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# English as a Foreign Language Teachers' Technology Professional Development Needs

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**Abstract: This study examined the Technological, Pedagogical, and Content Knowledge (TPACK) professional development needs of English as Foreign Language (EFL) Teachers. EFL teachers participated in semi-structured interviews from seven primary schools in a middle-sized urban school district in the east part of China. Content analysis with frequency tables and quotations from the interview transcription were conducted. The results indicated that though primary EFL teachers in China have the basic technological knowledge to support teaching, they lack appropriate knowledge and training particularly in areas of TPACK related to EFL teaching. Results from the present study indicate that there is a need for professional development (PD) that helps EFL teachers integrate technology in teaching reading, speaking, and writing.**

**Keywords:** EFL, TPACK, Teacher Professional Development, Education Technology.

## INTRODUCTION

Multimedia instruction using resources from the internet and multiple types of videos and audio-assisted listening experience has been found to boost students' language acquisition (Levak & Son, 2017; Tingir, et al., 2017). In addition, technology provides students with the motivation to acquire new concepts, both in content-area learning, as well as primary language and second language development (González-Carriedo, & Esprívalo Harrell, 2018).

Similarly, the ability of EFL teachers to integrate technology into their teaching plays a critical role in their students' language development (Rienties, et al., 2020). The use of digital learning has widely spread among English language learners (ELLs) by providing opportunities for interacting with peers and teachers, as well as for searching for vocabulary words and other resources (Park & Slater, 2015). Using educational and informational technology in EFL teaching and learning affords rich interactive tools and exciting materials to improve teaching effectiveness (Sadikin, & Saleh, 2016).

The Ministry of Education of China in 2018 implemented the National Education Informatization 2.0 Action Plan (NEIAP 2.0). This action plan focused on developing and promoting the training of informational technology application skills for K-12 school teachers across the country. This plan aimed at building a classroom-based, application-driven, and innovation-oriented teachers' educational technology literacy growth by 2022 (Educational informatization 2.0, 2018). To achieve this goal, there are essential needs that need to be considered such as implementing teacher training in technology use, narrowing the gap between urban and rural teachers' ability to use technology in their teaching, and building an informational technology-based teaching innovation for leading the future education (Educational informatization 2.0, 2018).

Although this policy has been implemented, there is little evidence that indicates that EFL teachers in China are receiving sufficient professional development (PD) training in integrating technology in their EFL classes (Xu & Sun, 2019). More importantly, due to the pandemic of the COVID-19, teaching virtually or in a hybrid format (online and face to face context) technology integration is becoming more important than ever. It is critical for schools to understand that it is not enough to increase teachers' access to hardware, but there is a

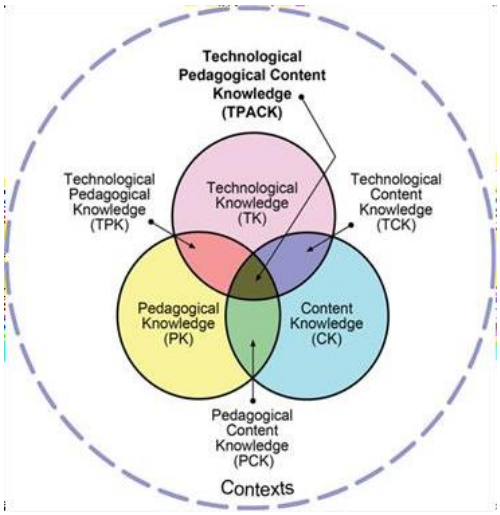
need to develop teachers' ability in the how to use technology specific to the disciplines that they teach. The purpose of the present study was to examine primary school EFL teachers in China Technological, Pedagogical and Content Knowledge (TPACK) (Mishra, & Koehler, 2006), as well as, their perceived PD needs related to technology for teaching EFL.

## CONCEPTUAL FRAMEWORK: TPACK

Lambert et al. (2008) defined "technology integration" as "teachers utilizing content and technological and pedagogical expertise effectively for the benefit of students' learning" (p. 386). In addition, Mishra and Koehler (2006) have indicated that the knowledge that teachers need to make choices regarding the prospective use of technology in educational contexts includes Technological Pedagogical Content Knowledge. This theory addresses teachers' capability to incorporate technology into the curriculum (Bostancıoğlu & Handley, 2018).

The TPACK model considers the interaction between three domains of knowledge: content, pedagogy, and technology. The framework for TPACK contains seven categories of knowledge supplementary with the integration of technology in instruction (Baser, Kopcha, & Ozden, 2015). First, Pedagogical Knowledge (PK) refers to teachers' profound knowledge about the procedures and performance or techniques of teaching and learning (Koehler et al., 2013). Second, Content Knowledge (CK) refers to teachers' knowledge of the subject area. Third, Pedagogical Content Knowledge (PCK) addresses teacher's CK for teaching (Bostancıoğlu & Handley, 2018). Fourth, Bostancıoğlu and Handley (2018) concluded that Technological Knowledge (TK) refers to "teachers' understanding of how to operate technologies which could be used in education" (p. 575). Thus, Technological Content Knowledge (TCK) addresses the knowledge needed to be able to use technology so that subject matter can be presented to promote understanding. Additionally, Technological Pedagogical Knowledge (TPK) focuses on how the use of the technology can improve teaching and learning. TPACK is the interception of TPK, TCK, and PCK (Figure 1).

