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Original Article

Revisiting Blended Learning in TPACK: A Content-Based Study of Themes and Implications

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Abstract

Blended learning is used in education to combine information and communications technology. The technology role in blended learning might be improved in cases of effectively combining different aspects such as pedagogy, content, and knowledge. TPACK framework brings together these conceptions into workable solutions for blended learning instruction. It seems crucial to have digitally literate teachers. Digital literacy is far beyond supporting teachers to understand and engage with the world; it enables them to challenge, shape, and change their worlds. With the integration of pedagogy, technology, and TPACK in teaching, utilization of the blended learning model requires an overview. This study is a systematic review of blended learning, digital literacy, and TPACK to identify the blended learning research's main themes and implications. To this end, 20 research articles on blended learning and TPACK, which were selected from applied linguistics journals published by Iranian universities, were reviewed. The findings revealed that the main themes were advantages, difficulties, proper use, disadvantages, the effect of learners' differences, teachers' characteristics, and comparison of different contexts. Besides, the most prominent theoretical implications were the importance of technology, the role of teachers, the change and development of blended learning, and the development of learners' autonomy. The findings of this study could propose a roadmap to facilitate the adoption of blended learning, which is one of the possible solutions to face the major challenges of education in the current era.

Keywords: Blended Learning, Implication, Technology, TPACK

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1. Introduction

The world enjoyed the advancement of data, information, and knowledge by the advent of the 21st century. On the other hand, people are confused with over-information, misinformation, and misusing knowledge. Digital literacy training could be regarded as a way to respond to these challenges created in the digital age (Rahmah, 2015).

Teachers designed Technology Enhanced Learning (TEL), a fundamentally challenging task (Winters & Mor, 2008). It addresses the real needs in workplace contexts; besides, at the same time, it reveals some complicated design preoccupations. According to Ruthven (2007), there are some features in the integration of TEL in education; teachers must create their knowledge according to their working environment, activity format, resource system, time resources, and curriculum script. Designing a TEL, however, requires 'thinking out of the box' based on emerging the learning context of digital media, which mixes new types of learning tasks, new methods of digital expression, new social composition forms, and spatial arrangements.

The advent of digital technology has brought with it different types of literacy, including computer literacy, media literacy, internet and information literacy, and digital literacy. Digital literacy was invented by Gilster (1997); meaning the ability to create and share meaning and concepts in various forms, create, participate in, and communicate effectively, and understand the proper use of digital technology at the right time and the right way to achieve these goals (Kim, 2019).

Digital literacy is an individual's ability to do things effectively in digital environments. The term digital refers to information used numerically and primarily for computer use. This concept has undergone fundamental changes, focused on technology skills, and includes personality's cognitive and attitudinal components (Rambousek et al., 2016).

Digital literacy significantly impacts the lifelong learning process regarding access to the correct information using reliable information sources. Rambousek et al. (2016) stated that the digital literacy framework is based on six skills: photo and image (virtual), re-creation skills, branch activity skills, information skills, social and emotional skills, and real-time thinking skills.

As Eggen and Kauchak (2012) declared, 21st-century schools could apply technology to teachers and learners. Sholihah et al. (2016) indicated that technology in education has

many benefits; for instance, technology could raise learners' motivation and visualize the content and materials.

Digital technology has created new opportunities for learners and teachers to use their digital space to improve their skills and access credible, authoritative and collaborative content. Digital spaces guide teachers from idea to action, make classrooms more dynamic, participatory, engaging, and rewarding, and give them more independence. Teachers would be able to free students from passive mode and turn them into active and creative learners using a variety of media (Hathaway & Norton, 2013). He also claimed that digital spaces improve teacher-learner interaction, facilitating their teaching and learning process. The use of technology as an educational tool has been increasingly considered in educational institutions. Hence, schools and universities are increasingly investing in equipping learning centers with hardware, software, and internet access. However, despite this organizational support, technology is still not accepted as an educational tool in the learning process (Owens & Fralinger, 2008).

