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Evaluating novice and experienced EFL teachers' perceived TPACK for their professional development

Naghmeh Nazari¹, Zohreh Nafissi^{1*}, Masoomeh Estaji² and S. Susan Marandi¹

Abstract: Technological Pedagogical Content Knowledge (TPACK) is a framework which provides a number of opportunities for conducting research in teacher education, teacher professional development, and teacher's use of technology. By applying TPACK framework, this mixed methods study aimed to examine novice and experienced EFL teachers' differences in their perceived TPACK and its influences on their professional development. To this end, for the quantitative phase, a sample of 427 EFL teachers, both male and female with different teaching experiences were selected from various English language institutes in Tehran. In the qualitative phase, 16 EFL teachers were selected for a structured interview. The quantitative results indicated that experienced teachers were of significantly higher scores in terms of pedagogical knowledge and pedagogical content knowledge subscales. In contrast, novice teachers were of significantly higher scores considering their



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PUBLIC INTEREST STATEMENT

Technological Pedagogical Content Knowledge (TPACK) refers to a framework for teacher knowledge for technology integration focusing on three main components of technology, pedagogy, and content knowledge of teachers and their intersections for effective teaching. Teacher professional development is an aspect which can be researched on through investigating EFL teachers' perceived TPACK. Professional teachers are those who can dynamically integrate these forms of knowledge into their teaching practice. The current study aimed to investigate novice and experienced EFL teachers' differences in their perceived TPACK and its impact on their professional development. Based on the results, novice and experienced teachers differed in their perceived TPACK. Novice teachers were found more competent in their technological knowledge and its combinations, whereas experienced teachers were more knowledgeable in their pedagogical and content knowledge and its combinations. Hence, it was found that novice and experienced teachers need different professional development courses tailored to their needs.

technological knowledge, technological content knowledge, technological pedagogical knowledge, and TPACK. The qualitative results demonstrated that novice and experienced EFL teachers favored different professional development programs tailored to their needs. Likewise, they claimed that they could bridge the gap in their knowledge through collaboration in professional development courses.

Subjects: Information & Communication Technology; ICT; Teaching & Learning - Education; Teachers & Teacher Education; Continuing Professional Development; Language Teaching & Learning

Keywords: TPACK; professional development; EFL teachers; novice teachers; experienced teachers

1. Introduction

The quality of Teacher Professional Development (TPD) has become an increasingly significant educational issue as teachers encounter growing scrutiny and pressure to help students achieve higher levels. While debates and tensions over the scope, form and focus of TPD continue, teachers are expected to perform according to new and changing standards, and school districts are calling on teachers to reform practices through teacher-learning activities ranging from workshops, to seminars, to classroom modeling (Margolis, Durbin, & Doring, 2017). As access to technology and the knowledge following that becomes more established and universal, its application within the curriculum and pedagogical practicality becomes remarkably important to educators. Additionally, the implications of how technology is then employed in EFL teacher professional development initiatives, becomes significantly compelling.

Research in the field of educational technology has often been a topic of criticism for a lack of theoretical grounding (Mishra & Koehler, 2006). Technological Pedagogical Content Knowledge (TPACK) is a theory designed by Mishra and Koehler (2006) to account for teachers' ability to integrate technology into the curriculum. TPACK builds on Shulman's (1986) concept of Pedagogical Content Knowledge (PCK). According to Shulman's model of PCK (1986), the effectiveness of an individual teacher depends not only on their Content Knowledge (CK) but also on their PCK (Bostancıoğlu & Handley, 2018). Extended from Shulman's (1986, 1987) pedagogical content knowledge (PCK), TPACK is a theoretical construct of teacher knowledge proposed by Mishra and Koehler (2006). It describes how teachers teach subject matter content using specific instructional methods with specific technology in particular contexts. TPACK is enacted as they develop three domains of core knowledge, i.e. technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK) (Tseng, 2017).

Since the final outcome of all education reform should be student improvement, any reformative approach, if it is to advance, ought to begin with recognition of the importance of teachers in promoting student performance (Armour-Thomas, Clay, Domanico, Bruno, & Allen, 1989; Ferguson, 1991; as cited in Harwell, 2003). In addition, since teachers are lifelong learners, they play a leading role in education. There is an increasing need of Professional Development (PD) for English teachers to take up challenges in education to enhance student performance. However, due to some reasons such as lack of time, energy, reluctance to develop professionally, or not knowing how to start, some EFL teachers do not invest in their professional development. Should the aforementioned problems exit, promoting student learning might be difficult to achieve.

Likewise, both experienced and novice teachers need to be academically updated with new knowledge and new insights through professional development (Hartono, 2016). A need therefore arises as to investigating EFL teachers perceived TPACK and their professional development. Despite the extensive body of literature on teacher professional development (e.g. Ab Rashid, 2018; Desimone, Porter, Garet, Yoon, & Birman, 2002; Evans, 2002; Farrell, 2000; Gómez, 2016;

Harwell, 2003; Simegn, 2014; Wong, 2011), there was a dearth of research about novice and experienced EFL teachers' perceived TPACK and its impact on their professional development. This study intended to fill the gap in the current literature by examining the differences between novice and experienced EFL teachers' perceived TPACK and their professional development. The Technological Pedagogical Content Knowledge (TPACK) framework was used to explain how novice and experienced English as a Foreign Language (EFL) teachers can learn to integrate technology more efficiently to contribute to their professional development which in turn leads to student learning. For the purposes of this study, the following research questions were posed:

1. Is there any difference between novice and experienced EFL teachers regarding their perceived TPACK?
2. What are novice and experienced EFL teachers' perceptions of their TPACK?
3. How do novice and experienced EFL teachers develop their TPACK to promote their professional development?

2. Literature review

Shulman's (1986) perspective in teacher education which changed the standards of qualified teachers was that qualified teachers ought to master not only content and pedagogical knowledge but also the intersection of both: pedagogical content knowledge (PCK). Mishra and Koehler (2006) with changes in technology built on Shulman's ideas to propose that technology also cannot be separated from pedagogical content knowledge (PCK); therefore, they suggested technological pedagogical content knowledge (TPACK) framework (Turgut, 2017). Technological Pedagogical Content Knowledge (TPACK) is a theory designed to explain teachers' ability to integrate technology into the curriculum (Bostancioğlu & Handley, 2018). In 2006, Mishra and Koehler developed a framework for teacher knowledge for technology integration. The principle underlying their framework is the fact that teaching is a highly complex activity that relies on many kinds of knowledge. Historically, knowledge bases of teacher education have only considered the content knowledge of the teacher (Shulman, 1986; Veal & MaKinster, 1999, as cited in Mishra & Koehler, 2006).

In 1986, Shulman developed a framework indicating that successful teachers integrate content knowledge with pedagogical knowledge in their teaching (Tallvid, Lundin, & Lindström, 2012). As expressed in Figure 1., the knowledge of pedagogy and content are considered separately. Within the intersection of pedagogical content knowledge which can be seen in Figure 2., Shulman includes, "for the most regularly taught topics in one's subject area, the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations _in a word, the ways of representing and formulating the subject that make it comprehensible to others" (Shulman, 1986, p. 9) that is a framework for teacher's knowledge provided by Shulman (1986).

Mishra and Koehler (2006) added the dimension of technological knowledge and argued how different kinds of teacher knowledge can be derived from the integration of technological, pedagogical, and content knowledge. These integrated forms of knowledge are pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPACK). Together with technological

Figure 1. The two circles showing pedagogical and content knowledge.

