

The Relationship between EFL Teachers' Professional Development and their Self-efficacy in Online Education during the Pandemic¹

Masoomeh Adavi², Mansooreh Amiri³, & Nargess Nourizadeh⁴, Lorestan University, Khoramabad, Iran

Abstract

This quantitative study aims to examine the relationship between EFL teachers' professional development (PD) and their self-efficacy in online education during the COVID-19 pandemic. The participants of this study were 80 English as a foreign language (EFL) teachers selected via convenience sampling who were teaching online in different schools in some cities of Iran. In order to gather the data needed for the study and to measure the variables of the study, two different types of closed or Likert questionnaires were administered. One was a questionnaire to measure various aspects of PD, and the other was a long form of teachers' sense of efficacy scale (TSES) to examine teacher self-efficacy. To answer the research questions, Pearson correlation coefficient linear and multiple regression were run. The results revealed that there was a positive significant relationship between teachers' self-efficacy, knowledge, skills, and the teacher professional development (TPD) program. The results also showed that among the components of the TPD, knowledge and skills were significant positive predictors of self-efficacy and the TPD programs cannot significantly predict teacher's self-efficacy ($p > .01$). Therefore, teacher professional development can predict teachers' self-efficacy. Finally, some findings and implications are presented.

Resumen

Este estudio cuantitativo tiene como objetivo examinar la relación entre el desarrollo profesional (PD) de los profesores de EFL y su autoeficacia en la educación en línea durante la pandemia de COVID-19. Los participantes de este estudio fueron 80 profesores de inglés como lengua extranjera (EFL) seleccionados a través de un muestreo de conveniencia que enseñaban en línea en diferentes escuelas en algunas ciudades de Irán. Para recopilar los datos necesarios para el estudio y medir las variables del estudio, se administraron dos tipos diferentes de cuestionarios cerrados o de Likert. Uno era un cuestionario para medir varios aspectos del PD, y el otro era una forma larga de la escala de sentido de eficacia de los profesores (TSES) para examinar la autoeficacia de los profesores. Para responder a las preguntas de investigación, se realizó una regresión lineal y múltiple del coeficiente de correlación de Pearson. Los resultados revelaron que existía una relación significativa positiva entre la autoeficacia, el conocimiento, las habilidades y el programa de desarrollo profesional docente (TPD). Los resultados también mostraron que entre los componentes del desarrollo profesional docente, los conocimientos y las habilidades fueron predictores positivos significativos de la autoeficacia y que los programas de desarrollo profesional docente no pueden predecir significativamente la autoeficacia de los docentes ($p > .01$). Por lo tanto, el desarrollo profesional docente puede predecir la autoeficacia de los docentes. Finalmente, se presentan algunos hallazgos e implicaciones.

Introduction

Fundamental changes in society might require the transformation of the educational system, and the main axis of the development in any educational system is the quality of teacher performance (Fullan, 1999; Hargreaves, 2002). As teachers gain more knowledge and the quality of their teaching improves, students can be more successful and perform more effectively. Therefore, the teacher, as one of the most important elements of education, needs to grow and develop as well. This growth and development can be achieved through PD courses (Bransford et al., 2005; DeMonte, 2013; Desimone et al., 2006; Fullan, 2000, 2001; Guskey & Yoon, 2009). Teachers' participation in PD programs can result in the acquisition and development of the knowledge, skills, and emotional intelligence necessary to think, plan, and practice professionally with their students and colleagues (Borko, 2004; Buczynski & Hansen, 2010; Day, 1999; Gabriel et al., 2011; Poskitt, 2005).

According to Guskey (1999), PD refers to "...those processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might, in turn, improve the learning of students" (p.16). Educational researchers have argued that during school reform, the PD of teachers is a key element in the development of education to meet the society's expectations (Ball & Cohen, 1999; Borko, 2004; Dede et al., 2009; Desimone, 2011; Desimone et al., 2006; Desimone & Pak, 2017; Putnam & Borko, 1997; Wilson & Berne, 1999). Since TPD includes all behaviors that change people's skills, knowledge, and experience beyond any initial training, it is an appropriate approach to improve teachers' capabilities and commitments (Allen, 2009; Alruqi & Alharbi, 2022; Borg, 2018).

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²m.adavi1491@gmail.com, 0000-0001-6283-3866

³amiri.ma@lu.ac.ir, 0000-0003-4150-5032, Correspondent.

⁴nourizadeh.n@lu.ac.ir, 0000-0003-4407-8304.

