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CONTENTS

TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK) IN LANGUAGE TEACHING: A LITERATURE REVIEW

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Abstract: The rapid changes of technology have brought impacts in most of the areas in our daily life and work including teaching and learning activities. The emerge of TPACK in recent years has been proved in the number of studies in which TPACK framework is regarded as a productive way to examine how teachers could integrate educational technology into the classroom to teach the subject matter. TPACK also provides opportunities for conducting research in teacher education, teacher professional development, and teacher's use of technology. The paper, therefore, employs secondary data from extensive literature on TPACK framework and approach in English language teaching to explore emerged issues in the ways TPACK has been used in different studies. The findings reveal the gaps of TPACK framework used in specific subject domains which need further research and require flexibility and deep knowledge from teachers in implementing in specific contexts since "most technologies are not designed for educational purposes" (Mishra et al., 2009).

Keywords: TPACK framework, knowledge base, professional development, language teaching pedagogy.

1. INTRODUCTION

English language teaching and learning activities have been recently affected by the development of the information technology. Research on the instructional uses of technology has revealed that teachers only explore about technology and not how to implement it into teaching and learning process (Mishra & Koehler, 2006). In other words, the teachers lack the knowledge to effectively integrate technology in their teaching, so technology is used as "efficiency aids and extension devices" (McCormick & Scrimshaw, 2001) rather than tools that can "transform the nature of a subject at the most fundamental level" (p. 47). The rapid rate of technology change makes teachers upgrade and invest time in learning new functions or work with what is available. It is clearly that, ones who adapt the new capabilities improve productivity in comparison to those who do not (Mishra et al., 2009). Furthermore, "learning technical skills alone is not sufficient, learning how to integrate technologies into teaching is equally important" (p.50) and the presence of Technological Pedagogical Content Knowledge (TPACK) by Mishra & Koehler is a step towards understanding what makes a technology an educational technology, which exist in the interplay between pedagogical knowledge, content knowledge, and technology knowledge. TPACK provides opportunities for conducting research in teacher education, teacher professional development, and teacher's use of technology. It describes how teachers teach subject matter content using specific instructional methods with specific technology in particular contexts. TPACK emerges as a framework for teacher Professional Development especially in new teaching and learning environment during the COVID-19 period. This paper, therefore, tries to look at the literature of TPACK framework in language teaching to get a general view of how TPACK framework has been used in diverse educational studies and investigates the gaps revealed from

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previous studies in different contexts. The paper employs secondary data from extensive literature on TPACK framework and approach in English language teaching to explore emerged issues in the ways TPACK used in different studies. The findings from an overall view in literature in TPACK studies may help novice researchers who have intention of applying TPACK framework in their research in specific major.

2. AN OVERVIEW OF TPACK

2.1. Development of TPACK

Knowledge bases of teacher education have shifted its focus from teacher's content knowledge to pedagogy, emphasizing general pedagogical classroom practices independent of subject matter and often at the expense of content knowledge (Ball & McDiarmid, 1989). The idea of pedagogical content knowledge (PCK) was first introduced by Shulman (1986) in which PCK represents the merging of content and pedagogy into an understanding of how particular aspects of subject matter are organized, adapted, and represented for instruction. This framework deals with the teacher's teaching process, including "the ways of representing and formulating the subject that make it comprehensible to others" (p. 9). The notion of PCK has attracted scholars in terms of teacher education and the subject matter of education (Cochran et al., 1993; Grossman, 1990; Shulman, 1987). It is regarded as an epistemological concept that bridges the traditionally distinct knowledge bases of content and pedagogy.

The rapid increase and change of technologies make technological knowledge a pivotal part of teacher's knowledge in their professional development. Based on Shulman's PCK framework, Mishra and Koehler (2006) formulated the TPACK framework which emphasizes the connections, interactions, affordances, and constraints between and among content, pedagogy, and technology. Before Mishra and Koehler (2006), several researchers had attempted to combine ICT into Shulman's (1986) model, namely Pierson (2001), Angeli and Valanides (2005), whose studies emphasized the role of teacher's technological knowledge in their teaching. Pierson (2001) stated that "the intersection of these three knowledge areas technological pedagogical content knowledge would define effective technology use" (p. 427). In their model called "ICT- related PCK", Angeli and Valanides (2005) defined several sources of teachers' knowledge base as pedagogical knowledge, subject area knowledge, knowledge of students, knowledge of environmental context, and ICT knowledge. Therefore, knowledge of students and context was added into the model which is different from Pierson's. This kind of knowledge, however, should be included in pedagogical knowledge of the framework. The development of TPACK framework by Mishra and Koehler (2006, 2008) has been highly appreciated and gained supports from research community. This new framework for teachers to teach the subject matter which integrates three crucial aspects interconnected each other. And the most important thing is teacher's awareness of how to implement technology in their teaching and learning process.