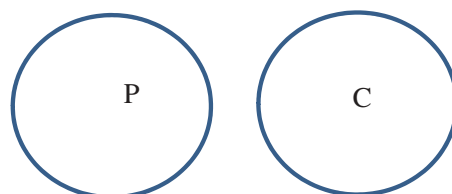
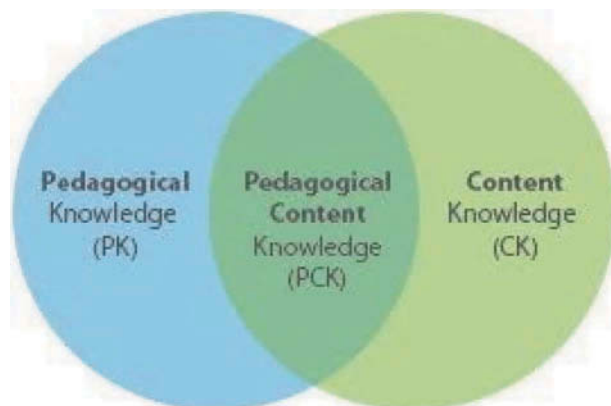


Figure 2. The two circles of pedagogical and content knowledge are now joined by pedagogical content knowledge (Mishra & Koehler, 2006).

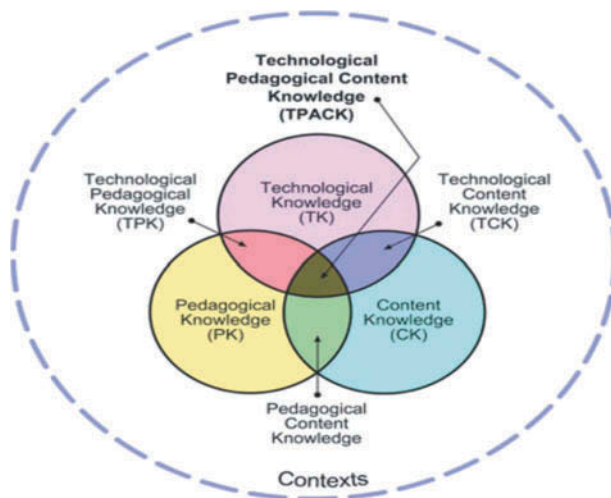


knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK), these seven kinds of knowledge make up the TPACK framework (Koh, Chai, & Lee, 2015). The seven constructs of TPACK (Mishra & Koehler, 2006) are as follows:

1. CK: Knowledge of subject matter
2. PK: Knowledge of instructional methods and strategies
3. TK: Knowledge of how to use technology tools
4. PCK: Knowledge of applying appropriate instructional strategies to teach subject content
5. TPK: Knowledge of applying technology to employ instructional strategies
6. TCK: Knowledge of representing subject content with technology.
7. TPACK: Knowledge of facilitating students' learning of a specific content through appropriate pedagogy and technology

As indicated in Figure 3., knowledge of how to employ technology is added in TPACK framework. Mishra and Koehler (2006) maintain that all three types of knowledge are necessary in teaching, but they highlight the importance of capitalizing on the expanding technological resources. Technological knowledge has to do with technology and its application in education (Tallvid et al., 2012). The TPACK framework provides a number of opportunities for conducting research in teacher education, teacher professional development, and teachers' technology use (Koehler &

Figure 3. TPACK (Mishra & Koehler, 2006).



Mishra, 2009). TPACK can enhance student learning, support students, parents, and make schools more appealing and relevant for students, and can create equal opportunities for each student, and contributes to teacher professional development. (Malik, Rohendi, & Widiaty, 2019).

The term “professional development” has been used in many contexts (Hartono, 2016) and with various conceptualizations (e.g. Craft, 2002; Day, 1999; DiPaola, & Wagner, 2018; Eraut, 1994; Evans, 2002; Farrell, 2000; Guskey, 2002; Harwell, 2003; Johnson, 2019; Wayne, Yoon, Zhu, Cronen, & Garet, 2008). Wong (2011) defines professional development as “a lifelong endeavor, a way of being, and a perspective on how one practices as well as the practice itself” (p. 142). Diaz-Maggioli (2003) defines it as an ongoing learning process in which teachers engage voluntarily to learn how best to tailor their teaching to the learning needs of their students. Professional development is not a one-shot, one-size-fits-all event, but rather an evolving process of professional openness, reflection, and development that generates the best results if continued over time in communities of practice and when focused on job-embedded responsibilities. As Guskey (2000) maintains, the term refers to those processes, actions and activities designed to promote the professional knowledge, expertise and perspectives of teachers so that they might contribute to the achievement of students.

Professional development is assumed to be one of the most effective ways to empower teachers (see e.g., Hartono, 2016; Kennedy, 2010; Murray, 2010). Professional development is a lifelong endeavor, a way of being, and a perspective on how one practices. One might never become professional or lose one’s professionalism. This process in education is referred to as teacher development, and it is stated that sustained learning is critical to teacher development (Wong, 2011). In essence, “professional development is about teachers’ learning, learning how to learn, and transforming their knowledge into practice for the benefit of their students’ growth” (Avalos, 2011, p. 10).

Teacher education and professional development programs initiate (student) teachers’ learning processes, resulting in teachers’ learning outcomes. When teachers draw on this knowledge, practices, and so on in their teaching, they form a crucial element of the learning context for the students, accompanied with the learning materials, physical environment, fellow-students, and so forth (Krolak-Schwerdt, Glock, & Böhmer, 2014). Professional development is essential in assuring teachers’ keep abreast of changes in comprehensive student performance standards, learn new methods of instruction in the content areas, learn how to best draw on instructional new technologies for teaching and learning, and adapt their teaching to shifting school environments and an increasingly diverse student population (Lawless & Pellegrino, 2007).

Educational technologies can present a sustained source for professional development and create communities of practice in teacher education programs (Brown, 2014). In 2017, Cheng conducted a survey on native language teachers’ technological pedagogical and content knowledge (TPACK) in Taiwan. The research was carried out on 172 in-service Hakka language teachers on their perceptions of TPACK in Taiwan. The survey framework included seven constructs of the TPACK framework. The results revealed that, although the native language teachers were satisfied with their TPACK on average, they had relatively low confidence in CK, TK, and TPK. Likewise, teaching experience was positively related to the teachers’ perceived CK, PK, and PCK.

Turgut (2017), conducted a research on pre-service, in-service and formation program for teachers’ perceptions of TPACK in English language teaching (ELT). The study purported to compare TPACK among teacher-candidates, pre-service and in-service English as a foreign language (EFL) teachers in Turkey. Quantitative and qualitative data analysis revealed significant differences among them. In addition, in a study conducted by Bostancioğlu and Handley (2018), a questionnaire was developed and validated to evaluate the EFL “Total PACKage”: (TPACK) for English as a Foreign Language (EFL). The results supported the approaches to English language teacher education which attempt to integrate TK, PK, and CK, rather than introduce them separately, and which emphasize the ways in

which emerging and established technologies can be implemented to represent language and provide opportunities for communication that are known to promote language acquisition. In a seminal study, Drajati, Tan, Haryati, Rochsantiningsih, and Zainnuri (2018) aimed to examine the perception and implementation of pre-service and in-service teachers about TPACK literacy. Through qualitative research, the data were collected from questionnaires of 100 pre-service and in-service teachers. The findings revealed the teacher demographics with TPACK literacy. The three points of the TPACK literacy were Pedagogical Content Knowledge for Multimodal Literacy, Technological Pedagogical Knowledge (21st Century Learning), and Knowledge about digital media tools. The implications of this research were for contributing to English teachers' professional development.

