



PREFACE

THEME: Language, Communication, and Technology: Crossing Borders, Connecting Minds

It is with great honor and excitement that I introduce this Special Issue, which is published in conjunction with the International Conference on Multidisciplinary Approaches in Language (ICMAL2024) and the Language, Innovation, Invention, and Design (LIID2024) conference. These dynamic events, held under the overarching theme "*Language, Communication, and Technology: Crossing Borders, Connecting Minds*," serve as a vibrant platform for intellectual exchange and innovation in the rapidly evolving fields of language, communication, and technology. The thematic focus of this Special Issue reflects the core mission of ICMAL and LIID: fostering interdisciplinary collaboration and encouraging fresh perspectives in applied language studies and the integration of technology in language education. By bringing together language practitioners, educators, researchers, and postgraduate students from around the globe, this publication seeks to capture the diverse and forward-thinking contributions that were presented at these conferences.

The articles featured in this issue span a broad range of topics, grouped under two significant sub-themes; a) Applied Language Studies which explore various dimensions of language as a tool for professional and intercultural communication, alongside its role in teaching, learning, and assessment. They offer valuable insights into how language can bridge cultural divides, enhance professional practices, and foster global connections, as well as b) Innovation and Technology in Language Learning which reflects transformative potential of technology, this section highlights pioneering research and applications of virtual reality (VR), augmented reality (AR), mobile apps, gamification, and artificial intelligence (AI) in language education. These contributions illustrate how emerging technologies are reshaping the way languages are taught, learned, and experienced.

As a Guest Editor, I am deeply impressed by the diversity and quality of the submissions. The innovative research and creative solutions presented in this issue demonstrate the commitment of our global academic community to addressing the challenges and opportunities at the intersection of language and technology. I extend my heartfelt gratitude to the authors for their outstanding contributions, to the reviewers for their meticulous feedback, and to the organizing committee for their tireless efforts in curating this conference and subsequent publication. I am confident that the articles in this Special Issue will inspire further dialogue, research, and innovation, contributing meaningfully to the advancement of language, communication, and technology.

Thank you for joining us on this intellectual journey.

Dr. Haida Umiera Hashim

Guest Chief Editor

Special Issue: *Language, Communication, and Technology: Crossing Borders, Connecting Minds*

ICMAL2024 & LIID2024

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Validity and Reliability of TPACK Self-Efficacy Scale of EFL High School Teachers in Inner Mongolia

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ABSTRACT

This study investigated the validity and reliability of instruments measuring self-efficacy in Technological Pedagogical Content Knowledge (TPACK) among English as a Foreign Language (EFL) high school teachers and their self-efficacy level regarding TPACK implementation in their classrooms in Inner Mongolia, China. TPACK is a framework that integrates Technology Knowledge (TK), Pedagogical Knowledge (PK), and Content Knowledge (CK) for effective technology integration in teaching. The TPACK framework developed by Mishra and Koehler and built upon Shulman's concept of Pedagogical Content Knowledge (PCK) to provide a comprehensive framework that specifically addresses the role of technology in teaching. This study employed a quantitative approach, where the researchers administered a validated TPACK self-efficacy questionnaire to 437 EFL high school EFL teachers in Inner Mongolia. The TPACK self-efficacy scale consists of five items to measure EFL high school EFL teachers' self-efficacy across the different components of TPACK, including Technological Knowledge, Pedagogical Knowledge, Content Knowledge, Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), PCK, and TPACK. To evaluate the reliability of the instrument, Cronbach's alpha was used to measure its internal consistency. Factor analysis was conducted to

explore construct validity by examining the underlying structure of the questionnaire. The findings revealed that Cronbach's alpha (0.937) and Composite Reliability (0.937) exceeded the recommended threshold (0.7) for internal consistency, indicating reliable results. Additionally, Average Variance Extracted (>0.5) suggested the questionnaire effectively measured the intended construct. Descriptive analysis revealed a moderate level of self-efficacy ($M = 2.98$) among EFL high school teachers.

Keywords: Technological Pedagogical Content Knowledge, Self-efficacy, English as a Foreign Language, high school EFL teachers, Inner Mongolia

INTRODUCTION

The effective integration of technology has become increasingly important in education, particularly in language learning environments (Zhang & Zou, 2022). For English as a Foreign Language (EFL) teachers, technology offers a multitude of tools and resources to enhance student engagement, improve language acquisition (Mohd Nasir & Yusof, 2022), and personalize learning experiences (Jameer & Narra, 2024). However, simply having access to technology is not sufficient for EFL high school teachers to effectively integrate technology into their language teaching practices. They also need the knowledge and skills to align technology with their pedagogy, curriculum, and diverse learning styles (Absari et al., 2020). This is where the Technological Pedagogical Content Knowledge (TPACK) framework comes in to effectively integrate technology into teaching and design lessons that leverage technology to improve student learning (Tseng et al., 2022).

