PASAA
Volume 62
July - December 2021

What Techno-effective Teachers Mean for Preservice Teachers of English: A Socio-Constructivist Study

Tuçe ÖZTÜRK KARATAŞ
Mersin University, Mersin, Turkey
ecut14@gmail.com

Hasan Çağlar BAŞOL
Selcuk University, Konya, Turkey
caglar.basol@selcuk.edu.tr

Abstract

In English language teacher education (ELTE), technological pedagogical content knowledge (TPACK) has gained popularity as it prepares preservice teachers of English for integration of technology, pedagogy, and content knowledge in language teaching. Thus, with the perspective of TPACK, the main objective of this qualitative study based on Kelly's personal construct theory was to clarify how three preservice teachers structured their constructs of techno-effective teachers. In so doing, this study uncovered three preservice teachers' personal theories including their beliefs, values, understandings, and assumptions of techno-effective teachers. To elicit the constructs and structures of preservice teachers' personal theories and elaborate more on these constructs, a cognitive mapping approach called the repertory grid and a follow-up interview were employed. The overall results showed that preservice teachers were good at conceptualizing each component of TPACK. However, content analysis of the constructs elicited from the

preservice teachers revealed that the preservice teachers had some difficulties in synthesizing their pedagogical content knowledge (PCK), technological content knowledge (TCK), and content knowledge (CK) to form an integrated conceptualization of TPACK. However, the structures of their personal theories showed that they were open to development if they were supported with integrated programs in language teacher education.

Keywords: technological pedagogical content knowledge (TPACK), English language teacher education, preservice teachers, technology integration

Introduction

In the 21st century, modern technologies have changed the knowledge bases of teachers. Therefore, integrating technological aspects of teaching practice into content and pedagogical knowledge has become a key focus (Niess, 2011). Thus, teachers must understand how to use technology for effective learning and teaching (Ertmer & Ottenbreit-leftwich, 2010).

At this point, technological pedagogical and content knowledge (TPACK), built on Shulman's (1986, 1987) pedagogical content knowledge (PCK) model, illustrates how teachers' understanding of educational technologies and PCK interact with each other to produce effective teaching with the successful integration of technology (Koehler & Mishra, 2009). TPACK, representing the integrated knowledge that teachers are expected to acquire in order to make effective use of technology in their teaching, is about understanding how technology can be related to pedagogy and content (Hughes, 2005; Keating & Evans, 2001; Lundeberg et al., 2003; Niess, 2005). Thus, the main objective of this qualitative study based on Kelly's personal construct theory was to clarify how three preservice teachers of English structured their constructs of qualities of techno-effective teachers with reference to TPACK. Driven by the notion that "personal theory development is recognized as being at the core of teacher learning"

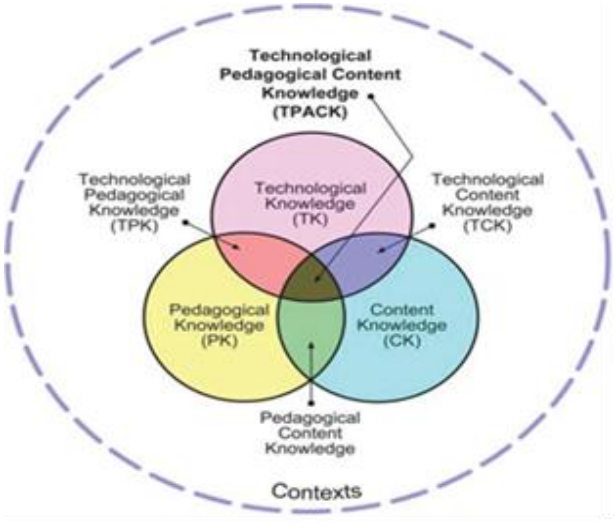
(Sendan & Robert, 1998, p. 231), this study attempted to ascertain preservice teachers' conceptions of what constituted technologically proficient teaching employing a repertory grid to minimize researcher bias.

Foundations of TPACK

Mishra and Koehler (2006) posit that there are three main domains of teacher knowledge: content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK). CK is knowledge of the subject matter and knowledge of concepts, theories, ideas, and approaches. PK is related to general classroom management skills, lesson planning, and understanding student learning and assessment. TK covers proficiency with standard technologies, such as published materials and whiteboards, as well as more advanced technologies such as the Internet, social media, multimedia, and digital learning environments (Mishra & Koehler, 2006; Harris et al., 2009; Koehler & Mishra, 2009). These domains are constantly interacting and integrating with one another, which results in technological content knowledge (TCK), pedagogical content knowledge (PCK), technological pedagogical knowledge (TPK), and TPACK (see Figure 1).

