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Investigating the Level of TPACK among Iranian EFL Teachers in Relation to their Educational Background and Teaching Experience

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ABSTRACT

This survey research looked at Iranian EFL teachers' level of Technological Pedagogical Content Knowledge (TPACK) in connection to their educational background and teaching experience. The survey included 104 Iranian EFL teachers from several branches of the Iran Language Institute (ILI). The TPACK Self-Assessment Questionnaire (Baser et al., 2016) was used to measure the participants' scores in different TPACK Questionnaire components (TK, CK, PK, PCK, TCK, TPK, and TPCK). The results showed that among the participants at different educational levels, there was no significant difference considering their scores in TK, PK, CK, PCK, TPK, and TPCK. However, when it comes to TCK scores, the MA participants outperformed the BA ones. The findings also showed that the more experienced participants outperformed the less experienced ones in terms of their obtained scores in PK, PCK, and TPCK. However, there was no significant difference between the more experienced and less experienced participants' TK, CK, TCK, and TPK scores. The findings of this study indicated the importance of hosting TPACK workshops for language teachers who require more training in this area.

KEYWORDS: Educational Background; Pedagogical Content; Teaching Experience

INTRODUCTION

Many studies on English as a second or foreign language teachers' knowledge and attitudes toward technology use have been conducted in order to discover how teachers perceive technology integration into their instructional practice (Zhao & Tella, 2002;Jahanban-Isfahlan et al., 2017; Mozafari, 2016; Saglam & Sert, 2012). Many researchers have focused on teachers' capacity and skills in integrating information and communication technology (ICT) into their teaching practice due to rapid advances in technology and technological innovations in education (Chai et al., 2010; Niess, 2008; Shih & Chuang, 2013). Teachers' perspectives on technology-supported learning environments have also been studied (Koh et al., 2010; Schmidt et al., 2009; Yurdakul et al., 2012). Previous studies have concentrated on teachers' beliefs and attitudes

toward technology integration, as well as the challenges they face in the classroom (Albirini, 2006; Dehqan et al., 2017; Gilakjani et al., 2015). Previous research focused on determining whether teachers' attitudes toward technology were positive or negative (Jahanban-Isfahlan et al., 2017; Mozafari, 2016; Saglam & Sert, 2012). When looking for reasons why teachers cannot effectively use technology, Ertmer et al. (1999) argue that researchers must consider both what teachers have (internal factors) and what they do not have (external factors). Ertmer and Ottenbreit-Leftwich (2010) discovered that when contextual barriers are removed, three internal factors have a greater influence on teachers' decisions about technology use. These are teachers' self-efficacy, knowledge, and pedagogical beliefs about integrating technology. Teachers also face challenges such as a lack of technological knowledge, a lack of support, a lack of time, and a lack of sufficient computers when they begin to use technology in their classrooms (Salehi & Salehi, 2012). Mishra and Koehler (2006) created the theoretical framework for technological pedagogical and content knowledge (TPACK). TPACK has been acknowledged as a valuable framework for describing and comprehending technology integration in various educational settings, including EFL classrooms. A well-developed TPACK could have a significant impact on teachers' understanding of the best ways to conduct technology-enhanced instruction, ultimately leading to improved student learning (Graham, 2011; Niess, 2008; Shih & Chuang, 2013).

Language institutes, schools, and universities almost never attempt to contribute language teachers' educational degree and teaching experience to their TPACK level. They also rarely hold workshops in the field of TPACK for teachers who need more instruction in this area. It is critical to know whether the TPACK level of Iranian EFL teachers is related to their educational degree and teaching experience. This study aimed to both examine the extent to which Iranian EFL teachers' TPACK level is related to their educational degree and teaching experience and investigate whether these teachers with different levels of educational degree and teaching experience need further training and workshops in the field of TPACK to gain the required proficiency in such an area.

REVIEW OF THE RELATED LITERATURE

THEORIES BEHIND TPACK

Shulman introduced the pedagogical content knowledge (PCK) paradigm in the 1980s, when educational technologies and resources were scarce. The pedagogical content knowledge concept focused mostly on how pedagogy and content are related to teaching. Mishra and Koehler (2006) advocated that technological knowledge be introduced as a third component to alleviate the constraint of the pedagogical content knowledge framework. By incorporating this third knowledge base and seeking to characterize the dynamic and strong links between knowledge of technology, content, and pedagogy, they developed a new model called Technological Pedagogical and Content Knowledge (TPACK). The purpose of their recommendation was to address the fact that new technologies have changed or have the potential to transform the nature of the classroom. Shulman's (1986, 1987) descriptions of Pedagogical Content Knowledge are expanded upon in the TPACK framework to describe how instructors' understanding of educational technologies and pedagogical content knowledge interact to produce effective technology-assisted teaching. Koehler and Mishra (2005) presented a paradigm for summarizing teachers' understanding of the complex interactions between technology, content, and pedagogy. In their paradigm, they have relied on Shulman's (1986, 1987) work characterizing Pedagogical Content Knowledge to emphasize the role of TPACK in understanding effective teaching using technology. At the heart of their paradigm are three domains of knowledge: content, pedagogy, and technology. Content (C) refers to the subject matter to be learned/taught. Modern technologies such as computers, the Internet, and digital video, as well as more classic technologies such as overhead projectors, are all examples of technology (T). Pedagogy (P) is the collection of practices, processes, tactics, procedures, and methods for teaching and learning. Mishra and Koehler (2006) developed the TPACK model, which includes various types of knowledge associated with technology integration practices: technological knowledge (TK), pedagogical knowledge (PK), content knowledge (CK), pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPCK). Mishra and Koehler (2006) provided the most complete descriptions of the framework, which grew over time and through a series of publications. They argued that technology can provide access to explanations, representations, parallels, and demonstrations that make the subject matter