Figure 1. The TPACK image (Reproduced by permission of the publisher, © 2012 by tpack.org)




## TPACK in EFL

Using of educational technology to improve teaching practices for learning through the lens of TPACK is valuable (Goradia, 2018). Recent studies, however, have shown that teachers' instruction is still restrained by conventional teaching strategies and focused on evaluating student performance influenced by the exam-driven curriculum (Liu & Kleinsasser, 2015). Many EFL teachers, for example, lack TK, which can assist them in incorporating technology in their teaching (Yıldız, 2017; Nazari et al., 2019). Alnajjar and Al-Jamal (2019) conducted a TPACK study which surveyed 69 EFL teachers in Jordan and

found that teachers were lacking TK. That is, there was a disconnection between CK and TK, and TPACK. A similar study, conducted in Taiwan, also reported, among the seven TPACK components, EFL teachers' TK to be their most limited area, which indicates, EFL teachers need more TK to further strengthen their TPACK (Wu & Wang, 2015). A more recent study conducted in mainland China also demonstrated that EFL teachers self-reported more confidently with TK but relatively uncertainly with their knowledge in TCK, TPK-TPACK (Li, 2021).

Moreover, studies have found that although EFL teachers indicated that they had confidence in CK, they do not feel that they have the TPK in the subject area that they are teaching (Sulaimani et al., 2017; Xu & Sun, 2019). According to Köse (2016) who administered a TPACK-EFL Survey to 127 EFL teachers in Turkey, the English teachers believed the most important component was their CK; yet "they do not think that they are highly competent in integrating technology into their content teaching with sound pedagogy" (p. 17). In a similar study, Hsu (2016) found that participants possessed appropriate TK, however, there was of lacked understanding found in three core areas: TK, PK, and CK. Hence, it appears that the effective use of technology requires a thorough comprehension of PK and TK, as well as, an understanding of how they interact with CK in order to deliver valuable instruction (Debbagh & Jones, 2018).

Additionally, studies have also found that the EFL teachers displayed a lack of ability in manipulating technology in class with appropriate pedagogies and they expressed a need to be provided with relevant PD activities regarding TPACK as it related to EFL (Liu et al., 2014; Nazari et al., 2019; Zhou, Padron, & Waxman, 2021). It is important that teachers receive appropriate PD since teachers' knowledge and attitudes toward teaching via technology. Their ability to use technology and the challenges they face during teaching have been identified as impediments to technology integration. (Liu et al., 2014).

Little research, however, has examined whether EFL teachers in China receive sufficient PD training in TPACK. In addition, most of the studies in literature do not address the integration of technology specifically in the subject of teaching EFL. Given the expected effects of policy implementation in China and the benefits of educational technology reported in many studies, it is vital to explore the how EFL teaching uses of technology. Three research questions were addressed as follows:

What are Chinese EFL teachers' perceptions of their use of TPACK?

What are Chinese EFL teachers' attitudes of their use TPACK and the support that they receive in teaching digitally?

What are Chinese EFL teachers' perceived PD opportunities and PD training needs regarding TPACK?

## METHOD

### Instrument

A semi-structured interview protocol consisting of 20 main questions along with follow-up probing questions were used in this study. Items of the interview protocol were adopted from Zhou et al. (2022) and adapted from two instruments: a) the Technological Pedagogical Content Knowledge (TPACK) for English as a Foreign Language (EFL) (Bostancıoğlu & Handley, 2018) and b) the EFL teachers' Current Practice and Application of EEFL (CPA-EEFL) (Kabakci Yurkakul et al., 2012). Both EFL-TPACK and CPA-E-EFL are comprehensive self-reporting instruments that focus on the identifying TPACK for the teaching of English language and teachers' perceptions of TPACK and its related training. The two instruments use a five-point Likert type scale ranging from 1= 'strongly disagree' to 5= 'strongly agree'. EFL- TPACK is made of 36 items which have good internal reliability reported with an overall Cronbach's α coefficient at .94 (Bostancıoğlu & Handley, 2018). Likewise, CPA-EEFL contains of 33 items with the internal consistency values of α = .95 (Kabakci Yurdakul et al., 2012).