2.2. The TPACK framework

TPACK is defined as a fundamental concept of effective teaching that combines technology and pedagogical techniques in order to construct new comprehension from students' existing knowledge (Mishra & Koehler, 2006). TPACK is also an understanding of the connection and interaction between technological knowledge, content knowledge and pedagogical knowledge in

the learning process. The TPACK framework, which is derived from Shulman's idea of PCK, attempts to identify the nature of knowledge required by teachers for technology integration in their teaching. As a form of knowledge, TPACK has been described as situated, complex, multifaceted, integrative and/or transformative (Koehler & Mishra, 2009). In essence, this is a powerful framework with numerous potential generative applications in research and development concerning the use of ICT in education. The TPACK framework and its interrelated knowledge components can be described as in Figure 1 below.

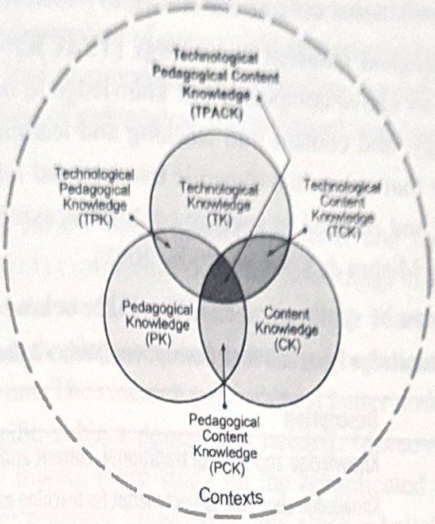

Figure 1: The Technological Pedagogical Content Knowledge Framework

(https://matt-koehler.com/tpack2/tpack-explained).

- **Content Knowledge (CK)** – Teachers' knowledge about the subject matter to be learned or taught which includes knowledge of concepts, theories, ideas, organizational frameworks, knowledge of evidence and proof, as well as established practices and approaches toward developing such knowledge (Koehler & Mishra, 2009; Shulman, 1986).

- **Pedagogical Knowledge (PK)** - Teachers' knowledge about practices, methods of teaching and learning process which involves educational purposes, values, and aims. This basic form of knowledge consists of general classroom management skills, lesson planning, and student assessment" (Koehler & Mishra, 2009).

- **Technology Knowledge (TK)** – Knowledge about certain ways of thinking about, and working with technology, tools and resources. This requires understanding information technology broadly enough to apply it productively at work and in everyday life, being able to adapt to changes in information technology. TK requires life-long and open-ended interaction with ICT (Koehler & Mishra, 2009).

- **Pedagogical Content Knowledge (PCK)** – The knowledge of pedagogy that is applicable to the teaching of specific content, including knowing what teaching approaches appropriate to the content, how elements of the content can be arranged for better teaching. PCK addresses the core business of teaching, learning, curriculum, assessment, and reporting, such as learning environments and the connections between curriculum, assessment, and pedagogy (Koehler & Mishra, 2009; Mishra & Koehler, 2006; Shulman, 1986).

- **Technological Content Knowledge (TCK)** – The knowledge of the manner in which technology and content influence and constrain one another. Teachers must master not only the

subject matter they teach but they must also have a thorough awareness of how the subject matter can be altered by the use of specific technologies. Teachers must grasp which individual technologies are most suited for addressing subject-matter learning in their domains, as well as how the content dictates or even modifies the technology-or vice versa (Koehler & Mishra, 2009).

- **Technological Pedagogical Knowledge (TPK)** – This involves understanding the pedagogical affordances and restrictions of various technology instruments in relation to discipline and developmentally relevant instructional designs and strategies (Koehler & Mishra, 2009).
- **Technological Pedagogical Content Knowledge (TPACK)** – The deep understandings of the complex interplay of all above components of knowledge in order to orchestrate and coordinate technology, pedagogy, and content into teaching and learning activities. TPACK is an emergent form of knowledge that exists in a dynamic transactional relationship among the three components and is grounded and situated in specific contexts as symbolized by the outer dotted circle in the TPACK diagram (Mishra & Koehler, 2006, 2008).