Some evidence displayed that the technology use (especially the internet) in teaching has not been as useful and effective as expected. A literature review has shown that some factors are operative in the effectiveness of the technology used in teaching. Among these factors are access to quality of hardware and software, resources, ease of use, national and school policies, commitment to professional learning, areas of computer knowledge, and the teachers' role in using technology. Among all these factors, the role of the teacher and the consideration of pedagogy have been introduced as the most important ones (Mumtaz, 2000).

Different models have been proposed to integrate technology into teaching. The pedagogical technological knowledge model (TPACK), presented by Kohler and Mishra (2006), has offered a new way to know the knowledge of effective technology use in teaching. Based on the TPACK model, technology is a required factor for the curriculum. The TPACK model is beneficial for creating goals, methods, materials, and assessments that can be utilized for different learners. The structure of the TPACK model depends on the diverse and flexible nature of new media. Besides, it is adaptable to various curriculum design methods, depending on how students learn, and at the same time, considers individual differences among learners (Kohler & Mishra, 2006).

The foundation of the TPACK model was based on the model of content pedagogy

knowledge presented by Shulman (1986). Shulman (1986) suggested that successful teaching requires a special science called Pedagogical Knowledge Content (PCK). He considered PCK as distinct knowledge composed of two sorts of knowledge: content knowledge and pedagogy knowledge. Content knowledge is knowledge of the topic to be taught, including knowledge of a discipline's facts, concepts, theories, and practices. In other words, content knowledge is a framework that organizes and connects ideas and theories, knowledge of presenting documents, evidence, and reasons. Pedagogical knowledge includes knowledge of the teaching process, cognitive and social theories of learning and understanding of how these theories are applied in the classroom. PCK is the result of combining content knowledge and pedagogy knowledge. It helps the teachers to understand the knowledge that guides organization, adaptation, and presentation for training (Kohler & Mishra, 2006). Loughran et al. (2004) maintained that PCK is an amalgamation of pedagogy and subject content knowledge, including how teachers present the content knowledge and their knowledge about the problems learners face while learning a particular subject in the content.

The TPACK model was developed by adding a technology factor to the Shulman model. Kohler and Mishra (2006) introduced the knowledge of technology according to the definition of information technology. From this perspective, technology knowledge goes far beyond the traditional notion of digital literacy. They maintained that technology knowledge provides a deep understanding of how to build a range of various tasks through information technology for the development of information, communication, and problem-solving throughout life.

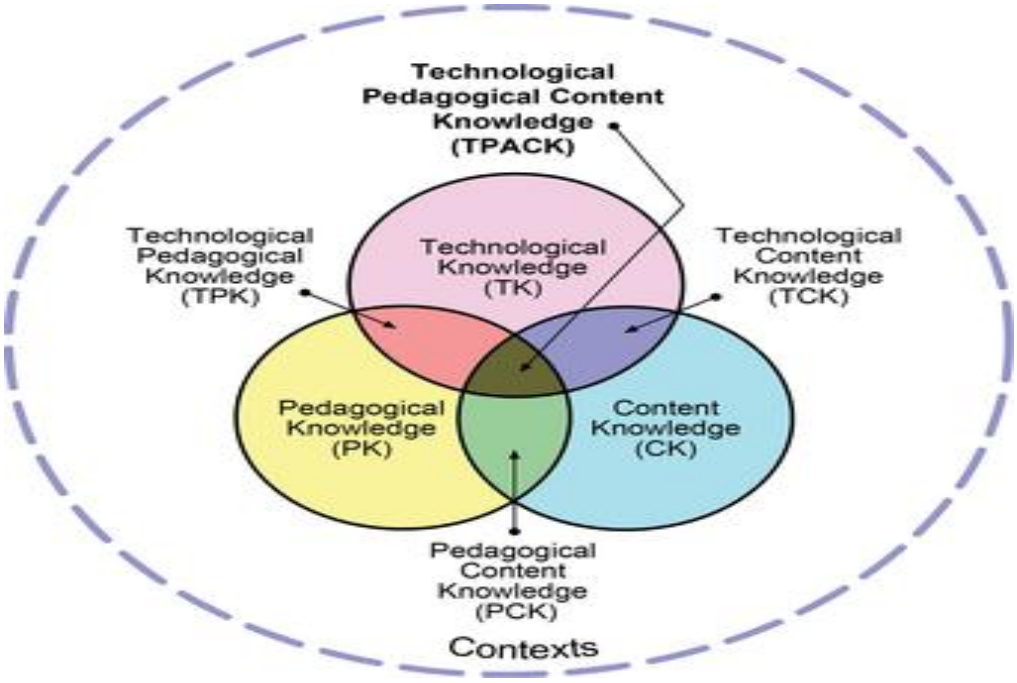
The rush of information technology development makes technology an indispensable part of language learning and teaching. English teachers should use technology as learning media, pedagogy, and content. The integration of technology in pedagogy support teachers in designing innovative and efficient learning tasks (Wichadee, 2017). Besides, the integration of pedagogy and technology can be influential in cases the teachers assume the features and affordances line up with the content and related theories of teaching and learning practices (Bostancıoğlu & Handley, 2018). Hence, technology that fits the learning goals considerably contributes to education development (Mulyadi et al., 2020).