more accessible to the student, but that technology differs from the content and its representation. The technological pedagogical and content knowledge framework aided teachers in integrating material, pedagogy, and technical expertise (Niess, 2008). There are two approaches to technological pedagogical and content knowledge, according to Mishra and Koehler (2006). The first is concerned with the direct impacts of technological knowledge, content knowledge, and pedagogical knowledge, whereas the second is concerned with the effects of intervening knowledge components of pedagogical content knowledge, technological content knowledge, and technological pedagogical knowledge.

RELATED STUDIES ON TPACK

Pamuk et al. (2015) demonstrated that the technological pedagogical knowledge and technological content knowledge effects were important in explaining the TPACK. Furthermore, constructs such as technological pedagogical knowledge, technological content knowledge, and pedagogical content knowledge had a greater influence on predicting TPACK than technological knowledge, content knowledge, and pedagogical knowledge. Khine et al. (2017) investigated Emirati pre-service teachers' perceptions of TPACK components. The findings of this study revealed that technological knowledge had a significant impact on technological pedagogical knowledge and TPACK. Technological pedagogical knowledge, TPACK, and pedagogical content knowledge were all affected by pedagogical knowledge. Furthermore, content knowledge had a significant effect on TPACK, but there was no causal relationship between content knowledge and pedagogical content knowledge. Technological pedagogical knowledge and TPACK were significantly related, but pedagogical content knowledge and TPACK had no relationship.

According to Kiray et al. (2018), technological content knowledge, technological pedagogical knowledge, and pedagogical content knowledge had significant, direct, and positive influences on TPACK. Pedagogical content knowledge had the greatest influence on TPACK. Furthermore, science teachers' content knowledge had a direct and positive impact on their technological content knowledge and pedagogical content knowledge, which was a stronger influence than the effect of technological knowledge and pedagogical knowledge. Nazari et al. (2019) conducted a mixed methods study to investigate differences in perceived TPACK and its influences on professional development among novice and experienced EFL teachers. According to the quantitative findings, experienced teachers scored significantly higher on the pedagogical knowledge and pedagogical content knowledge subscales. In comparison, novice teachers scored significantly higher in terms of technological knowledge, technological content knowledge, technological pedagogical knowledge, and TPACK. The qualitative findings revealed that both novice and experienced EFL teachers preferred different professional development programs tailored to their specific needs. Similarly, they claimed that they could overcome the knowledge gap through collaboration in professional development courses.

Şen (2020) demonstrated that content knowledge, technological knowledge, and pedagogical content knowledge influenced TPACK directly and positively in a study on the sense of efficacy and TPACK among Turkish chemistry teachers. The researcher concluded that the increase in TPACK is dependent on content knowledge, technological knowledge, and pedagogical content knowledge. Nazari et al. (2020) investigated the effect of a TPACK-focused online professional development course on the TPACK of EFL teachers. The findings revealed that the online course had a significant impact on EFL teachers' TPACK, with the exception of pedagogical content knowledge in the novice group and content knowledge in both the novice and experienced groups. In terms of TPACK and pedagogical content knowledge, experienced teachers benefited more from the online course. According to the qualitative findings, all interviewees expressed positive attitudes toward the course.

In an attempt to assess and develop Iranian EFL teachers' technological pedagogical content knowledge, Najjari et al. (2021) discovered statistically significant differences in participants' TPACK literacy before and after TPACK workshops. Furthermore, it was discovered that participants' perceptions of TPACK literacy evolved as a result of TPACK workshops. In a study, Mahmoudi et al. (2021) investigated how influential in-service education and training courses were in developing teachers' TPACK. The results revealed statistically significant differences in the participants' knowledge base components prior to and after the courses. Semi-

structured interviews were also used to investigate the participants' perspectives on the content of the courses. The perceptions expressed by teachers during interview sessions showed that the teachers had some complaints about the course content and made some suggestions. Yang et al. (2021) found significant interconnections among the TPACK constructs except for the association between pedagogical content knowledge and TPACK in a study investigating the effect of teachers' level of TPACK on E-schoolbag adoption.

Mohammad-Salehi and Vaez-Dalili (2022) investigated Iranian EFL teachers' perceptions of Web 2.0 technologies using Mishra and Koehler's (2006) TPACK framework. Except for one construct, the results revealed that Web 2.0 technological knowledge, pedagogical knowledge, and content knowledge, as core knowledge components, positively and directly influenced the second-level knowledge bases, namely technological pedagogical knowledge, pedagogical content knowledge, and technological content knowledge. In contrast, the effects of technological knowledge, pedagogical knowledge, and content knowledge on TPACK were not statistically significant, and thus did not contribute to the development of EFL teachers' TPACK. Furthermore, it was discovered that technological pedagogical knowledge, technological content knowledge, and pedagogical content knowledge all play a role in the development of TPACK.

