Technological, Pedagogical, and Content Knowledge (TPACK): Exploring Saudi EFL Teachers' Views to Improve Students' Vocabulary Learning

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ABSTRACT
The current mixed-method study aimed to explore the Saudi EFL teachers' views on using TPACK Model to improve students' vocabulary learning. Moreover, it sought to obtain in-depth data regarding EFL teachers' experiences using the TPACK model in their classrooms. The study sample comprised 115 Saudi EFL teachers who responded to the online form of the questionnaire. Results of the first three questions in section 1 showed that (78.3%) of EFL teachers had introduced TPACK previously into their teaching, and about 21.7% had not used it in their classes. Results indicated that about (47.0%) intend to use TPACK in teaching English, and about (43.5%) plan to use it sometime. Moreover, (63.5%) highly valued the importance of using the TPACK Model in teaching English, and (27.8%) somehow recognized the significance of TPACK emergence in EFL classrooms. The questionnaire findings showed that Saudi EFL teachers view the TPACK Model positively to improve students' vocabulary learning. Participants perceived the value of using TPACK-based instruction for EFL learning and demonstrated significant agreement on fourteen items. However, the results indicated that the Saudi EFL teachers were unsure in six statements if the TPACK Model might support EFL learners in learning vocabulary.
Keywords: TPACK Model, vocabulary learning, EFL teachers' views.

INTRODUCTION
Historically, the framework was an extension of pedagogical content knowledge (PCK) proposed by Shulman (986). The fast advancement of information and communication technology (ICT) led to its inclusion in this framework.

However, theoretically, it was introduced by Punya Mishra and Matthew Koehler in 2006 (Mishra & Koehler, 2006). According to Mishra and Koehler (2006), Technological Pedagogical and Content Knowledge (TPACK) seems to be a new teaching model that integrates technology into the teaching-learning process. TPACK refers to "the knowledge of coordinating the use of subject-specific or topic-specific activities with topic-specific representations using emerging technologies to facilitate student learning" (Cox & Graham, 2009, p. 64). Likewise, TPACK is also defined as a conceptual framework that emphasizes "connections among teachers' understanding of content, pedagogy, and technology interaction to produce effective teaching" (Koehler et al., 2013, p. 101).

Effective technology integration for pedagogy focused on a specific subject necessitates the development of a transactional interaction between various knowledge components positioned in unique contexts. According to Mishra and Koehler (2006), the TPACK framework, in general, comprises three key knowledge components combined to generate four additional types of knowledge (see Figure 1).

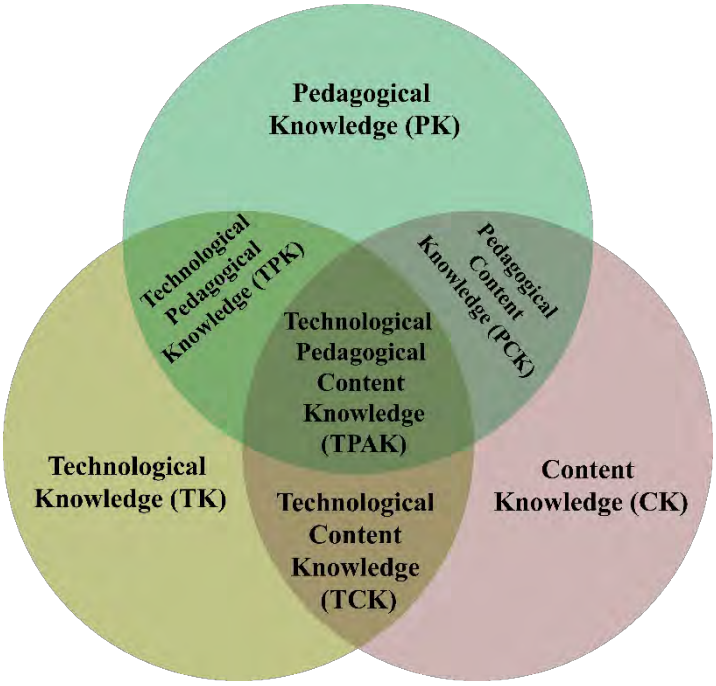


Figure 1. Intersections between the three primary seven components of TPACK

The center of Figure (1) demonstrates an in-depth understanding of how to employ technology to improve student learning experiences. Instead, the TPACK approach extends beyond considering these three knowledge bases in isolation. The TPACK paradigm takes a step further by emphasizing knowledge that exists at the intersections of three primary forms: Pedagogical Content Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK). As a concise introduction to the TPACK framework, Koehler and Mishra (2009, p. 63-67) defined the seven components of TPACK as follows (see Table 1):

Table 1. Definitions of the seven components of TPACK

TPACK Model Components	Definitions
Content Knowledge (CK)	It refers to the instructors' understanding of the content to be learned or taught.
Pedagogical Knowledge (PK)	It refers to instructors' extensive understanding of procedures and techniques and teaching and learning approaches and methods.
Technology Knowledge (TK)	It refers to comprehending information technology to use it successfully in the classroom.
Pedagogical Content Knowledge (PCK)	It refers to knowledge of pedagogy that relates to specific topic instruction, which is congruent with and related to Shulman's (986) concept.
Technological Content Knowledge (TCK)	It relates to comprehending how teachers utilize technology to represent learning information or how technology and content interact.
Technological Pedagogical Knowledge (TPK)	It relates to comprehending how various technologies might uniquely alter teaching and learning.
Technological Pedagogical Content Knowledge (TPACK)	It refers to incorporating technology into underlying practical and highly competent education.

TPACK Model in EFL Classroom

According to Koehler and Mishra (2009), teaching is a complicated, ill-structured subject with three major components: comprehension of material, teaching, and technology. Harris and Hofer (2011) stated that in the 1990s, there was much discussion about the potential strength and utility of digital tools, resources, and networks in education. They stated, however, that many instructors are unaware of the entire spectrum of curriculum-based learning activities, projects, and strategies that may be used in combination with different educational technologies. Moreover, Guerrero (2011) stated that for technology to impact teachers' practices and increase students' learning in reform-oriented ways, it must be adequately integrated into teaching in accurate, effective, and nonroutine ways. Tai and Chuang (2012) and Tseng (2014) stated that successful technology integration into

education necessitates instructors' understanding of technology, pedagogy, and content and mastery of the relationship between the three key knowledge domains.

Furthermore, Harris et al. (2009) assured that using the TPACK Model is not limited to a confined teaching, learning, or technology integration method. Tai and Chuang (2012) proposed a TPACK-in-Action Model to help in-service English teachers develop their TPACK proficiency and integrate CALL in their classrooms. The workshop provided abundant opportunities for instructors to participate in hands-on activities, which increased teachers' confidence in their instructional skills and led to more successful teaching experiences. Kwangsawad (2016), on the other hand, surveyed EFL preservice teachers' TPACK through self-report, lesson plans, and actual practice and discovered that teacher education programs have been successful in training teachers with highly innovative TPACK knowledge that provides them with skills and knowledge of technology to implement in their instruction. While Drajati et al. (2018) have investigated preservice and in-service teachers' perceptions of implementing the TPACK model in the English classroom, they found that lecturers still need little help to open the mindset of preservice and in-service teachers require some practice in using the TPACK framework for language learning.

Existing research recognizes the crucial role played by TPACK in many different EFL contexts and subject areas, and more attention has focused on employing TPACK in the language classroom where English is taught as the target language (L2). For example, Kurt et al. (2014) explored how EFL Turkish preservice teachers reflected their TPACK on their lesson plans and teaching. The data analysis from lessons and classroom observations of three cases demonstrated that instructors planned and implemented their classes with the interaction between content, pedagogy, and technology in mind. Baser et al. (2016) developed a TPACK-survey to assess the TPACK paradigms of EFL teachers. According to the findings, TPACK is well adapted to the EFL setting.

Similarly, Ersanli (2016) investigated the efficacy of a five-week TPACK workshop and training sessions for Turkish EFL preservice teachers. The findings show that male and female preservice teachers' TPACK ratings improved. Preservice EFL instructors also outperformed in creating and customizing language materials with specific purposes. Moreover, Kozikoğlu and Babacan (2019) explored the relationship between TPACK skills and the technological attitudes of Turkish EFL instructors. The results demonstrated a favorable association between instructors' TPACK skills and technological attitudes. Recently, Ardıç (2021) investigated the relationship between Turkish instructors' perspectives on students' usage of technology and their attitudes toward TPACK. The results found positive and significant connections between instructors' beliefs about students benefiting from technology implements and their attitudes on the TPACK confidence scale.