Various factors such as teaching experience, school culture, school administration, and job satisfaction affect teachers' PD (Hall, 2007; Özer & Beycioglu, 2010; Turner, 2007). Also, some researchers have explored the effects of PD on teacher efficacy. They mentioned that teachers who honestly take part in PD practices have a higher sense of efficacy (Rimm-Kaufman & Sawyer, 2004; Ross, 1994; Stein & Wang, 1988). According to Caena (2011), teacher self-efficacy is significantly related to TPD opportunities and can create superiority and indirect experiences, thus making teachers' competence levels increase. Since teacher self-efficacy is very important in the development of students, it is necessary to shed light on the effectiveness and advantages of teachers' PD and how it relates to their self-efficacy. Thus, as teacher self-efficacy is another important factor that is widely discussed in the educational research literature on the teaching profession, we hypothesized in this study that there could be a relationship between TPD and teacher self-efficacy.

Tschannen-Moran et al. (1998) defined teacher self-efficacy as "the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context" (p. 22). High self-efficacy helps teachers to perform better in more challenging and unsuccessful situations and to become more diligent in dealing with students (Tschannen-Moran & Hoy, 2001; Tschannen-Moran et al., 1998). Self-efficacious teachers are those who manage the classroom well, engage students, and can apply learning and teaching strategies in the classroom. In addition, they spend more time planning and organizing class activities. Therefore, students can learn more from self-efficacious teachers (Shojaei, 2018). In fact, they are effective in enhancing student achievement (Guskey, 2003), and the implications of teachers' self-efficacy are also related to many educational consequences such as student motivation, school effectiveness, and supervisors' ratings of teachers' competence (Guskey, 1998). As efficacy is a contextual concept, teachers with high levels of efficacy in traditional classes are not necessarily efficacious in other contexts and they might need to be provided with new skills, knowledge, or support. Due to the availability of the internet in all parts of the world, online learning has become very popular and has been studied by many researchers. Accordingly, Alonso Díaz and Blázquez Entonado (2009), Hampel and Stickler (2005), and Soleimani and Khanjani (2013) mentioned that, as online education is totally different from traditional education and requires new competencies different from face-to-face classes, teachers' proficiency in traditional classes does not make them successful in online classes.

Today, the way learners learn, process, and interact with new information is vastly different than it was a decade ago (Khatoony & Nezhadmehr, 2020). Furthermore, with the rapid growth of the internet use, online education is widely accepted in the context of education (Huang et al., 2012; White, 2006), and has been studied by many researchers. In fact, as online education provides a good opportunity for learners to learn with limitations such as time, distance, and location, it is a suitable alternative to face-to-face classrooms (Crawford-Ferre & Wiest, 2012; George & Lal, 2019; Rostami, 2020; Treacy, 2007). Hence, teachers' needs for PD programs and strategies to improve their self-efficacy is increasing. Due to the COVID-19 outbreak, the aforementioned topic emerged, but many educational researchers focussed on how to manage teachers' learning in online education, transition to online education, and variations of models and online learning platforms (Basilaia & Kvavadze, 2020; Doghonadze et al., 2020; Gunawan et al., 2020; Moorhouse, 2020; Subekti, 2021; Zhang et al., 2020).

There has been some research on how teachers behave in online education. Atmojo and Nugroho (2020) examined how EFL teachers teach in an online course and the challenges they faced during the global pandemic. The results showed that although teachers performed some activities during online teaching using a wide range of online resources such as social networking sites, applications, internet sites, and online quizzes, they still faced challenges, especially with regard to students and/or parents. In another study, Khatoony and Nezhadmehr (2020) explored the challenges of EFL teachers in the process of online teaching and investigated the contribution of technology integration to online classes during the Coronavirus pandemic condition in Iran. Despite the fact that teachers had a positive attitude towards the use of technology in their classrooms, they mainly encountered various challenges such as lack of suitable materials, lack of attention and motivation for students during online classes, and lack of budget and support for language institutions.

Additionally, Ravandpour (2019) explored the relationship between the continuing professional development (CPD) of EFL teachers and their self-efficacy. This research showed that there was a positive, moderate significant relationship between CPD and total self-efficacy. Also, it found that CPD is a positive, significant predictor of self-efficacy. Safari et al. (2020) conducted research on the influence of EFL teachers' self-efficacy, job satisfaction, and reflective thinking on their PD. The findings suggested that self-efficacy positively predicted PD, and as a result, it could be assumed that teachers with a high degree of self-efficacy take more advantage of PD. In another study, Watson (2006) explored whether PD programs affect the

long-term self-efficacy of in-service teachers. The results revealed that teachers' self-efficacy level improved after the summer workshops and remained high for years even after their participation in the program. Also, Amanulla and Aruna (2014) investigated the effect of teacher efficacy on the PD of higher secondary school teachers. The results indicated that there was a significant and positive relationship between the efficacy of the teachers and their PD. Nevertheless, shifting the classes from face-to-face to online during the Covid-19 pandemic had the potential to affect some elements in the field of teachers' PD. However, to the best of the researchers' knowledge, there is no empirical research on the relationship between EFL teachers' PD, its components, and their self-efficacy in online education in Iran during the pandemic.