In English language teaching (ELT), blended learning generally addresses associating traditional teaching with technology, including offline and online materials/activities

(Whittaker, 2013). Consequently, English teachers should have TPACK knowledge to integrate pedagogy, technologies, and content into their teaching activity (Tseng et al., 2018).

Figure 1.

Content Pedagogical Technological Knowledge (Mishra & Kohler, 2006)



According to the TPACK model, combining technology with the curriculum is a promising path to success in the learning process. Today, TPACK has been used as a theory, model, educational approach, and evaluation approach for knowledge integration of technology in many institutions, and many studies have shown its capabilities in boosting learning. Hoang (2015) considered TPACK as an effective model for blended learning. In sum, it can be stated that TPACK is one of the most incredible integration patterns of technology in learning and teaching that pays attention to the purposeful interaction of the three areas of pedagogy, technology, and content. The integration of this model into the role and performance of educational designers could be considered a prerequisite element in e-learning educational design programs.

Recently, studies and implementation of blended learning are increasing. Although online learning has been the focus of various research, there is a shortage of research on blended learning. Conclusively, it is required to delve into the literature to_explore the

available opinion about blended learning. The current research attempted to find the status of blended learning inquiry and detect their themes and implications based on their contents.

2. Literature Review

The integration of information and communication technology in education has been an influential and durable stage, which has led to a qualitative change in goals, programs, methods, and the effectiveness of education. It is anticipated that technology has paved the way for solving long-standing dreams and unsolvable problems such as applying education, focusing on learners' abilities and needs, institutionalizing student-centeredness, changing the role of the teacher as a guide, and finally, perfecting the researcher (Keiler, 2018).

Arguably, teaching and learning processes are considered as two main domains affected by developing technology. Various studies were conducted to shed light on different aspects of blended learning and TPACK. For example, Shahrokni and Talaeizadeh (2013) conducted a study to explore the learning process of blended learning. The study revealed that students desired to use online learning synchronously and asynchronously. In addition, their study showed that students preferred the TPACK model and blended learning since the provided opportunity by technology could eliminate face-to-face teaching and learning limitations.

Along the same line, Tseng (2014) investigated the effect of the TPACKs′ teachers on the students' perceptions. The study was conducted in the Taiwanese context with 257 high school students. Tseng (2014) concluded that learners considered their teachers more competent in content knowledge than integrated technology knowledge. They claimed that their teachers are not fully updated and unable to cope with the technological progressions. These findings determined the necessity of TPACK learning courses for teachers. Besides, the results also implied the importance of learners' perceptions and attitudes. These attitudes help practitioners with the improvement of their technology-related instruction tasks.