Extensive research has been conducted on teacher's professional development from a number of perspectives. In 2018, Kasprabowo, Sofwan, and Bharati conducted a qualitative study on perceptions and the implementation of continuing professional development through publication among 13 English teachers. The findings revealed that English teachers had positive perceptions towards Continuing Professional Development (CPD) scheme implementation through publication. In practice, however, only few teachers wrote or published their works. The reasons were the limited time of the teachers to write, lack of training on writing and other responsibilities besides teaching they had to take on. In addition, it was shown that to assist teachers publish their works, teacher educators were needed. Teachers' active participation in teachers' forums to aid them to write were proposed to be encouraged. In a study by Zein (2017), the perspectives of teachers and teacher educators on professional development needs of primary EFL teachers were investigated. The study proposed a model of needs-based PD for primary EFL teachers that exemplified aspects of EFL teachers' profiles, their needs and the specific typicality of their professional environment.

In 2015, Ansyari conducted a study on designing and evaluating a professional development program for basic technology integration in EFL classrooms. The study explored the characteristics of this program to English lecturers' TPCK development. The findings indicated that participants had positive experiences with the professional development program. TPCK was also increased after the professional development activities based on self-reported TPACK survey. All in all, data triangulation results revealed that the professional development arrangement for technology integration improves the English lecturers' TPCK. It was also indicated that important aspects of a professional development program should include the TPACK framework as a knowledge base, the design approach, active engagement, authentic learning experiences in a collaborative environment, curriculum coherency, an intensive program schedule, guidance, support, and feedback (Ansyari, 2015).

A review of the related literature shows that a number of studies on TPACK and professional development have been conducted (see e.g. Allan, Erickson, Brookhouse, & Johnson, 2010; Bustamante, 2019; Harris & Hofer, 2017; Koh, Chai, & Lim, 2017; Ritter, 2012). These studies all reveal that little research has addressed novice and experienced EFL teachers' TPACK and their professional development. To fill this gap, this study aimed to shed light on how novice and experienced Iranian EFL teachers perceive TPACK.

3. Methodology

3.1. Participants and research setting

This was a mixed-methods study which was conducted with 427 EFL teachers. Through convenience sampling, a sample of 500 EFL teachers, both male (31%) and female (69%) with different teaching experiences were primarily selected from various Tehran English language institutes. They were both novice and experienced teachers. Novice teachers are defined by Gatbonton as those who are still going through training, who have just completed their training, or who have just initiated teaching and still have very little (e.g. less than two years) experience behind them (2008). Experienced teachers are those with many years of teaching behind them, with "many" explained in different studies as at least four to five years (e.g. Gatbonton, 1999; Richards, Li, &

Table 1. Teachers' level of experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Novice	156	36.5	36.6	36.6
	Experienced	270	63.2	63.4	100.0
	Total	426	99.8	100.0	
Missing	System	1	.2		
Total		427	100.0		

Tang, 1998; Tsui, 2003, 2005, as cited in Gatbonton, 2008). The following table presents the details of the teachers' experience (Table 1).

The age range of the participants was between 20–55. Before asking for the completion of the questionnaires, consent was obtained from teachers. Likewise, the supervisors of the institutions were available for guiding the participants in case of any ambiguities or problems. For the next phase of the study, 16 EFL teachers were selected based on purposive sampling for the interview. There were some criteria for this selection. Firstly, EFL instructors with TEFL background were targeted. Secondly, the interviewees were all MA holders in TEFL. Thirdly, both male and females were selected. Finally, there were 8 novice EFL teachers and 8 experienced EFL teachers. The criterion for teachers' experience was Gatbonton's (2008) definition as mentioned previously.

3.2. Instrumentation

3.2.1. TPACK questionnaire

To explore the responses to the quantitative research question, a demographics questionnaire along with a close-ended questionnaire (See Appendix A) on variable of TPACK for the EFL context were employed. To have a complete picture of the instrument used in this study and what it measures, its characteristics are illustrated in the following table:

Concerning the measurement of TPACK, as indicated in Table 2, a 39-item instrument was administered to the participants. The TPACK-EFL survey which can be seen in Table 8 presents the categories of TPACK and themes A is a nine-point rating scale ranging from "nothing/none" (1) to "very little" (3) to "some" (5) to "quite a bit" (7) to "a great deal" (9). Although other TPACK surveys use a five-point scale, a nine-point scale can help increase the accuracy of pre-service teachers' self-assessments (Baser et al., 2016).

Table 2. Characteristics of the TPACK-EFL survey

Questionnaire	Source	Number of items	Likert-scale	Components
TPACK-EFL survey	Baser, Kopcha, and Ozden (2016)	39	9 points	Technological knowledge (TK) Content knowledge (CK) Pedagogical knowledge (PK) Pedagogical content knowledge (PCK) Technological content knowledge (TCK) Technological pedagogical knowledge (TPK) Technological pedagogical content knowledge (TPACK)

According to Baser et al. (2016) who developed the instrument, evidence for internal consistency of the developed TPACK instrument was obtained through Cronbach's alpha. When the items for each factor were analyzed separately, the reliability coefficients for the TPACK factors ranged from .81 to .92. The instrument measures seven factors of TPACK. In their study, the seven factors were labeled in accordance with the TPACK framework (i.e. TK, CK, PK, PCK, TCK, TPK, and TPACK). The final TPACK-EFL survey included a total of 39 items: 9 TK items, 5 CK items, 6 PK items, 5 PCK items, 3 TCK items, 7 TPK items, and 4 TPACK items. The reliability of this instrument was measured by the researchers in this study.

Out of 500 EFL teachers, 427 participants filled in the EFL-TPACK survey. The questionnaire was administered to the participants both in hard and soft copies. The hard copies were administered to the volunteered participants in person either by the present researchers or the supervisor or manager of the institutes to whom all the essential explanations were given. Likewise, the soft copies were emailed to those teachers who were not physically available to the researcher.

The explanations provided to the teachers were general and based on the directions of each questionnaire. As Dornyei (2016) puts it, we should always pilot our research instruments and procedures before initiating our research study. Piloting is a required part of a quantitative research and any effort to skip or deemphasize the piloting stage will seriously jeopardize the psychometric quality of the study. The questionnaire had been previously validated by Baser et al. (2016) so the validity was not examined. However, to accomplish reliability analysis, prior to carrying out the study, the data of 30 participants were piloted.

3.2.2. *Follow-up interview*

To select the volunteer participants for the interview phase, a question was added to the demographic questions targeting MA holders in TEFL with more than five years of teaching experience interested to take part in the interview to leave their number/email so that a time could be arranged for the interview. Through purposive sampling, 16 participants attended the interview.

The themes of the interview were on EFL teachers' perceived TPACK and its components in addition to teachers' professional development. It was a structured interview (See Appendix B) whose items were developed by the researchers and were checked and modified by three experts in the field of TEFL. The interviewer arranged a suitable time with each interviewee at their convenience to conduct the face-to-face interview. Each interview lasted 20–25 minutes. With the permission of the interviewees, the interviews were recorded using a DVR (Digital Voice Recorder) to avoid loss of data.