Accordingly, the researchers aimed to determine whether the current professional courses, and the skills and the knowledge of teachers are correlated with their self-efficacy in online classes and whether they are sufficient for this new context. Therefore, the link between PD and its components, and teachers' sense of self-efficacy is investigated in the present study. Taking the important roles of PD and self-efficacy into account, a possible value is identified to better understand and examine whether TPD and teachers' self-efficacy are interrelated. Apart from the personal understanding of the topic under investigation in the teaching context, it is hoped the results of this study provide EFL teachers with useful views regarding the PD in teaching, and encourage them to participate in PD programs to improve their self-efficacy.

The following research questions are addressed in this study:

RQ1: Is there any significant relationship between EFL teachers' PD, its components, and their self-efficacy in online education during the pandemic?

RQ2: Can TPD significantly predict EFL teachers' self-efficacy in online education, and if it can, which components of PD are stronger predictors of teachers' self-efficacy?

The following null hypotheses were tested for this study:

RH1: There is no significant relationship between EFL teachers' PD, its components, and their self-efficacy in online education during the pandemic.

RH2: TPD cannot predict EFL teachers' self-efficacy in online education significantly.

Review of Literature

A teacher's sense of self-efficacy is a critical issue in various aspects of teaching and learning because efficient teachers are one of the significant elements in developing students' cognitive competencies in learning environments (Bandura, 1997). Bandura (1995) defined self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to manage prospective situations" (p. 2). Furthermore, Tschannen-Moran & Hoy (2001) described a teacher's self-efficacy as "the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context" (p. 223) and as "a judgment of his or her capabilities to bring about desired outcomes of student engagement and learning even among those students who may be difficult or unmotivated" (p. 783). Consequently, teachers with a high sense of self-efficacy stand critical conditions more, focus more on education, spend more class time on academic aspects of the activities, try to use more sophisticated and new teaching methods, and appreciate the success of their students more than teachers who have a low sense of self-efficacy (Gibson & Dembo, 1984).

On the other hand, teacher professional development is one of the features which can influence teachers' performance in the classroom, it can affect their self-efficacy (Moradian & Ahmadi, 2014). Additionally, these consequences should be facilitated with PD opportunities for teachers to increase their knowledge and skills and develop new teaching practices (Borko, 2004) to improve the quality of teaching and the behaviour of teachers in the classroom (Sarbazi Azad, 2017). Guskey (2000) considers PD to be "... processes and activities designed to enhance the professional knowledge, skill, and attitudes of the educators and might, in turn, the learning of the students" (p. 16). He also stated that it should be a purposeful, continuous, and systematic process.

The outbreak of COVID-19 in early 2020 led to the closure of traditional classrooms in institutes, universities and schools. Therefore, the issue of teacher's PD and their self-efficacy during the forced remote learning emerged and teachers' demand for PD programs and strategies to improve their self-efficacy rose. The 2020-2021 academic year was challenging for almost all institutions and universities throughout the world, including Iran (Amirkhani, 2020). Consequently, educational administrators decided quickly to replace traditional classes with online ones for presenting course content, involving learners, and assessing them in order not to stop learning and protect students from the disease (Abbaszadeh, 2020; Mukhtar et al., 2020). This replacement led to growth in online teaching and as a result, teachers faced various challenges because

it was an unexpected happening and COVID-19 changed the routine of teaching (Bazri Mirak Mahale, 2021; Sun et al., 2020).

The global pandemic brought about a new context of education and teachers and educators were compelled to master technology in order to perform and enrich their educational tasks. This new context brought uncertainty to the context of language teaching and required certain abilities and qualifications for teachers to be cope. In this new reality, some teachers lacked the necessary skills regarding online classes and this might have impacted their sense of self-efficacy. Even if they had the required skills, teachers needed to activate their knowledge based on the context they were working in. One might assume that it negatively impacted teachers' sense of efficacy especially in times of distance education. It is necessary to bear in mind that teachers who were professionals in their fields may not have been able to quickly move toward online education without any planning, training, and support (Bazri Mirak Mahale, 2021). In fact, this development required knowledgeable and qualified teachers to teach online efficiently and manage the teaching process (Amirkhani, 2020). Moreover, teachers needed a the knowledge, skills, and ethics to use the technology and fulfil online teaching duties as effectively as possible (Yüksel & Kavanoz, 2011; Zhu & Liu, 2020).