Furthermore, TPACK is also explored in the Indonesian EFL context. For example, Cahyono et al. (2016) investigated how a TPACK-focused teaching practice course helps Indonesian EFL teachers enhance the quality of their instructional designs and teaching practices. The results revealed that the instructors benefitted a lot from the training, and they effectively produced instructional designs and completed the teaching practices by employing the TPACK framework. Likewise, Oktalia and Drajati (2018) evaluated Indonesian EFL instructors' perceptions of the Text to Speech (TTS) Program in developing listening materials using the TPACK paradigm, with Google Sites serving as the media delivery platform. The findings revealed that using the TPACK approach, EFL teachers responded favorably to incorporating Text to Speech Programs. Furthermore, the Google site is considered advantageous since it allows instructors to develop online classes that students can access anytime. This digital technology has been shown to be beneficial in the l EFL classroom. Recently, Asri et al. (2020) investigated employing Internet apps for educating university students by young Indonesian EFL lecturers. The majority of the participants utilized Google Classroom. WPLMS, YouTube, Google Form, Blog, Turnitin, Quissis, Kahoot, Edmodo, Virtual Learning, EdPuzzle, Email, Moodle, Classmaker, and Schoology are some of the additional Internet apps that were used. Various features of using the apps, such as sharing resources, providing feedback, posting assignments and announcements, conducting online discussions and greater engagement, delivering exams or quizzes, and having fun while learning through games, have encouraged people to utilize them.

Similarly, Prasojo et al. (2020) used a newly developed scale to assess the perspectives of Indonesian EFL in-service teachers on TPACK. According to the findings, PK had the most significant perception in this study, whereas TK had the lowest. According to the conclusions of this study, Indonesian teacher education programs should emphasize the implementation of technology in the classroom.

Similarly, researchers in Malaysia explored TPACK incorporation in EFL courses. Muhamad (2014), for example, studied the influence of TPACK and motivation in Computer-Mediated Communication (CMC) speaking skills. T The findings demonstrated significant discrepancies and dissatisfaction among Malaysian ESL "teachers and

students about the efficiency of TPACK in enabling online course material. Abdul Samat and Abdul Aziz (2020) investigated using multimedia learning to improve EFL reading comprehension. The findings suggested that multimedia learning in teaching reading comprehension is beneficial since mixing numerous media components scaffolded the understanding process. On the contrary, audio is the least helpful in assisting Malaysian students in comprehending the content. Azhar and Hashim (2022) investigated the TPACK skills and attitudes toward technology among Malaysian ESL instructors. The data revealed that the instructors' TPACK level was astonishingly high. It also revealed a significant relationship between instructors' TPACK skills and their attitudes toward technology.

The Tai EFL context, like Malaysian, has investigated the TPACK Model. Gyamfi and Sukseemuang (2018), for example, assessed Tai EFL learners' satisfaction with the online asynchronous computer-assisted language learning (CALL) software Tell Me More (TMM). The findings showed that the students received the program's vocabulary, reading, and listening components very well. Nonetheless, learners' varied reactions to the software's modest appeal to their learning style, requirements, and preferences indicate that the program needs to be modified to accommodate a wide range of learning strategies. Based on the TPACK paradigm, Inpeng and Nomnian (2020) evaluated Thai preservice EFL instructors' competency and views of English instruction using Facebook. The results demonstrated that respondents had high competency levels in all areas of knowledge and TPACK. They could use TPACK tactics in their teaching while also using Facebook. Facebook was effective in virtually all teacher trainers' relationships and social parts of classes but less so in their academic tasks. Adipat (2021) recently explored whether "technology-enhanced content and language-integrated learning (T-CLIL)" training may improve Tai EFL preservice teachers' TPACK. T-CLI education improves instructors' TPACK, as evidenced by a consistent improvement for all seven TPACK aspects throughout the four periods.

TPACK was investigated in several methods in Taiwanese EFL classes. Tseng (2014), for example, used a validated student-based TPACK tool to investigate Taiwanese EFL students' perceptions of their teachers' TPACK. The findings revealed that students considered their teachers' content knowledge more adequate than their integrated TPACK. Wu and Wang (2015) evaluated EFL in-service teachers' performance on the seven TPACK construct components. According to the findings, the EFL teacher's TPACK was more focused on inspiring students than employing technology to generate opportunities for learners to use English competently. Furthermore, it was clear that their technology-related expertise (TK and TPACK) needed to be improved. Another study by Tseng (2019) explored how Taiwanese EFL instructors applied their TPACK in the EFL environment. He used the Substitution, Augmentation, Modification, and Redefinition (SAMR) model to investigate the degree of TPACK in iPad-based English instruction and discover contextual elements that may impact TPACK levels. The results showed that the tablets mostly improved instruction.

Iranian EFL classrooms have examined the incorporation of the TPACK Model. Bagheri (2020), for example, investigated Iranian EFL instructors' perceptions of TPACK. According to the findings, responding instructors could recognize six of the seven components in the original TPACK framework. Furthermore, the study suggested that TPACK may be utilized to build ICT courses for language instructors to improve teachers' ICT literacy through implementing TPACK-based programs.

Paneru (2018) explored how EFL instructors gained teaching competency and used CALL and ICT in the classroom. The findings indicated that teachers' perceptions, practices, and reflections about their instructors' proficiency and integration of ICT or CALL in EFL classrooms are overwhelmingly positive.

Gao and Zhang (2020) offered new empirical evidence for research on teacher cognition in online EFL teaching in the Chinese EFL setting during the rapid global epidemic of COVID-19. According to the findings, Chinese university professors had explicit cognitions about the characteristics, benefits, and restrictions of online EFL teaching and developed ICT literacy by recognizing students' learning requirements.

In summary, TPACK, as a conceptual framework, seeks to help teachers teach effectively using technology.

TPACK Model in Saudi EFL Classroom

Over the last decade, integrating technology into the Saudi education system has become an evident approach. Several studies have confirmed this new trend. According to Harris et al. (2009), instructors' TPACK is not tied to a specific instructional technology integration. Professional development for teachers based on TPACK must be adaptable and inclusive.

Kabooha (2016), for example, explored the attitudes of Saudi EFL university students and teachers toward the incorporation of English movies in their classes. According to the study findings, students and teachers had

positive attitudes toward employing movies in the foreign language classroom. The study suggested that movies be chosen strategically depending on the course material, students' interests, and competency levels. It has the potential to increase student's motivation to learn the language. Moreover, language teachers should not overlook the necessity of creating beneficial and pertinent exercises for students.

In the context of EFL, Alabsi and Alghamdi (2019) investigated Saudi university students' perspectives on WhatsApp usage and functionalities. According to the findings, WhatsApp is a popular communication medium and one of the fastest-growing social networks. Elyas and Al-Bogami (2019) explored the role of iPad tablets in the L2 curriculum as an instructional instrument. According to quantitative and qualitative data, Saudi EFL students who were exposed to iPad were far more engaged and outperformed their counterparts in language achievements. Alshammari (2020) investigated the current use of mobile devices among Saudi EFL professors and students. According to the interview findings, mobile devices are utilized informally outside the classroom to support and allow learners to practice English language learning. Albedaiwi (2022) conducted a study to positively evaluate Saudi university EFL learners' views toward improving collaborative writing in digital settings (CWDP). The results show that the strategy is preferred for its collaborative and technological value.

Several recent studies investigating the TPACK Model have been conducted in a Saudi EFL context. Alahmari (2017), for example, assessed the level of TPACK among Saudi EFL teachers at vocational and technical institutions. The study discovered that EFL instructors' technology usage was positively related to their perceptions of willingness to utilize it. Furthermore, in terms of TPACK perception, they used it to comprehend its pedagogical application. In addition, EFL teachers with more exceptional teaching experience perceived TPACK more positively than those with less experience.

Furthermore, Alghamdi (2017) also explored the TPACK of Saudi EFL male teachers in secondary schools. The study examined teachers' expertise and attitudes regarding ICT use in EFL courses. According to the quantitative and qualitative data, EFL teachers displayed knowledge and skills in using ICT in an EFL environment. Furthermore, their technology usage was favorably related to their ICT knowledge, attitudes, and TPACK perception. Notwithstanding the factors influencing their responses, teachers' willingness and readiness to use ICT in an EFL environment were high.

Recently, Alahmadi and Alraddadi (2020) examined the impact of the virtual classroom on the L2 interaction of Saudi PYP female undergraduate students. The findings demonstrated that Saudi students communicated and interacted well, particularly in virtual classes. In addition, participants had a favorable attitude about adopting online courses for L2 learning.

Another recent descriptive study conducted by Alharbi (2020) investigated the level of EFL teaching knowledge among Saudi EFL school teachers using the TPACK framework. According to the TPACK framework, the results revealed that Saudi EFL teachers had a high level of teaching knowledge. The findings also showed a substantial difference in the degree of teaching expertise attributed to gender and stage level among EFL teachers, favoring female teachers.

Almalki (2020) investigated the factors influencing using novel technologies in Saudi EFL classes. A questionnaire was utilized as the tool in a quantitative research technique. According to the data, there was no statistically significant relationship between teacher age and technology integration. On the other hand, integrating technology in Saudi EFL classrooms was significantly related to teachers' proficiency levels and perception of technology.

