Enhancing English Language Learning through ICT Integration: Innovations, Challenges, and Pedagogical Implications

Nurfisi Arriyani[1], Rudi Hartono[2], Sri Wuli Fitriati[3], Hendi Pratama[4]
[1,2,3,4]Universitas Negeri Semarang, Indonesia

Abstract

ICT in English Language Teaching (ELT) has revolutionized language learning by allowing the students to become more active, interact frequently and assume more responsibility in their learning process. This study investigates the research question: How do EFL teachers demonstrate and integrate Technological Pedagogical Knowledge (TPK) and Pedagogical Content Knowledge (PCK) in ICT-supported English language instruction? Focusing on EFL instructors at a public university, the study employed a quantitative research design supported by a survey instrument that measured teachers' self-reported TPK and PCK levels. Supplementary data were gathered through lesson plan evaluations and structured classroom observations to triangulate findings. Descriptive statistical analysis has been conducted and provided in the form of mean scores and standard deviations in order to outline the centralities and ranges in the knowledge domains of teachers. Preliminary results show that teachers have reported to be above average when voicing their Pedagogical Content Knowledge (PCK) (M = 4.1, SD = 0.6), although their Technological Pedagogical Knowledge (TPK) (M = 3.4, SD = 0.9) scores have displayed more variance than the latter, which may show the necessity to provide more support to integrate the use of technology. There was a greater chance that a teacher having higher TPK would employ interactive and student-based ICT activities. In contrast, those with lower TPK relied more on traditional, lecture-based methods despite having access to digital tools. In order to promote balanced teacher professional knowledge (TPK) and pedagogical content knowledge (PCK) in EFL instructors, the results support the significance of focusing on professional development. This presentation provides evidence-based recommendations for teacher educators and policymakers to support the effective integration of ICT in tertiary-level English Language Teaching (ELT) settings.

Keywords – Technological Pedagogical Knowledge (TPK), Pedagogical Content Knowledge (PCK), ICT integration, EFL teachers, English Language Teaching (ELT), digital pedagogy, teacher knowledge, quantitative research

INTRODUCTION

The Information and Communication Technology (ICT) participation which is involved in English Language Teaching (ELT) has brought about a revolutionary change that has produced significant changes in traditional language teaching and learning. ICT increases the activity, interactivity, and autonomy of the learners during the process of language acquisition, corresponding to the latest trends in pedagogy, which suggests the learner-centred method and digital literacy. The growth of digital tools affords tentative chances of boosting not only the teaching potential but also the engagement enhanced among learners, notably in the tertiary education context (Kirkwood & Price, 2014; Zhao, 2020).

Despite these developments, a significant gap still exists between the expected outcomes of ICT integration and the actual outcomes of integration in classrooms. Even though most digital tools are readily available, ELT instructors struggle to apply technology in pedagogical activities successfully. The observable reasons for this gap are most often seen in the context of unevenness of teacher knowledge, particularly in their Technological Pedagogical knowledge (TPK) and Pedagogical Content knowledge (PCK) (Ertmer & Ottenbreit-Leftwich, 2020; Tondeur et al., 2012). The current research on the concept of effective ICT-facilitated language teaching has already shown that TPK and PCK are significant in promoting effective ICT-supported language teaching, but most studies remain narrow either in establishing the importance of technology use itself or the outcomes of this language instruction (Stockwell, 2012; Levy & Stockwell, 2013).

This paper is an adaptation of the TPACK framework (Mishra & Koehler, 2006), where their framework conceptualises the relationship between technology, an understanding of pedagogy, and

content knowledge as central to achieving successful ICT integration. Previous evidence has shown that most teachers have good subject-matter content knowledge. However, some teachers exhibit a great deal of variation in terms of the technological pedagogical skills required to execute interactive and student-centred ICT practices with consistency (Koehler & Mishra, 2009; Archambault & Crippen, 2009). Furthermore, studies in digital pedagogy emphasize the need for continuos professional development to bridge these gaps in teachers' technological skills (Lawless & Pellegrino, 2007; Inan & Lowther, 2010). This study addresses a crucial research gap as it triangulates self-reported data of teachers about their TPK and PCK done through a quantitative survey with assessment of lesson plans conducted by the researchers and classroom observations, thus providing a reading into a more comprehensive picture of the interplay between teacher knowledge and ICT pedagogical practices in English language classrooms.

The contribution of this research will be based on its multi-dimensional approach towards the study of teacher knowledge and its direct correlation to instructional strategies implemented using ICT, which has not been thoroughly studied. Contrary to other studies that may concentrate on specific competencies alone or neglect the learners' competencies when formulating their research questions, this study draws a rigorous connection between teachers' content-related technological and pedagogical content knowledge and their classroom behaviour and instructional design. The research identifies the variance of TPK and its association with ICT pedagogical uses, providing valuable insights for the professional development of concerned educators. In this way, it contributes to a better understanding of the issues and breakthroughs in digital pedagogy of the ELT at the tertiary level. It provides evidence-based guidelines that teacher educators and policymakers should consider (Hsu, 2016; Voogt et al., 2015).