3.3. *Data collection procedure*

This study drew on data triangulation to obtain the results from multiple sources. The following steps were taken in this study. First of all, the researcher made an effort to persuade the institutions' supervisors and colleagues to carry out the study by explaining the aim of the study and the procedures for completing the questionnaire either through hard copies or email. Next, the volunteer EFL teachers completed the questionnaires and returned them to the institution secretary, supervisor, or the researcher or emailed their responses to the researchers. The questionnaire was distributed both in hard and soft copies via submitting it to the EFL teachers in person or by email, respectively. Subsequently, after collecting the questionnaires, a pilot study was conducted on 30 participants to ensure reliability of the responses. The pilot study was carried out on EFL-TPACK survey on the data of 30 EFL teachers similar to the teachers in the study. The purpose of the piloting stage is to assess the appropriateness of data collection methods and other procedures and to make changes if necessary. In addition, it enables the researcher to test the hypotheses which might suggest if further refinement is needed.

In summer 2018, the participants of the study, both male and female, were selected based on convenience sampling with different teaching experiences from various English language institutes

in Tehran such as Safir, Kish and Kanoon English institutes in Iran. The reason for selecting teachers from different institutes was to incorporate different teaching styles and various teaching backgrounds. After the collection of the questionnaires, the quantitative data were entered into SPSS (Statistical Packages for Social Sciences) and the scores were calculated.

In autumn 2018, the interviewer held an interview with 16 of those who were willing to attend the interview having the required criteria. Each interview took about 20–25 minutes and was audio-recorded through a DVR with the participants' permission. The interview questions, by and large, comprised EFL teachers' perceived TPACK and their professional development. The interviewer attempted to maintain confidentiality that had been promised to each respondent by letting him/her know that the recorded data were going to be used solely for academic and educational purposes. Similarly, prior to the interview initiation, the researcher talked about the purpose of the interview and then started asking questions in sequence. Eventually, the whole interviews were transcribed by the researchers for data analysis.

4. Results and discussion

4.1. Quantitative data

In order to answer the quantitative research question, a questionnaire measuring EFL teachers' perceived TPACK was administered. To do so, first the reliability analysis of this questionnaire is presented. Then the response to this research question is provided.

In order to investigate the reliability of the questionnaire, the data of the 30 of the sample employed in the piloting phase of this study were selected and then Cronbach's alpha as a measure of internal consistency reliability was computed for them. Table 3 presents the alphas, which range between .78 and .94, which as can be seen all the values are above 0.78, hence there exists high internal consistency reliability.

In order to examine if there was any statistically significant difference between novice and experienced EFL teachers regarding their perceived TPACK, the experienced and novice teachers were compared with each other in terms of their mean scores on total scale and subscales of the TPACK questionnaire. To begin with, the analysis related to TPACK questionnaire is presented. In so doing, first the descriptive statistics of the total scale and subscales of this questionnaire were computed (Table 4). Then the normality of the data for the total scale and subscales was examined computing skewness and kurtosis ratios (by dividing the skewness/kurtosis value by its standard error). According to Table 4, the data of the total TPACK questionnaire has ratios within ± 1.96 , hence running parametric statistics, that is independent samples t-test. For all the subscales though, non-parametric statistic i.e. Mann Whitney test was run.

Table 3. Reliability statistics

Scale	Cronbach's Alpha	N of Items
TK	.78	9
CK	.86	5
PK	.83	6
PCK	.82	5
TCK	.81	3
TPK	.93	7
TPACK	.94	4
Total. TPACK	.91	39

Table 4. Descriptive statistics for TPACK questionnaire

Experience	N	Min	Max	Mean	SD	Skewness		Kurtosis	
							Std. Error		Std. Error
Novice	TK	46.00	77.00	66.1529	5.31,467	-1.033	.194	1.031	.385
	CK	36.00	45.00	44.9299	.72,602	-12.108	.194	149.442	.385
	PK	24.00	52.00	42.4395	6.51,757	-1.007	.194	.044	.385
	PCK	30.00	44.00	39.5541	2.89,206	-.585	.194	.278	.385
	TCK	3.00	19.00	11.5669	1.74,413	1.164	.194	11.812	.385
	TPK	14.00	29.00	22.2675	2.60,518	.412	.194	.532	.385
	TPACK	4.00	15.00	8.2038	2.69,077	.832	.194	-.500	.385
	Total.TPACK	157	206.00	235.1146	11.85,163	-.167	.194	-.302	.385
	Valid N (listwise)	157							
	Experienced	TK	32.00	68.00	49.7926	6.00198	-.471	.148	-.150
CK		43.00	45.00	44.9370	.25,817	-4.254	.148	18.911	.295
PK		31.00	54.00	51.3481	2.52,958	-2.943	.148	16.598	.295
PCK		39.00	45.00	43.4000	1.50,686	-.690	.148	-.441	.295
TCK		3.00	19.00	10.6074	1.39,354	.561	.148	12.465	.295
TPK		10.00	32.00	18.7593	2.55,886	.252	.148	3.026	.295
TPACK		4.00	15.00	7.0926	1.56,956	1.450	.148	5.914	.295
Total.TPACK		270	200.00	225.9370	8.03985	-.231	.148	.530	.295
Valid N (listwise)		270							

Table 5. Ranks

	Experience	N	Mean Rank	Sum of Ranks
TK	Novice	157	342.81	53,820.50
	Experienced	270	139.10	37,557.50
	Total	427		
CK	Novice	157	219.38	34,442.00
	Experienced	270	210.87	56,936.00
	Total	427		
PK	Novice	157	90.79	14,254.50
	Experienced	270	285.64	77,123.50
	Total	427		
PCK	Novice	157	110.10	17,285.00
	Experienced	270	274.42	74,093.00
	Total	427		
TCK	Novice	157	270.51	42,470.00
	Experienced	270	181.14	48,908.00
	Total	427		
TPK	Novice	157	312.11	49,002.00
	Experienced	270	156.95	42,376.00
	Total	427		
TPACK	Novice	157	237.79	37,332.50
	Experienced	270	200.17	54,045.50
	Total	427		

Since Mann Whitney test is a non-parametric test exploiting mean rank rather than mean, the mean ranks for all the non-normal data of the subscales were computed as well (Table 5) to be used later in finding which group was of significantly higher or lower scores on the subscales of TPACK.

Table 6 presents the Mann Whitney test results for the subscales of TPACK. Obviously, the novice and experienced groups are of significantly different scores on all the subscales ($p < .05$) except for CK subscale ($p > .05$). Table 7 on the independent samples t-test results also indicates that the novice and experienced teachers are of significantly different total TPACK scores ($p < .05$). In sum, given the mean/mean rank comparisons results in Tables 6 and 7 as well as the means and mean ranks in Tables 4 and 5, the following findings are clear:

- Experienced teachers are of significantly higher scores in terms of PK and PCK subscales.
- Novice teachers are of significantly higher scores in terms of TK, TCK, TPK, and TPACK.

The finding that experienced teachers were of significantly higher scores in terms of PK and PCK is in compliance with those of Cheng (2017), Jang and Chang (2016), and Jang and Tsai (2012). However, CK was not significantly high for experienced teachers in this study; in the aforementioned studies it was also high, indicating a disconformity with those studies. Likewise, as is demonstrated in Table 5, there is an inverse relationship between teaching experience and technological forms of knowledge (i.e., TK, TCK, TPK, TPACK). Hence, novice teachers are of significantly higher scores in the aforementioned technological forms of knowledge. This finding is in harmony with those of Hervey (2015), Hsu, Tsai, Chang, and Liang (2017), Roig-Villa, Mengual-Andrés, and Quinto-Medrano (2015) indicating that novice teachers capitalize on their technological knowledge for teaching in their classes.