Teaching Vocabulary in a Technology-based Setting

Vocabulary is essential in English instruction because students cannot comprehend others or communicate their views without it. Wilkins (1972) stated that ". . . while without grammar, very little can be conveyed, without vocabulary nothing can be conveyed" (pp. 111-112). Hence, learning vocabulary assists students in understanding and communicating with others. So students develop greater fluency and expression by developing more productive vocabulary. Schmitt (2000) emphasizes that "lexical knowledge is central to communicative competence and the acquisition of a second language" (p. 55).

Willis (2008) defines vocabulary learning as "this active processing (doing things with words, from acting them out to creating graphic organizers) that brings students ownership of the new vocabulary" (p.81).

Several approaches and techniques are being practiced by many teachers to improve vocabulary learning, such as drawing, contrasting, and using objects, illustrations, and pictures (Alqahtani, 2015). For example, Saeidi and

Mozaheb (2012) examined using two methodologies for vocabulary learning (flashcards and m-learning) among 80 EFL Iranian university students. According to the findings, using mobile phones for language and vocabulary learning is incomparable to using flashcards or other traditional methods. Alsaleem (2013) explored the improvement of Saudi undergraduate EFL students' vocabulary learning through WhatsApp electronic dialogue journaling. The results concluded that WhatsApp improved learners' writing, speaking, vocabulary, and word choice.

On the other hand, the rapid evolution of ICT has affected EFL skills and aspects. Numerous studies have been conducted to measure the effectiveness of technology in developing vocabulary learning. For example, Bataineh (2014) investigated the effect of internet games on Saudi EFL students' reading comprehension, vocabulary learning, and motivation. According to the findings, the experimental group outperformed those instructed traditionally. Also, students' eagerness to study improved their reading comprehension and vocabulary learning.

Habbash (2015) examined the impact of mobile apps on vocabulary teaching at the undergraduate EFL level. The findings demonstrated that EFL Saudi teachers have positive perceptions of mobile apps. They agreed to encourage students to use social media sites such as Twitter, Instagram, Facebook, and WhatsApp to boost vocabulary development. Furthermore, they revealed the critical functions of mobile apps in vocabulary instruction.

Kabooha and Elyas (2015) evaluated the effect of using YouTube video clips during reading tasks on vocabulary comprehension and recognition development in Saudi EFL students enrolled in King Abdul-Aziz University's PYP. The findings indicated that students have positive attitudes towards using YouTube videos to facilitate learning new vocabulary items.

Kabooha and Elyas (2018) conducted another work investigating the perceptions of both Saudi EFL students and teachers towards including YouTube videos in vocabulary comprehension and retention. The results show that a multimedia environment using YouTube videos significantly affected the students' vocabulary acquisition. Moreover, the findings indicated that students have positive attitudes toward using YouTube videos to facilitate learning new vocabulary items. Well-selected video resources can improve students' language learning processes and motivate them to learn the target language.

The influence of employing Games, Mind-mapping, and Twitter Hashtags as the GMT strategy on the vocabulary performance of Saudi EFL female university students was investigated by Alhajaji et al. (2020). It also aimed to increase students' motivation, active participation, and interaction in vocabulary learning. The results proved the experimental group's improvement and importance. Besides, the learners overwhelmingly favored using the GMT approach to facilitate their language learning experience.

STATEMENT OF THE PROBLEM

The evolution of TPACK integration took place widely in the 21st century. A growing body of literature recognizes the importance of technology and demonstrates how it provides several new opportunities for supporting English as a second/foreign language learning and teaching (Alabsi & Alghamdi, 2019; Albedaiwi, 2022; Alshammari, 2020; Elyas & Al-Bogami, 2019; Gao & Zhang, 2020; Guerrero, 2011; Paneru, 2018; Tseng, 2014). Cox and Graham (2009) described it as a model that reflected the teacher's ability to use technology to combine subject-specific activities with topic-specific representations to enhance students' learning. More recently, Amin (2020) conducted a systematic review of more than a hundred studies published on using technology in English language classrooms in the last ten years. He found that integrating technology developed English language learning and teaching. Thus, teachers should consider incorporating digital learning opportunities in their EFL classrooms to help improve English language skills.

In Saudi education, EFL learners are introduced to around 2800 words from the most frequent 5000 words and an additional 1000 less frequent words over seven years of learning EFL (Alsaif & Milton, 2012).

However, they left school with less than 10% of this number. A considerable number of Saudi studies indicated that learning vocabulary is a crucial issue behind the problem of mastering EFL at all levels (Al-Shuwairekh, 2001; Alqahtani, 2015; B. Alsaleem, 2013; Bataineh, 2014; Habbash, 2015; R. Kabooha & Elyas, 2018, 2015).

After analyzing 106 publications, Irwanto (2021) offered a complete overview of existing literature and some potential directions for future TPACK research for academics and educators. He noted a growing interest in TPACK research since it is critical to integrate technology into education adequately.

In the Saudi context, the literature revealed few Saudi studies (Alahmadi & Alraddadi, 2020; Alahmari, 2017; Algaissi et al., 2020; Alghamdi, 2017) had implemented the TPACK Model in EFL vocabulary teaching and learning. Hence, more attention must be paid to appropriate techniques and methods to teach vocabulary in Saudi EFL classrooms.

Thus, the current study explores the EFL teachers' viewpoints on using the TPACK Model to improve students' vocabulary learning. Moreover, it seeks to obtain in-depth data regarding EFL teachers' experiences using the TPACK model in their classrooms.

Research questions

1. What are EFL teachers' views on using the TPACK model to improve students' vocabulary learning?
2. What are EFL teachers' personal experiences about using the TPACK model to improve students' vocabulary learning?

METHODOLOGY

The mixed-method approach was adopted in the current study. Fraenkel and Wallen (2009, p.557) stated that mixed-method research involves "quantitative and qualitative methods in a single study." Hence, the quantitative data was collected through a questionnaire with close-ended items, and qualitative data through posing an open-ended question.

Population and research sample

The total population of Saudi EFL teachers in Madinah, Saudi Arabia, is 1470 teachers. During the first semester of the 2022 academic year, 115 Saudi EFL teachers (7.82%) voluntarily participated after obtaining the online version of the official questionnaire distributed by the Planning and Development Department at the Directorate of Education (PDDDE) in Madinah. The participants were assigned to rate each statement in the questionnaire regarding their views on using the TPACK model to improve students' vocabulary learning. The open-ended question respondents were only 20 EFL teachers.

Instrumentation

The researchers first designed a questionnaire with three components as the primary study instrument. The first component had three closed questions about the teachers' background, interests, and assessment of utilizing TPACK (see Figure 1).

The second section consisted initially of 17 closed-ended items based on previous literature (Alghamdi, 2017; Alharbi, 2020; Hill & Uribe-Florez, 2019; Nazari et al., 2019). Participants were asked to score their perspectives on a three-point Likert scale. An open-ended question was also developed and submitted separately in the third section, asking EFL teachers to describe their experiences utilizing the approach to enhance students' vocabulary learning. The quantitative and qualitative responses might provide insights, strengthen the validity of the questionnaire items, and provide different TPACK model implementation experiences.

Regarding section 1, the findings of the first question, "Is it the first time to been introduced to TPACK Model?" showed that about 90 (78.3%) of EFL teachers have introduced TPACK previously into their teaching, with about 25 (21.7%) who have not used it in their classes (see Figure 2).

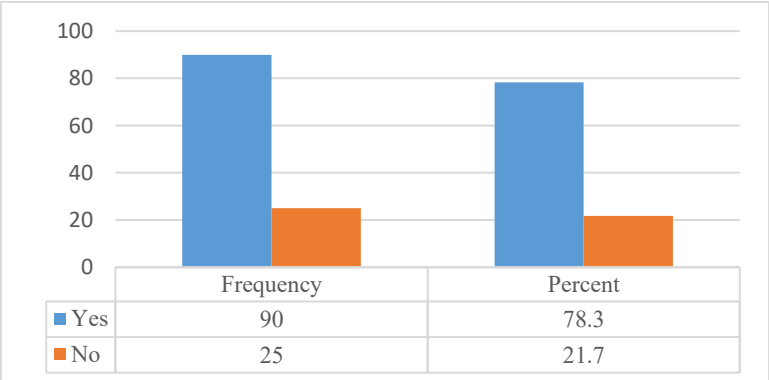
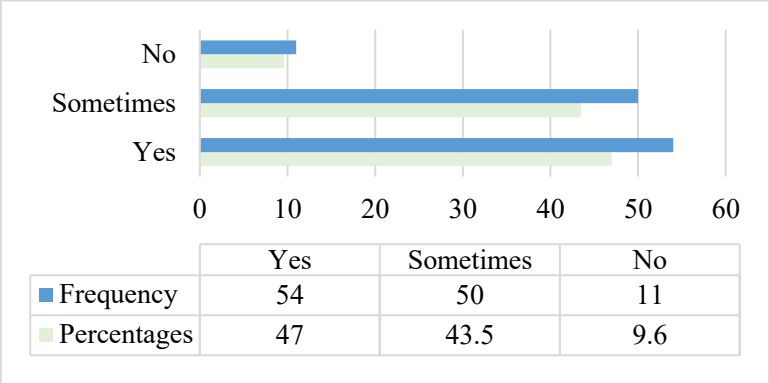