The TPACK knowledge can be synthesized as in the Table below

Table 1: TPACK Knowledge Types and Their Descriptions (Mishra & Koehler, 2006)

Knowledge type	Description
Technological Knowledge (TK)	Knowledge and skills of traditional, current and emerging technologies
Content Knowledge (CK)	Knowledge about the subject matter for teaching and learning.
Pedagogical Knowledge (PK)	Knowledge about methods and process of teaching, such as classroom management, assessment, and student teaching
Pedagogical Content Knowledge (PCK)	The tacit of blending content and pedagogy for developing better teaching practices
Technological Content Knowledge (TCK)	The tacit of blending content and technology for developing better teaching practices.
Technological Pedagogical Knowledge (TPK)	Knowledge of the affordances of technologies and what teaching strategies can be combined with those affordances to leverage learning outcomes.
Technological Pedagogical Content Knowledge (TPACK)	Teachers' understanding of the interplay among content, pedagogy, and technology as well as the procedural knowledge of integrating technologies into their teaching routines.

3. TPACK IN LANGUAGE TEACHING

3.1. TPACK in Teachers' Professional Development research

It is undoubted that the TPACK framework provides a number of opportunities for conducting research in teacher education, teacher professional development, and teachers' technology use (Mishra et al., 2009). TPACK is not a new concept for teachers to integrate technology, pedagogy and content knowledge; nonetheless, it is a challenge for teachers to undertake the activity as professionals. A review of the literature reveals that a number of studies on TPACK framework for Professional Development and English language teaching have been conducted (Bustamante, 2020; Dinh, 2015; Mulyadi et al., 2020; Tseng et al., 2022; Van Loi, 2021). The use of TPACK in English language teaching offers a blueprint for English teachers effectively integrate technology into their instruction, informs our understanding of how teachers' knowledge can be measured within the TPACK framework (Brantley-Dias & Ertmer, 2013). This will help identifying what additional knowledge base teachers of English to speakers of other languages need to promote language acquisition. The appropriate implementation of TPACK in English language teaching is the combination of three main components: (1) content components in the curriculum—language

skills and culture; (2) pedagogical elements in second language teaching—the communicative approach and the task-based learning approach; and (3) technological components—the selection of appropriate technological tools (Keengwe & Kang, 2012).

Results from Bos (2011)'s study on Professional Development for teachers using TPACK imply that experienced teachers may perceive the value of knowledge about pedagogical and content through their interactions with technology and find the value in the creative and problem-solving capacity of technology. TPACK, undoubtedly, provides a theoretical foundation for the 21st -century teacher and makes better understanding of appropriate student-oriented pedagogy. Teachers need to use technology that will lead to conceptual understanding through instructional practices that emphasize knowledge structures of pedagogical, mathematical, and cognitive accuracy.

3.2. TPACK and teachers' beliefs

A systematic literature review about theoretical basis and the practical use of TPACK conducted by Voogt et al. (2013) exposes different understandings of TPACK and of technological knowledge, which impacted the way TPACK was measured. Teacher knowledge (TPACK) and beliefs about pedagogy and technology are intertwined and both determine the teacher's decision to teach with technology or not. The research gaps suggest better understanding on what teacher's knowledge base is for specific subject domains is needed. Moreover, since teacher knowledge and beliefs are inextricably linked, more study on the complicated interaction between TPACK (teacher knowledge), teacher practical knowledge, and teacher beliefs is required. Teacher's craft knowledge (teachers' accumulated wisdom with respect to their teaching practice (Van Driel et al., 1998) including knowledge about pedagogy, students, subject matter and the curriculum gained in formal schooling and practice should be a useful concept for professional development strategies aiming to develop TPACK in teachers. The TPACK concept must be redefined in specific subject domains so a teacher can demonstrate TPACK with valid and reliable instruments.

Beliefs about the functionality of specific technologies have great impacts on the way teachers integrate technology in their teaching whereas their decisions during lesson preparation as well as execution are motivated by their educational ideals about content and technology rather than by technological affordances. Teachers tend to choose familiar teacher-centered pedagogical solutions when they design online courses even though technological affordances may readily enable a learner-centered approach. However, teachers may have the knowledge and skills to use technology but find it difficult to make it real in practice (referred to as in use TPACK) (Niess, 2005; Voogt et al., 2013).