In another research, Alijani et al. (2014) examined cognitive processes, relevant factors, and benefits of using blended learning models. By interviewing schoolteachers, they concluded that 48 percent of teachers considered blended learning courses superior. Teachers agreed with utilizing blended learning by focusing on students' academic success. They also suggest applying for blended learning courses through the learning process to guarantee students' academic success.

Camahalan and Ruley (2014) studied applying blended learning in high school writing courses. They divided their participants (16 students) into two groups. One group received blended learning courses, while the other received traditional face-to-face ones. Their findings showed those students who received blended learning courses outperformed those who received traditional and face-to-face learning.

Dashtestani (2014) investigated the technological knowledge of Iranian EFL teachers. He claimed that Iranian teachers lacked specialized knowledge to integrate the TPACK model in their classrooms. Accordingly, he proposed that a certain level of computer literacy is necessary for English teachers. Conclusively, all Iranian teachers need TPACK learning courses, especially English teachers.

Papanikolaou et al. (2017) presented a constructivist pre-service teacher training framework in TEL in which teachers designed innovative content, working alone or with their colleagues. The researchers mentioned the components used to develop and augment online interaction, taken from two methods of the TPACK framework and the Community of Inquiry approach. They investigated the influence of synthetic design activities on the advance of pre-service teachers' synthetic knowledge. They also tried to find the relations among specific features of TPACK and Community of Inquiry. Results declared the significant potential of synthetic activities for teachers' TPACK progress and specified connections among components of the TPACK and Community of Inquiry frameworks.

Along with the teachers' technical knowledge, the students' understanding of technological-based materials also helps the learning process. Chang et al. (2018) evaluated the students' knowledge of TPACK and technological-related materials in the Chinese context. The results showed that students familiar with technology-based items and TPACK are more successful in learning. The study generally revealed that the EFL students' conception of technological knowledge affected TPACK success. Subject matter knowledge and students' understanding knowledge are indirectly linked to TPACK.

Rahmawati et al. (2019) conducted a systematic review to investigate the latest developments in conducting TPACK in blended learning models. They found that teachers must develop the TPACK needed to incorporate education technology successfully. Besides, they revealed the effect of pre-service education on TPACK.

Mulyadi et al. (2020) tried to discern the TPACK of English teachers in a blended learning design. An online inquiry including 28 closed-ended questions was conducted on

70 teachers from several Indonesian Universities. The result revealed that most ESP teachers mastered three TPACK subdomains, including a) TCK, b) TPK, and c) TPACK. However, they are required to develop their PCK.

Reviewing the related literature indicated an absence of study in critically examining the status of blended learning and TPACK in the EFL context. Accordingly, the present study tried to review the research on English language teacher training in the form of blended learning based on the TPACK model in the EFL contexts. Given the importance of blended learning courses, TPACK, and digital literacy, the following research questions were formulated:

RQ1. What are the major themes of the research on blended learning regarding TPACK?

RQ2. What are the theoretical and pedagogical implications of blended learning research regarding TPACK?

3. Methodology

3. 1. Design of the Study

The current research adopted a qualitative study approach (Merriam, 1998) to reach a profound understanding of the 20 articles in the realm of blended learning. Qualitative data collection and data analysis procedures were administered.

All relevant published and unpublished evidence was identified by searching from google. The researcher has selected 47 research articles from Iranian university journals by searching titles of blended learning, TPACK, and digital literacy. The researcher downloaded the full-text articles and listed them based on their title, authors' names, year publication, journal name, and key themes.

The design used in the current study is Okoli and Schabram's (2010) design, a literature review using work that has been systematically adjusted based on the literature.

This systematic review of 20 articles was conducted on articles published from 2016 to 2020. The literature review was directed at research articles related to the key topics discussed by researchers with keywords of blended learning, TPACK, and digital literacy. The journal database is still limited to applied linguistics journals published by Iranian universities, which were indexed in ISI, ISC, and SCOPUS from 2016 to 2020.