Figure 2. EFL teachers' future intention to use the TPACK Model

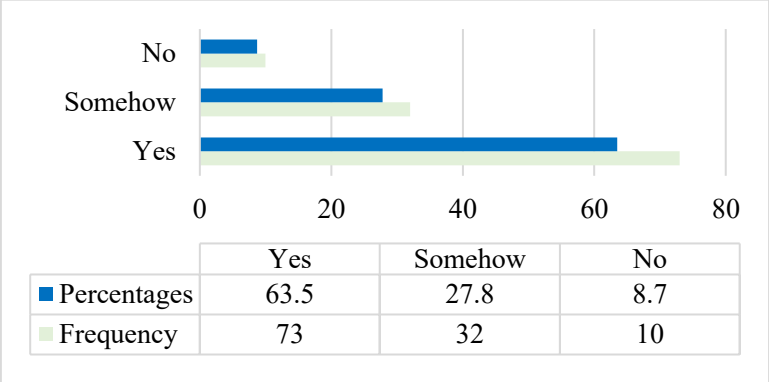
Moreover, the findings of the second question, "Based on the definition above, do you think you may use TPACK Model in teaching EFL?" showed that about 54 (47.0%) intend to use TPACK in teaching English, and about 50 (43.5%) plan to use it sometime. The mean score (M=2.37; S.D.= .655) indicated a highly positive response to implementing the TPACK Model in language teaching. On the contrary, only 11 (9.6%) did not prefer to use TPACK Model in their EFL classes (see Figure 3).



	Yes	Sometimes	No
Frequency	54	50	11
Percentages	47	43.5	9.6

Figure 3. The results of the EFL teachers' future intention to use the TPACK Model

The findings of the third question, " Do you value the importance of using the TPACK Model in teaching English to new generations?" show that about 73 (63.5%) highly value the importance of using the TPACK Model in teaching English, and about 32 (27.8%) somehow recognize the significance of TPACK emergence in EFL classrooms. The mean score (M=2.55; S.D.= .652) indicated a highly positive response to the belief in implementing the TPACK Model in language teaching. On the contrary, only 10 (8.7%) did not value how important to use the TPACK Model in their EFL classes.



	Yes	Somehow	No
Percentages	63.5	27.8	8.7
Frequency	73	32	10

Figure 4. The results of EFL teachers' evaluation of the importance of the TPACK Model

Validity

For validation purposes of the research instrument, the questionnaire was sent to five EFL teachers who are specialists in integrating technology into the EFL classroom to ensure construct and content validity. The review resulted in a few changes. For example, they recommended adding three more items and correcting some statements linguistically. The final version was a 20-item questionnaire.

Reliability

A pilot study was conducted with thirty Saudi EFL instructors to calculate the questionnaire's reliability and internal consistency. The results of the Pearson correlation indicated a direct, positive, and significant relationship between the total and the 20 items with values ranging (from r =.772-.932). Cronbach's alpha coefficient was used to determine the internal consistency of all items, which revealed that all twenty items had high internal consistency and reliability (0.980). The computed reliability of the analyzed items was more than 0.7.

Data collection

The questionnaire was formally distributed to Saudi EFL teachers in Madinah, Saudi Arabia, on November 19, 2022. Three weeks later, 115 responses were received. The open-ended question was emailed to the study sample on December 22, 2022, but only twenty participants took it seriously and shared their experiences using the TPACK Model while teaching vocabulary.

Data analysis

The questionnaire data were assessed using frequencies, percentages, means, and standard deviations. The researchers assigned preliminary codes to the open-ended question to reduce the gathered data into categories (Types of technologies employed and broadly shared experiences). The researchers then thoroughly assessed the allocated codes to identify data to exemplify the selected categories. Frequencies and percentages were used to show the coded and classified qualitative data. SPSS software was used for statistical analysis (version 25).

RESULTS

Responding to the study's objectives to explore Saudi EFL teachers' views on using the TPACK Model to improve vocabulary learning and obtain in-depth data regarding teachers' experiences using the TPACK Model, descriptive statistics were computed to address the research questions.

Results of EFL teachers' views on using the TPACK Model to improve students' vocabulary learning

The results of the first question, "What are EFL teachers' views of using the TPACK model to improve students' vocabulary learning?" were ranked based on the frequency of use.

Table 2. The results of EFL teachers' views on using the TPACK model to improve students' vocabulary learning

No.	Statements	The Scale			Mean	S.D.	Level
		Agree	Neutral	Disagree			
TPACK Model helps EFL learners to……..							
1.	Use various digital resources to find the synonyms and antonyms of new vocabulary.	68 (59.1%)	30 (26.1%)	17 (14.8%)	2.44	0.74	Agree
2.	Categorize vocabulary according to different parts of speech by using various mobile language learning applications.	69 (60.0%)	27 (23.5%)	19 (16.5%)	2.43	0.762	Agree
3.	Collaborate with classmates to figure out vocabulary meaning during technology-based instruction.	71 (61.7%)	22 (19.1%)	22 (19.1%)	2.43	0.795	Agree
4.	Build their vocabulary dictionaries using generic office applications.	68 (59.1%)	26 (22.6%)	21 (18.3%)	2.41	0.782	Agree
5.	Repeat frequently the pronunciation of new vocabulary by using various technological resources.	69 (60.0%)	24 (20.9%)	22 (19.1%)	2.41	0.794	Agree
6.	Search various digital language learning resources for the multiple meaning of new vocabulary.	69 (60.0%)	23 (20.0%)	23 (20.0%)	2.40	0.804	Agree
7.	Engage in a motivating virtual language-learning environment.	71 (61.7%)	19 (16.5%)	25 (21.7%)	2.40	0.825	Agree
8.	Develop self-learning skills using various digital tools, resources, and applications.	70 (60.9%)	19 (16.5%)	26 (22.6%)	2.38	0.833	Agree
9.	Participate in various types of vocabulary activities by using mobile language learning games, applications, and platforms.	67 (58.3%)	23 (20.0%)	25 (21.7%)	2.37	0.820	Agree
10.	Gain confidence in using vocabulary in a different context after in-depth exposure to language e-resources.	67 (58.3%)	23 (20.0%)	25 (21.7%)	2.37	0.820	Agree
11.	Acquire different long-life skills that enhance language through exposure to virtual language settings.	66 (57.4%)	25 (21.7%)	24 (20.9%)	2.37	0.809	Agree
12.	Be satisfied with various vocabulary activities that are acquired in technology-based instruction.	63 (54.8%)	30 (26.1%)	22 (19.1%)	2.36	0.786	Agree

No.	Statements	The Scale			Mean	S.D.	Level
		Agree	Neutral	Disagree			
13.	Use new vocabulary in meaningful structures during technology-based instruction.	64 (55.7%)	27 (23.5%)	24 (20.9%)	2.35	0.806	Agree
14.	Augment positive attitudes toward integrating technology to learn vocabulary.	67 (58.3%)	21 (18.3%)	27 (23.5%)	2.35	0.838	Agree
15.	Develop multimedia presentations (e.g., videos or animation) to clarify vocabulary meaning and use.	64 (55.7%)	25 (21.7%)	26 (22.6%)	2.33	0.824	Neutral
16.	Discover preferable learning styles in learning new vocabulary after fair exposure to digital language learning resources.	63 (54.8%)	27 (23.5%)	25 (21.7%)	2.33	0.814	Neutral
17.	Spell new vocabulary accurately using various digital language learning games, applications, and platforms.	60 (52.2%)	28 (24.3%)	27 (23.5%)	2.29	0.825	Neutral
18.	Create informative and recognizable vocabulary concept maps using generic office applications, multimedia creator applications, or web resources.	62 (53.9%)	24 (20.9%)	29 (25.2%)	2.29	0.846	Neutral
19.	Be less anxious during exposure to new vocabulary using various types of technology-based instruction.	58 (50.4%)	30 (26.1%)	27 (23.5%)	2.27	0.820	Neutral
20.	Participate in the spelling competition via mobile language learning games, applications, and platforms.	55 (47.8%)	35 (30.4%)	25 (21.7%)	2.26	0.796	Neutral

According to Table 2, fourteen items demonstrated significant agreement among Saudi EFL teachers who apply the TPACK Model increases students' vocabulary development. The participants perceive the value of using technology-based instruction for EFL learning, including multimedia, webpages, games, applications, platforms, virtual classrooms—etc.