Table 6. Mann-Whitney U test statistics

	TK	CK	PK	PCK	TCK	TPK	TPACK
Mann-Whitney U	972.500	20,351.000	1851.500	4882.000	12,323.000	5791.000	17,460.500
Asymp. Sig. (2-tailed)	.000	.055	.000	.000	.000	.000	.002

a. Grouping Variable: Experience

4.2. Qualitative data

In order to answer the qualitative research questions, a structured interview was carried out with 8 novice and 8 experienced EFL teachers, all in person. Firstly, out of those volunteer EFL teachers, those who met the criteria of the purposive sampling were selected. Next, the interviewer arranged a time with each participant for the face-to-face interview. At the beginning of the interview, the interviewer created a nonthreatening environment to put the respondent at ease. After introducing herself in a friendly way, the interviewer stated the purpose of the interview, but refrained from giving too much information about the study to avoid bias. The interviews were conducted in a way to obtain valid and comprehensible responses.

Since comparable data were needed, the interview procedure was standardized by using a structured interview schedule. According to Ary, Jacobs, Irvine, and Walker (2018), the structured interview schedule includes specific questions in a fixed sequence which is asked from all the respondents together with transitions and probes. In an effort to assess the reliability of researcher-developed interview questions, three TEFL experts were primarily asked to assess the relevance and appropriateness of the questions along with conducting a sample interview by each of those experts. Then, the consistency of the responses was measured. There is a positive relationship between the consistency of the responses and the reliability (Ary et al., 2018).

To answer the qualitative research questions, exploring the perceptions of novice and experienced EFL teachers regarding their TPACK and the extent to which novice and experienced EFL teachers have developed their perceived TPACK to promote their professional development, the transcribed data were analyzed through using content analysis to find patterns and categories through coding schemes.

Concerning the first qualitative research question focusing on exploring novice and experienced EFL teachers' perceptions of their TPACK, Table 8 presents TPACK categories and themes on novice EFL teachers' perceptions of their TPACK.

As expressed in Table 8, novice EFL teachers have a rich knowledge of technology as opposed to their content and pedagogical knowledge. The reason behind this might be because novice EFL teachers are digital natives who "have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age" (Prensky, 2001, p. 1). This finding is consistent with that of Hervey (2015), who found since novice teachers have been raised in a digital age, they are inclined to take more risks in implementing technologies in their classrooms. Likewise, the finding that novice teachers use a variety of technological tools in classes is in compliance with that of Drajati et al. (2018), who found less experienced teachers (1–3 years) used different technological tools in their teaching.

Table 9 below, gives us information on experienced EFL teachers' perceptions of TPACK components.

As is demonstrated in Table 9, the pedagogical and content knowledge of experienced EFL teachers outweigh their technological knowledge. This finding that experienced teachers possess

Table 7. Independent samples test

		t-test for Equality of Means									
		Levene's Test for Equality of Variances					t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
Total. TPACK	Equal variances assumed	28.363	.000	9.509	425	.000	9.17,761	.96,512	7.28,060	11.07,462	
	Equal variances not assumed			8.618	240.666	.000	9.17,761	1.06,492	7.07,985	11.27,537	

Table 8. Novice EFL teachers' perceptions of TPACK components

TPACK components	Novice teachers' perceptions of TPACK components
PK	Being kind and patient Establishing rapport with students Creativity Creating a non-threatening classroom atmosphere
CK	Having a high level of English proficiency Content knowledge of lexical and grammatical resources General or background knowledge
TK	Using mobiles, tablets, e-book readers, Mp3/4 players, video projectors for showing power point slides, video clips Using various applications for English teaching Using podcasts for teaching listening and speaking Technology facilitates the process of teaching and learning Technology increases students' motivation and attention The easiest way of sharing knowledge Assigning webQuests and suggesting websites to do a task Using wikis for teaching writing Using social networks and online forums for group discussions Using weblogs to improve students' reading and writing TED Talks for teaching speaking and listening Taking advantage of Moodle for online classes Suggesting English radio apps to the students Using voice recorders for practicing student's speaking Watching English films to teach culture Using online dictionaries
TPK	Introducing students to some useful e-books, e-tests, etc. Assigning students to some small-group technology-based projects Providing explanations to the students and giving hints to them regarding how to use technology autonomously for language leaning Talking about importance of technology in tackling with learning problems Grouping the students to watch a short clip and summarizing that Assigning students to edit their writings through wikis and weblogs Asking students to do an online task Engaging students in free discussion chat rooms
TCK	Creating a whatsapp or telegram group and sending discussion topics and asking them to share their ideas on the topic Teaching a grammatical or lexical point through online tasks Creating weblogs for teaching writing Assigning them to listen to some podcasts and record their voice as the summary Making online quizzes to assess their language skills and sub skills Assigning them to watch an English movie and having a discussion the next session Creating online classes and uploading educational YouTube videos in addition to sharing images and podcasts to teach a module
PCK	Enhancing knowledge of vocabulary through playing educational games Applying different teaching methods to teach content Teaching the target language through AVAs (Audio Visual Aids)
TPACK	Teaching a grammatical point though searching the internet, finding good examples, summarizing all the main points, preparing colorful slides with examples and presenting them in the class Creating lesson plans and finding the best technological tools to convey the main points of the lesson

plentiful content and pedagogical knowledge because of having many years of teaching experience behind them is in conformity with that of Hervey (2015), indicating that experienced teachers are more competent in pedagogical and content knowledge, but less competent in technological knowledge. This reminds us of the idea of digital immigrants developed by Prensky (2001) in that those who were born prior to the digital age or 1985 are considered as digital immigrants. Hence, they are slower in using technology and they need to adapt themselves with technology and new ways of presenting knowledge through technological tools.

Table 9. Experienced EFL teachers' perceptions of TPACK components

TPACK components	Experienced Teachers' perceptions of TPACK components
PK	Being passionate about teaching Establishing good rapport with students Knowledge of teaching techniques and methods Respect for students Psychological knowledge of learners' individual differences Verbal and nonverbal immediacy skills Classroom management skills Knowledge of lesson planning & creativity Considering learners' needs Working on one's professional development Skills of applying knowledge and techniques to real world contexts Being updated about teaching techniques Creating a friendly and non-threatening environment for L2 (second language) leaning Knowledge of context Knowledge of classroom assessment Knowledge of reflective strategies for classroom experiences Knowledge of research Knowledge of critical thinking
CK	Knowledge of lexical and grammatical resources Subject matter knowledge General knowledge of English World knowledge Sociological knowledge Communicative cultural competence Theoretical knowledge of L2 learning Declarative and procedural knowledge Knowledge of academic sources and resources on language skills and sub-skills Knowledge of language sub-skills
TK	Facilitating learning and teaching Listening tasks Playing English movies in class Basic computer skills
TPK	Suggesting students to use You-Tubes for skills development Sharing educational applications with students and assigning them some tasks Need to be trained in that Having students send their assignments via email
TCK	Teaching through social networks A difficult task to achieve
PCK	Technology is not a must Teaching without technology especially the internet is difficult
TPACK	Using technology for making the content look more amazing to students No ideas about the term

Due to the generation gap between novice and experienced teachers, the limited technological knowledge of experienced teachers is not comparable to that of novice teachers in that novice teachers possess a great amount of technological knowledge due to being digital natives (Prensky, 2001). In spite of having a limited knowledge of technology, mostly all the experienced teachers believed that the use of technology in today's English classes is inevitable and they acknowledged that they need to be trained on technology integration in their ELT (English Language Teaching) classes. However, some mentioned that it is a difficult task for them to adapt themselves and keep up with the latest technological tools in education.