The interview of the present study intended to gauge teachers' knowledge and attitudes toward the integration of technology into teaching EFL and their related PD needs

(Table 1). More specifically, the interview aimed at examining primary EFL teachers' knowledge about: a) use of technology, b) technological and pedagogical teaching skills, c) integration of technological, pedagogical and content knowledge in EFL teaching; d) teachers' attitudes towards applying TPACK in EFL teaching, and e) teachers' PD training opportunities and needs related to TPACK.

Table 1. Sample questions of the interview

| Category | Example |
|---|---|
| Technology use | What kind of computer hardware do you usually use in the classroom? |
| Technological & pedagogical skills | How do you digital tools in teaching? |
| Technological, pedagogical & content integration in EFL class | What educational technology tools do you use when teacing students in the skills of listening, reading, writing and speaking? |
| Teachers' attitudes towards applying TPACK | Are you satisfied with educational technology use in your current teaching context? |
| Teachers' TPACK related PD training opportunities and needs | Have you had sufficient PD focusing on using technology in teaching EFL? If not, why? |

**Data Collection & Data Analysis**

Each participant was interviewed for approximately 30 minutes in English. The audio part of all interviews was recorded and later transcribed by the authors. The original instrument has been proved with good validity as it has been applied in Bostancıoğlu & Handley (2018), Kabakci Yurkakul et al. (2012), and Zhou et al., (2022), respectively. Due to the descriptive nature of the interview modality, content analysis with frequency tables, figures, and quotations from the interview transcription were used. In terms of the frequency tables and figures, descriptive analyses of quantitative coding results from the interviews were conducted. In assessing teacher's TPACK, responses to each question were coded as No equals to 0, and Yes equals to 1. In addition, questions regarding teacher's judgments and attitudes were coded as: positive judgments and attitudes were coded as Yes= 1, and the negative responses were coded as No= 0. Lastly, for questions that examine teacher's feeling or perception by different levels, responses were coded according to participants answers numerically from Disagree= 1 and up to Agree= 4 to represent the level in categories.

**Sample**

After receiving institutional review board approval, the authors used the institution's bulk email to recruit participants from local school district in an suburban area in east China. With random sampling, 60 EFL teachers from seven public primary schools were recruited. Teachers who agreed to participate in this research study were further communicated with in-person semi-structured interviews. Generally, the participating EFL teachers involved in this study served approximately a total of 8, 000 EFLs. Due to China's large population, particularly in the eastern region, the size of class in this public-school district is large with an average of 50-60 students per teacher. Generally, each EFL teacher has a teaching load of two to four 45-minute class periods a day.

The participants (N=60) in this study included 49 females (82%) and 11 males (18%) EFL certified full-time teachers ranging from third to sixth grade level. The mean of the participated EFL teachers' age was 39 years old with a median at 35. According to Table 2, most teachers' ages range from 31 to 50 years old. The average year of participants 'teaching experience was 11 years, with a median at 9 years. Twenty-three percent of teachers were at beginning level with less than 5 years teaching experience, 33% of

teachers were at intermediate level with teaching experience between 6 and 10 years, 22% of participants had advanced teaching experience with 11 to 15 years, and 22% of participants had advanced high level with teaching experience of 16 years and more.

Table 2. Characteristics of Participants (N= 60)

| Characteristics | Category | Frequency | % |
|---|---|---|---|
| Gender | Female | 49 | 82 |
| | Male | 11 | 18 |
| Age (Mean= 39) | 20-30 | 9 | 15 |
| | 31-40 | 24 | 40 |
| | 41-50 | 16 | 27 |
| | 51+ | 11 | 18 |
| Years of experience (Mean= 11) | 0-5 (beginning) | 14 | 23 |
| | 6-10 (Intermediate) | 20 | 33 |
| | 11-15 (Advanced) | 13 | 22 |
| | 16+ (Advanced high) | 13 | 22 |

## Results

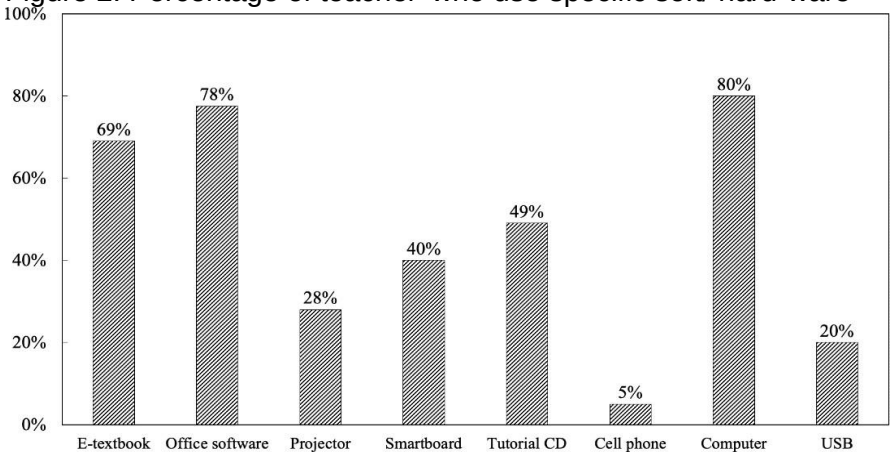
### Teachers' perceptions of their TK, TPK, and TPACK