Saudi EFL teachers revealed that the TPACK Model could assist EFL learners in locating synonyms and antonyms of new vocabulary (Item 1, M=2.44; SD=0.74). Identical mean results (M=2.43) suggested that they agreed that the TPACK Model might assist EFL learners in categorizing vocabulary according to different parts of speech and improving collaboration among students in determining vocabulary meaning.

Similarly, identical mean scores (M=2.41) suggested that Saudi EFL teachers believed that the TPACK Model might assist EFL learners in building vocabulary dictionaries and regularly repeating the pronunciation of new material.

Table 2 reveals equal mean scores (M=2.41), demonstrating that Saudi EFL teachers believed the TPACK Model might assist EFL learners in searching for numerous meanings of new vocabulary and engaging in a stimulating language-learning environment.

The data also demonstrated a significant agreement (Item 8, M=2.38; SD=0.833) among Saudi EFL teachers on the relevance of the TPACK Model in assisting EFL learners in developing self-learning skills.

Furthermore, equal mean scores (M=2.37) suggested that Saudi EFL teachers agreed that the TPACK Model might assist EFL learners in various vocabulary exercises, gaining confidence to use vocabulary in a new context and acquiring other long-term skills. According to Saudi EFL teachers, the TPACK Model may assist EFL learners in demonstrating their happiness with various vocabulary tasks (Item 12, M= 2.36; SD= 0.786).

Finally, identical mean scores (M=2.35) suggested that they believed the TPACK Model might assist EFL learners in using new vocabulary in meaningful structures and encouraging positive attitudes toward integrating technology in vocabulary learning.

However, Table 2 indicated that the Saudi EFL teachers were unsure if the TPACK Model might support EFL learners in making multimedia presentations to explain the vocabulary meaning and usage or discover preferable learning modes for acquiring new vocabulary. Similarly, the mean ratings for Items 17 and 18 (M=2.29) indicated uncertainty that the TPACK Model might help EFL learners spell new vocabulary correctly or create informed and recognized vocabulary idea maps.

Similarly, Saudi EFL teachers were unsure if the TPACK Model positively influenced EFL learners' anxiety during exposure to new vocabulary (Item 19, M=2.27; SD=0.820) or motivated them to participate in spelling competitions (Item 20, M=2.26; SD=0.796).

Results of the open-ended question

The open-ended question aimed to convey experiences using other TPACK practices to improve students' vocabulary learning. Descriptive statistics were applied to present the categorized qualitative data and address the second study question, "What are EFL teachers' personal experiences using the TPACK model to improve students' vocabulary learning?".

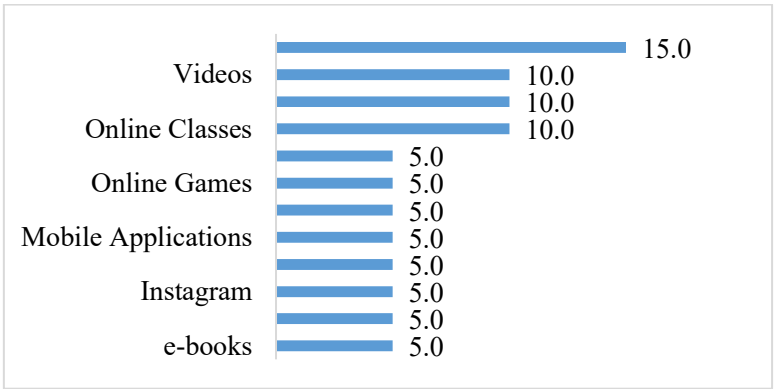


Figure 5. TPACK practices utilized in EFL vocabulary classrooms

Figure 5 demonstrates that Saudi EFL teachers (15.0%) considered using PowerPoint presentations to benefit students, with only two responses (10. 0%) reporting using videos, searching the Internet, and using online to teach vocabulary. They also considered using other TPACK practices, such as Snapchat, online games, movies, mobile applications, Madrasati official website, Instagram, e-tests, and e-books.

The statements below reflect the views of Saudi EFL teachers regarding their employment of TPACK practices in their vocabulary classes.

***Teacher 1**: TPACK is a helpful technique. I am applying different teaching methods to teach vocabulary content by using technology.*

***Teacher 2:** Using technology in my English language classes is a must. My experience is very good. I create online classes, upload educational YouTube videos, and share images. My students enjoy and participate better when I use technology.*

***Teacher 3:** My experience using the TPACK model to improve my students' vocabulary learning is very beneficial.*

***Teacher 4:** We must integrate technology with the teaching method and academic content, especially in distance education. Technology is crucial in the development of students. My experience with distance teaching made me go deeper and learn more about technology, and I use it in teaching language skills in general and vocabulary in particular.*

***Teacher 5:** I think TPACK is the easiest way to share knowledge and new vocabulary and frequently listen to word pronunciation using technology.*

***Teacher 6:** Nowadays, with online learning, I am introducing my students to some valuable e-books and e-tests for vocabulary.*

Teacher 7: *I used to teach face-to-face, but now I have new experiences with online learning that provide multiple opportunities for giving vocabulary e-resources.*

DISCUSSION

This study explored the EFL teachers' views on using the TPACK Model to improve students' vocabulary learning and sought to obtain an in-depth analysis of EFL teachers' experiences employing the TPACK model in their instruction.

Based on the analysis of the primary three questions in the questionnaire, most Saudi EFL teachers have previously introduced TPACK into their teaching or intended to use it. However, some EFL teachers declared no use of TPACK in their classes. Besides, about half of the participants responded positively to implementing the TPACK Model in language teaching, whereas only (9.6%) did not prefer to use TPACK Model in their EFL classes.

A possible explanation might be that using technology-based instruction has become a part of the Saudi EFL teachers' teaching-learning process. Moreover, the rapid expansion of the ICT Saudi educational system has altered EFL teachers to adopt new methods to establish and engage students in language learning. Another possible explanation is that EFL teachers believe that traditional audio and video equipment no more adds benefits to the curriculum. They might assume the essential roles of the other digital tools available to help students understand and engage in the EFL content, such as mobile language applications and other online resources. Additionally, they might figure out that technology is no longer merely providing machines, authentic material, or more resources for instructors to employ; it can potentially change where and when learning occurs.

These results are in accord with those of Baser et al. (2016), Cahyono et al. (2016), Ersanli (2016), Oktalia and Drajati (2018), Paneru (2018), and Tseng (2019) who reported that EFL teachers had performed better in designing language learning/teaching materials with specific goals when using TPACK. They have also successfully enhanced their teaching, designed language learning/teaching materials, and utilized the teaching practices by adopting the TPACK framework with determining techniques.

Moreover, these results correspond with some recent studies (Abdul Samat & Abdul Aziz, 2020; Albedaiwi, 2022; Alshammari, 2020; Gao & Zhang, 2020), which discovered that EFL instructors' usage of technology was positively related to their willingness to employ such technology. This is because integrating technology in language instruction facilitates and provides opportunities for students to practice English language learning. Besides, they found that implementing TPACK in teaching is helpful as combining multiple media elements scaffolds for the language understanding process.

Those who never used TPACK Model might be unable to perceive that TPACK includes any resources built upon and based on multimedia, websites, e-games, mobile devices applications, virtual classrooms—etc. What supports this interpretation is that some participants, as Saudi teachers, had suffered and hardly became a part of the online transition during the COVID-19 outbreak when the Saudi Ministry of Education (MOE) activated virtual and online nationally. The MOE has delivered several e-services for students, teachers, administrative staff, and parents via the Saudi digital platform as a TPACK Model.

Concerning the first research question, it was found that the EFL teachers agreed positively on fourteen statements regarding their view on the importance of the TPACK Model to help in vocabulary learning. The participants agreed that employing the TPACK Model in various digital resources will assist Saudi students in vocabulary learning. For example, it will help find synonyms and antonyms, classify vocabulary according to different parts of speech, collaborate to figure out vocabulary meaning, build vocabulary dictionaries, frequently repeat the pronunciation, search for the multiple meanings of new vocabulary, and engage in a motivating virtual language-learning environment.

These results may be explained by the fact that Saudi EFL teachers might consider preparing their students for the world of technology, and a great way to do that is to teach using technology. Hence, they agreed on integrating technology in designing vocabulary lesson plans, activities, and drills to create a more engaging learning environment for students. It also increases opportunities for collaboration and motivation among students while learning vocabulary.

Another possible explanation is that EFL teachers' views were based on their classroom practices while teaching vocabulary. For example, they might refer to situations when teachers create online classes using certain Internet features or specific applications. Likewise, students might get used to their smart devices inside the classroom and consult e-dictionaries, YouTube videos, or certain language apps to search for meaning, find synonyms and

antonyms, or practice pronunciation of new vocabulary. Besides, the teachers' face-to-face discussions supervise collaborative work opportunities and enhance students' motivation to learn new vocabulary.