Figure 1

TPACK Framework (Mishra & Koehler, 2009, p. 63)



TCK involves domains shaping and binding technology and content to one another (Mishra & Koehler, 2009). PCK includes core issues of teaching, learning, curriculum, and assessment (Mishra & Koehler, 2006; Harris et al., 2009). TPK is "an understanding of how teaching and learning change when particular technologies are used" (Harris et al., 2009, p. 398). In other words, it comprises using appropriate technological tools for specific pedagogical purposes.

Theoretically, the TPACK model aims to identify seven distinct constructs related to delivering content knowledge in a technologically effective way. However, this conception has been criticized by several scholars. For instance, Graham (2011) asserts that the surface-level parsimony of TPACK does not reflect its complexity because the definition of each construct and the articulation of the relationship between them are not clear enough to highlight this complexity. Moreover, Archambault and Barnett (2010), in a three-factor design where PCK, TCK, and TK form the framework, posit that TK emerges as the only construct distinguishing itself as an apparent domain. In other words, while TK is the only core domain that distinguishes itself, PK and CK are not distinguishable from TPACK, and are instead integrated with each other and TK. Indeed, the suggestion of an intrinsic link between PK and CK is well established in the literature although some studies claim that there is an independent emergence of CK from PK and PCK, primarily in the context of English language teacher education programs where CK and PK are not integrated (Bostancıoğlu & Handley, 2018). Additionally, TK arises as an independent factor because some teacher-education programs might highlight technology with little consideration of its pedagogically oriented use (Bostancıoğlu & Handley, 2018; Turgut, 2017a; Öz, 2015).

In a similar vein, much current TPACK literature discusses whether its core constructs are CK, TK, and PK; or TPK, TCK, and PCK. One study (Pamuk et al., 2015) argues that TPACK is the combination of TPK, TCK, and PCK, that TPK and TCK is the key to explaining TPACK, and that TPK is the most challenging area (Valtonen et al., 2020). Thus, TPK, TCK, or both, may be the most critical components of TPACK since they project either pedagogically accepted integration

of technology into teaching or integration of technology and content. This position is supported by the assertion that TK for various purposes is not readily available for transfer into teaching (Keating & Evans, 2001; Turgut, 2017b) and that commonplace familiarization with technology, such as daily use of the Internet, does not have a significant effect on TPACK alone (Atar et al., 2019). Therefore, it has been asserted that TPK (Figg & Jaipal, 2009), rather than TK, is the core of TPACK augmented by the fundamental constructs of PCK and TK (Archambault & Barnett, 2010).

There are also other perspectives suggesting that PCK is at the core of TPACK (Graham, 2011) and that consequently priority should be given to its acquisition which would be supported by authentic teaching experience (Pamuk, 2012). PK is still advocated as the principal predictor even for the preliminary proposition defining CK, TK, and PK as the core of TPACK. This is because technology integration is also a pedagogical practice (Chai et al., 2010; Valtonen et al., 2020), and teachers with high TK might not integrate technology and pedagogy without a high level of PK (Pierson, 2001). A lower PK also explains why inexperienced teachers might find it challenging to connect content, pedagogy, and technology (Niess et al., 2016).

After an extensive review of perspectives and discussions in current TPACK literature, this study came to define TPACK as a complex interaction among TPK, TCK, and PCK and posited that TPACK is crucial for effective teaching through technology. Nevertheless, this study accepted that TPACK can take many forms in practice depending on the context.

Studies on TPACK

In addition to theoretical papers on TPACK, there are studies on its functional domains, and TPACK has been investigated and implemented in various disciplines, including the teaching of science and mathematics. However, investigations of TPACK in the field of language teaching and language teacher education are minimal (Ersanlı, 2016). Of those that have taken place, some concentrated on the development of TPACK and its assessment using surveys,

interviews, and observations (Abera, 2014; Atar et al., 2019; Baser et al., 2016; Bostancıoğlu & Handley, 2018; Elas et al., 2019; Öz, 2015; Habibi et al., 2019; Sarıçoban et al., 2019), while others aimed to understand how preservice teachers developed TPACK before, during, and after the implementation of the specific information and communications technology (ICT) programs or initiatives by utilizing various data collection tools (Nordin et al., 2013; Ersanli, 2016; Turgut, 2017c). In addition, a number of researchers focused on the entire teacher training program in which they took ICT courses, or technology and material development courses, as part of a curriculum (Özdemir, 2016), while some dealt with the development of valid and reliable measurement tools based on TPACK (Baser et al., 2016; Solak & Çakır, 2014). However, studies on how preservice teachers perceived TPACK have revealed that they were "generally not equipped with TPACK due to the lack of experience in school" (Kasim & Singh, 2017, p. 438). Since TPACK is contextualized (Koehler & Mishra, 2008; Porras-Hernández & Salinas-Amescua, 2013; Rosenberg & Koehler, 2015), "more research is needed to ascertain the nature of TPACK by looking at what sub-domains are truly in practice and how they interact with the context" (Tseng et al., 2019, p.172).