The following extract is taken from one of the interviewees regarding whether there is a need to integrate technology:

Depending on the syllabus, my students' knowledge and needs, technology can be included. The new generation of students has different needs and use different strategies to learn. They

no longer tolerate the traditional boring classes. The teachers should benefit from technology to keep the students motivated and try to relate their courses and teaching process to the real life tasks the students are engaged with. Also, technology can be used as supplementary materials to flavor the teaching methods. Some skills are better taught using technology if appropriately defined and implemented. Integrating technology facilitates teaching and learning. However, I need to be trained in that. (Participant 7, experienced)

Still another participant responded as follows:

Integrating technology in ELT classrooms is beneficial. However, lack of organizational facilities, lack of administrative support, and insufficient teachers' digital literacy could be regarded as barriers for technology integration in classrooms. (Participant 3, experienced)

The above finding is in harmony with that of Pelgrum (2001) in that administrative obstacles will lead to teachers' unwillingness to integrate technology into their classrooms.

Concerning how experienced teachers develop their TPACK for their professional development with the focus on three bodies of knowledge, i.e., technological, pedagogical, and content knowledge, the following extracts were taken from the respondents' interview transcriptions:

Personally, regarding the development of my technological knowledge, I only google some topics and apply them in my classes. I totally believe that technology should be used in EFL classes. But, to tell you the truth, I guess I need some workshops on how to use technology for my professional development. (Participant 8, experienced)

According to another interviewee:

Well, to develop my technological knowledge for my professional development, I constantly search online. Also, for my pedagogical knowledge development, I talk to colleagues, read books and articles, observe my peers' classes, and attend workshops and seminars. And for improving my content knowledge, I read references such as books and articles on the subject matter and the foreign language culture. (Participant 1, experienced)

With regard to the second qualitative research question focusing on how novice and experienced EFL teachers develop TPACK to promote their professional development, Figures 4 and 5 present the categories and themes for novice and experienced EFL teachers, respectively.

As is illustrated in Figure 4, novice EFL teachers make a lot of efforts in developing their technological knowledge for their professional development. This finding is in compliance with Hervey (2015) in that being born in the digital age, novice teachers are disposed to take more risks in applying technology in their classrooms. However, since they are considered as novice, they are less familiar with ways to develop their content and pedagogical knowledge for professional development. The following extract is taken from one of the novice participant's transcriptions regarding the application of technology:

A teacher who does not use technology is like a doctor who examines and operates his patient with the methods used fifty years ago. (Participant 3, novice)

The finding on joining online PD communities is in compliance with Lloyd and Duncan-Howell (2010) remarks in that being affiliated to an online TPD community does create opportunities for teachers to share experiences, connect with a larger peer group, and collaborate with each other.

Another interviewee puts it as follows:

Because of the fact that English is constantly evolving and every day, new methods for learning English like applications are being introduced to a wide range of students, students

Figure 4. Developing three bodies of knowledge by novice EFL teachers for PD.

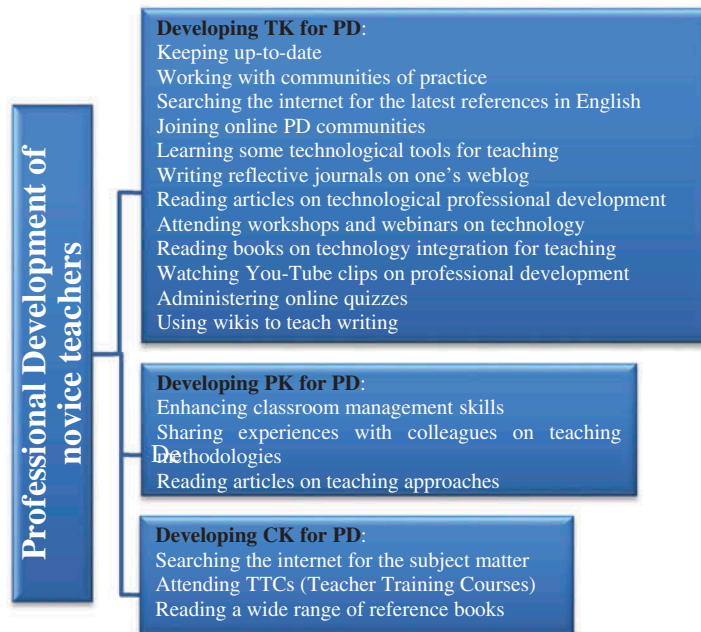
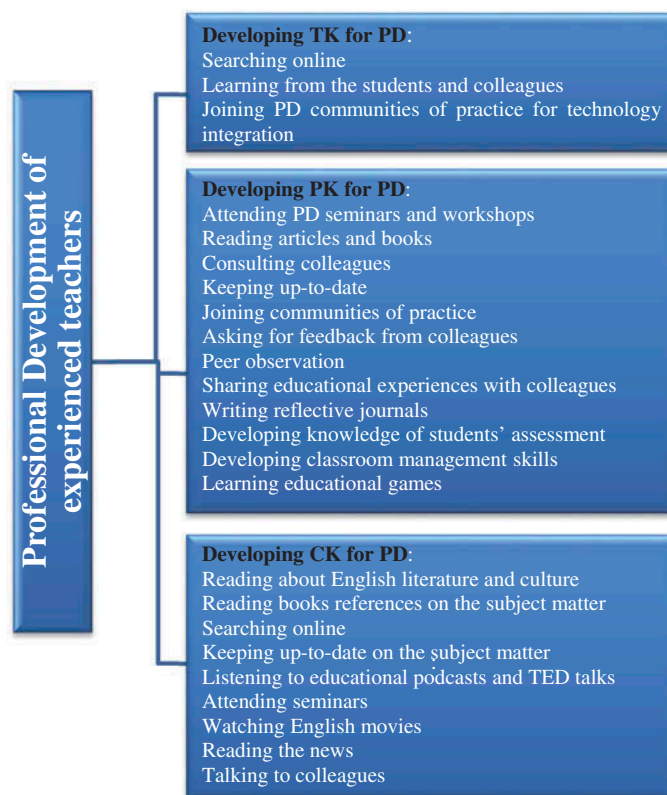


Figure 5. Developing three bodies of knowledge by experienced EFL teachers for PD.



whose methods of learning are changing along with the change of all the matters expressed above and so, this makes it absolutely necessary that technology should be used in classes.
 (Participant 5, novice)

In addition, the following themes were explored on what experienced teachers do to develop their TPACK components with the focus on three bodies of technological, pedagogical, and content knowledge to promote their professional development.

As indicated above, experienced EFL teachers have a considerable knowledge on how to develop their pedagogical and content knowledge for their professional development. However, concerning their technological knowledge, they need to take professional development courses tailored to their needs for technology integration. This is in line with that of Hervey (2015), who found since novice teachers have a rich knowledge of technology and need to expand their pedagogical and content knowledge and experienced teachers possess very little knowledge of technology and are expert at their pedagogical and content knowledge, there should be opportunities for both novice and experienced teachers to take customized professional development courses and to collaborate with each other on different aspects of TPACK.