These findings are in accord with the findings of previous studies (Albedaiwi, 2022; Almalki, 2020; Asri et al., 2020; Elyas & Al-Bogami, 2019; Oktalia & Drajati, 2018; Paneru, 2018), which found that technology integration in Saudi EFL classrooms are considered significantly impressive since it lets teachers create online classes to teach vocabulary interactively using various digital resources. Examples include Google Classroom, Moodle, Turnitin, Classmaker, Virtual Learning, and Schoology. On the other hand, technology-based digital resources provide teachers with opportunities to create interactive language settings, plan collaborative vocabulary activities and drills, and engage learners in the learning process. Examples of digital resources, mobile-based or Internet-based programs, and applications that students might use inside and outside the classroom to learn vocabulary are e-dictionaries, Kahoot, Edmodo, EdPuzzle, YouTube videos, Blogs, WhatsApp, and others. Learners get used to available or provided digital tools for several purposes, such as searching for meanings, finding synonyms and antonyms, and practicing pronunciation of new vocabulary. Technology can utilize other tasks, such as opportunities for online debates, collaborative activities and practices, immediate constructive feedback, language games, and exams or quizzes. Likewise, it promotes vocabulary acquisition when students perform any given task.

Moreover, these results accord with some studies (Bataineh, 2014; Kabooha & Elyas, 2018; Kabooha, 2016; Muhamad, 2014; Wu & Wang, 2015), which indicated the suitability of TPACK in facilitating students' motivation to learn vocabulary. According to the studies, well-chosen digital resources can improve students' language learning and motivate them to study L2.

Furthermore, the study sample agreed that employing the TPACK Model in various digital forms will assist Saudi students in vocabulary learning. For example, it will help develop self-learning skills, participate in multiple e-activities, gain confidence in using words in a different context, acquire other long-life skills, show satisfaction with various drills, use vocabulary in meaningful structures, and encourage positive attitudes toward integrating technology in vocabulary learning.

These findings are consistent with previous research (Alahmari, 2017; Inpeng & Nomnian, 2020), which reported that EFL teachers' technology usage was related to their views of willingness to utilize that technology. They were able to include TPACK principles in their teaching. Besides, according to practically all teacher trainers, TPACK enhanced classroom interactions, communication, teamwork, and social elements. In the Saudi context, these findings also align with Habbash's (2015) results, which indicated that EFL Saudi teachers prefer mobile applications and agree on encouraging their students to utilize social media sites to boost vocabulary development. Furthermore, they highlighted the importance of mobile applications in enhancing vocabulary instruction. Likewise, Alahmadi and Alraddadi' (2020) results revealed that Saudi students showed acceptable levels of communication and interaction in learning vocabulary during their virtual classes.

On the other hand, numerous studies have stated that teachers' and students' attitudes were enhanced using TPACK. For example, Kabooha's (2016) findings showed that EFL students and teachers were positive about using movies to teach language skills. Moreover, the current study's results agree with Kabooha and Elyas' (2015) and (2018) findings, which showed that using YouTube videos to facilitate learning new vocabulary has positively enhanced EFL students' attitudes.

Likewise, these results also match those observed in Alahmadi and Alraddadi' (2020) study that students showed positive attitudes toward using online courses or other technological tools for L2 learning. According to several recent studies (Ardıç, 2021; Azhar & Hashim, 2022; Kozikoğlu & Babacan, 2019), TPACK increased students' attitudes and found a relationship between instructors' TPACK skills and students' attitudes toward technology.

Regarding the other six statements, it was found that the EFL teachers were uncertain of their view on the importance of the TPACK Model in helping students develop multimedia presentations or create informative vocabulary concept maps as an activity or a home assignment using videos, animation, mobile applications, or web resources to clarify vocabulary meaning and use. A possible explanation might be that the various TPACK types, whether Internet-based or mobile-based digital tools, are used to ease and facilitate L2 vocabulary learning. The EFL teachers might focus on vocabulary learning as a process, not on using technology as a product. Another possible interpretation of this result may be that the teachers usually care more about how they are better prepared to teach vocabulary using different digital resources and not how students acquire vocabulary to achieve previously set learning outcomes.

The study results showed that the Saudi EFL teachers were also hesitant about viewing the importance of the TPACK Model in discovering students' preferred learning styles or being less anxious while learning new vocabulary. An explanation might be that EFL teachers believe that their students are deeply affected by ICTs. They are considered literary as 21st-digital learners who actively use technology to learn on multiple devices and engage in on-demand anytime and anywhere language materials. That is why their learning styles toward integrating technology into education are beyond doubt, and there is no need to use any model to discover them.

It was also found that the EFL teachers were doubtful of their view on the importance of the TPACK Model in helping students to spell new vocabulary accurately or participate in any spelling competition by using a range of digital language learning games, applications, and platforms. This result is somewhat surprising and must be interpreted with caution because what comes to mind is that all language applications help in learning language skills and aspects, even if unevenly. Possible explanations might include that English spelling is more complex than reading or writing and can be frustrating for students when they encounter numerous exceptions to spelling rules and different methods of spelling the same sound. Thus, it should be explicitly taught via specific techniques. Besides, language mobile applications or web resources usually include auto-correction features to assist users in writing words or sentences.

CONCLUSION AND RECOMMENDATIONS

This mixed-method study explored Saudi EFL teachers' views on using the TPACK model to improve students' vocabulary learning. Moreover, it seeks to obtain in-depth data regarding EFL teachers' experiences using the TPACK model in their classrooms. The participants were 115 (7.82%) Saudi EFL teachers.

The results of the first three questions in section 1 showed that about 90 (78.3%) of EFL teachers had introduced TPACK previously into their teaching, and about 25 (21.7%) had not used it in their classes. Besides, 54 (47.0%) intend to use TPACK in teaching English, and about 50 (43.5%) plan to use it sometime. Moreover, 73 (63.5%) highly valued the importance of using the TPACK Model in teaching English, and about 32 (27.8%) somehow recognized the significance of TPACK emergence in EFL classrooms.

According to the questionnaire results, the participants perceived the value of using technology-based instruction for EFL learning, including multimedia, webpages, games, applications, platforms, virtual classrooms—etc., and demonstrated significant agreement on fourteen items. However, the results indicated that the Saudi EFL teachers were unsure in six statements if the TPACK Model might support EFL learners in learning vocabulary.

Regarding the open-ended question, Saudi EFL teachers (15.0%) considered using PowerPoint presentations to benefit students, with only two responses (10. 0%) reporting using videos, searching the Internet, and using online to teach vocabulary. They also considered using other TPACK practices, such as Snapchat, online games, movies, mobile applications, Madrasati official website, Instagram, e-tests, and e-books. The EFL teachers also commented on the practical employment of TPACK practices in their vocabulary classes.

This study aimed to improve Saudi EFL instructors' comprehension of TPACK implementation in their language classrooms. Overall, the current study provides several significant contributions to the growing literature on incorporating TPACK in language classrooms. It is also helpful for instructing and learning vocabulary at the school level.

The researchers suggest some practical recommendations based on the findings of this study. First, it is crucial to give much care to technology-enhanced professional development to ensure the EFL teachers' understanding of the role of integrating the TPACK model in instruction. Thus, the MOE, the National Center for Professional Development, educational districts, and school administrators should provide systematic professional development (PD) for EFL teachers to discover techniques for efficiently leveraging the technologies available to enhance the teaching-learning process. EFL teachers should be oriented on the value of technology incorporation in their classes and expose them to the most recent educational and technological tools, applications, and platforms to utilize in EFL classes.

Besides, the PD programs should offer EFL teachers techniques to supplement their current pedagogical practices and new trends for technology-based instruction. PD programs should be practical and assist teachers in using the technology, addressing any issues that may arise, and applying the technology in the classroom.

Second, Saudi Faculties of Education should integrate technology into teacher education programs and be alert that the student teachers learn and practice techniques to develop authentic interactions, boost cooperation, and

promote creativity among their prospective students. In this way, educators interact with student teachers as students and assist them in experiencing TPACK as future teachers.

Third, EFL educators should develop professional development communities (PDC) for novice teachers with experienced teachers, either face-to-face or virtual, using SHMS, the Saudi OER Network, which is the main initiative of the National Open Education Resources Program. PDC is a nationwide platform that provides instructors with reliable and secure educational resources depending on their professional development needs. It expands novice EFL teachers' understanding of integrating the TPACK and contributes to the expert EFL teachers' professional development.

Finally, the Ministry Agency for Research and Innovation in MOE should encourage teachers to perform TPACK and technology integration action research and observational studies to present a comprehensive view of how teachers' TPACK is reflected in technology integration.

This study examined EFL teachers' views on technology integration in vocabulary teaching and learning. Further research is needed to duplicate the current study with Saudi EFL teachers to understand better their perspectives on using TPACK in learning other language skills. Extending the study population to involve EFL teachers at all school levels is highly recommended to understand better integrating technology to create meaningful learning. Examining teachers' perspectives on how technology is utilized at the school level increases the data's validity and offers a better sense of how teachers have meaningful opportunities to use technology. This study will act as the basis for future studies that will provide valuable pedagogical implications for the TPACK Model.