The TPACK Framework was developed by Mishra and Koehler (2006) to conceptualize the intersection of three essential knowledge domains for successful technology integration in teaching. These domains are as seen in Figure 1 below.

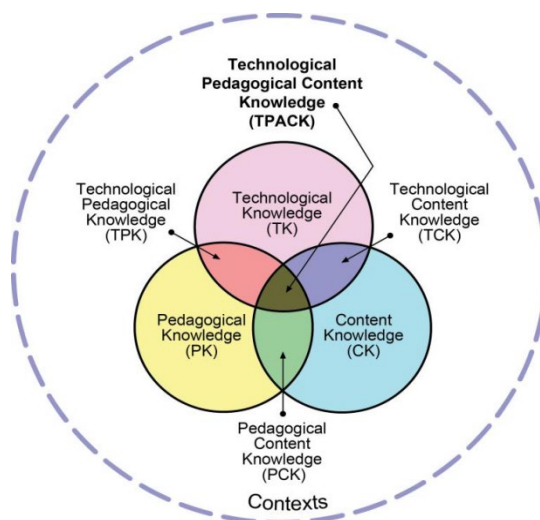


Figure 1. TPACK Framework Image
(Source: Mkoehler, 2011)

The TPACK Framework comprises seven domains, namely Technology Knowledge (TK), Pedagogical Knowledge (PK), and Content Knowledge (CK), PCK, Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), and TPACK.

TK refers to the understanding and ability to use various educational technologies and tools. EFL teachers with strong TK can select and utilize appropriate technology for specific learning objectives (Santos & Castro, 2021).

PK encompasses knowledge and skills related to effective teaching practices, including instructional strategies, classroom management, and assessment techniques. Skilled EFL teachers can adapt their teaching methods to leverage the affordances of technology for more interactive and engaging lessons (Lisa et al., 2021).

CK represents the deep understanding of the specific subject matter being taught. In EFL contexts, this includes a strong grasp of English language grammar, vocabulary, pronunciation, and teaching methodologies for second language acquisition (Al-Ahdal, 2023).

The TPACK framework goes beyond the fundamental areas by emphasizing the crucial intersections between TK, PK, and CK (Thyssen et al., 2023).

PCK is the knowledge of how to teach specific content effectively. It combines an understanding of the content (CK) with the knowledge of best practices for teaching that content (PK). For EFL teachers, this might involve knowing how to present grammar rules in an engaging way or using technology to facilitate conversation practice.

TPK refers to the knowledge of how to use technology effectively to enhance teaching practices. For example, an EFL teacher with strong TPK can leverage interactive online platforms to create collaborative learning activities (Gozali & Cahyono, 2022).

TCK involves understanding how technology can be used to represent and teach specific subject matter content. An example of TCK in EFL teaching could be using a digital storytelling app to create engaging narratives for language practice (Saeed et al., 2022).

TPACK represents the pinnacle of the TPACK framework, encompassing the ability to harmonize all three knowledge domains. A teacher with strong TPACK can design and implement technology-integrated lessons that seamlessly blend effective pedagogy with the specific needs of EFL learners and the affordances of technology (Shamsi, 2021).

By utilizing the TPACK framework, EFL teachers can move beyond simply using technology in isolation. They can become strategic and deliberate in their technology integration to create a more dynamic and effective learning environment for their students (Kathirvel & Hashim, 2020). However, a crucial factor in successful technology integration is teacher self-efficacy - a teacher's belief in their ability to perform specific tasks effectively (Bandura, 1999).

In the context of TPACK, self-efficacy refers to a teacher's confidence in their ability to utilize technology effectively for teaching EFL. This includes not only the technical aspects but also the ability to integrate technology with pedagogical methods and specific content knowledge (Tondeur et al., 2020).

Teachers with high TPACK self-efficacy are more likely to embrace technology, experiment with new tools, and adapt their teaching strategies to incorporate technology effectively (Naz et al., 2021). Conversely, teachers with low TPACK self-efficacy may feel apprehensive about using technology, leading to underutilized resources and missed opportunities to enhance student learning (Kundu, 2022).

While the importance of TPACK and teacher self-efficacy in EFL teaching is well recognized to motivate, support, and empower a more successful and innovative application of technology in the classrooms, research on instruments specifically designed to measure TPACK self-efficacy among EFL teachers in Inner Mongolia, China, is limited (Liu et al., 2021).