### EFL Teachers' TK

To determine the EFL teachers' TK, EFL teachers were asked: "What kind of computer hardware do you usually use in the classroom? And why do you prefer to use these tools?" Teachers responded that the hardware that they most often used in the classroom included (Figure 2): computer/laptop (80%), Office software (78%), and e-Textbook (69%). Teachers reported that these tools were time-saving and easy to operate in class to engage students. Results related to the participants' perceptions of their ability to use digital tools and their knowledge of technology related concepts indicate that 97% of teachers have sought help from online platforms and/or peers to solve technological problems. For example, 50% of the teachers did not know how to edit images or edit videos.

Interestingly, nearly 40% of teachers reported that they have chat groups on mobile "Apps" with parents. They found this is effective in involving parents in their children's language learning. In general, teachers know how to use technology at a basic level, such as computers, office software, and e-textbook; however, the results also indicate that they lack TK when it comes to being able to solve technical problems independently.

Figure 2. Percentage of teacher' who use specific soft/ hard-ware




### EFL Teachers' TPK

Teachers were also asked about how they used digital tools in teaching. Among the technology tools used for whole group instruction, the use of audio and video files within the e-textbook and tutorial CD were mentioned most often (73%). This was followed by, the use of PPT to share the content and key concepts from the book (60%). Teachers reported the use of smartboard and the accessing online platforms and internal links to interact with

students, (41%, 40% respectively). Few teachers (16%) mentioned that some schools have smart classrooms that provide students with digital tools that they can use in class to interact with teachers and/or peers, such as iPads; yet, teachers are able to teach in this classroom once per semester due to the lack of availability of the classroom (Figure 3).

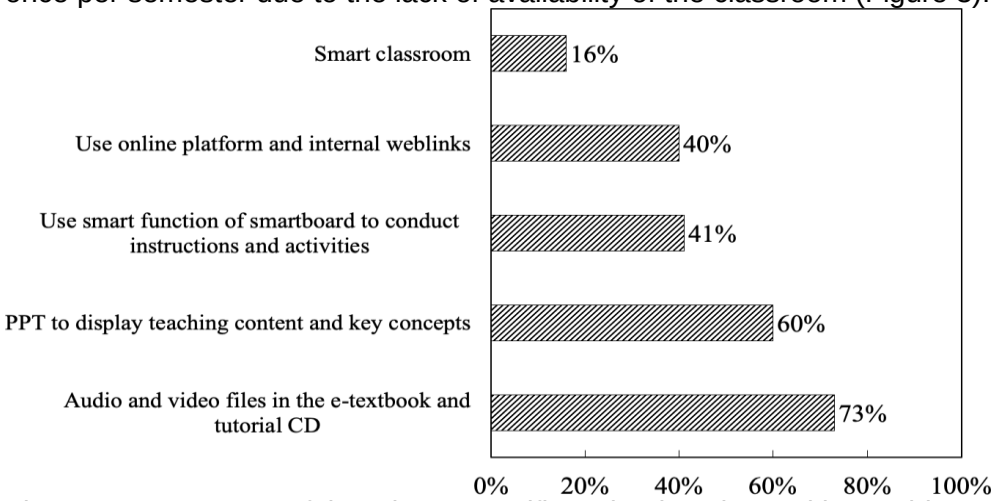



Figure 3. Percentage of time that a specific technology is used in teaching EFL.

Although 41% of the teachers reported using the Smartboard and this is required practice for all teachers by the Ministry of Education in China in NEIAP 2.0, a small percentage (13 %) of the teachers perceived themselves as skilled in using the smart functions of the whiteboard (Table 3). Not surprisingly, in terms of the features of educational technology that teachers used in engaging students, only 25% of teachers have applied a combination of visual, audio, and translation features. On the other hand, 75% of the teachers sought online materials for use in their lesson plans, while 50% used resources provided by the school district. However, only 40% of the teachers indicated that they knew English learning websites for preparing lessons and for students to use. Interestingly, teachers (63%) were unable to define multimedia instruction. Teachers gave a few examples in a tentative tone, such as “PPT?”, “audio recording?”, etc.; one teacher asked: “Is it just teaching with computer?”; another teacher said, “is it like to use a projector in teaching?”