METHODS

In this study, a quantitative research design was used to determine self-reported proportions of Technological Pedagogical Knowledge (TPK) and Pedagogical Content Knowledge (PCK) of EFL teachers in using ICT-supported English instructional practices. This quantitative advantage made it possible to collect the data systematically and statistically describe the teachers' knowledge, which allowed for exploring patterns, central tendencies, and variations of ICT integration practices (Creswell, 2014). Quantitative methods have been widely used in similar studies to ensure reliability and generalizability (Garcia-Sanchez, 2018).

This research tested a sample of EFL teachers in a government higher education institution who are actively handling English courses at the tertiary level. As a way of upholding confidentiality and observing ethical considerations, data collection and reporting involved anonymising all respondent identities by coding them. These participants were teachers of diverse technological and professional experiences who, after gaining complete information and making informed consent, took part in the study voluntarily.

Data collection was conducted using multiple instruments to provide a comprehensive understanding of teachers' knowledge and practices. The general instrument was a well structured Teacher Knowledge Survey, which consisted of Likert-items adapted version of validated TPACK instruments designed specifically to fit the ELT situation (Schmidt et al., 2009). Also, the lesson plans in which the teachers intended to introduce ICT were provided by the latter and were assessed with the help of a rubric with reference to the theory estimating TPK and PCK. This way allowed assessment of the practical application of technology within content delivery (Angeli & Valanides, 2009; Niess, 2013). Structured classroom observations were also performed to document actual instructional practices involving ICT use and pedagogical strategies, thereby triangulating the survey and lesson plan data.

The data collection process began with administering the online Teacher Knowledge Survey to all eligible participants. Following the completion of the survey, lesson plans illustrating the integration of ICT were gathered so as to be analyzed on an evaluative basis. Visits in the classroom were to be arranged in advance and in compliance with basic ethical rules to uphold voluntary participation and the secrecy of the participants in case of data collection.

To analyse the data, descriptive statistics were used to summarise survey respondents, and the means and standard deviations of the teacher-reported levels of TPK and PCK were used to describe

the distribution and the mean of these represented variables. The qualitative data from lesson plans and classroom observations were examined thematically to complement and verify the survey results. This multi-instrument strategy strengthened the validity and reliability of the findings by cross-checking self-reported knowledge with actual pedagogical implementation (Bazeley, 2013; Maxwell, 2013).

FINDINGS AND DISCUSSION

Findings

Table 1: Summary Statistics of Teachers' Knowledge Domains

Knowledge Domain	Mean (M)	Standard Deviation (SD)	Minimum Score	Maximum Score	Interpretation
Pedagogical Content Knowledge (PCK)	4.1	0.6	3.1	5.0	Strong and consistent confidence in content and pedagogy
Technological Pedagogical Knowledge (TPK)	3.4	0.9	1.8	5.0	Moderate, more variability reflects uneven tech integration

This table presents the main tendency and distribution of points of two major areas of knowledge of EFL teachers. The mean score of the PCK is bigger, and the standard deviation is smaller, which means that in general teachers have a powerful and enduring mastery of content and pedagogical strategies. In comparison, the TPK scores have a significantly smaller mean value and a significantly higher spread (standard deviation), indicating varying degrees and confidence pertaining to the lessons in successful interlinking of technology with their teaching techniques. This information shows that some of the teachers require development and assistance in their technological skills to improve balanced competencies.

Table 2: Relationship Between TPK Levels and Teaching Methods

TPK Level	Teaching Method	Frequency (Number of Teachers)	Percentage (%)
High (Above Mean +1 SD)	Interactive, student-centered ICT activities	12	48%
Moderate (Within Mean ±1 SD)	Mixed methods: interaction & some lecture	10	40%
Low (Below Mean -1 SD)	Traditional, lecture-based methods with digital tools	3	12%

The table illustrates a correlation between the levels of technological pedagogical knowledge of teachers and preferred methods of instructions. Almost half of the teachers who scored high on TPK pushed ICT activities towards being more interactive and student-centered which proves that increased integration of tech at one end goes in tandem with more dynamic pedagogy on the other. The group with an intermediate score of TPK implemented a combination of traditional and

interactive techniques, and the group that scored as low in TPK tended towards the traditional lecture based approaches, even when digital technologies could be used. This indicates that there is an inhibition of more innovative teaching practices because of low technological competency, in spite of the available technological tools.