RESEARCH QUESTIONS OF THE STUDY

RQ 1. What is the level of Iranian EFL teachers' technological knowledge, pedagogical knowledge, and content knowledge of TPACK considering their educational degree and teaching experience?

RQ 2. What is the level of Iranian EFL teachers' pedagogical content knowledge, technological content knowledge, and technological pedagogical knowledge of TPACK considering their educational degree and teaching experience?

RQ 3. What is the level of Iranian EFL teachers' technological pedagogical content knowledge of TPACK considering their educational degree and teaching experience?

METHODOLOGY

PARTICIPANTS

One hundred and four male and female Iranian EFL teachers teaching at various branches of the Iran Language Institute (ILI) were chosen through convenience sampling. Participants held BA, MA, and Ph.D. degrees in subfields of English language teaching, translation, and literature. Their ages ranged from 22 to 60, and Persian was their first language. The Technological Pedagogical and Content knowledge (TPACK) Self-Assessment Questionnaire (Baser et al., 2016) was used to measure participants' familiarity with TPACK. Some items were added to the main questionnaire to collect demographic information (such as participants' educational degree and teaching experience), too. The main participants were chosen from among those who completed the questionnaire thoroughly. Before completing the questionnaire, all respondents were told of the study's goal and that their responses would be examined by the researcher and kept anonymous.

MATERIALS

THE TPACK SELF-ASSESSMENT QUESTIONNAIRE

Teachers' technological pedagogical content knowledge competency was measured using the TPACK Self-Assessment Questionnaire (Baser et al., 2016). This questionnaire consisted of 39 items divided into seven categories: technological knowledge (9 items), pedagogical knowledge (6 items), content knowledge (5 items), pedagogical content knowledge (5 items), technological content knowledge (3 items), technological pedagogical knowledge (7 items), and technological pedagogical content knowledge (4 items). Participants rated their level of agreement with each questionnaire item on a likert scale (i.e. nothing/none, very little, some influence, quite a bit, and a great deal). A higher technological pedagogical and content knowledge score denoted greater TPACK proficiency. According to Baser et al. (2016), who developed and validated the instrument, this questionnaire enjoys high validity. Examining the internal consistency of the questionnaire through Cronbach's alpha revealed that the reliability coefficients for the questionnaire components ranged from .81 to .92 when the items for each component were analyzed separately (Baser et al., 2016). The

participants were sent the questionnaire link via the WhatsApp application. A demographic questionnaire was also attached to the main questionnaire to probe the participants' educational degree and teaching experience.

PROCEDURE

The goal of this research was to determine the TPACK level of Iranian EFL teachers while taking their educational degree and teaching experience into account. A quantitative research method was used in this survey study. The participants' educational degree and teaching experience were the study's independent variables, and their level in TPACK components was the dependent variable of the study. One hundred and four Iranian male and female EFL teachers (novice and experienced) teaching at different branches of the Iran Language Institute (ILI) from different provinces of Iran (i.e., Ardabil, East Azerbaijan, Fars, Gilan, Isfahan, Mazandaran, and Razavi Khorasan) were chosen through convenience sampling to participate in the study. Participants held various educational degrees, including BA, MA, and Ph.D. degrees in various subfields of English language teaching, translation, and literature.

The current study conducted the following steps to obtain the essential data. First, the researcher requested authorization from the ILI's director to conduct the study there. Then, to serve the purpose of the research, a TPACK Self-Assessment Questionnaire (Baser et al., 2016) was used to assess the participants' level in seven components of the TPACK Questionnaire (i.e. technological knowledge, pedagogical knowledge, content knowledge, pedagogical content knowledge, technological content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge). Demographic information (such as educational level and years of teaching experience) was also gathered using a demographic questionnaire. The data was gathered during a four-month period. The questionnaire's online link was distributed to participants via the WhatsApp application. Participants were also given instructions on how to complete the TPACK questionnaire, and they were insured that their information and responses to the questionnaire items would be kept confidential and analyzed by the researcher. Following data collection, the participants' scores in TPACK components were analyzed using SPSS software.

RESULTS AND DISCUSSION

1. ANSWERING THE FIRST RESEARCH QUESTION

RQ 1. What is the level of Iranian EFL teachers' technological knowledge, pedagogical knowledge, and content knowledge of TPACK considering their educational degree and teaching experience?

The test of normality was run for the three educational levels' scores in order to select the appropriate statistical test.

Table 1

The Test of Normality for the Technological Knowledge Scores of the Three Educational Levels

		Kolmogorov-Smirnov[a]		
	Degree	Statistic	df	Sig.
TK	Ph.D.	.180	10	.200*
	MA	.119	64	.125
	BA	.142	30	.126

The Kolmogorov-Smirnov normality test results showed that the data for the three sets of scores were normally distributed (P>.05). As a result, the one-way ANOVA was the best test for comparing means. The descriptive statistics for the three groups are shown in the table below.