Table 3. Percentage of teachers’ having technological pedagogical knowledge

| TPK | Frequency | % |
|---|---|---|
| Know the smart function of the whiteboard | 8 | 13 |
| Able to clearly define Multimedia Instruction | 38 | 63 |
| Use multiple types of technology in teaching | 27 | 47 |
| Use combination features of technology in teaching | 15 | 25 |
| Sufficient knowledge of English learning websites | 24 | 40 |
| Get multimedia resources online | 45 | 75 |
| Get multimedia resources from school district | 30 | 50 |
| Know the smart function of the whiteboard | 8 | 13 |

Note. N= 60

**EFL Teachers’ TPACK**

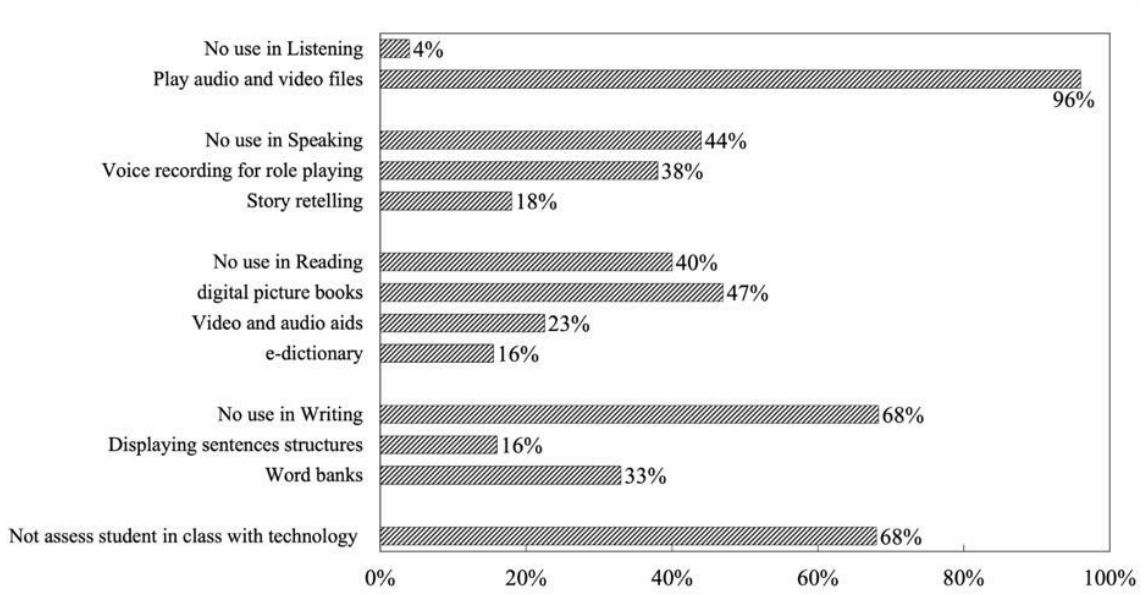
Regarding what educational technology tools teachers use when teaching students in the skills of listening, reading, writing and speaking, 95% of teachers reported using technology to practice listening skills; while, 60% used technology in teaching reading development and 57% of used technology in teaching speaking skills. Only about a third of the teachers used technology to assess students (33%) or develop students’ writing skills (32%).

Among those who use technology in teaching the four language skills (Figure 4), the activities used most often to develop oral language skills included dubbing and voice recording for role-playing (38%) and story retelling (18%). In addition, digital picture books

(47%), video and audio aids (23%), and e-dictionary (16%) are used to facilitate students' reading skills. For writing instruction, displaying sentence structures on the smartboard (15%) and providing word banks (33%) occurred most often in teaching. Additionally, nearly 67% of the teachers indicated that they do not assess students using digital tools.

In general, EFL teachers in this study are integrating TPACK in teaching the listening aspect of language. For example, the majority of teachers used audio and video files which provide authentic native speakers' voice for students to practice listening skills. However, they integrated TPACK less often in developing students' speaking, reading, and writing skills.

Figure 4. Percentage of teachers using a particular technology in teaching the four language skills




**Teachers' Attitudes towards Their TPACK Support**

As for teachers' satisfaction with educational technology use in their current teaching context, only 30% of the teachers felt satisfied while 42% indicated that they were familiar with the support provided by the school district (Table 4). Interestingly, 53% of the teachers reported that observing a master teacher is an effective way to learn technology skills in teaching EFLs. Overall, teachers (87%) have positive perceptions about teaching EFL digitally; however, they are not satisfied with the use of educational technology in their teaching and the resources given by the school district.