It is highly recommended to duplicate the study by including additional parameters, such as demographic data, to evaluate participant variations based on their academic degrees, years of teaching experience, gender, and age.

It also would be better to extend the study population to involve EFL students at all school levels and explore their perspectives, attitudes, and satisfaction when using technology-based instruction. Comparing students' perspectives, attitudes, and satisfaction levels in different school levels (upper primary, intermediate, and secondary) shows how technology integration constantly enhances students' technological knowledge and skills and how their utilization evolves over time.

Moreover, exploring the factors that could affect EFL teachers' actual practices is recommending and determining where to place efforts in evolving technology integration practices. Another study is suggested to focus on what types of TPACK technology EFL teachers use, how frequently they use, and for what purposes they are used (e.g., communications, collaboration, instructional activities, critical thinking, assignments, and projects). Such investigation would confirm EFL teachers' technology integration practices and reflect on their technology usage from different dimensions.

LIMITATIONS

Despite its significance, the results of this study must be interpreted with caution, and several limitations should be considered. One of the apparent limitations is the lack of data from students' perspectives that might allow for a more holistic analysis. Moreover, the scale in this study included a questionnaire as an instrument, which might not measure the respondents' actual knowledge. Another limitation of this study is its minimal generalizability due to its small sample size and volunteer nature. The respondents were only 115 Saudi EFL teachers (7.82%) could also be a limitation in this study, where a more considerable number of respondents is preferable.

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REFERENCES

Abdul Samat, M. S., & Abdul Aziz, A. (2020). The effectiveness of multimedia learning in enhancing reading comprehension among Indigenous Pupils. *Arab World English Journal*, *11*(2), 290–302. https://doi.org/DOI: https://dx.doi.org/10.24093/awej/vol11no2.20

Adipat, S. (2021). Developing technological pedagogical content knowledge (TPACK) through technology-enhanced content and language-integrated learning (T-CLIL) instruction. *Education and Information Technologies*, *26*(5), 6461–6477. https://doi.org/10.1007/s10639-021-10648-3

Al-Shuwairekh, S. (2001). *Vocabulary learning strategies used by AFL (Arabic as a Foreign Language) learners in Saudi Arabia* [The University of Leeds, School of Education]. http://etheses.whiterose.ac.uk/187/

Alabsi, K. M., & Alghamdi, F. M. (2019). Students' opinions on the functions and usefulness of communication on WhatsApp in the EFL higher education context. *Arab World English Journal*, *Special Issue 1: Application of Global ELT Practices in Saudi Arabia*, 129–144. https://doi.org/https://dx.doi.org/10.24093/awej/elt1.10

Alahmadi, N., & Alraddadi, B. (2020). The impact of virtual classes on second language interaction in the Saudi EFL context: A case study of Saudi undergraduate students. *Arab World English Journal*, *11*(3), 56–72. https://doi.org/10.24093/awej/vol11no3.4

Alahmari, A. S. (2017). *An investigation of Saudi Arabian EFL teachers' engagement with technology* [Monash University.Thesis]. https://doi.org/https://doi.org/10.4225/03/58b4f67696508

Albedaiwi, S. (2022). Collaborative writing on a digital platform: Measuring gains of EFL learners in Saudi Arabia. *Journal of Language and Linguistic Studies*, *18*(1), 760–770.

Algaissi, A. A., Alharbi, N. K., Hassanain, M., & Hashem, A. M. (2020). Preparedness and response to COVID-19 in Saudi Arabia: Building on MERS experience. *Journal of Infection and Public Health*, *13*(6), 834–838. https://doi.org/10.1016/j.jiph.2020.04.016

Alghamdi, S. S. (2017). *The effect of EFL teachers' technological pedagogical content knowledge (TPACK) on EFL teaching in Saudi Arabian secondary schools*. The University of New England.

Alhajaji, B. H., Algmadi, J. S., & Metwally, A. A. (2020). Exploring the success of GMT technique: Games, mind-mapping, and Twitter hashtags in teaching vocabulary in EFL higher education environment. *International Journal of Higher Education*, *9*(3), 290–299. https://doi.org/10.5430/ijhe.v9n3p290

Alharbi, A. A. (2020). The degree of teaching knowledge for Saudi EFL teachers : An investigation for Madinah EFL teachers' perceptions regarding TPACK framework. *Canadian Center of Science and Education*, *13*(10), 99–110. https://doi.org/10.5539/elt.v13n10p99

Alharbi, A. A. M. (2020). The degree of teaching knowledge for Saudi EFL teachers: An Investigation for Madinah EFL teachers' perceptions regarding TPACK framework. *English Language Teaching*, *13*(10), 99–110. https://doi.org/10.5539/elt.v13n10p99

Almalki, A. (2020). Integration of technology among Saudi EFL teachers. *English Language Teaching*, *13*(8), 160. https://doi.org/10.5539/elt.v13n8p160

Alqahtani, M. (2015). The importance of vocabulary in language learning and how to be taught. *International Journal of Teaching and Education*, *III*(3), 21–34. https://doi.org/10.20472/te.2015.3.3.002

Alsaif, A. and Milton, J. (2012). Vocabulary input from school textbooks as a potential contributor to the small vocabulary uptake gained by English as a foreign language learners in Saudi Arabia. *The Language Learning Journal*, *1*(40), 21–33. https://doi.org/DOI: 10.1080/09571736.2012.658221

Alsaleem, B. (2013). The effect of "Whatsapp" electronic dialogue journaling on improving writing Vocabulary Word Choice and Voice of EFL Undergraduate Saudi Students. *Arab World English Journal*, *4*(3), 213–225.

Alsaleem, B. I. A. (2013). The effect of "Whatsapp" electronic dialogue journaling on improving writing vocabulary word choice and voice of EFL undergraduate Saudi students. *Arab World English Journal (AWEJ*, *4*(3), 213–225. www.awej.orgwww.awej.orgwww.awej.org

Alshammari, R. (2020). The current use of mobile devices among students and faculty in EFL teaching in a Saudi Arabian context. *TOJET: The Turkish Online Journal of Educational Technology*, *19*(2), 34–51.

Amin, E. A.-R. (2020). A review of research into Google Apps in the process of English language learning and teaching. *Arab World English Journal*, *11*(1), 399–418. https://doi.org/https://dx.doi.org/10.24093/awej/vol11no1.27

Ardıç, M. A. (2021). Three internal barriers to technology integration in education: Opinion, attitude and self-confidence. *International Journal of Education*, *9*(S1-May), 81–96. https://doi.org/10.34293/education.v9is1-may.4004

Asri, T. M., Irmawati, D. K., & Dewi, D. D. (2020). Investigating the Use of Internet Applications for Teaching at Higher Educational Level in the Indonesian Context. *Arab World English Journal*, *11*(2), 37–48. https://doi.org/https://dx.doi.org/10.24093/awej/vol11no2.3

Azhar, I. N. K., & Hashim, H. (2022). Level of ESL teachers' technological pedagogical content knowledge

(TPACK) skill and attitude towards technology. *Creative Education*, *13*(04), 1193–1210. https://doi.org/10.4236/ce.2022.134074

Bagheri, M. (2020). Validation of Iranian EFL teachers' technological pedagogical content knowledge (TPACK) scale. *Tesl-Ej*, *24*(2), 1–20.

Baser, D., Kopcha, T. J., & Ozden, M. Y. (2016). Developing a technological pedagogical content knowledge (TPACK) assessment for preservice teachers learning to teach English as a foreign language. *Computer Assisted Language Learning*, *26*(4), 749–764. https://doi.org/10.1080/09588221.2015.1047456

Bataineh, A. (2014). The effect of using website games on Saudi pupils' reading comprehension, vocabulary acquisition, and motivation. *Research on Humanities and Social Sciences*, *4*(11), 100–108. www.iiste.org

Cahyono, B. Y., Kurnianti, O. D., & Mutiaraningrum, I. (2016). Indonesian EFL teachers' application of TPACK in in-service education teaching practices. *International Journal of English Language Teaching*, *4*(5), 16–30. www.eajournals.org

Cox, S., & Graham, C. R. (2009). Diagramming TPACK in practice: Using an elaborated model of the tpack framework to analyze and depict teacher knowledge. *TechTrends*, *53*(5), 60–70. https://doi.org/https://doi.org/10.1007/s11528-009-0327-1

Drajati, N. A., Tan, L., Haryati, S., Rochsantiningsih, D., & Zainnuri, H. (2018). Investigating English language teachers in developing TPACK and multimodal literacy. In *Indonesian Journal of Applied Linguistics* (Vol. 7, Issue 3). https://doi.org/10.17509/ijal.v7i3.9806

Elyas, T., & Al-Bogami, B. (2019). (2019). The role of the iPad as instructional tool in optimizing young learners' achievement in EFL classes in the Saudi context. *Arab World English Journal: Special Issue: Application of Global ELT Practices in Saudi Arabia*, *1*, 145–163. https://doi.org/https://dx.doi.org/10.24093/awej/elt1.11

Ersanli, C. Y. (2016). Improving technological pedagogical content knowledge (TPACK) of preservice English language teachers. *International Education Studies*, *9*(5), 18–27. https://doi.org/10.5539/ies.v9n5p18

Fraenkel, J., & Wallen, N. (2009). Statistics in perspective. In *How to design and evaluate research in education*. McGraw-Hill.

