Study on the Influencing Factors of TPACK Development for Middle School English Teachers

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Abstract

In order to keep up with the development of twenty-first century abilities needed by middle school English teachers, this study explores a series of factors influencing technological pedagogical content knowledge (TPACK) development for middle school English teachers by summarizing and reviewing previous studies. The findings indicate that teachers, students, textbooks and school equipment are closely related to the efficiency of TPACK integration in middle school English classes. The implications of the study suggest that TPACK can be enhanced and developed by middle school English teachers greatly if the above factors can be properly considered.

Keywords

Technological Pedagogical and Content Knowledge (TPACK); Middle School; English Teachers; Influencing Factors.

1. Introduction

As technology continues to enhance the affordances of the 21st century class-rooms and in the condition of COVID-19 pandemic, the teaching and learning practices have changed a lot these days. It is difficult for traditional teaching materials and methods to keep pace with the development of twenty-first century abilities. In middle school English classes, the using of digital technology approaches such as computers, tablets and smart phones to teach and learn based on TPACK model are becoming increasingly frequent (Calderón et al., 2020). Students take advantage of these devices to acquire knowledge and information through visual and audio materials. Therefore, develop teachers' TPACK abilities has become an urgent measure to improve class efficiency. However, given the complex and different situation of schools and students, what kind of factors should be considered and how to develop teachers' ability of TPACK have become extremely important. In this regard, this paper discusses these questions from the perspective of teachers, students, textbooks and school equipment. The purpose is to identify these important elements that could promote class efficiency and give some suggestions and references to the educational department for their policy making and provide reference for pre-service and in-service teachers how to teach students keeping up with modern technologies.

2. Basic Concept

The notion of TPACK (technological pedagogical content knowledge) is developed from the concept of PCK (pedagogical content knowledge) proposed by Shulman (Shulman, 1987). As Mishra & Koehler combined PCK with TK (technological knowledge), they launched TPACK framework in 2005, and its representations have been con-tested (see Angeli & Valanides, 2009; Koehler et al., 2014). The TPACK framework has emerged for envisioning the knowledge that teachers must rely on to design and implement instruction with digital technologies (Koehler & Mishra, 2009; Niess, 2005).

The framework of TPACK includes three basic elements and four cross components, the most widely cited framework is the seven-factor model articulated by Mishra and Koehler. They are content knowledge (CK), pedagogical knowledge (PK), technological knowledge (TK), TCK (Technological Content Knowledge), PCK (Pedagogical Content Knowledge), TPK (Technological Pedagogical Knowledge) and TPACK (Technological Pedagogical Content Knowledge), these components are considered equally important to this framework (Koehler & Mishra, 2009). In other words, TPACK is teachers' ability to simultaneously use technology (i.e. computer, tablet and Internet applications), their pedagogical (i.e. teaching skills, being able to choose instructional methods suitable to students) and content knowledge (i.e. course content such as mathematics, Chinese and English) (Şefika Sümeyye Çam, & Gürcü Koç, 2021).

3. Literature Review

Brinkley-Etzkorn thought teachers' ability of adapting new technologies and transferring them into their teaching were the key to improve TPACK efficiency (Brinkley-Etzkorn,2018); Kabakçı Yurdakul, I. had a new perspective that students' readiness levels, prior knowledge and areas of interest would have an impact on teachers' teaching design and professional development (Kabakçı Yurdakul, I. (2013); Çam, Ş. S. thought teachers' training were closely related to their development of TPACK abilities(Çam, Ş. S.,2019).

Zhang Zhe, Zhang Hai and Wang Yining discussed demographic variables, technology related training courses and teaching experiences from the perspective of pre-service teachers (Zhang Zhe and Zhang Hai ,2016); Zhao Leilei, Li Yue and Xie Jianzhi thought teachers' teaching belief, professional identity were closely related to the development of teachers' TPACK development (Zhao Leilei, Li Yue and Xie Jianzhi,2018); Chen Lingling and Deng Feng described objective and subjective factors from the perspective of pre-service chemistry teachers, such as teachers' knowledge and experience, personalities and concepts, willingness and abilities (Chen Lingling and Deng Feng,2020); Guo Kan and Cao Yiming thought sex, teaching age, technological contents, teacher beliefs and technology using frequency are closely related to the development of teachers' TPACK ability from the perspective of mathematics (Guo Kan, Cao Yiming, 2015).

From the basic concept provided, the definition and framework of TPACK is almost complete and unified, However, there is no enough discussion about factors related to the integration of TPACK, especially in middle school classes in China, although some papers have mentioned partial factors about the reasons, no specialized and clear classification of factors has been published, so this paper aims to provide sufficient explanation to these factors from the perspective of teachers, students, textbooks and school equipment. Given these factors, it will improve teachers' teaching efficiency, enhance students' learning abilities, provide new ideas for scholar peers and make reference of educational department for their policy making.

4. Results and Discussion

When it comes to the factors related to the integration of TPACK in EFL education class, there are scattered slides about it in previous studies, some paper mentions that teachers' personal characteristics, academic performance, attitudes to TPACK, their beliefs, especially for design beliefs is closely related to the integration of TPACK in EFL class, others discuss that students' readiness levels, prior knowledge, areas of interests, collaboration, interaction, individual differences, active participation, extracurricular activities and pre-class tasks will influence the integration of TPACK in EFL classes. Except above two perspectives, the author supplement other two aspects for this question, and they are textbooks and school equipment with software and hardware. And these factors will be discussed systematically in the following part.