Table 2

The Descriptive Statistics for the Technological Knowledge Scores of the Three Educational Levels

					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum

Ph.D.	10	31.5000	3.24037	1.02470	29.1820	33.8180	27.00	36.00
MA	64	33.5781	6.09138	.76142	32.0565	35.0997	19.00	45.00
BA	30	30.8333	6.81825	1.24484	28.2874	33.3793	16.00	43.00
Total	104	32.5865	6.19052	.60703	31.3826	33.7904	16.00	45.00

The Ph.D., MA, and BA mean scores were 31.50, 33.57, and 30.83, respectively. The results of the inferential test are shown in the table below.

Table 3

The Results of the One-Way ANOVA for the Comparison of the Three Educational Levels

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	166.945	2	83.473	2.230	.113
Within Groups	3780.276	101	37.428		
Total	3947.221	103			

According to Table 3, there was no statistically significant difference in Technological Knowledge scores between the three educational levels, F (2, 101) = 2.23, P>.05. The following table displays the normality test for Technological Knowledge scores based on teaching experience.

Table 4

The Test of Normality for the Technological Knowledge Scores Based on Teaching Experience

		Kolmogorov-Smirnov[a]		
	Experience	Statistic	Df	Sig.
TK	More than 5	.076	80	.200*
	Less than 5	.188	24	.028

The Kolmogorov-Smirnov test of normality showed that the data for the two sets of scores were not normally distributed (P<.05 for the second category). As a result, the Mann-Whitney U test was the appropriate test for mean comparison. Below are the descriptive statistics for the two categories.

Table 5

The Descriptive Statistics for the Technological Knowledge Scores Based on Teaching Experience

	Experience	N	Mean Rank	Sum of Ranks
TK	More than 5	80	52.28	4182.50
	Less than 5	24	53.23	1277.50
	Total	104		

The mean ranks for the categories above and below five were 52.28 and 53.23, respectively. The results of the inferential test are shown in the table below.

Table 6

The Results of the Mann-Whitney U test for the Comparison of the Two Teaching Experience Categories

	TK
Mann-Whitney U	942.500
Z	-.135
Asymp. Sig. (2-tailed)	.892

As can be seen in the above table, there was not any statistically significant difference between the two groups regarding their Technological Knowledge score, $U = 942.50$, $P > .05$.

To deal with the Pedagogical Knowledge, the test of normality was used for the scores of the three educational levels to choose the appropriate statistical test.

Table 7

The Test of Normality for the Pedagogical Knowledge Scores of the Three Educational Levels

		Kolmogorov-Smirnov[a]		
	Degree	Statistic	df	Sig.
PK	Ph.D.	.170	10	.200*
	MA	.117	64	.031
	BA	.113	30	.200*

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The Kolmogorov-Smirnov test of normality showed that the data were normally distributed for at least two sets of scores (P> .05). Thus, the suitable test for mean comparison was the one-way ANOVA. The descriptive statistics of the three groups are shown below.

Table 8

The Descriptive Statistics for the Pedagogical Knowledge Scores of the Three Educational Levels

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound	Minimum	Maximum
Ph.D.	10	23.6000	1.89737	.60000	22.2427	24.9573	21.00	26.00
MA	64	24.7500	4.40418	.55052	23.6499	25.8501	6.00	30.00
BA	30	24.3000	4.24386	.77482	22.7153	25.8847	11.00	30.00
Total	104	24.5096	4.16876	.40878	23.6989	25.3203	6.00	30.00

The mean scores for the Ph.D., MA, and BA levels were 23.60, 24.75, and 24.30, respectively. The next table shows the results of the inferential test.

Table 9

The Results of the One-Way ANOVA for the Comparison of the Three Educational Levels

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	13.290	2	6.645	.378	.686
Within Groups	1776.700	101	17.591		
Total	1789.990	103			

According to Table 9, there was no statistically significant difference in Pedagogical Knowledge scores among the three educational levels, F (2, 101) =.378, P>.05. The following table displays the normality test for Pedagogical Knowledge scores depending on teaching experience.

Table 10

The Test of Normality for the Pedagogical Knowledge Scores Based on Teaching Experience

		Kolmogorov-Smirnov[a]		
	Experience	Statistic	df	Sig.
PK	More than 5	.129	80	.002
	Less than 5	.150	24	.175

The Kolmogorov-Smirnov normality test results demonstrated that the data for the two sets of scores were not normally distributed (P<.05 for the first row). As a result, the Mann-Whitney U test was the best choice for comparing means. The descriptive statistics for the two categories are presented below.

Table 11

The Descriptive Statistics for the Pedagogical Knowledge Scores Based on Teaching Experience

	Experience	N	Mean Rank	Sum of Ranks
PK	More than 5	80	58.16	4652.50
	Less than 5	24	33.65	807.50
	Total	104		

The mean ranks for the categories above and below five were 58.16 and 33.65, correspondingly. The results of the inferential test are shown in the table below.

Table 12

The Results of the Mann-Whitney U Test for the Comparison of the Two Teaching Experience Categories

	PK
Mann-Whitney U	507.500
Z	-3.508
Asymp. Sig. (2-tailed)	.000

As shown in the table above, there was a statistically significant difference in Pedagogical Knowledge scores between the two groups (in favor of the more experienced teachers), U = 507.50, P>.05.

