimodal scaffolding teaching to English classrooms, aiming to help teachers establish efficient interactive classrooms and improve students' ability to independently use multimodal information acquisition. [6] Jetnikoff analyzed the limitations of multimodal teaching and information technology utilization in English classes through a case study of English teachers, emphasizing the importance of teachers' proficiency in multimedia technology usage for multimodal teaching. The research on multimodal teaching in China mostly focuses on teaching design, covering various fields of college English teaching. [7] The earliest researchers to study the relationship between multimodality and foreign language teaching were Gu Yueguo. Gu defined multimodality and proposed five hypotheses. [2] Zhang Delu and Ding Zhaofen proposed a multimodal learning ability cultivation model. [8] Guo Wanqun created a multimodal teaching model called MAP. [9] Zhang Sheru conducted an empirical study on the correlation between multimodal teaching and the internalization law of learning. The study proved that multimodal teaching can effectively reduce students' cognitive load, stimulate learning interest and motivation, and provide a feasible approach for internalizing learning cognition. [10] Huang Lihe pointed out that in practical teaching, multimodal concepts are presented in different forms and penetrate into various stages. [11]

2.2 TPACK Theory. In 1986, Shulman proposed that teachers need to possess PCK (Pedagogical Content Knowledge), which is subject teaching knowledge. [12] In 2006, Koehler and Mishra, integrated technical factors into the PCK model and proposed TPCK (Technical Pedagogical Content Knowledge), which integrates subject teaching knowledge of technology. For the convenience of pronunciation, the model framework was later renamed TPACK.[13] TPACK related research mainly focuses on three aspects: firstly, developing scales and measuring the TPACK knowledge structure of different teacher groups. The latest scales include The TPACK-EFL scale developed by Bostancioglu et al. used to test the TPACK knowledge literacy of pre-service English teachers and in-service English teachers respectively. [14] The second is to use TPACK as a framework or standard for evaluating the knowledge and skills of pre-service teachers, and use longitudinal research to track how pre-service teachers develop knowledge and skills related to technology integrated teaching. [15] The third is to explore whether TPACK has played a role in teachers' use of

information technology in teaching, and if so, how it affects teachers' integration of information technology.

Research on foreign language teachers' understanding of TPACK in China has made certain progress. Since 2011, domestic TPACK related research has mainly gone through several stages: concept introduction, theoretical discussion, cutting-edge review, and empirical research. [16] The research on TPACK ability of English teachers in the domestic academic community mainly focuses on the level of universities. For example, Zhang Fengjuan analyzed the characteristics of TPACK among college English teachers and proposed development strategies for TPACK among college English teachers. Some scholars also focus on pre-service teachers and teacher training students, such as Zhai Hongying, who, under the framework of TPACK theory, reformed the traditional English teaching method and curriculum teaching mode through "design based learning" activities to explore the professional development of foreign language teachers based on the development of students' core competencies, providing inspiration for the training of pre-service teachers. [17] Wu Yuling and other scholars conducted an empirical research on 321 students major in of Normal University, identifying the shortcomings of TPACK ability among these students. [18]

The TPACK framework repositions teachers' technical knowledge, and from the three dimensions of technical knowledge, subject content, and teaching methods, it answers the question of the comprehensive knowledge and skills that teachers need to have to use technology for effective teaching, and also points out the direction for teacher development in the context of "educational informationization" and "Internet plus".

3. Discussion on the TPACK Framework in the Multimodal Teaching Model for College English Teachers

3.1 Current status of TPACK for public English teachers. At present, the TPACK ability of English teachers in Chinese universities is generally low, and the utilization of modern information technology in college English teaching is still in the primary stage. This study selected 20 college English teachers from three universities in Shaanxi Province in China as the research objects based on the seven elements of TPACK. Face-to-face interview and classroom observation methods were used to study them.

The current TPACK status of college English teachers in this school is as follows.

(1) CK level. More than 95% of the college English teachers in this study have got their Master degrees in Foreign linguistics and half of them also obtained TESOL Advanced Certification. Most of them are highly experienced English teachers with more than ten years teaching experience, but there is a phenomenon of language erosion.