Therefore, this study aims to examine the validity and reliability of TPACK self-efficacy measurement tools and the self-efficacy level of high school EFL teachers in Inner Mongolia, China, regarding TPACK implementation in their classrooms. By establishing a valid and reliable instrument of TPACK Self-efficacy Scale, EFL high school teachers in Inner Mongolia can be provided teacher training programs, identify areas where teachers need additional support, and ultimately promote more effective technology integration in EFL classrooms (Yang & Wang, 2024).

METHODOLOGY

A quantitative research design was chosen for this study due to its emphasis on objective measurement and data analysis. This approach allowed us to gather self-reported data from a large sample of EFL teachers, enabling the statistical assessment of the instrument's reliability and validity (Creswell & Creswell, 2017). Quantitative methods are particularly well-suited for investigations aiming to generalize findings to a broader population (Jin, 2020). This study uses data from the Inner Mongolia Statistical Comprehensive Data Platform (2020). According to the data, Inner Mongolia has 12 city-ships and 305 senior high schools, and there are approximately 30,000 high school English teachers in Inner Mongolia following the same curriculum and English textbooks administered and published by the Ministry of Education (MoE) of China.

To ensure a representative sample, a snowball sampling technique was employed in considering the selection criteria: 1) voluntary participation. Voluntary participation will be based on invitations; 2) regional distribution, which integrates high schools in Inner Mongolia; 3) the stage of teacher professional development including novice, experienced, and expert teachers; 4) Second-grade EFL high school teachers in Inner Mongolia; and 5) willingness to have the interview audio-recorded. After applying the selection criteria, the final sample size comprised 450 EFL high school teachers (Kinney et al., 2020).

To ensure the instrument accurately captured the specific experiences and challenges faced by EFL high school teachers in Inner Mongolia when integrating technology into their classrooms, the questionnaire previously developed by Lin and Zheng (2015) was adapted to specifically address the context of EFL high school teaching in Inner Mongolia to increase confidence in the data collected reflects teachers' self-efficacy levels accurately.

Following the selection and adaptation of the instrument, data collection procedures were established. With the cooperation of school administrators, teachers within the chosen schools were contacted and invited to participate in the study. Informed consent was obtained from all participants prior to their involvement. To ensure confidentiality and anonymity, the questionnaire was administered electronically using a secure online platform, Wenjuan Wang (<https://www.wenjuan.com>), a professional online platform for data collection, which allowed for efficient data collection and minimized the risk of errors during data entry.

The collected data was subjected to rigorous statistical analyses to assess the instrument's internal consistency (reliability) and construct validity to access the validity and reliability of TPACK self-efficacy scale of EFL high school teachers in Inner Mongolia. Cronbach's alpha coefficient was employed to measure the instrument's internal consistency. This statistic assesses the extent to which the items within the questionnaire measure the same underlying construct (Tavakol & Dennick, 2011). A Cronbach's alpha coefficient exceeding 0.70 is generally considered to indicate acceptable internal consistency, with higher values reflecting stronger reliability.

Factor analysis, a statistical technique, was also used to identify underlying factors within a set of variables, was employed to explore the instrument's construct validity (Sujati et al., 2020). In this context, factor analysis would be used to examine whether the items within the questionnaire group together in a way that aligns with the different TPACK components (TK, PK, CK, TPK, TCK, PCK, and TPACK) as intended. If the factor analysis reveals distinct factors corresponding to each TPACK component, this would provide evidence that the instrument is measuring the intended construct (TPACK self-efficacy) accurately.

RESULTS AND DISCUSSION

The analysis of internal consistency using Cronbach's alpha revealed a significant result. A Cronbach's alpha coefficient above 0.70 is generally considered acceptable for internal consistency (Tavakol & Dennick, 2011). To investigate construct validity, the factor analysis was employed to identify the underlying structures within variables and assess whether the items within the questionnaire grouped together in a way that aligns with the TPACK self-efficacy questionnaire.

Table 1. Validity and Reliability for self-efficacy

Construct	Cronbach α	CR	AVE
Self-efficacy	0.937	0.937	0.7914

As seen in Table 1, the Cronbach's alpha (0.937) and Composite Reliability (0.937) both significantly exceed the recommended threshold of 0.7 for acceptable internal consistency (Caner & Aydin, 2021), providing strong evidence that the TPACK Scale yields reliable results. Additionally, Average Variance Extracted (AVE) values exceeding 0.5 suggest the self-efficacy items consistently measure the intended construct. Therefore, the instrument demonstrates both

validity and reliability in assessing EFL high school teachers' self-efficacy in TPACK (Namaziandost & Çakmak, 2020).

The acceptable range for skewness and kurtosis values is typically between +2 and -2 (Sharma & Ojha, 2020). In this case, as indicated in Table 2, the self-efficacy values (-.037 and -.688) fell within the range of +2 and -2, indicating the field data exhibited a normal distribution, and the data can be used for the further study.