3. 2. The Corpus of the Study

For this study, 20 research articles were selected out of 47 from applied linguistics journals published by Iranian university journals, which have been indexed in ISI, ISC, and SCOPUS from 2016 to 2020. These articles focused on blended learning, digital literacy, and TPACK models. The articles were analyzed through literature search, selection of eligible research, and inclusion/exclusion factors.

The studies met these factors:

a) Published from 2016 to 2020,

b) Examined both blended learning and TPACK,

c) Recruited participants who were EFL teachers or learners,

d) Employed qualitative, quantitative, or mixed-method design,

e) Included theoretical and pedagogical implications/recommendations.

Reviewing the related literature, some criteria were used to exclude the unqualified studies, including:

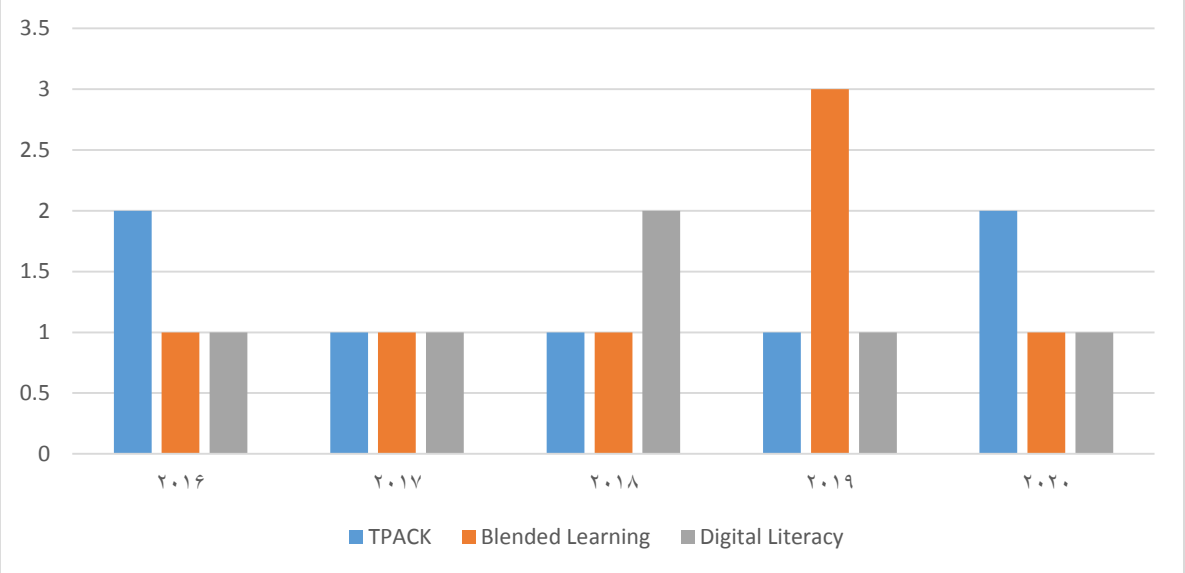
a) Qualitative/Quantitative synthesis/reviews,

b) Special issues of journals,

c) Blended learning and TPACK studies in ESL contexts.

Figure 2.

The Year of Publication



3. 3. Data Collection Procedure

According to the above criteria, 20 research articles were selected from applied linguistics journals published by Iranian researchers. Finally, the chosen articles' themes, findings, and implications were examined.

After identifying all relevant published documents by searching google, the researcher has selected 20 research articles by searching key terms of blended learning‖, TPACK, and digital literacy through Iranian scientific journal sites. The journals offer subscription-based access to an extensive database of scientific studies. The selected research articles were full text downloaded and listed by article title, authors name, year of publication, journal name, level of education, and key themes.

3. 4. Data Analysis Procedure

The researcher reviewed and analyzed the selected articles. They identified and reported the main theme and theoretical and pedagogical implications of blended learning regarding TPACK. It is worth mentioning that to observe the reliability terms of the study, two raters were asked to participate in the study.