3.3. TPACK approach in published articles

In their critical review of research on TPACK in language teaching, Tseng et al. (2022) indicate that the TPACK framework can enlighten stakeholders about designing helpful and effective technology-enhanced courses and platforms. During the COVID-19 pandemic, the TPACK-enhanced programs have saved teachers' time and effort in integrating emerging technology into the curriculum with the help of mobile or computer language learning apps, using distance learning platforms appropriate for language teaching and learning. The review from 51 articles on TPACK in language education published from 2011 to 2019 by Tseng et al. (2022) reveals the four main categories namely *exploring TPACK*, *assessing TPACK*, *developing TPACK*, and *applying TPACK*. The result in exploring TPACK exposes the dominant use of technology in traditional teacher-centered teaching despite various levels of

confidence in teachers' TPACK competence. Research on assessing TPACK shows how the boundaries between the TPACK constructs need to be clearly established through enhancing the level of specificity (subject-specific strategies and technologies in survey items). The study on developing TPACK reveals the beneficial effects of language teachers' TPACK development over time and effective interventions involved language teachers' understanding of the TPACK framework, modeling from teacher educators or experienced teachers, and language teachers' engagement in designing lessons collaboratively. Finally, studies on the use of TPACK indicates that TPACK-informed language learning courses and platforms are regarded to be helpful and effective.

The literature on TPACK in language teaching indicates that most of the papers focus on identifying the TPACK knowledge base of language teachers from their perceptions through surveys and understand how TPACK-based interventions influenced teachers' TPACK development. Research on TPACK in practice is still modest except some studies on pedagogical reasoning and classroom performances conducted by some scholars (Boschman et al., 2016; Bueno-Alastuey et al., 2018; Bustamante, 2020; Tseng et al., 2019). Therefore, research on creating TPACK-informed language learning programs and platforms is an area that deserves more attention.

4. CONCLUSION

The TPACK paradigm stresses the role of teachers as decision makers who create their own instructional technology settings as needed, in real time, without concern that those environments may become obsolescent. With this approach, teachers become flexible in teaching through changes in technologies, content, or pedagogies. Mishra et al. (2009) mentioned David Pasig's terminology "melioration" which means "the competence to borrow a concept from a field of knowledge supposedly far removed from his or her domain, and adopt it to a pressing challenge in an area of personal knowledge or interest" (Passig, 2007) in comparison with characters of TPACK framework. This kind of cognitive skill can draw on knowledge from varying fields and integrating them in unique and effective ways. In other words, the framework like TPACK requires teachers with "overarching cognitive skills, competencies, and creativity rather than technical understanding and functional knowledge of specific technologies" (Mishra et al., 2009).

As indicated in the preceding literature, most of the research was conducted prior to the Covid 19 pandemic, the ideal time to examine the efficiency of online learning and teaching activities. Therefore, more studies in applying and TPACK framework. Furthermore, the boundary conditions that enable one element in the TPACK framework to be distinguished from adjacent elements must be clarified and the contribution of each construct in the framework should be defined to a better understanding of issues face by practitioners. In general, the TPACK framework is a generative framework with many more possible future applications which need redesigned to be suitable to each specific field study.

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MÔ HÌNH CÁC KIẾN THỨC ỨNG DỤNG CÔNG NGHỆ THÔNG TIN TRONG DẠY HỌC NGOẠI NGỮ: TỔNG QUAN LÝ THUYẾT

Tóm tắt: *Những thay đổi nhanh chóng của công nghệ tác động đến các lĩnh vực trong cuộc sống và công việc hàng ngày của chúng ta bao gồm cả hoạt động dạy và học. Sự xuất hiện của mô hình các kiến thức ứng dụng công nghệ thông tin trong dạy học (TPACK) trong những năm gần đây đã được chứng minh qua số lượng các nghiên cứu trong đó khung TPACK được coi là một hướng tiếp cận mới trong việc giảng dạy môn học tích hợp các khối kiến thức liên quan mật thiết đến nhau (kiến thức về công nghệ, kiến thức về chuyên môn, và kiến thức về phương pháp sư phạm) và tạo ra các cơ hội nghiên cứu về đào tạo giáo viên, phát triển nghề nghiệp giáo viên và vấn đề sử dụng công nghệ của giáo viên. Bài viết trình bày tổng quan tài liệu về khung TPACK để tìm hiểu tính hiệu quả của việc sử dụng khung TPACK trong các nghiên cứu khác nhau. Kết quả nghiên cứu chỉ ra việc áp dụng khung TPACK cần có tính mở và linh hoạt khi áp dụng trong các lĩnh vực cụ thể khác nhau và thậm chí cần phải điều chỉnh lại khung cho phù hợp với bối cảnh nghiên cứu.*

Key words: *Khung TPACK, kiến thức nền tảng, phát triển sự nghiệp, phương pháp giảng dạy ngoại ngữ.*

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