Factors influencing TPACK integration in education EFL classes in China can be divided into four dimensions, including teachers, students, textbooks and school equipment.

For teachers, firstly, research studies have shown that teachers' personal characteristics may relate to their TPACK (Cheng & Xie, 2018; Koh, Chai, & Tay, 2014; Scherer, Tondeur, Siddiq, & Baran, 2018). For example, teachers' age is negatively correlated with their technology-related knowledge domains, such as TK, TPK, TCK and TPACK (Cheng & Xie, 2018; Koh et al., 2014). Compared with secondary school teachers, primary school teachers have a lower perception of TPACK (Koh, Chai, & Tsai, 2014). Secondly, TPACK is also closely related to teachers' academic performance in teacher education. The TPACK enactment is often context-specific, and can be affected by teaching levels, delivery formats and assessment methods. So far, only a few studies analyze teachers' discourse about technology integration from the perspective of TPACK. Our understanding about the relationship between the knowledge domains of TPACK is still far from conclusive (Cheng & Xie, 2018). In addition, teachers' beliefs have been recognized as an area that needs to be researched in conjunction with teachers' TPACK as these constructs are closely intertwined in influencing teachers' instructional decision-making. In particular, teachers' design beliefs have been identified as a multidimensional construct that is associated with teachers' TPACK, and teachers' design beliefs may predict the teachers' TPACK (Chai & Koh, 2017).

For students, firstly, before a course is designed based on TPACK, students' readiness levels, prior knowledge and areas of interests are determined (Kabakçı Yurdakul et al., 2014). In this way, the course design can be adjusted to the students. On the other hand, collaboration, active learning and problem solving are particularly featured in instructional processes with TPACK. These methods and strategies are preferred in topics that are difficult to teach through traditional methods, and the process is carried out by getting technological support. Communication is established with students as this approach is implemented, and information on the course subject is constantly shared with them. In this regard, effective communicative environments for correspondence and sharing information or documents are founded through social networks at the beginning of the semester. Students' having communication and interaction related to the course with their peers and instructors enhances their persistence throughout the process and enables them to relate what they learn to daily life (Brinkley-Etzkorn, 2018). Secondly, collaboration, interaction, individual differences and students' active participation should be considered accordingly. What's more, the extracurricular activities and pre-class tasks for students during the instructional process are another important objective of the TPACK approach. Students are encouraged to be also active outside the classroom, and equipped with the responsibility of their own learning by enabling them to use technology actively. Since the main purpose here is to make sure that students are active, assessment methods are arranged accordingly. Unlike traditional methods, end-of-class evaluations are conducted continuously. For this reason, the entire semester is evaluated through a process-based approach. Effective Web 2.0 tools are used in the classroom for evaluation activities (Harris & Hofer, 2011). They should involve their students in the course design stage, and arrange pre-class tasks for students to be prepared for the class. At this time, a student-centered classroom atmosphere has been established at the desire level, and the technologies supporting materials has been adapted appropriately.

For textbooks, especially for foreign language textbooks, the integration of TPACK in education EFL classes plays an important role in teaching and learning. As we all know that, a new language can be acquired by listening, speaking, reading and writing. In order to learn English much better and authentic, teachers should not only analyze school textbooks, but also expand reading materials outside school textbooks given the limited contents. For example, when you teach listening in class, except printing listening materials before class, a teacher should also find out corresponding audio and visional materials. When you teach writing, the reading article in the same unite should be connected and analyzed to integrate students' abilities for both reading and writing.

For school equipment, the use of open access repositories, digital educational resources, social media and e-Research can greatly improve efficiency of teaching and learning. It is necessary for resource development department to introduce and purchase more useful learning systems which will bring benefits to teachers' self-development. For example, if the open access repositories have been adapted in a school, and it is convenient for both teachers and students to acquire these resources, students can restore and note new words and phrases appeared in school textbooks and post-class reading books, in this way, students' English vocabulary can be increased by their own efforts. In addition, the management of these systems should also be considered.

5. Summary

The findings of the study not only shows concept and framework of TPACK, but also clarifies that teachers, students, textbooks and school equipment are core factors influencing the development of middle school English teachers in China, specifically speaking, teachers' personal characteristics, academic performance, attitudes to TPACK, their beliefs, especially for design beliefs is closely related to the integration and development of TPACK in middle school English classes; students' readiness levels, prior knowledge, areas of interests, collaboration, interaction, individual differences, active participation, extracurricular activities and pre-class tasks will influence the integration and development of TPACK in middle school English classes. Except these two dimensions; the author also adds another two factors related to this question, and they are school textbooks and school equipment such as open access repositories, digital educational resources, social media and e-Research which can also greatly improve efficiency of teaching and learning and the integration of TPACK in middle school educational English classes in China. This paper will not only provide a new angle of view for scholar peers about TPACK, but also give some advice and suggestions to educational department for the program of TPACK development. However, as for the author's limited reading materials and incomplete knowledge basis, the factors influencing TPACK development for middle school English classes in China are not complete and sufficient. Given these limits, the author will read further to acquire more information about this topic and pay much attention to the frontier development of the integration of TPACK in middle school English classes.

Acknowledgments

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