TPD and teachers' self-efficacy have been studied and presented differently so far. Various researchers and policymakers have focused on these issues in recent years. For instance, several studies have investigated the potential effects of TPD on school improvement, enhancement of teacher quality, and student learning (e.g., Aminudin, 2012; Avalos, 2011; Borko, 2004; Fishman et al., 2003; Gabriel et al., 2011; Hawley & Valli, 1999; Hürsen, 2012; Hustler et al., 2003; Karimi, 2011; Marczely, 1996; Powell et al., 2003; Shulman, 1986; Sparks & Loucks-Horsley, 1989; Supovitz & Turner, 2000; Wilson & Berne, 1999; Yurtsever, 2013). Also, a review of the literature shows that various factors such as gender (Veisi et al., 2015), age (Campbell, 1996), experience and academic degree (Akbari & Moradkhani, 2010), and stress (Vaezi & Fallah, 2011) affect teachers' self-efficacy. In addition, expected outcomes (Bandura, 1977, 1989, 1997, 2004, 2005; Wood & Bandura, 1989) and teachers' performance are influenced by teachers' self-efficacy beliefs.

Many researchers have explored the possible relationship between teachers' self-efficacy and other factors, such as their commitment to teaching (Coladarci, 1992; Gibson & Dembo, 1984), reflective teaching (Babaei, 2009; Nourmohammadi, 2012), English language proficiency (Mirjafari, 2017), CPD (Ravandpour, 2019), and context of teaching (Moradkhani & Haghi, 2017). A study of 447 teachers by Akbari and Moradkhani (2010), who examined possible relationships between experience, academic degree, and teachers' efficacy among EFL teachers, found that experienced teachers had a significantly higher level of global efficacy and self-efficacy compared to novice teachers. Several attempts have also been made to study the effect of TPD programs on personal changes of teachers and on students' achievements (Ashton & Webb, 1986; Avalos, 2011; Harris & Sass, 2011; Lovett et al., 2008; Vogt & Rogalla, 2009), increasing student motivation (Ermeling, 2010; Frey & Fisher, 2009; Guay et al., 2016; Levine & Marcus, 2010; Morais et al., 2005; Seymour & Osana, 2003), improving technical knowledge (Ponte et al., 2004), teachers' perceptions and practice regarding student self-regulated learning (Hoekstra et al., 2009), and teacher satisfaction and enhancement of curricular understanding and self-efficacy (Lovett et al., 2008; Nielsen et al., 2008; Nir & Bogler, 2008).

Besides these, some researchers have studied the positive effects of PD on teachers' performance (e.g., Aminudin, 2012; Desimone, 2009; Gabriel et al., 2011; Guskey, 2000, 2002; Hustler et al., 2003; Powell et al., 2003). In addition, a study by Borko and Putnam (1995) found that PD led to positive changes in teaching. When teachers participate in PD programs, they are more likely to strengthen their knowledge systems and thus change their teaching methods effectively. However, some studies have denied the effectiveness of PD activities due to compliance with the normative demands of education, regardless of the underlying constraints and opportunities (Darling-Hammond & McLaughlin, 1995/2011; Villegas-Reimers, 2003).

Additionally, some researchers have indicated that teachers who have a strong sense of efficacy have higher levels of job satisfaction (Akomolafe & Ogunmakin, 2014; Caprara et al., 2003; Caprara et al., 2006; Tschannen-Moran & Hoy, 2001). As mentioned in a study among primary and middle school teachers in Norway by Skaalvik and Skaalvik (2010), there was a strong positive relationship between teachers' job satisfaction and their self-efficacy. On the same line, another study in Greece demonstrated that different factors of teachers' job satisfaction were related and had a positive effect on different factors of teachers' self-efficacy (Gkolia et al., 2014).

Other studies have been conducted on the attitudes of teachers toward PD activities. For instance, Hürsen (2012) investigated the attitudes of teachers in the Turkish Republic of Northern Cyprus (TRNC) and noted that there was a significant difference between the attitudes of male and female teachers toward PD

activities in that context and women had more positive attitudes than men. Also, younger teachers and teachers with less teaching experience were found to have a more positive attitude.

In view of this, it should be noted that little attention has been paid to the relationship between TPD and teachers' self-efficacy. Due to this gap in the literature and with respect to all previous studies in this field, the general aim of this study was to examine the relationship between EFL teachers' PD and its components and teachers' sense of self-efficacy in online education during the Covid-19 online education process.

Methodology

Design of the study

The present study adopted one of the approaches in quantitative design, correlational research, in order to address the research questions. It was considered to be the most appropriate research method to gain a deeper understanding of the relationship between the PD of EFL teachers, its components, and their self-efficacy in online education during the pandemic. Correlational design measures the relationship between two variables without the researcher controlling either one of them. It aims to find out whether there is a positive correlation, a negative correlation, or a zero correlation between the variables (Farhady, 1995).