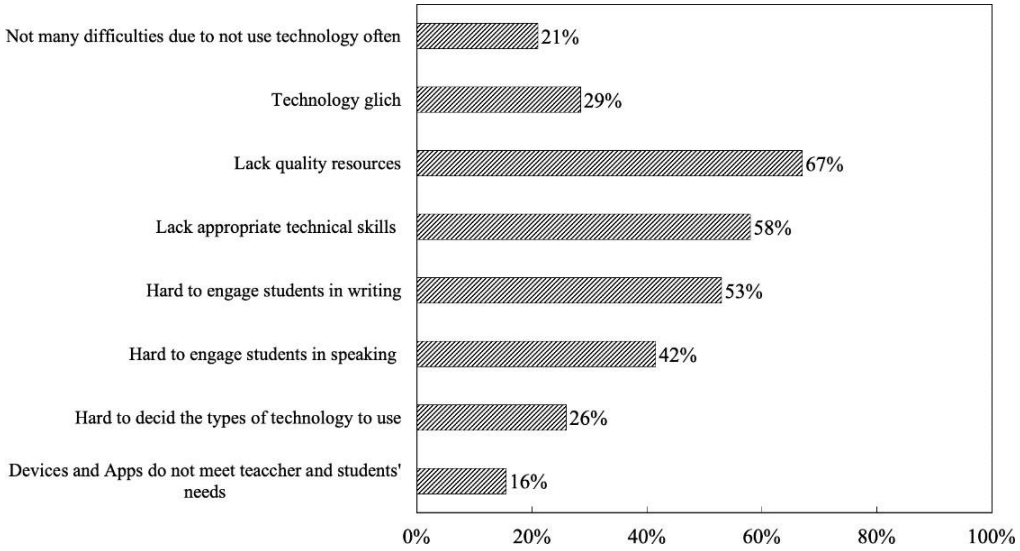
Although the majority (87%) of teachers reported a preference for teaching digitally (Table 4), teachers most often reported difficulties in teaching digitally were: the lack quality resources (67%) and their lack of technical skills (58%) (Figure 5). In addition, 53% of teachers felt that it was hard to engage students in teaching writing. Interestingly, 21% of the teachers indicated that they did not have many difficulties using technology in their teaching since they seldom used technology to teach.

Table 4. Percentage of EFL teachers' perceptions towards TPACK support

| TPACK | Frequency | % |
|---|---|---|
| Satisfied with school and district's support | 18 | 30 |
| Familiar with school district's technological support | 25 | 42 |
| Preference for teaching digitally | 52 | 87 |
| Observing master teacher's teaching and gaining advice from them | 32 | 53 |

Note. N= 60

Figure 5. Percentage of teachers indicating the reasons for difficulties in teaching with technology




**EFL Teachers' PD Opportunities and Needs**

A few (22%) teachers perceived having received sufficient PD related to teaching digitally. In the past two years, 47% of teachers reported having had online PD, and 53% had face to face PD training (Table 5). Overall, most teachers (93%) indicated that the lack of use of technology in their EFL class was due to the lack of training in this area.

Table 5. Percentage of EFL teachers having PD opportunities

| TPACK | Frequency | % |
|---|---|---|
| Soft/hard-ware PD opportunities | 35 | 58 |
| ICT PD opportunities | 22 | 37 |
| Online PD opportunities | 28 | 47 |
| Face to Face PD opportunities | 32 | 53 |
| Perceived had sufficient PD | 13 | 22 |
| Need more TPACK relevant PD opportunities | 56 | 93 |
| Soft/hard-ware PD opportunities | 35 | 58 |

Note. N= 60

Not only was the PD not offered, but they (47%) did not know how to obtain information on the availability of that training. Teachers (59%) further explained that much of the PD they have received did not meet their needs, since it did not focus on teaching EFL; it was only for the purpose of accumulating credits. Additionally, teachers indicated that they had had no PD training that provided them with quality teaching resources (Figure 6).

Results from this study indicate that teachers did not have sufficient PDs in TPACK-EFL. The majority of the teachers (93%) indicated that they needed PD focusing on using technology in teaching EFL. Additionally, 57% of teachers said they prefer to have both more PD training and more support resources. Moreover, 35% of teachers prefer to have online/distance PD training, 42% like in-person PD more, while 23% would accept both (Figure 7).

Teachers who preferred to have online PD explained that online PD was preferred because of the flexibility by not requiring attendees to physically stay in a certain place and attend at a particular time. Also, online PD allows teachers to go back and review concepts easily. One teacher said, "I feel like online PD is more flexible to control the time and mobility, and it is easy to go over the content again by replaying the videos." However, a few individuals preferred to have a face-to-face PD. One such teacher said, "I think face to face PD is better because I can get my questions answered quickly and have more opportunities to communicate with other teachers; online PD is sometimes just for accumulating credit purpose, and I cannot focus too much on it". Therefore, the primary reason that they enjoyed this type of PD was that it provided an opportunity for building social networks with other schoolteachers. They also felt that it was easier to ask questions and interact with trainers.