According to one of the interviewees:

As these days in many countries, teachers are using technology and online learning is attracting a lot of attention, if I refuse to use technology in my classes, I will be left behind. Many of the books and materials designed these days force the teacher to use technology. Thus, by updating my knowledge in this regard I will be able to apply the most creative methods of teaching in my classes and facilitate both teaching and learning. Although I know I need to take some professional development courses on technology integration in teaching. I need to know about technological tools which are applied in classrooms for better student achievement. (Participant 5, experienced)

As is indicated in the findings, teachers need more professional development courses for developing their TPACK constructs. This is consistent with that of Martin (2018), suggesting that faculty need more professional development to develop their TPACK integration practices. The finding on joining communities of practice for technology integration is in agreement with that of Glazer, Hannafin, and Song (2005) and Gómez (2016) indicating the importance of communities of practice for promoting teachers' technology use for pedagogy.

From an overall perspective, this study achieved its aims. It attempted to add to a large body of literature by examining the differences between novice and experienced EFL teachers perceived TPACK and how they develop their TPACK components to improve their professional development.

5. Conclusion and implications

The findings of the present study basically revealed that there was a significant difference between novice and experienced Iranian EFL teachers in terms of their perceived TPACK. Novice EFL teachers were mainly more proficient in their technological knowledge, technological content knowledge, technological pedagogical knowledge and TPACK, and were less proficient in their pedagogical and content knowledge. In contrast, experienced EFL teachers had a richer knowledge of pedagogy and pedagogical content knowledge and were less skilled in their technological knowledge and its different bodies of knowledge, compared to novice EFL teachers.

Likewise, it was indicated that novice and experienced EFL teachers perceive their TPACK and its subcomponents differently. In view of being digital natives, novice EFL teachers possessed a profound knowledge of technology and its subcomponents in contrast to their pedagogical and content knowledge which was quite superficial as a result of having fewer years of experience, corroborating the quantitative results. Similarly, some novice teachers had few ideas about TPACK concept only in the form of few intuitive examples although they had never heard about the TPACK term. Additionally, considering being digital immigrants, experienced EFL teachers possessed little knowledge of technology and its subcomponents. However, in view of having a lot of teaching experience behind them, experienced teachers had a considerable knowledge of pedagogy and content, confirming the

quantitative results. Experienced teachers had almost no ideas about the definition of TPACK. Neither group was acquainted with the concept of TPACK as a framework for teacher knowledge.

Furthermore, it was found that in order to develop professionally, novice and experienced EFL teachers developed their levels of TPACK in different ways. That is, with respect to three bodies of knowledge, i.e., technology, pedagogy, and content, novice teachers possessed a great deal of knowledge concerning technology integration in EFL classrooms and were more interested in making efforts for developing their TK for their PD. However, since they were considered as novice, they were far less informed about how to develop their PK and CK which substantiates the quantitative results. Conversely, in view of having several years of teaching experience, experienced EFL teachers were very well informed about how to develop their pedagogical and content knowledge. However, on account of being digital immigrants or not being educated in technology integration techniques for English instruction, they still did not sufficiently know about how to develop their technological knowledge to promote their professional development.

More significantly, it emerged that each group of teachers needed a different, customized, bottom-up, and needs-based professional development program to promote their levels of TPACK for developing professionally. This finding was in compliance with that of Hervey (2015) in which it was stated that creating opportunities for collaboration of novice and experienced teachers would contribute to their TPACK that in turn would promote their professional development. The findings of the study provide invaluable pedagogical implications for TTC (Teacher Training Course) educators, teacher education curriculum developers, administrators, supervisors, EFL teachers, and materials developers.

First, it is recommended that TTC educators educate their trainees as to the importance of technology integration in EFL classes and teach their trainees various educational technological tools for applying in EFL classes contributing to their professional development. In addition, there seems to be a need for TTC educators to inform their pre-service teachers on the importance of having a strong TPACK and its role in creative and effective teaching with technology to meet the requirements of the 21st century leaning skills (Mishra & Koehler, 2006). In view of the fact that novice teachers were less competent in their PK and CK, measures should also be taken to enhance these skills at the outset in novice teachers in TTC classes both by providing them with enhanced input in terms of PK and CK and by creating situations where they can collaborate with experienced teachers who are quite competent in these skills and share their experiences and receive peer feedback to promote novice EFL teachers' professional development. Similarly, it is suggested that TTC educators develop needs-based professional development communities of practice, either face to face or online for novice teachers with experienced teachers and recommend novice teachers to collaborate with their more experienced peers and gain the cutting-edge knowledge of pedagogy and content and its combinations with other forms of teacher knowledge in TPACK which would expand PK and CK of novice teachers and would contribute to novice EFL teachers' professional development. Furthermore, since experienced teachers were less competent in their TK in general and TCK and TPK in particular, it is highly recommended that TTC educators offer various needs-based professional development courses for experienced teachers as well to primarily inform them on the significance of technology and technological applications and tools in pedagogy to teach content and teach them how to apply various technological tools for English instruction to develop their TK, TPK, and TCK, and TPACK to develop professionally. Likewise, it is suggested that TTC educators develop professional development communities of practice, either face to face or online for experienced teachers with novice teachers to encourage experienced teachers to collaborate with their less experienced peers and take advantage of their knowledge of technology and its combinations with other forms of teacher knowledge in TPACK which would contribute to experienced EFL teachers' professional development.

Second, it is essential that teacher education curriculum developers incorporate technology into curriculum for enhancing teaching and learning and develop various bottom-up, needs-based not one-size-fits-all teacher education curriculums considering novice and experienced EFL teachers' needs to promote their professional development.

Next, there seems to be a need for administrators and supervisors to provide novice and experienced EFL teachers with needs-based customized professional development courses on TPACK and create opportunities such as creating communities of practice in which these teachers can share their experiences with each other through collaborative practices to promote their professional development.

Furthermore, the findings of this study would be of help for EFL teachers to design lesson plans which integrates all forms of TPACK for effective teaching. Last but not least, it is incumbent upon materials developers to develop materials that require teachers to use different technological tools in and out of class and to integrate technology with pedagogy and content in the right context.

While the current study examined novice and experienced EFL teachers' TPACK and the ways they develop three bodies of knowledge in TPACK to promote their professional development, further studies are required to investigate EFL teachers' reflections through using their TPACK. Furthermore, an experimental study could be conducted by having a TPACK-focused professional development course for novice and EFL teachers and having pre- and post-tests of TPACK to identify the impact of the course on teachers' knowledge base and having interviews at the end.

This study should be considered in light of some potential limitations which could affect the interpretation of the findings. For the quantitative phase, this study enjoyed convenience sampling which is a subcategory of non-probability sampling; the extent of generalizability in this sample is often minimal (Dornyei, 2016). In addition, another potential limitation is related to the nature of self-report instruments. Since they measure perception, some teachers might have given socially desirable responses (Dornyei, 2016). Concerning the qualitative phase, further studies could cast light on different realizations of the components of EFL teachers' TPACK through collecting teachers' lesson plans, observations, stimulated verbal and written reports, and reflective journals. In addition, more studies could focus on EFL teacher educators for assessing their TPACK levels. Furthermore, other studies could focus on top-down and bottom-up methods of professional development for examining EFL teachers' TPACK. It is hoped that these studies will contribute to the development of EFL teachers' TPACK and consequently their professional development.

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Correction

This article has been republished with minor changes. These changes do not impact the academic content of the article.