Gao, L. X., & Zhang, L. J. (2020). Teacher learning in difficult times: Examining foreign language teachers' cognitions about online teaching to tide over COVID-19. *Frontiers in Psychology*, *11*, 1–14. https://doi.org/10.3389/fpsyg.2020.549653

Guerrero, S. (2011). Technological pedagogical content knowledge in the mathematics classroom. *Journal of Digital Learning in Teacher Education*, *26*(4), 132–139. https://doi.org/10.1080/10402454.2010.10784646

Gyamfi, G., & Sukseemuang, P. (2018). EFL learners' satisfaction with the online learning program, tell me more. *Turkish Online Journal of Distance Education*, *19*(1), 183–202. https://doi.org/10.17718/tojde.382798

Habbash, M. (2015). Learning English vocabulary using mobile phones: Saudi Arabian EFL teachers in focus. *European Scientific Journal*, *11*(35), 446–457.

Harris, J. B., & Hofer, M. J. (2011). Technological pedagogical content knowledge (TPACK) in action: A descriptive study of secondary teachers' curriculum-based, technology-related lnstructional planning. *Journal of Research on Technology in Education*, *43*(3), 211–229. https://doi.org/10.1080/15391523.2011.10782570

Harris, J., Mishra, P., & Koehler, M. (2009). Teachers' technological pedagogical content knowledge and learning activity types: Curriculum-based technology integration refrained. *Journal of Research on Technology in Education*, *41*(4), 393–416. https://doi.org/10.1080/15391523.2009.10782536

Hill, J. E., & Uribe-Florez, L. (2019). Understanding secondary school teachers' TPACK and technology implementation in mathematics classrooms. *International Journal of Technology in Education*, *3*(1), 1–13. https://doi.org/10.46328/ijte.v3i1.8

Inpeng, S., & Nomnian, S. (2020). The use of facebook in a TEFL program based on the TPACK framework. *LEARN Journal: Language Education and Acquisition Research Network*, *13*(2), 369–393.

Irwanto, I. (2021). Research trends in technological pedagogical content knowledge (TPACK): A systematic literature review from 2010 to 2021. *European Journal of Educational Research*, *10*(4), 2045–2054. https://doi.org/https://doi.org/10.12973/eu-jer.10.4.2045

Kabooha, R., & Elyas, T. (2018). The effects of YouTube in multimedia instruction for vocabulary learning: Perceptions of EFL students and teachers. *English Language Teaching*, *11*(2), 72–81. https://doi.org/10.5539/elt.v11n2p72

Kabooha, R., & Elyas, T. (2015). The impacts of using YouTube videos on learning vocabulary in Saudi EFL classrooms. *Proceedings of ICERI 2015*, *December 2016*, 3525–3531.

Kabooha, R. H. (2016). Using movies in EFL classrooms: A study conducted at the English language institute (ELI), King Abdul-Aziz University. *English Language Teaching*, *9*(3), 248.

https://doi.org/10.5539/elt.v9n3p248
Koehler, M. J., & Mishra, P. (2009a). What is technological pedagogical content knowledge (TPACK)? *Contemporary Issues in Technology and Teacher Education*, *9*(1), 60–70. https://doi.org/10.1177/002205741319300303
Koehler, M. J., & Mishra, P. (2009b). What is technological pedagogical content knowledge (TPACK)? *JContemporary Issues in Technology and Teacher Education*, *9*(1), 60–70. https://doi.org/10.1177/002205741319300303
Koehler, M. J., Mishra, P., Kereluik, K., Shin, T. S., & Graham, C. R. (2013). Handbook of research on educational communications and technology: Fourth edition. In E. Spector, M., Merrill, M.D., Elen, J. and Bishop, M.J. (Ed.), *Handbook of Research on Educational Communications and Technology: Fourth Edition* (pp. 101–111). Springer-Verlag, New York. https://doi.org/10.1007/978-1-4614-3185-5
Kozikoğlu, İ., & Babacan, N. (2019). The investigation of the relationship between Turkish EFL teachers' technological pedagogical content knowledge skills and attitudes towards technology. *Journal of Language and Linguistic Studies*, *15*(1), 20–33. https://doi.org/10.17263/jlls.547594
Kurt, G., Akyel, A., Koçoğlu, Z., & Mishra, P. (2014). TPACK in practice: A qualitative study on technology integrated lesson planning and implementation of Turkish preservice teachers of English. *ELT Research Journal*, *3*(3), 153–166.
Kwangsawad, T. (2016). Examining EFL preservice teachers' TPACK trough self-report, Lesson plans and actual practice. *Journal of Education and Learning*, *10*(2), 103–108. https://doi.org/10.11591/edulearn.v10i2.3575
Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teacher knowledge. *Teachers College Record*, *108*(6), 1017–1054.
Muhamad, N. A. B. (2014). Investigating the roles of motivation and technological pedagogical content knowledge (TPACK) in computer- mediated-communication (CMC) speaking skills instruction. *International Journal of Applied Linguistics and English Literature*, *3*(2), 112–130. https://doi.org/10.7575/aiac.ijalel.v.3n.2p.112
Nazari, N., Nafissi, Z., Estaji, M., Marandi, S. S., & Wang, S. (2019). Evaluating novice and experienced EFL teachers' perceived TPACK for their professional development. *Cogent Education*, *6*(1), 1–26. https://doi.org/10.1080/2331186X.2019.1632010
Oktalia, D., & Drajati, N. A. (2018). English teachers' perceptions of text to speech software and Google site in an EFL Classroom: What English teachers really think and know. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT)*, *14*(3), 183–192.
Paneru, D. R. (2018). Information communication technologies in teaching English as a foreign language: Analysing EFL teachers' TPACK in Czech elementary schools. *Center for Educational Policy Studies Journal*, *8*(3), 141–163. https://doi.org/10.26529/cepsj.499
Prasojo, L. D., Habibi, A., Mukminin, A., & Yaakob, M. F. M. (2020). Domains of technological pedagogical and content knowledge: Factor analysis of indonesian in-service EFL teachers. *International Journal of Instruction*, *13*(4), 593–608. https://doi.org/10.29333/iji.2020.13437a
Saeidi, M., & Mozaheb, M. A. (2012). Comparing vocabulary learning of EFL learners by using two different strategies (mobile learning vs. flashcards). *International Journal of Mobile Learning and Organisation*, *6*(3–4), 303–315. https://doi.org/10.1504/IJMLO.2012.050050
Schmitt, N. (2000). *Vocabulary in language teaching*. Cambridge University Press. https://doi.org/10.2307/3588334
Shulman, L. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, *15*(2), 4–14.
Tai, S.-J. D., & Chuang, H.-H. (2012). TPACK-in-action: An innovative model to help English teachers integrate CALL. *Proceedings of the 20th International Conference on Computers in Education, ICCE 2012, (Pp. 26-30).*, *December*, 26–30.
Tseng, J.-J. (2019). Do EFL teachers transform their teaching with iPads? a TPACK-SAMR approach. *Professional Development in CALL: A Selection of Papers*, *2019*, 71–85. https://doi.org/10.14705/rpnet.2019.28.871
Tseng, J.-J. (2014). Investigating EFL teachers' technological pedagogical content knowledge: Students' perceptions. *In S. Jager, L. Bradley, E. J. Meima, & S. Thouësny (Eds), CALL Design: Principles and Practice; Proceedings of the 2014 EUROCALL Conference, Groningen, The Netherlands (Pp. 379-384).*, 379–384. https://doi.org/10.14705/rpnet.2014.000249
Williams, H. (2010). Linguistics in language teaching. In *The Linguistic Structure of Modern English*. https://doi.org/10.1075/z.156.12lin
Willis, J. (2008). *How your child learns best: Brain-friendly strategies you can use to ignite your child's learning and increase school success* (Il. Source). Sourcebooks, Inc. http://books.google.com/books?hl=en&lr=&id=7CtupkYefFYC&pgis=1

Wu, Y. T., & Wang, A. Y. (2015). Technological, pedagogical, and content knowledge in teaching English as a foreign language: Representation of primary teachers of English in Taiwan. In *Asia-Pacific Education Researcher* (Vol. 24, Issue 3, pp. 525–533). https://doi.org/10.1007/s40299-015-0240-7