Table 2. Normality test for self-efficacy

Construct	N	Skewness	Kurtosis
Self-efficacy	437	-.037	-.688

This study employed descriptive statistics to analyze EFL high school teachers' self-efficacy in using TPACK within their classrooms. To understand their perceived levels of self-efficacy, the mean scores were categorized for each component based on a classification system established by previous research (Ersoy & Aktay, 2007). Details of this classification system are presented in Table 3.

Table 3. Mean value classifications

Mean Level	1-1.79	1.8-2.59	2.6-3.39	3.4-4.19	4.2-5
Self-efficacy Level	Very Low	Low	Moderate	High	Very High

The descriptive statistics results in Table 4 show a moderate average score (2.98), indicating that the teachers generally possess some confidence in using technology for teaching English. However, this also suggests room for improvement (Beardsley et al., 2021). The standard deviation (1.021) reveals a range of self-efficacy levels among the teachers. In other words, some teachers were highly confident using TPACK, while others felt less assured (Ali et al., 2020).

Table 4. Descriptive analysis of self-efficacy

Construct	Mean	Level	Standard Deviation
Self-efficacy	2.98	Moderate	1.021

In this study, the findings of this study imply the need for targeted professional development programs that equip EFL high school teachers in Inner Mongolia with the necessary technological knowledge and skills to confidently leverage technology in their English language teaching to

enhance teachers' TPACK skills and confidence. By understanding their current level of self-efficacy, educators can design targeted training and support to equip teachers with the necessary knowledge and skills to effectively integrate technology into their EFL classrooms (Bachtiar, 2024).

Additionally, providing EFL teachers with training programs can leverage this instrument to identify areas where EFL teachers may require additional support in developing their TPACK skills (Dalal et al., 2020). By pinpointing specific knowledge gaps in TK, PK, CK, TPK, TCK, or PCK, targeted professional development programs can be designed to enhance teachers' self-efficacy in these domains (Shah, 2022).

Moreover, the instrument can be used as a pre- and post-intervention tool to assess changes in EFL teachers' self-efficacy after participating in professional development programs focused on technology integration (Sabourianzadeh & Ahmadi, 2023). This data can help track progress and evaluate the effectiveness of such programs in enhancing teachers' confidence in utilizing technology in EFL high school teachers' classrooms (Önalán & Kurt, 2020).

CONCLUSION AND RECOMMENDATION

This study successfully explored a TPACK self-efficacy instrument adapted specifically for EFL teachers in Inner Mongolia, China. The instrument demonstrated strong internal consistency, indicating that its questions consistently measure the intended construct of teacher self-efficacy in integrating technology (González-Rivera et al., 2020). Additionally, the findings provided robust support for the instrument's construct validity, meaning it effectively measures the different domains within the TPACK framework (Arslan, 2020) suggesting the adapted instrument offers a reliable and accurate way to assess EFL teachers' self-efficacy across the TPACK domains (Mishra & Koehler, 2006).

EFL high school teachers in Inner Mongolia have the moderate level of TPACK suggesting a need for targeted professional development programs that equip EFL high school teachers in Inner Mongolia with the necessary technological knowledge and skills to confidently leverage technology in their English language teaching to enhance teachers' TPACK skills and confidence. By understanding their current level of self-efficacy, educators can design targeted training and support to equip teachers with the necessary knowledge and skills to effectively integrate technology into their EFL classrooms.

The ability to gauge teacher self-efficacy in this way holds significant implications for the field of EFL education. Teacher education programs can utilize the instrument to tailor instruction and support to areas where teachers may feel less confident in integrating technology (Raygan & Moradkhani, 2022). Additionally, the instrument can be employed to monitor teachers' progress over time, allowing for targeted professional development opportunities (Bragg et al., 2021).

Furthermore, the instrument facilitates comparative research across different EFL contexts, enabling educators and researchers to gain a broader understanding of teacher self-efficacy in technology integration (Dinçer et al., 2024). Ultimately, this research contributes to the advancement of effective technology integration within EFL classrooms by providing a valuable

tool for assessing and supporting teachers in their use of technology for improved language learning outcomes (Kumar et al., 2022).

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Conflict of Interest

The authors have no conflicts of interest to declare.

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Authors' Contributions

The authors confirm contribution to the paper as follows: study conception and design: Li Jinyao. Ena Bhattacharyya; data collection: Li Jinyao; analysis and interpretation of results: Li Jinyao. Ena Bhattacharyya; draft manuscript preparation: Li Jinyao. Ena Bhattacharyya. All authors reviewed the results and approved the final version of the manuscript.