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Appendix A

Dear respondent,

This questionnaire is devised with the aim of looking into your actual teaching practices as a professional teacher. To that end, your careful completion of the questionnaire will definitely contribute to obtaining real data which is crucial for more accurate findings. Hence, please check the box which best describes your actual teaching practices. The information will be kept confidential and will be used just for research purposes. Thank you very much in advance for your time and cooperation.

Part I: Demographic Information

Name:	Gender:	<input type="checkbox"/> Female	<input type="checkbox"/> Male	Teaching Experience (years):
Degree:	<input type="checkbox"/> No Degree	<input type="checkbox"/> BA in English	<input type="checkbox"/> MA in English	<input type="checkbox"/> PhD in English
	<input type="checkbox"/> Degree in Other Fields of Study (please specify):			

Would you like to attend an interview on on EFL teachers' perceived TPACK and their professional development? If you are interested in attending the interview and meet the following criteria, please leave your email or phone number below.

- You need to have less than two or more than five years of English teaching experience
- You need to hold an MA in TEFL

Email:

Phone number:

Thanks a lot in advance for your kind cooperation.

Items	How much can you do?								
	Nothing		Very Little		Some Influence		Quite A Bit		A Great Deal
(1) I can use basic technological terms (e.g. operating system, wireless connection, virtual memory, etc.) appropriately.	1	2	3	4	5	6	7	8	9
(2) I can adjust computer settings such as installing software and establishing an Internet connection.	1	2	3	4	5	6	7	8	9
(3) I can use computer peripherals such as a printer, a headphone, and a scanner.	1	2	3	4	5	6	7	8	9

(Continued)

(Continued)									
(4) I can troubleshoot common computer problems (e.g. printer problems, Internet connection problems, etc.) independently.	1	2	3	4	5	6	7	8	9
(5) I can use digital classroom equipment such as projectors and smart boards.	1	2	3	4	5	6	7	8	9
(6) I can use Office programs (i.e. Word, PowerPoint, etc.) with a high level of proficiency.	1	2	3	4	5	6	7	8	9
(7) I can create multimedia (e.g. video, web pages, etc.) using text, pictures, sound, video, and animation.	1	2	3	4	5	6	7	8	9
(8) I can use collaboration tools (wiki, edmodo, 3D virtual environments, etc.) in accordance with my objectives.	1	2	3	4	5	6	7	8	9
(9) I can learn software that helps me complete a variety of tasks more efficiently.	1	2	3	4	5	6	7	8	9
(10) I can express my ideas and feelings by speaking in English.	1	2	3	4	5	6	7	8	9
(11) I can express my ideas and feelings by writing in English.	1	2	3	4	5	6	7	8	9
(12) I can read texts written in English with the correct pronunciation.	1	2	3	4	5	6	7	8	9
(13) I can understand texts written in English.	1	2	3	4	5	6	7	8	9
(14) I can understand the speech of a native English speaker easily.	1	2	3	4	5	6	7	8	9
(15) I can use teaching methods and techniques that are appropriate for a learning environment.	1	2	3	4	5	6	7	8	9
(16) I can design a learning experience that is appropriate for the level of students.	1	2	3	4	5	6	7	8	9
(17) I can support students' learning in accordance with their physical, mental, emotional, social, and cultural differences.	1	2	3	4	5	6	7	8	9
(18) I can collaborate with school stakeholders (students, parents, teachers, etc.) to support students' learning.	1	2	3	4	5	6	7	8	9
(19) I can reflect the experiences that I gain from professional development programs to my teaching process.	1	2	3	4	5	6	7	8	9
(20) I can support students' out-of-class work to facilitate their self-regulated learning.	1	2	3	4	5	6	7	8	9
(21) I can manage a classroom learning environment.	1	2	3	4	5	6	7	8	9
(22) I can evaluate students' learning processes.	1	2	3	4	5	6	7	8	9
(23) I can use appropriate teaching methods and techniques to support students in developing their language skills.	1	2	3	4	5	6	7	8	9
(24) I can prepare curricular activities that develop students' language skills.	1	2	3	4	5	6	7	8	9
(25) I can adapt a lesson plan in accordance with students' language skill levels.	1	2	3	4	5	6	7	8	9
(26) I can take advantage of multimedia (e.g. video, slideshow, etc.) to express my ideas about various topics in English.	1	2	3	4	5	6	7	8	9

(Continued)

(27) I can benefit from using technology (e.g. web conferencing and discussion forums) to contribute at a distance to multilingual communities.	1	2	3	4	5	6	7	8	9
(28) I can use collaboration tools to work collaboratively with foreign persons (e.g. Second Life, wiki, etc.).	1	2	3	4	5	6	7	8	9
(29) I can meet students' individualized needs by using information technologies.	1	2	3	4	5	6	7	8	9
(30) I can lead students to use information technologies legally, ethically, safely, and with respect to copyrights.	1	2	3	4	5	6	7	8	9
(31) I can support students as they use technology such as virtual discussion platforms to develop their higher order thinking abilities.	1	2	3	4	5	6	7	8	9
(32) I can manage the classroom learning environment while using technology in the class.	1	2	3	4	5	6	7	8	9
(33) I can decide when technology would benefit my teaching of specific English curricular standards.	1	2	3	4	5	6	7	8	9
(34) I can design learning materials by using technology that supports students' language learning.	1	2	3	4	5	6	7	8	9
(35) I can use multimedia such as videos and websites to support students' language learning.	1	2	3	4	5	6	7	8	9
(36) I can use collaboration tools (e.g. wiki, 3D virtual environments, etc.) to support students' language learning.	1	2	3	4	5	6	7	8	9
(37) I can support students as they use technology to support their development of language skills in an independent manner.	1	2	3	4	5	6	7	8	9
(38) I can use Web 2.0 tools (animation tools, digital story tools, etc.) to develop students' language skills.	1	2	3	4	5	6	7	8	9
(39) I can support my professional development by using technological tools and resources to continuously improve the language teaching process.	1	2	3	4	5	6	7	8	9

Thanks a million for your kind cooperation.

Appendix B

Interview questions

1. Please tell me about your teaching experience and academic background?
2. What are your key words defining English pedagogy? (PK)
3. What types of knowledge, skills, and attitudes are required for the subject matter? (CK)
4. Do you think there is a need to integrate technology in your teaching? Why? Why not? (TK)
5. What is the main purpose of using technology in English classes? (TK)
6. Can you keep up with new important technologies? If so, how? (TK)
7. Do you ever use technology in your teaching? If yes: (TK)
 - a. What kind of technological tools do you use for teaching English language skills? (TK)
 - b. Can you prepare your students for the effective use of technology for language learning? If so, how? (TPK)
 - c. How can you support your student learning at home through using technology? (TCK)

8. How can you facilitate your students' collaboration with each other through using technology? (TPK)
9. Can you teach English effectively without using technology to help students learn the language? (PCK)
10. How might you synthesize your knowledge of content, instructional strategies, and technology in the form of lesson activities to meet the goals you have set for student learning? (TPACK)
11. What is your understanding of Technological Pedagogical Content Knowledge? (TPACK)
12. Regarding your professional development:
 - a. What do you do to develop your technological knowledge for your professional development? (TK for PD)
 - b. What do you do to develop your pedagogical knowledge for your professional development? (PK for PD)
 - c. What do you do to develop your content knowledge for your professional development? (CK for PD)
13. In what ways does using TPACK (Technological Pedagogical Content Knowledge), contribute to English teachers' professional development? (Please add if you have any other point regarding TPACK)



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