Participants

The participants in this study were 80 EFL teachers (34 males and 46 females) teaching at different middle and high schools in 15 cities in Iran (Tehran, Isfahan, Mashhad, Aligoodarz, Qom). The participants study were chosen through convenience sampling. They were first requested to provide demographic information, such as gender, age, academic degree, and years of experience. The teaching experience of the participants ranged from one to 21 years or more and their ages varied from 20 to 59 years old. A total of 39 of the participants had MA degrees, 38 of them had BA degrees, and one of them held a Ph.D. in teaching English as a foreign language (TEFL). There were also two teachers who had majored in other fields. All the teachers had previously attended PD programs during their teaching career, and they held their classes online using the Shad application introduced by the Ministry of Education during the Covid-19 pandemic.

Instruments

To collect the data needed for the study and to measure the study variables, two different types of closed or Likert questionnaires, one on TPD and the other on teacher self-efficacy, were administered to the EFL teachers. Both questionnaires consisted of several sections. First, participants were given brief information about the purpose and significance of the study and the points that should be considered when answering the questions. The next section included some demographic questions including name, city, age, gender, teaching background, and academic degree, and the last section included a consent form and the original items of the questionnaires.

Teacher professional development questionnaire

One of the instruments used in this study was a PD questionnaire for teachers developed by Khany and Azimi Amoli (2016). To validate this questionnaire, an initial tentative model with 130 items was tested through exploratory and confirmatory data analyses on a sample of 400 experienced and novice EFL teachers based in different state, rural and urban schools, language institutes, and centers of higher education from three provinces namely, Tehran, Ilam, and Mazandaran. In the end, 28 items were removed, resulting in a final 102 TPD inventory. The result of the exploratory factor analysis demonstrated that this questionnaire consists of three underlying components: knowledge, skills, and TPD programs (Khany & Azimi Amoli, 2016). It consists of 102 five-point Likert type items, ranging from 0 (not at all) to 5 (very much). The Cronbach alpha value was employed to assess the reliability of the TPD questionnaire in this study. The reliability coefficient is higher than .070 ($r = .92$) which shows that the questionnaire is highly reliable, and can be used to measure teachers' PD.

In addition, a pilot study was carried out to clarify the questions and eliminate the ambiguities that teachers may encounter while answering the questionnaire. Through this pilot study, the reliability of the questionnaire was tested. The participants of the pilot study were 25 EFL teachers (6 males and 19 females) with ages ranging from 20 to 49 years old. These teachers were selected from the same context as the main sample of the study. During the pilot study, the researcher was available online to answer any questions or ambiguities that could be raised by the participating teachers. It took about 20 minutes to respond to the questionnaire, and participants' feedback was received and recorded. In order to calculate Cronbach's alpha internal consistency reliability of the questionnaire, IBM Statistical Package for the Social Sciences (SPSS)

statistics software (version 19) was used. The results indicated that the reliability index of the TPD questionnaire was 0.88, showing that it could be used as a reliable instrument for the main study.

Using the data collected from the pilot study and the feedback provided by the participating teachers, the ambiguities in the presentation of the questions and the instructions of the questionnaire were corrected, and the questionnaire was carefully adjusted and finalized.

Teacher's self-efficacy questionnaire

In this study, the long form of TSES by Tschannen-Moran & Hoy (2001) was utilized. Since the TSES questionnaire was valid and used by many scholars and for different research purposes, the validation process was ignored for this instrument. It has three components: student engagement, instructional strategies, and classroom management. The long form of this questionnaire consists of 24 nine-point Likert type items ranging from 1 (nothing) to 9 (a great deal). Each of the three components of teacher efficacy is measured by eight questions. The Cronbach's alpha coefficient of the TSES is 0.97, and the instrument is considered highly reliable.

Procedures

After conducting the pilot study and ensuring that the items of the TPD questionnaire were clear to the participants, both questionnaires (TPD and TSES) were sent to 80 English language teachers teaching online at different schools in some cities of Iran during the Covid-19 pandemic. Considering the pandemic situation, responses were collected online using *Google Forms*. The links to two questionnaires were sent to the participants through *WhatsApp* and *Telegram*, the most frequently used social media applications in Iran. Participants completed the questionnaires on a voluntary basis. They were assured that their responses to the questionnaires would remain confidential and anonymous and would only be used for research purposes. In addition, they were asked to mark their responses with care and attention, choose the best answer that would describe them, and to fill out the questionnaires.