(2) PK level. The level of understanding and application of college English teachers in this study on the theories and methods of "teaching" and "learning" varies. The longer the teaching experience, the more they understand; The effectiveness of classroom teaching organization and management is not only related to their teaching experience but also varies depending on the learning situation.

(3) TK level. According to the survey, all college English teachers in this study will use teaching apps, learning apps, and other information technology to enrich their teaching, but only 20% of English teachers are able to keep up with cutting-edge technologies, such as creating MOOCs and micro courses. Most English teachers are able to solve simple teaching software and hardware problems, but the overall usage rate in classroom teaching is not high. These data indicate that these college English teachers generally possess fundamental information-based teaching abilities, but there is still room for improvement.

(4) PCK, TCK, TPK, TPACK levels. The overall level of TPACK composite elements among college English teachers is not high and there are individual differences due to differences in the learning situation of students in different colleges, as well as differences in teaching experience and information literacy among teachers. Many college English teachers produce PPT courseware mainly in a static manner, with little involvement of dynamic multimodal factors, and there are few related subject databases or corpora. Many teachers use technology purely for the sake of technology.

3.2 Problems and Attribution Analysis of TPACK for College English Teachers. Both teachers and students have the problem of insufficient internal driving force. Since college students are enrolled from different provinces, there are many problems in English learning methods, learning objectives, learning attitudes, etc. Some students have a weak foundation in English, with fear of difficulty and fatigue; Many students have poor English learning methods, mainly focusing on learning vocabulary and grammar in English classroom teaching, while neglecting other aspects of learning. In addition, the goal of English learning is only to pass the final exam of each semester, and only a small number of students have English learning enthusiasm, clear goals, and pursuit of further education.

In response to this situation of English learning, although English teachers have fully prepared their lessons and employed various methods to explain the contents explicitly, the "English learning inertia" that most students have already developed makes them give no feedback or doubts about the teacher's teaching. Over time, teachers also lose motivation. As a result, teaching and learning cannot complement each other, and teachers' professional abilities will also decline. The internal driving force for improving teachers' TPACK will also be insufficient.

Another reason that can't be neglected is the insufficient internal power for teachers' professional development. Teachers lack positive attitudes, familiarity, and application ability towards the new teaching model in terms of their own TPACK improvement. The college English teachers in this study generally agree with the promoting role of information technology in English teaching, but there are significant personal differences in their attitudes and interests towards technology integration in actual teaching. This means that college English teachers have both similarities and differences in their overall concept of integrating information technology with foreign language teaching, indicating the complexity of their TPACK knowledge; Due to the majority of young and middle-aged English teachers, their teaching tasks are heavy and their research pressure is high, and they may not have the time to consider keeping up with the times in their teaching methods. Classroom teaching still relies mainly on traditional teaching methods. Meanwhile, TPACK requires high standards. In terms of the three basic elements, many teachers do not meet the standards. In terms of teaching strategies and presentation forms for integrating information technology with foreign language teaching, college English teachers have a general understanding and mastery, and can use information technology to improve and enrich the original teaching mode and content in daily teaching. However, there are few practices for deeply integrating information technology with English teaching. Most teachers lack a reasonable plan for their own professional development and cannot stick to their long-term goals, resulting in a lack of willingness and ways for teachers to improve TPACK to keep up with the times.

3.3 Lack of effective TPACK training. Most universities lack proficiency and motivation in fostering teachers' TPACK abilities. The training content is based on a wide range of materials, and there is no hierarchical training for teachers of different age groups, resulting in insufficient focus of training. Secondly, the training is conducted in the form of lectures or online learning, with monotonous methods and limited hooking to trainee teachers, and is limited to the training of the three individual elements of TPACK, lacking the overall training and guidance of TPACK organic integration. In addition, the development of new technologies and teaching resources by teachers is time-consuming and laborious, and the school's relevant incentive and assessment mechanisms in this regard are not effective enough.