Figure 6. Reasons for perceived insufficient PD

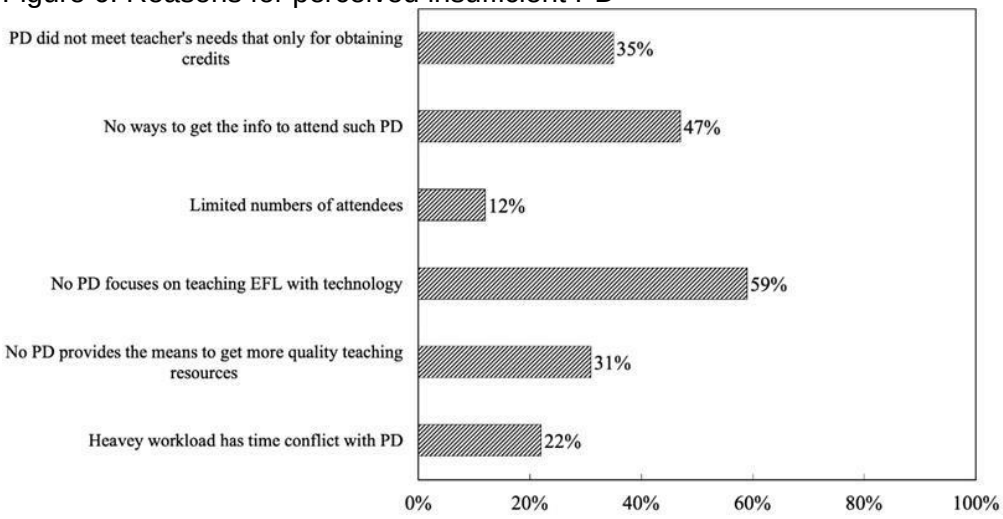
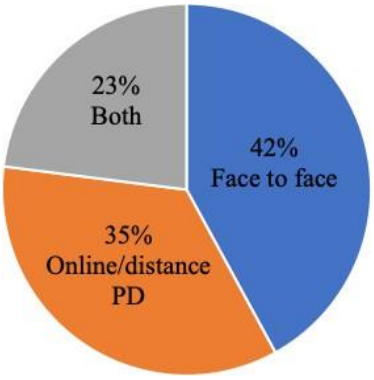
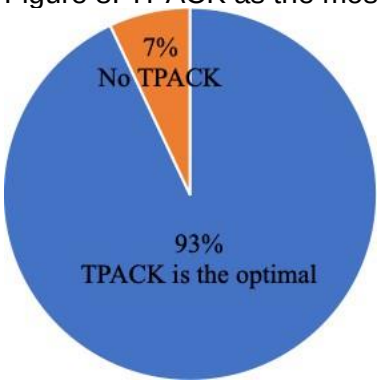



Figure 7. Percentage of PD context preference




Finally, the interview examined types of PD that teachers most look forward to regarding TPACK, including CK, TK PK, TCK, TPK, PCK, and TPACK. Among the group of each knowledge domain, 37% chose to learn more TK, followed by 32% on PK and 31% on CK. Of the combination of any two domains, TPK ranks first at 44%, then, TCK and PCK with respectively 38% and 18%. Last but not least, 93% of teachers voted that TPACK is the most essential one for their future PD training (Figure 8). Therefore, the data indicates that overall, TK, TPK, and TPACK training are in the most demand among EFL teachers.

Figure 8. TPACK as the most needed PD training




## DISCUSSION

### Teachers' Perceptions of their TPACK and Attitudes towards Support

Data analyses showed that the most of the teachers in the present study used a teacher-centered approach that uses traditional classroom materials and have adopted

limited TPACK in their EFL classes. This finding is in line with Liu and Kleinsasser's study (2015) that EFL teachers are restricted in conventional teaching strategies. Finding from the present study suggests that for teacher's had basic technological knowledge in classroom teaching, however, they do not have sufficient knowledge and lack skills on how to independently solve technical problems for teaching. Therefore, teachers' use of technology is at a basic level.

Also, the results indicate that teachers have limited knowledge of multimedia instruction and features various technology which affects their ability to use enough TPK in teaching. That is, teachers do not have adequate knowledge on how to integrate TPK in their teaching, due to a limited understanding of multimedia instruction and an inability to provide multimedia instruction. For example, even though nearly half of the teachers reported using the Smartboard in teaching, only 13% of the them believed themselves as skilled in using the smart functions of the whiteboard. Moreover, teachers reported not used to incorporate a combination of visual, auditory, and translation features of educational technology to increase student interaction and not having sufficient knowledge about the resources of language learning websites/platforms. These evidences revealed that teacher may lack instructions and need more training in learning how to incorporate the smart function of the educational technology into real classroom teaching.

Additionally, though EFL teachers have a good sense of TPACK in teaching the listening skills of language, they are lacking TPACK in developing learners' other language skills in learning English. As teachers indicated in the study, lack of resources given from the district and school might be an obstacle in implementing technology integration in classroom teaching. Also, we could infer that lacking adequate PD training among EFL teachers regarding TPACK would possibly account for the low level of their TPACK, which is in line with the findings of previous studies found in other regions (Alnajjar & Al-Jamal, 2019; Liu et al., 2014). Hence, the results of this study suggest that it may be necessary to offer more enriched training in the technology integration related topics in teacher development programs, and allow teachers to have extensive practices on these skills as it related to EFL instruction.