Okoli and Schabram's (2010) guideline has eight main steps, as follows:

1. Mention the aim of the review of the literature.
2. If there are more than two researchers, they must be in complete agreement about the detailed process to be followed to be consistent.
3. The researchers are required to describe the details of the literature search explicitly.
4. The researcher needs to be explicit about the criteria studies were considered for review and the ones to be eliminated.
5. The researcher must explicitly mention the criteria for judging which articles are insufficient to be included in the review analysis.
6. After the inclusion of all the research to be reviewed, the reviewers are required to extract the applicable information from the studies systematically.
7. This step includes combining the facts extracted from the research through appropriate techniques, even quantitative, qualitative, or both.
8. The systematic literature review procedure needs to be reported in detail in a way that the results of the review can be independently reproduced.

4. Results

The present research aimed to probe into the main theme of the articles in terms of applying blended learning regarding the TPACK model. Besides, it tried to explore the theoretical and pedagogical implications of the selected papers. The following sections tried to report the results.

The researcher reviewed and analyzed the 20 selected articles and found seven different main themes in these articles. The following table is dedicated to reporting these themes. The researcher analyzed and reviewed the papers regarding their titles and purposes. The researcher found the main themes and categorized the related ones into a category. The following seven categories are the final categorization.

Table 1

The Main Themes of the Articles

1	Advantages of blended learning and TPACK
2	Difficulties in employing blended learning for TPACK
3	Proper utilizing blended learning for enhancing TPACK
4	Disadvantages of blended learning and TPACK
5	The Effect of Learners' Differences in Employing Blended Learning and TPACK
6	The Effect of Teachers' Characteristics in Employing Blended Learning and TPACK
7	Comparing EFL and ESL Context while Employing Blended Learning and TPACK

The researcher found seven themes by observing and analyzing the corpus concerning blended learning and TPACK. These articles are mainly focused on advantages, difficulties in employing, proper utilizing, disadvantages, learners' differences, and teachers' characteristics concerning utilizing blended learning and TPACK, and comparing EFL or ESL Context

As mentioned above, one of the current research aims was to probe into the theoretical and pedagogical implications of the studies in blended learning and TPACK. Table 2 demonstrates these selected articles' main theoretical and pedagogical implications. The table is divided into two sections: theoretical and pedagogical implications.

Table2.

Theoretical and Pedagogical Implications

Theoretical Implications	Pedagogical Implications
1- The importance of technology in blended learning design	1- Implications for ELT researchers and practitioners
2- The role of teachers and CALL practitioners	2- Implications for ESL/EFL instructors and learners
3- Blended and TPACK contexts need to be changed and developed from a focus on integrating electronic tools to creating face-to-face and online activities	3- Implications for ELT and CALL designers and policymakers
4- Blended learning promotes learner autonomy in a communicative environment – balancing individualization, interaction, and interdependence, therefore, should be a part of the programs	

The theoretical implications reported in the above table are: 1- the importance of technology in the blended learning model design, 2- the role of instructors and CALL practitioners, 3- blended and TPACK contexts need to be shifted and developed from a focus on integrating electronic tools to creating face-to-face and online tasks, and 4- blended learning improves learner autonomy in communicative contexts – balancing interaction, interdependence, and individualization, therefore, it is required to be included in the programs.

The pedagogical implications stated in Table 2; are categorized into three groups: 1- ELT researchers and practitioners, 2- ESL/EFL instructors and learners, and 3- ELT and CALL designers and policymakers.

5. Discussion

Technology integration in learning in the current era has been extensively utilized. Eggen and Kauchak (2012) confirmed the benefits of technology use and declared that nowadays, technology is utilized by teachers and students in schools. Sholihah et al. (2016) demonstrated that technology visualizes the materials and increases learners' motivation.

Furthermore, it enables teachers to use technology throughout the learning process in their classrooms.

Due to the importance of technology in pedagogy, the current research focused on blended learning. Two research questions directed it; the first one investigated the major themes of the research in the realm of blended learning regarding TPACK. The related results indicated that the main themes of TPACK include the advantages of blended learning and TPACK, difficulties in employing blended learning for TPACK, proper utilizing blended learning for enhancing TPACK, disadvantages of blended learning and TPACK, the effect of learners' differences in employing blended learning and TPACK, the effect of teachers' characteristics in employing blended learning and TPACK, and comparing EFL or ESL contexts while employing blended learning and TPACK.