The test of normality of the Content Knowledge scores was used for the scores of the three educational levels in order to select the suitable statistical test.

Table 13
The Test of Normality for the Content Knowledge Scores of the Three Educational Levels

		Kolmogorov-Smirnov[a]		
	Degree	Statistic	df	Sig.
CK	Ph.D.	.222	10	.176
	MA	.235	64	.000
	BA	.175	30	.020

The results of Kolmogorov-Smirnov test of normality revealed that the data were not normally distributed for at least two sets of scores (P>.05). As a result, the Kruskal-Wallis H test was the best choice for comparing means. The descriptive statistics for the three groups are presented below.

Table 14
The Descriptive Statistics for the Content Knowledge Scores of the Three Educational Levels

	Degree	N	Mean Rank
CK	Ph.D.	10	53.15
	MA	64	54.74
	BA	30	47.50
	Total	104	

The mean ranks for the Ph.D., MA, and BA levels were 53.15, 54.74, and 47.50, correspondingly. The following table shows the results of the inferential test.

Table 15
The Results of the Kruskal-Wallis H test for the Comparison of the Three Educational Levels

	CK
KWH	1.224
Df	2
Asymp. Sig.	.542

Based on Table 15 above, there was no statistically significant difference among the three educational levels regarding their Content Knowledge score, x^2 (2) = 1.22, *P*> .05. The next table illustrates the test of normality for the Content Knowledge scores based on the teaching experience.

Table 16
The Test of Normality for the Content Knowledge Scores Based on Teaching Experience

		Kolmogorov-Smirnov[a]		
	Experience	Statistic	df	Sig.
CK	More than 5	.229	80	.000
	Less than 5	.118	24	.200*

The Kolmogorov-Smirnov test of normality revealed that the data for the two sets of scores were not normally distributed (P<.05 for the first row). As a result, the Mann-Whitney U test was the best choice for mean comparison. The descriptive statistics for the two groups are shown in the table below.

Table 17
The Descriptive Statistics for the Content Knowledge Scores Based on Teaching Experience

	Experience	N	Mean Rank	Sum of Ranks
CK	More than 5	80	55.04	4403.50
	Less than 5	24	44.02	1056.50
	Total	104		

The mean scores for the above-five and below-five categories were 55.04 and 44.02, respectively. The next table shows the results of the inferential test.

Table 18
The Results of the Mann-Whitney U test for the Comparison of the Two Teaching Experience Categories

	CK
Mann-Whitney U	756.500
Wilcoxon W	1056.500
Z	-1.597
Asymp. Sig. (2-tailed)	.110

As shown in the table above, there was no statistically significant difference between the two groups in terms of Content Knowledge score, U = 756.50, P >.05.

2. ANSWERING THE SECOND RESEARCH QUESTION

RQ 2. What is the level of Iranian EFL teachers' pedagogical content knowledge, technological content knowledge, and technological pedagogical knowledge of TPACK considering their educational degree and teaching experience?

In order to find the proper statistical test, the test of normality was applied for the scores of the three educational levels.

Table 19

The Test of Normality for the Pedagogical Content Knowledge Scores of the Three Educational Levels

		Kolmogorov-Smirnov[a]		
	Degree	Statistic	Df	Sig.
PCK	Ph.D.	.343	10	.001
	MA	.182	64	.000
	BA	.166	30	.033

Based on the results of the Kolmogorov-Smirnov test of normality, the data were not normally distributed for the three sets of scores (P<.05). Consequently, the Kruskal Wallis H Test was the appropriate test for mean comparison. The descriptive statistics of the three groups are shown below.

Table 20

The Descriptive Statistics for the Pedagogical Content Knowledge Scores of the Three Educational Levels

	Degree	N	Mean Rank
PCK	Ph.D.	10	54.85
	MA	64	53.13
	BA	30	50.38
	Total	104	

The Ph.D., MA, and BA mean ranks were 54.85, 53.13, and 50.38, respectively. The results of the inferential test are shown in the table below.

Table 21

The Results of the Kruskal Wallis H Test for the Comparison of the Three Educational Levels

	PCK
KWH	.241
Df	2
Asymp. Sig.	.887

According to Table 21, there was no statistically significant difference in Pedagogical Content Knowledge scores among the three educational levels, $x^2(2) = .24$, P>.05. The following table displays the normality test results for the Pedagogical Content Knowledge scores based on teaching experience.

Table 22

The Test of Normality for the Pedagogical Content Knowledge Scores Based on Teaching Experience

		Kolmogorov-Smirnov[a]		
	Experience	Statistic	df	Sig.
PCK	More than 5	.222	80	.000
	Less than 5	.192	24	.023

The Kolmogorov-Smirnov test of normality revealed that the data for the two sets of scores were not normally distributed (P<.05). As a result, the Mann-Whitney U test was the best choice for mean comparison. The descriptive data for the two groups are presented in the table below.

Table 23

The Descriptive Statistics for the Pedagogical Content Knowledge Scores Based on Teaching Experience

	Experience	N	Mean Rank	Sum of Ranks
PCK	More than 5	80	58.95	4716.00
	Less than 5	24	31.00	744.00
	Total	104		

The mean ranks for the categories above and below five were 58.95 and 31, respectively. The results of the inferential test are shown in the table below.