The researcher was available online to answer any questions or ambiguities that might be raised by the participating teachers. Responding to both questionnaires took about 30 minutes for each participant and the data collection procedure took approximately three weeks in September 2021. The completed questionnaires were then scored, analyzed, and the results were extracted.

Data analysis

First, the EFL teachers' responses to the items of the two questionnaires were entered and computed into the SPSS. To analyze the collected data, descriptive and inferential statistics were utilized. For each variable and its components, the frequency and percentage of descriptive information of the participants were calculated. Next, to find out if the gathered data had a normal distribution, tests of normality (i.e., Kolmogorov-Smirnova and Shapiro-Wilk) were run. Then, in order to answer the first research question which was about the relationship between TPD, its components, and their self-efficacy, the Pearson correlation coefficient test was run. To answer the second research question, linear and multiple regression tests were run.

Results

Descriptive statistics of the study

Based on the data collected and computed into the SPSS according to their own values, some descriptive indexes of the study were first calculated. Table 1 shows the descriptive characteristics of the variables such as mean, standard deviation, minimum, and maximum scores:

	N	Minimum	Maximum	Mean	St. Deviation
TSES questionnaire					
Student engagement	80	3.8	9	7.6	1.2
Instructional strategies	80	4.8	9	7.7	1.1
Classroom management	80	3.3	9	7.5	1.2
Teacher self-efficacy (total)	80	4.04	9	7.6	1.1
TPD questionnaire					
Skills	80	1.9	5	4.2	0.77
Knowledge	80	1.8	5	4.1	0.76
TPD programs	80	1.1	5	3.6	0.96
TPD (total)	80	1.6	5	4.0	0.82

Table 1: Descriptive statistics for all variables

Considering the 9-point Likert type items, mean scores of teacher self-efficacy show that the teachers enjoyed a rather good level of self-efficacy. According to the results of TPD questionnaire, with 5-point Likert type items, mean scores indicate a low level of TPD.

Inferential statistics of the study

Test of normality of data

The Kolmogorov–Smirnov (K–S) and Shapiro-Wilk tests presuppose that the distribution of the data is normal. If the obtained meaningful level is equal to or greater than .05, the prerequisite is met and it is concluded that the distribution of the considered variable is normal. The results of the K-S and Shapiro-Wilk tests are shown in Table 2:

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Self-efficacy	.090	80	.164	.979	80	.204
TPD	.061	80	.200*	.989	80	.699

Table 2: The results of the Kolmogorov–Smirnov and Shapiro-Wilk tests

As Table 2 indicates, the variables of the study were distributed normally. The results obtained from the exploration of the questionnaires and the findings of the analysis will be discussed in detail in the following subsections.

The first research question

The first research question investigated whether “there was any significant relationship between EFL teachers’ PD, its components, and their self-efficacy in online education during the pandemic’. To test the first null hypothesis, the Pearson Correlation test was applied to the results of TPD and the TSES. The correlation coefficient between EFL teachers’ PD and their self-efficacy, as well as the correlation between teachers' self-efficacy and the three components of TPD, was reached as reported in Table 3 below:

TPD		knowledge	skills	TPD program
self-efficacy	Pearson Correlation	.601**	.555**	.632**
	Sig. (2-tailed)	.000	.000	.000
	N	80	80	80

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 3: Pearson Correlation for the TPD questionnaire, its components, and the teachers’ self-efficacy questionnaire

The results demonstrate that there is a significant relationship between EFL teachers’ PD and their self-efficacy. Since it is a positive value, it shows that there is a positive correlation between those two variables. Also, it indicates the strength of the relationship between the two variables ($r=0.601$ at $p\leq 0.01$ level). Similarly, as Table 3 also displays, it could be said that there is a significant relationship between teachers' self-efficacy, knowledge ($r=0.555$ at $p\leq 0.01$ level), skills ($r=0.632$ at $p\leq 0.01$ level) and the TPD program ($r=0.240$ at $p\leq 0.05$ level).

As the values of Pearson Correlation for the EFL teachers’ self-efficacy and the components of TPD are positive, accordingly, there is a positive correlation between teachers' self-efficacy and the components of TPD as well. Consequently, the first hypothesis is rejected, that is, there is a significant relationship between EFL teachers’ PD, its components, and teachers' self-efficacy.