Table 3: Variance in TPK and PCK Scores Among Teachers

Measure	Variance (SD^2)	Range (Max - Min)	Implication
PCK	0.36	1.9	Low variability; teachers fairly consistent in pedagogical content knowledge
TPK	0.81	3.2	Higher variability shows disparity in technology integration expertise

This table shows how much variation can be seen in the teacher scores regarding PCK as well as TPK. The smaller standard deviation and the small difference between min and max values in PCK means that the content and pedagogical knowledge of teachers is relatively consistent. In the meantime, the large variance and great dispersion observed in TPK point to more disparities in the confidence and futility of teachers to integrate technology in pedagogy. There is variability that might imply not only varying needs to be supported when it comes to different approaches to technology use, but also different levels of professional development based on the levels of technological competency.

The analysis conducted in the study found interesting findings relating to the level of self-evaluated Technological Pedagogical Knowledge (TPK) and Pedagogical Content Knowledge (PCK) of EFL teachers teaching in ICT-aided English Language Teaching (ELT). The average PCK levels were stated as being above average with the mean score of 4.1 (SD = 0.6) which shows the high confidence that the teachers had in their pedagogical content expertise. When comparing these scores, TPK scores were lower on average (mean TPK: 3.4 (SD = 0.9)) and had increased variability, indicating less consistent levels of integration of technology knowledge among instructors.

Table 4: Teachers' self-assessed levels of Technological Pedagogical Knowledge (TPK) and Pedagogical Content Knowledge (PCK) in ICT-supported English Language Teaching (ELT)

Knowledge Domain	Mean (M)	Standard Deviation (SD)	Interpretation
PCK	4.1	0.6	Above average, consistent confidence in pedagogical content knowledge
TPK	3.4	0.9	Moderate level with wider variance indicating uneven technological knowledge

The finding also indicated that educators who scored higher on TPK were likely to use interactive as well as student centered ICT activities in the lessons. On the other hand, lecturing or more traditional teaching methods were frequently used by teachers with lower TPK scores, even though they had at their disposal digital tools. This mismatch identifies an issue of technological

accessibility versus its use in pedagogy. The results suggest there is an acute necessity of targeted professional learning that focuses on developing greater technological pedagogical knowledge among teachers to even out the levels of expertise in technological and pedagogical aspects.

Discussion

From the finding above, the results align with the foundational TPACK framework (Mishra & Koehler, 2006), which stresses the importance of integrating technological knowledge with pedagogical and content knowledge for effective ICT implementation in teaching. The higher and consistent PCK scores rationalize that teachers generally feel confident in their mastery of content and pedagogical strategies. However, the relatively lower and more varied TPK scores reflect ongoing challenges in adopting and integrating technology in pedagogical content delivery, a finding consistent with prior studies in ELT contexts showing that access to technology does not automatically translate into effective technological integration (Ertmer, 1999).

The observation that teachers with greater TPK engage in interactive, student-centered activities supports the theory that technological knowledge enables more innovative teaching strategies (Koehler & Mishra, 2009). Conversely, reliance on traditional lecture methods by teachers with lower TPK, despite access to digital tools, highlights the existence of barriers beyond mere availability—such as lack of training, confidence, or appropriate support (Ertmer, 2005). This suggests that professional development programs should not only provide technological skills but also focus on pedagogical approaches that encourage active student engagement.

In addition, the results resonate with the demands of the earlier studies that supported integrated development of teacher professional knowledge so as to maximize the benefits of ICT in ELT (Angeli & Valanides, 2009). It became very necessary to support teachers in the development of both their TPK and PCK simultaneously in a bid to develop effective technology integration that is in line with pedagogically sound instruction design.

Based on these results, policymakers and educators in teacher preparation programs would do well to think about well-planned sustained professional development programs that not only encourage technological prowess but also pedagogical creativity. These endeavors will assist teachers in transcending to the proper use of technology, besides the simple adoption aspect.

CONCLUSION

This research problem was to investigate the extent to which EFL teachers have and use their Pedagogical Content Knowledge (PCK) and Technological Pedagogical Knowledge (TPK) in the use of ICT in English language teaching. The results also demonstrate that there is a high and steady level of mastery by the teachers in the realm of PCK, which reflects their firm grasp of their subject matter knowledge and pedagogical steps. Nevertheless, there is a significant difference in their TPK as they are competent and confident to different degrees in incorporating technology instruction. This difference affects teaching behaviours since the teachers with the higher TPKs prefer more interactive and student-oriented use of ICT, and teachers with less TPK prefer more traditional and lecture-based use of ICT, even though they have the same access to digital tools.

The findings are indicative of the urgent need for specially designed professional development plans that focus on teacher improvement in technological pedagogy to integrate technology into language learning spheres effectively. In practice, schools and policymakers of education ought to invest in continuous ICT training programs that cater to the diverse learning needs of teachers. Moreover, establishing sustainable support and the possibility of collaborative learning can help increase innovation and the embracement of the student-focused approach to digital teaching.

Finally, longitudinal studies would be a possible next step to research, and these studies could examine the effect that such improvement in TPK has on student engagement and learning outcomes. Furthermore, researching what can support or inhibit the development of the technological skills required by teachers will shed more light on how best to ensure the successful implementation of ICT in ELT practice.

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