Table 24

The Results of the Mann-Whitney U test for the Comparison of the Two Teaching Experience Categories

	PCK
Mann-Whitney U	444.000
Z	-4.021
Asymp. Sig. (2-tailed)	.000

As shown in the table above, there was a statistically significant difference in Pedagogical Content Knowledge scores between the two groups (in favor of the more experienced teachers), U = 444, P<.05.

In order to choose the appropriate statistical test, the test of normality for the Technological Content Knowledge Scores was run for the scores of the three educational levels.

Table 25

The Test of Normality for the Technological Content Knowledge Scores of the Three Educational Levels

		Kolmogorov-Smirnov[a]		
	Degree	Statistic	Df	Sig.
TCK	Ph.D.	.163	10	.200*
	MA	.109	64	.057
	BA	.120	30	.200*

The results of the Kolmogorov-Smirnov test of normality showed that the data were normally distributed for the three sets of scores (P>.05). Therefore, the appropriate test for mean comparison was the one-way ANOVA. The descriptive statistics of the three groups are shown below.

Table 26

The Descriptive Statistics for the Technological Content Knowledge Scores of the Three Educational Levels

					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
Ph.D.	10	12.0000	2.78887	.88192	10.0050	13.9950	7.00	15.00
MA	64	11.6406	2.55335	.31917	11.0028	12.2784	5.00	15.00
BA	30	10.1333	2.82517	.51580	9.0784	11.1883	5.00	15.00
Total	104	11.2404	2.72527	.26723	10.7104	11.7704	5.00	15.00

The mean scores for the Ph.D., MA, and BA levels were 12, 11.64, and 10.13, respectively. The next table shows the results of the inferential test.

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Table 27
The Results of the One-Way ANOVA for the Comparison of the Three Educational Levels

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	52.789	2	26.395	3.743	.027
Within Groups	712.201	101	7.051		
Total	764.990	103			

According to Table 27, there was a statistically significant difference among the three educational levels regarding their Technological Content Knowledge score, F (2, 101) = 3.74, P< .05. The following table shows the pairwise comparison.

Table 28
The Pairwise Comparison Table for the Technological Content Knowledge Scores Based the Three Educational Levels

		Mean Difference (I-J)			95% Confidence Interval	
(I) Degree	(J) Degree		Std. Error	Sig.	Lower Bound	Upper Bound
Ph.D.	MA	.35938	.90296	.916	-1.7885	2.5073
	BA	1.86667	.96964	.137	-.4399	4.1732
MA	Ph.D.	-.35938	.90296	.916	-2.5073	1.7885
	BA	1.50729*	.58756	.031	.1096	2.9050
BA	Ph.D.	-1.86667	.96964	.137	-4.1732	.4399
	MA	-1.50729*	.58756	.031	-2.9050	-.1096

As the above table shows, there was only a significant difference between the MA and BA groups, P = .03. The next table shows the test of normality for the Technological Content Knowledge scores based on the teaching experience.

Table 29
The Test of Normality for the Technological Content Knowledge Scores Based on Teaching Experience

		Kolmogorov-Smirnov[a]		
	Experience	Statistic	df	Sig.
TCK	More than 5	.146	80	.000
	Less than 5	.247	24	.001

The results of the Kolmogorov-Smirnov test of normality showed that the data were not normally distributed for the two sets of scores (P<.05). Therefore, the appropriate test for mean comparison was the Mann-Whitney U test. The descriptive statistics of the two categories are shown below

Table 30
The Descriptive Statistics for the Technological Content Knowledge Scores Based on Teaching Experience

	Experience	N	Mean Rank	Sum of Ranks
TCK	More than 5	80	54.11	4329.00
	Less than 5	24	47.13	1131.00
	Total	104		

The mean ranks for the above-five and below-five categories were 54.11 and 47.13, respectively. The next table shows the results of the inferential test.

Table 31
The Results of the Mann-Whitney U test for the Comparison of the Two Teaching Experience Categories

	TCK
Mann-Whitney U	831.000
Z	-1.003
Asymp. Sig. (2-tailed)	.316

As can be seen in the above table, there was no statistically significant difference between the two groups regarding their Technological Content Knowledge score, U = 831, P > .05.

The test of normality for Technological Pedagogical Knowledge scores was performed on the results of the three educational levels in order to select the suitable statistical test.

Table 32

The Test of Normality for the Technological Pedagogical Knowledge Scores of the Three Educational Levels

		Kolmogorov-Smirnov[a]		
	Degree	Statistic	Df	Sig.
TPK	Ph.D.	.238	10	.113
	MA	.092	64	.200*
	BA	.115	30	.200*

The Kolmogorov-Smirnov normality test results demonstrated that the data for the three sets of scores were normally distributed (P>.05). As a result, the one-way ANOVA was the best test for comparing means. The descriptive statistics for the three groups are presented in the table below.