The second research question

As pointed out before, the second research question explored whether TPD can significantly predict EFL teachers' self-efficacy in online education, and if it can, which components of PD are stronger predictors of teachers' self-efficacy. In order to assess the second null hypothesis, the researcher made use of Multiple and Linear regression analysis. The following tables (Tables 4, 5 and 6) show the results of the analysis of Linear Regression:

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8186.845	1	8186.845	44.105	.000
	Residual	14478.543	78	185.622		
	Total	22665.388	79			

Predictors: (Constant), TPD
 Dependent Variable: self-efficacy

Table 4: ANOVA in Linear Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.601	.361	.353	13.62433

Table 5: Model summary in Linear Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	92.666	13.749		6.740	.000
	TPD	.217	.033	.601	6.641	.000

Predictors: (Constant), TPD
 Dependent Variable: self-efficacy

Table 6: Regression analysis of teachers' self-efficacy on TPD

As the above tables show, a significant regression equation was found ($F(1, 78) = 44.105, p < .001$), with an R^2 of .361. The participants' predicted self-efficacy was equal to $92.666 + 0.217(TPD)$ and their average self-efficacy increased .217 for TPD. Therefore, it could be claimed that TPD can predict the variance in teachers' self-efficacy positively and significantly and, as a result, it could be confirmed that TPD was a predictor for teachers' self-efficacy. Therefore, the second hypothesis is rejected.

To answer the second part of this question and to discover which components of TPD, skills, knowledge, and TPD program is a stronger predictor of teachers' self-efficacy, a multiple regression analysis was conducted. The Tables below (7, 8 and 9) report the results of examining the predicting effect of components of TPD on teachers' self-efficacy.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.669	.448	.426	12.83550

Predictors: (Constant), TPD programs, knowledge, skills

Table 7: Model summary in Multiple Regression

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10144.381	3	3381.460	20.525	.000 ^a
	Residual	12521.006	76	164.750		
	Total	22665.388	79			

a. Predictors: (Constant), TPD programs, knowledge, skills
 b. Dependent Variable: self-efficacy

Table 8. ANOVA in Multiple Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	81.335	13.364		6.086	.000
	Skills	.362	.086	.487	4.208	.000
	Knowledge	.284	.112	.271	2.530	.013
	TPD program	-.036	.080	-.043	-.454	.651

a. Dependent Variable: self-efficacy

Table 9: Regression analysis of teachers' self-efficacy on components of TPD

A multiple linear regression was used to predict teachers' self-efficacy based on the components of TPD. A significant regression equation was found ($F(3,76)=20,525$, $p<.001$), with an R^2 of .448. The participants' predicted self-efficacy is equal to $81.335+0.362(\text{skills})+0.284(\text{knowledge})-0.036(\text{TPD program})$. The participants' self-efficacy increased 0.362 for skills, and 0.284 for knowledge. Both skills and knowledge were significant predictors and added statistically significantly to the prediction, $p<.01$. However, a TPD program was not a significant predictor of self-efficacy, $P>.01$.

Discussion

This study aimed at exploring the relationship between EFL teachers' PD and their self-efficacy in online education during the pandemic. In order to answer the two research questions of the study and to test the null hypotheses, the researcher asked the participants of the study to respond to the TPD and TSES questionnaires. The quantitative analysis of the data collected yielded the following results. Teachers with higher PD have higher levels of self-efficacy, and teachers with lower PD are likely not to believe in their own abilities. In other words, to increase teachers' self-efficacy, their PD should be considered. It can be also inferred that if EFL teachers want to enhance their sense of self-efficacy, they should apply different parts of PD and promote and improve themselves in terms of knowledge and skills. In other words, if EFL teachers grow professionally, they will have a much higher sense of self-efficacy. However, as Khanjani et al. (2016) mentioned, "the pre-service EFL teacher training program has not been well laid-out." (p. 18). One of the weaknesses of the courses in the pre-service EFL programs in Iran is that they are theory-oriented. Further, there is a need for up-to-date materials (Khanjani et al.). Based on the results of the current study, it can be concluded that if more practical courses, for instance on online education, are included, teachers' skills and their self-efficacy might be improved consequently.

Additionally, the second research question of the present study investigated the predictive power of teachers' PD, and its components with respect to EFL teachers' self-efficacy. The results showed that teachers' PD predicted 36% of the variance in teachers' self-efficacy. This means that if teachers develop professionally, they might have a higher self-efficacy. Furthermore, the more skills and knowledge teachers have, the more they feel more self-efficacious. Therefore, it can be concluded that for teachers to be more self-efficacious, teacher education courses should focus on skills and knowledge and promote them. Although TPD programs cannot predict teacher's self-efficacy it does not mean that they are ineffective or not useful. These programs should be evaluated to see if they can meet the needs of teachers and develop the professional skills and knowledge of teachers

The results of this study were in accordance with the results of a study by Ravandpour (2019) which proved that there was a positive significant relationship between CPD and teachers' self-efficacy. Moreover, Drossel and Eickelmann (2017) claimed that teachers' participation in PD concerning the implementation of new technologies in class had a significant relationship with their self-efficacy. In another study, Alsagoff and Low (2007) studied the development of the Postgraduate Diploma in English Language Teaching (PGDELT) in Singapore and discussed how the content of these training courses has been influenced by economic changes in the country and emphasized that teachers' class activities were affected by their attendance in such education programs, reflecting the current changes in society. Graves (2009) also suggested that if language teachers attend education programs, they will use more effective classroom practices.