According to teachers' responses to the interview, most of the EFL teachers have positive attitudes towards the benefit of teaching by TPACK in their EFL class, but they indicated that they had few resources given by the school district which resulted in limited skills is the use of TPACK. District and school admins need to provide more quality resources and access to help teacher to be competent in teaching digitally. In addition, teachers indicated that they experienced many difficulties in teaching digitally (e.g., lack of hardware, software, equipment not working), which resulted in a high rate of dissatisfaction. Therefore, stakeholders including school administrators and district teacher professional development training programs should increase their attention and give more support to facilitate these EFL teachers professional learning.

Research indicated that teachers' PD training, grounded on the conceptual framework of TPACK, has powerful effects on teachers' instructional skills assisted with educational technology (Caromawati, 2017; Liu & Kleinsasser, 2015). According to the report from the teachers, peer observation and peer coaching are effective PD approaches in improving their TAPCK and its related skills. More than half of the teachers mentioned that they had experience in observing master EFL teacher's exemplar (teaching with technology integration as a way of professional development. This peer observing approach gave them aspirations on their own teaching. Research has found similar results that peer observation, as a way for teacher development, is effective for increasing teachers of EL's beliefs in their ability of classroom teaching (Mousavi, 2014). Moreover, teachers in this study also received feedback from exemplar EFL teachers when they were observed by exemplar teachers for real classroom teaching. The feedback included information on how to integrate technology in teaching EFLs more effectively and efficiently which had positive effects on improving teaching strategies. Thus, we can draw an assertion that, teachers, who are supported with

more TPACK related PD training specifically in EFL subject areas, might achieve a higher level of instruction skills and maximize their potential to integrate the knowledge of teaching content technologically and pedagogically.

### PD Opportunities and PD Needs

The results of this study indicate that EFL teachers had insufficient opportunities to participate in TPACK related PD training. This is of concern since teacher's knowledge of technological, pedagogical, and content integration provides student-centered instruction that opens access in multidimensional language learning to fulfill the needs of EFL learners. Since the ongoing training and development for teachers on their technological, pedagogical and content knowledge along with the practice in technology integration skills are highly associated with their teaching performance and outcomes (Akturk & Ozturk, 2019), the TPACK-related PD training for EFL teachers plays a significant role in promoting the quality of teaching effectiveness, which needs to be improved in teacher PD training programs. Further, teachers' awareness of enhancing their TPACK related skills might not be appropriately reinforced by the schools and districts as they reported limited ways to get the information for the related PD training. Therefore, it is important for EFL teachers to be motivated to equip themselves with the skills required to incorporate technology, since incorporating technology in their teaching has can benefit students' learning and performance.

In addition, this study examined the EFL teacher's PD needs related to technology integration in teaching. To be more specific, the TK, TPK, and TPACK are identified as the three knowledge aspects that are needed the most among primary-level EFL teachers. Mishra and Koehler (2006) stated that TK is foundation knowledge for instructors being able to integrate technology. Teachers with little knowledge of technology might lead to limited integration of technology with appropriate pedagogy to engage student in-class, which would result in a lack of TPK. As such, the integration of TK and PK needs to be addressed in PD training programs particularly as it related to EFL. Thus, it eventually promotes both teachers' instructional efficiency and students' performance.

## CONCLUSIONS AND IMPLICATIONS

In this study, EFL teachers indicated using traditional classroom materials with limited use of technology due primarily to their limited skills in the application of TPACK. In addition, teachers felt that there was not adequate PD training for EFL teachers to assist them in integrating technology in their teaching. This training is limited because of the limited resources provided by the school district. Interestingly, most of the EFL teachers reported having positive attitudes towards the benefit of teaching by TPACK in their EFL classes and would like to teach digitally. The present study provides stakeholders with an effective approach to evaluate teachers' knowledge skills and their ability to incorporate technology into teaching their EFL students. The participants displayed the lack of ability in manipulating technology in EFL with appropriate pedagogies and proposed robust needs in receiving relevant PD activities regarding their demands in TPACK-EFL. PD training should be developed that provide second language teachers with knowledge and skills necessary to integrate technology in their EFL teaching. It is not just adding technology to the existing teaching and content domain, but rather teachers need consistent training in how to make connections between technological knowledge, pedagogical knowledge, and content knowledge.

While the study provides information on the impact of teacher PD on their TPACK, there are a few limitations of this study. First, though there are other elements of TPACK, such as CK, PK, and CPK, which account for the effects on teacher's TPACK in teaching EFLs, we did not include them in this study since they are not the focus of this study. However, future studies could consider including more factors that impact teacher's level of TPACK in teaching EFLs in order to provide more insight on teacher PD in TPACK teaching EFLs and its related topics. Additionally, while the data source of interviews provides

meaningful information, the interview data is self-reported by the participants. Future experimental or intervention studies may be conducted to analyze the effect of the TPACK-EFL PD and teacher's knowledge of TPACK.

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