Table 33

The Descriptive Statistics for the Technological Pedagogical Knowledge Scores of the Three Educational Levels

					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
Ph.D.	10	26.9000	3.10734	.98263	24.6771	29.1229	22.00	30.00
MA	64	26.9219	5.41692	.67711	25.5688	28.2750	10.00	35.00
BA	30	25.4000	5.47471	.99954	23.3557	27.4443	15.00	35.00
Total	104	26.4808	5.26387	.51617	25.4571	27.5045	10.00	35.00

The Ph.D., MA, and BA mean scores were 26.90, 26.92, and 25.40, respectively. The results of the inferential test are shown in the table below.

Table 34

The Results of the One-Way ANOVA for the Comparison of the Three Educational Levels

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	49.252	2	24.626	.887	.415
Within Groups	2804.709	101	27.769		
Total	2853.962	103			

According to Table 34, there was no statistically significant difference in Technological Pedagogical Knowledge scores among the three educational levels, F (2, 101) =.887, P>.05. The following table displays the normality test results for Technological Pedagogical Knowledge scores based on teaching experience.

Table 35

The Test of Normality for the Technological Pedagogical Knowledge Scores Based on Teaching Experience

		Kolmogorov-Smirnov[a]		
	Experience	Statistic	df	Sig.
TPK	More than 5	.117	80	.009
	Less than 5	.177	24	.051

The normality test results demonstrated that the data were not normally distributed (P<.05 for the first row). As a result, the Mann-Whitney U test was the proper test for mean comparison. Below are the descriptive statistics for the two groups.

Table 36

The Descriptive Statistics for the Technological Pedagogical Knowledge Scores Based on Teaching Experience

	Experience	N	Mean Rank	Sum of Ranks
TPK	More than 5	80	55.49	4439.00
	Less than 5	24	42.54	1021.00

	Total	104

The average ranks for the categories above and below five were 55.49 and 42.54, respectively. The results of the inferential test are shown in the following table.

Table 37

The Results of the Mann-Whitney U test for the Comparison of the Two Teaching Experience Categories

	TPK
Mann-Whitney U	721.000
Z	-1.848
Asymp. Sig. (2-tailed)	.065

As can be seen in the above table, there was no statistically significant difference between the two groups regarding their Technological Pedagogical Knowledge score, $U = 721$, $P > .05$.

3. ANSWERING THE THIRD RESEARCH QUESTION

RQ 3. What is the level of Iranian EFL teachers' technological pedagogical content knowledge of TPACK considering their educational degree and teaching experience?

The test of normality was applied for the scores of the three educational levels in order to select the suitable statistical test.

Table 38

The Test of Normality for the Technological Pedagogical Content Knowledge Scores of the Three Educational Levels

		Kolmogorov-Smirnov[a]		
	Degree	Statistic	Df	Sig.
TPCK	Ph.D.	.244	10	.093
	MA	.093	64	.200*
	BA	.136	30	.165

The Kolmogorov-Smirnov normality test results demonstrated that the data for the three sets of scores were normally distributed (P>.05). As a result, the one-way ANOVA was the best test for comparing means. The descriptive statistics for the three groups are presented in the table below.

Table 39

The Descriptive Statistics for the Technological Pedagogical Content Knowledge Scores of the Three Educational Levels

					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
Ph.D.	10	14.5000	4.50309	1.42400	11.2787	17.7213	8.00	19.00
MA	64	14.0469	3.80655	.47582	13.0960	14.9977	6.00	20.00
BA	30	12.6667	3.93335	.71813	11.1979	14.1354	5.00	19.00
Total	104	13.6923	3.92917	.38529	12.9282	14.4564	5.00	20.00

The Ph.D., MA, and BA mean scores were 14.50, 14.04, and 12.66, respectively. The results of the inferential test are shown in the table below.

Table 40

The Results of the One-Way ANOVA for the Comparison of the Three Educational Levels

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	46.128	2	23.064	1.509	.226
Within Groups	1544.026	101	15.287		
Total	1590.154	103			

According to Table 40, there was no statistically significant difference in Technological Pedagogical Content Knowledge scores among the three educational levels, F (2, 101) = 1.50, P>.05. The following table displays the test of normality for Technological Pedagogical Content Knowledge scores based on teaching experience.

Table 41

The Test of Normality for the Technological Pedagogical Content Knowledge Scores Based on Teaching Experience

		Kolmogorov-Smirnov[a]		
	Experience	Statistic	Df	Sig.
TPCK	More than 5	.110	80	.019
	Less than 5	.228	24	.002

The Kolmogorov-Smirnov normality test results showed that the data for the two sets of scores were not normally distributed (P<.05). As a result, the Mann-Whitney U test was the best choice for comparing means. The descriptive statistics for the two categories are shown below.

Table 42

The Descriptive Statistics for the Technological Pedagogical Content Knowledge Scores Based on Teaching Experience

	Experience	N	Mean Rank	Sum of Ranks
TPCK	More than 5	80	56.04	4483.50
	Less than 5	24	40.69	976.50
	Total	104		

The mean ranks for the above-five and below-five categories were 56.04 and 40.69, respectively. The inferential test results are shown in the table below.

Table 43

The Results of the Mann-Whitney U test for the Comparison of the Two Teaching Experience Categories

	TPACK
Mann-Whitney U	676.500
Z	-2.195
Asymp. Sig. (2-tailed)	.028

As shown in the table above, there was a statistically significant difference between the two groups (in favor of the more experienced teachers) in their Technological Pedagogical Content Knowledge score, U = 676.50, P<.05.