The findings of this study were also in line with the results of a study conducted by Wolf et al. (2010) on the relationship between the professional experiences of agricultural education teacher candidates during their internship, their sense of teacher self-efficacy, and their perceptions of their preparation. Teacher candidates reported high levels of teacher self-efficacy at the end of their internship experience. It also suggested that the PD experiences of agricultural education teacher candidates can predict the overall teacher self-efficacy. McKim and Velez (2017) also identified PD as a statistically significant, positive predictor of science teaching self-efficacy.

Conclusions

The challenge of doing something new is usually followed by stress and lack of self-confidence. The sudden change to a new teaching and learning environment, which happened due to the spread of Covid-19 for teachers in Iran and around the world, was challenging. Online education is fundamentally different from traditional or face-to-face education and requires different teacher education and preparation procedures, which can result in teachers' PD (Barbour & Unger, 2014).

TPD includes all behaviours that change people's skills, knowledge, and experience beyond any initial training. Furthermore, TPD is considered a process that should be expanded in universities, schools, and institutions to improve the skills and knowledge of teachers (Safari et al., 2020). According to Caena (2011),

teacher self-efficacy is significantly related to TPD opportunities and can create superiority and indirect experiences making teachers' competence levels increase. Self-efficacious teachers are the ones who manage the classroom well, engage students, and can apply learning and teaching strategies in the classroom. In addition, they spend more time planning and organizing class activities. In fact, they are effective in enhancing student achievement (Guskey, 2003), and also implications of teacher self-efficacy are related to many educational consequences (Guskey, 1998). Since self-efficacy is very important in the development of students, it is necessary to investigate the effectiveness and advantages of teachers' PD and how it relates to their self-efficacy. Therefore, this research tried to investigate the relationship between EFL teachers' PD and their self-efficacy in online education during the pandemic. In addition, there was an attempt to explore if teachers' PD could predict teachers' self-efficacy.

According to the results obtained, the following pedagogical implications are recommended for teachers, schools, educational organizations, policymakers, teacher educators and the researchers who work on and are interested in online education. First, teachers' awareness levels of the positive outcomes of teachers' PD and how it can affect their self-efficacy in online education should be increased. Teachers should be encouraged to take PD courses to improve their self-efficacy and become more self-efficacious teachers in online education. In addition, schools and educational organizations can promote teachers' PD by holding PD programs based on their needs and expectations, and encourage teachers to take part in such programs. PD programs will be useful in improving their skills and knowledge, as a result teachers' self-efficacy, and consequently their students' learning and achievements, too.

Policymakers can boost the motivation of teachers to participate in PD courses by taking regular tests to examine teachers' self-efficacy, and based on the results, they can take appropriate PD courses to consequently grow teachers' self-efficacy in online education. Although education has almost fully returned to its pre-pandemic times and online education is no longer considered as the primary means anymore in most countries, it will be in our lives probably stronger than pre-pandemic times. When teacher educators are aware of the relationship between teachers' PD and their self-efficacy, they can take the instructional courses as well as PD materials design procedures in a direction that will have a positive impact on teachers' PD and, as a result, their self-efficacy. Some useful techniques could include the creation of a safe, welcoming learning environment in PD programs, offering teachers constructive feedback, and encouraging them to reflect on their teaching practices as well as the newly learned content in the programs. Such activities could be useful in increasing their awareness and trust in their own knowledge and skills. .

Conducting this study was not without limitations. The first was the limited number of participants, which means that the results of this study may affect its generalizability. The second one was that there was a lack of a qualitative method for gathering data on the relationship between the PD of EFL teachers and their self-efficacy in online education during the pandemic. Another limitation of this study was that it focused on EFL teachers, leaving out teachers of other fields of study who worked at schools in the cities of Iran where the data were collected. Hence, the results may not be generalizable to other settings and subject fields of teaching.

Based on the limitations of this study, several suggestions can be made for future research. Since the number of participants in this study was small, it is possible to conduct future research with more participants and increase the generalizability of the findings. Additionally, studies should qualitatively and quantitatively explore the relationship between the PD of teachers and their self-efficacy in online education during the pandemic. Studies are needed in universities or English language institutes and among teachers of different majors to investigate the two variables in the context of face-to-face or traditional education as well. In addition, the researcher suggests that other studies can investigate how age, gender, academic degree, and years of experience affect teachers' self-efficacy and their PD, and how these two variables are related to students' progress and learning or schools' progression.

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