Based on the bulk of research and related articles, applying blended learning regarding TPACK benefited learners and the learning process. For instance, the significant findings declared by Shahrokni and Talaeizadeh (2013) showed that the learners benefitted from online teaching, although there were some challenges to online learning. Besides, the main investigating theme of the selected articles showed the advantages of blended learning and the TPACK model. In agreement with the present research results, Alijani et al. (2014) also claimed the superiority of blended learning. A study on blended learning and the TPACK model found that blended learning could guarantee students' academic success. Moreover, Chang et al. (2018) stated that students' understanding of technological and personal knowledge influenced TPACK courses. In other words, the students' perceptions of teachers' performance helped their instructors reflect on the teaching process and improve some teaching behaviors and strategies.

The second research question focused on the theoretical and pedagogical implications of blended learning research regarding TPACK. Concerning the theoretical implications of the TPACK, the results indicate that such implications consist of: the importance of technology in the design of the blended learning model, the teachers' role and CALL practitioners, blended and TPACK contexts need to be improved in a way to boost their students' autonomy. Lastly, in terms of the study's practical implications, the implications were categorized into three groups that benefitted from blended learning. These implications include implications for ELT researchers and practitioners, implications for ESL/EFL instructors and learners, and implications for ELT and CALL designers and policymakers.

6. Conclusion

The study's findings contribute to ELT researchers and practitioners, ESL/EFL instructors and learners, and ELT and CALL designers and policymakers. Accordingly, EFL and ESL teachers can improve their work by applying blended learning and the TPACK model if they attend to sufficient support before teaching in multimodal instructional environments. In addition, the findings of this study suggest some learners' influential factors which affect the learners' perception and satisfaction toward blended learning such as the time duration they have spent using the program, the proficiency level of students, the limitations of the program's interface, and the students' level of computer literacy. The pedagogical implications of the revised studies also recommended boosting teachers' technology knowledge, pedagogy knowledge, and content knowledge with a series of teacher training workshops.

Considering the theoretical implication of the articles, the investigation showed the necessity of implementing the TPACK model. It blended learning courses, the roles of teachers and CALL practitioners, changing and modifying the blended and TPACK contexts, and enhancing the learners' characteristics such as autonomy by blended learning. Generally, the findings proposed the support and training of the TPACK and blended learning courses, especially at the beginning learning process. These training and supporting courses lead to professional digital literacy. Martin and Grudziecki (2006) claimed that digital literacy refers to individuals' ability to implement digital tools appropriately and effectively, communicate effectively, construct new knowledge, identify and evaluate digital resources, and facilitate the learning process in the educational setting.

Kohler and Mishra (2006) claimed that, unfortunately, some teachers and educators consider that there is no need for technology and what works for past and traditional eras could be used today. In other words, society has changed, and schools have not. Kohler and Mishra (2006) identified a serious problem in integrating the technological-based techniques and TPACK model in teaching; most technological tools are unsuitable for educational aims. In addition to content knowledge, today's educators should be aware of the technology. They should be familiar with digital technology literacy and how to implement it in teaching. Based on Winters and Mor (2008), implementing technology-based trends and TPACK, in general, in-classroom teaching is considered a severe challenge for teachers because there is no fixed procedure for different situations.

Despite the findings, this study has several limitations that should be acknowledged. For the review articles in the current research database, there are only 20 research articles. Some of these articles were only reviewed, which was not enough to review the blended learning and TPACK model. More review articles for blended learning and TPACK were required that indicate the importance of this research. It is impossible to cover all the available studies on blended learning and TPACK. Therefore, this research could only be taken as a reference, and further review, including more research articles from other perspectives, is required in the future. Future research could focus on various blended learning models with specific application domains. Besides, future research could focus on blended learning challenges by providing some solutions to improve the learning experience.

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