DISCUSSION

The purpose of this survey was to determine the level of TPACK among Iranian EFL teachers based on their educational background and teaching experience. The results showed that among the participants at different educational levels, there was no significant difference considering their scores in technological knowledge, pedagogical knowledge, content knowledge, pedagogical content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge. However, when it comes to technological content knowledge scores, the MA participants outperformed the BA ones. The findings also showed that the more experienced participants outperformed the less experienced ones in terms of their obtained scores in pedagogical knowledge, pedagogical content knowledge, and technological pedagogical content knowledge. However, there was no significant difference between the more experienced and less experienced participants' technological knowledge, content knowledge, technological content knowledge, and technological pedagogical knowledge scores. This study's emphasis on technological knowledge as one component of EFL teachers' TPACK was somehow consistent with that of another study, which focused on teachers' capacity and skills in integrating information and communication technology (ICT) into their teaching practice (Chai et al., 2010). In agreement with the research which has been done to investigate teachers' perspectives on technology-

supported learning environments (Koh et al., 2010; Schmidt et al., 2009; Yurdakul et al., 2012), the current study concentrated on technological knowledge of language teachers as a component of TPACK framework. A study conducted by Mishra and Koehler (2006) provided an explanation for TPACK as a model for effective teaching. Based on their study, effective teaching originates from the interactions between and among TPACK components and the teachers' ability to apply these components in the classroom. The present investigation also supported this notion by investigating EFL teachers' level in TPACK components. According to the quantitative findings of a study done by Nazari et al. (2019) who investigated the differences in perceived TPACK and its influences on professional development between novice and experienced EFL teachers, experienced teachers scored significantly higher on pedagogical knowledge and pedagogical content knowledge. These findings are in congruence with the results of the current investigation. Their study's findings also showed that novice teachers scored significantly higher in terms of technological knowledge, technological content knowledge, technological pedagogical knowledge, and TPACK. However, the results of the present research showed that there was no significant difference between experienced and novice teachers in terms of their technological knowledge, technological content knowledge, and technological pedagogical knowledge. In line with the purpose of the current study which was to assess Iranian EFL teachers' TPACK level considering the variables of educational degree and teaching experience, in another attempt to assess and develop Iranian EFL teachers' TPACK, Najjari et al. (2021) discovered statistically significant differences in participants' TPACK literacy before and after TPACK workshops.

Furthermore, it was discovered that TPACK workshops influenced participants' perceptions of TPACK literacy. In accordance with the purpose of the present investigation which was to show the importance of holding workshops in the field of TPACK for teachers who need more instruction in this area, Nazari et al. (2020) investigated the impact of a TPACK-focused online professional development course on the TPACK of EFL teachers. The results showed that the online course had a significant impact on EFL teachers' TPACK, with the exception of pedagogical content knowledge in the novice group and content knowledge in both the novice and experienced groups. Experienced teachers may benefit more from the online course in terms of TPACK and pedagogical content knowledge. To show the importance of TPACK workshops for EFL teachers, Mahmoudi et al. (2021) investigated the role of in-service education and training courses in the development of teachers' TPACK. The results revealed statistically significant differences in the participants' knowledge base components before and after the courses. Semi-structured interviews were also used in their study to elicit participants' perspectives on the content of the courses. The perceptions expressed by teachers during interview sessions showed that the teachers had some complaints about the course content and offered some suggestions. In general, the outcomes of this study confirmed the need of hosting TPACK workshops for language teachers who need more training in this area.

CONCLUSION AND IMPLICATIONS

Based on the study's findings and results, it can be concluded that there was no significant difference between EFL teachers with different educational levels concerning their scores in technological knowledge, pedagogical knowledge, content knowledge, pedagogical content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge. In terms of technological content knowledge scores, however, MA EFL teachers outperformed BA ones. The findings also revealed that more experienced EFL teachers outperformed less experienced ones regarding achieved pedagogical knowledge, pedagogical content knowledge, and technological pedagogical content knowledge scores. However, there was no significant difference in the technological knowledge, content knowledge, technological content knowledge, and technological pedagogical knowledge scores between the more experienced and less experienced EFL teachers.

IMPLICATIONS

The findings and results of the study have several theoretical and pedagogical consequences for researchers, administrators, educators, curriculum writers, and EFL teachers:

1. Examining EFL teachers' technological pedagogical content knowledge level with TPACK questionnaires and other data collection tools, as well as designing various courses, seminars, programs, and

workshops in the field of TPACK for EFL teachers with varying qualifications and teaching experiences, will improve their competency in this area.

2. Administrators could hold TPACK training courses for EFL teachers in order to improve their level in this area.

3. EFL teacher educators can inform their trainees about the importance of technology and various technological tools in EFL classes.

4. Curriculum developers could incorporate technological knowledge, pedagogical knowledge, content knowledge, pedagogical content knowledge, technological content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge into curricula to improve the teaching quality of EFL teachers.

5. Taking into account different components of TPACK such as knowledge of technology, pedagogy, and subject matter, the findings of this study indicated that during the teaching process, EFL teachers need to develop their knowledge of new technological tools, recent trends in language pedagogy, and the subject matter they are teaching.

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