4. Strategies for Improvement of TPACK Ability of College English Teachers

4.1 Improve TPACK Capabilities through Specialized and Categorized Training. The most effective and direct way to cultivate the TPACK ability of college English teachers is to regularly and systematically organize training. Training can be grouped according to the course group or subject team of the teacher, age or length of service, subject content and difficulty. In response to the actual problems encountered by teachers in teaching, the education and training courses for pre-service and in-service college English teachers can be reformed. Highlighting the content of TPACK in teaching methodology is a must, helping teachers master the methods and strategies of integrating information

technology with their daily teaching activities, including classroom teaching design based on integrated technology, multimodal teaching, production of teaching courseware, use of online teaching platforms, construction of teaching resource libraries, search and evaluation of information resources, and use of foreign language teaching software and network resources. In this process, it is necessary to refine the various dimensions of TPACK knowledge, ensure that teachers correctly understand and comprehensively grasp the connotation of TPACK, and learn to use modern technology to effectively carry out language knowledge and skills, cross-cultural communication and other teaching work.

4.2 Build a Professional Learning Community for College English Teachers and Cultivate Their Ability to Apply TPACK in Practical Teaching. TPACK is an emerging topic in education and teaching, and its theoretical and practical exploration is challenging. Building a teacher learning community for information exchange and resource sharing can help teachers utilize collective wisdom and strength to solve the difficulties and problems encountered by individuals in practical exploration. At the same time, activities such as demonstration and observation classes, evaluation classes, and joint research projects can promote the development of TPACK among all members of the community, which is an effective external way to promote the development of TPACK for teachers.

After college English teachers have clarified the connotation of TPACK ability and possess a certain level of TPACK ability, they should consider how to apply what they learned in practical teaching. In the actual teaching process, teachers need to explore the practical application ability of TPACK based on students' cognitive abilities and actual needs of content. When applying TPACK, teachers must comprehensively consider the individual differences of students, teach according to their aptitude, implement personalized teaching, provide students with rich and diverse learning resources and a lively classroom atmosphere to the greatest extent, enable learners to fully utilize critical thinking, strengthen specific understanding of abstract content, and deepen their mastery and application of language knowledge in this process; Meanwhile, due to the rich content, diverse forms of college English teaching, if only a single text learning is used, it will make teaching dull and tedious. Teachers can fill the cognitive gap between abstract text and students' limited understanding by applying TPACK ability to add corresponding pictures and videos, adjust the teaching mode and methods in a timely manner, and adopt multimodal mode to adapt to different learning content and learning needs of learners in different teaching stages.

4.3 Combination of Multimodality and localization. Economic globalization and cultural diversity require foreign language teaching to keep up with the trend of the times. Simply emphasizing the cultural teaching of the target language is no longer suitable for the needs of the new era. Our foreign language teaching needs to shift towards a two-way input and output of Chinese and Western cultures, guiding students to engage in cultural thinking and cultivating cross-cultural abilities. Multimodal foreign language teaching utilizes modern technological information methods to stimulate learners' visual, auditory, tactile and other sensory experiences, truly achieving personalized and three-dimensional teaching that is "student-centered". It can effectively break the traditional teaching concept of "teaching culture from the perspective of language", emphasize equal dialogue between the target language culture and the mother tongue culture, and guide students to deeply examine, understand, and identify with the mother tongue culture, thus accomplish the goal of educating students subtly.

5. Summary

The arrival of the new media era and the development and application of multimodal theory have led to continuous updates and reforms in English teaching in Chinese universities. Only by fully utilizing multimedia technology, resources, and information-based teaching environment, can we build a new model for professional development to better ensure teaching effectiveness and achieve the goal of professional talent cultivation. The new teaching model based on the integration of TPACK framework and multimodal English teaching mode requires teachers to update their teaching concepts, improve their knowledge literacy, guide students to use information technology as a tool to

obtain information, explore and solve problems, continuously improve their own qualities, and become innovative foreign language talents that meet the needs of society.

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