In the literature, TPACK of preservice teachers were evaluated with Likert-type assessment scales; however, they have been criticized for not reflecting the actual complexity of the salient surface level structure of TPACK (Graham, 2011). Thus, although preservice teachers might reflect a high level of TPACK, their conceptualization of the area might mostly refer to TK, missing TPK. Moreover, quantitative results might be misleading (Turgut, 2017b). Therefore, in order to appreciate the nature of TPACK in the Turkish context, this qualitative study focused on how three preservice teachers structured their constructs of what constituted techno-effective teachers and their personal understanding of TPACK.

Method

Research Design

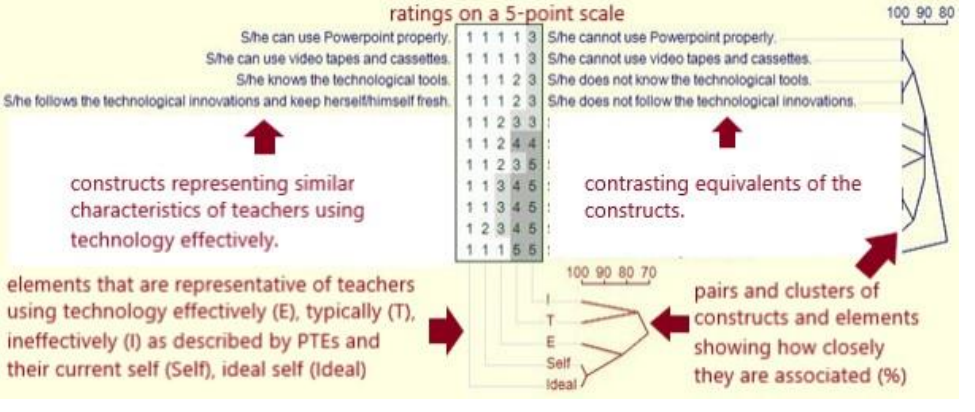
The present qualitative study employed the repertory grid technique (RepGrid), based on Kelly's personal construct theory (1955), as the primary data elicitation technique. This technique contained three major components: elements, constructs, and links (associations) as shown in Figure 2 below.

The RepGrid form (see Appendix) included five elements. Three of these elements represented a language teacher using technology *effectively* (E), *typically* (T) and *ineffectively* (I). Two other elements represented preservice teachers' *self-evaluation* (Self) and perception of their *ideal self* in terms of using technology effectively. Additionally, the form included a 5-point scale in which the preservice teachers rated themselves ranging from "1" to "5."

FOCUS-ed grid data analysis was used to present the content and structure of the preservice teachers' conceptions or personal theories of the qualities technologically proficient teachers (techno-effective teachers) would possess. In the FOCUS-ed grid analysis, constructs, elements, links among constructs, and relationships between elements in the personal theory of each preservice teacher were represented by a separate "tree" as can be observed in Figure 2.

Figure 2

An Example of FOCUS-ed Grid Analysis



Objectives of the Study

This study's main objective was to understand the personal conceptions or theories of three preservice teachers on how language teachers could use technology effectively as follows:

1. To determine the nature of each preservice teacher's construction of techno-effective teachers in the structure and the content of their personal theories.
2. To investigate the nature of each preservice teacher's construction of "current self" and "ideal self" as a techno-effective teacher in their personal theories.
3. To explore the preservice teachers' perceptions of techno-effective teachers in terms of TPACK.

Participants

Three senior preservice teachers studying at the English Language Teaching Department at one of the state universities in Turkey took part in this study. Their ages ranged from 20 to 26. They were all female.

None of the preservice teachers had any professional teaching experience. However, considering their competency level in terms of the use of digital tools such as computers, laptops, iPods, and interactive whiteboards, they defined themselves as competent. The preservice teachers reported that they had more than four hours of computer access per day.

Data Elicitation and Analysis

Data elicitation was conducted through separate meetings with each preservice teacher. To elicit how preservice teachers conceptualized techno-effective teachers, samples of teachers using technology *effectively (E), typically* (T), and lastly *ineffectively* (I), were shown to the participants. The participants were asked to think of one teacher each that they considered to be techno-effective. Later, during the elicitation process, the participants freely wrote their constructs of the similar and contrasting features of these teachers. These were defined as the features of techno-effective teachers, and their

"contrasting" equivalents. Then the three participants rated these features from "1" to "5," with "1" representing the closest fit to the "similarity" pole, "3" indicating the midpoint, and "5" reflecting the closest point to the "contrast" pole. Once they rated their "E," "T," and "I" teachers, they rated their "Self" and "Ideal" elements regarding each construct that they identified. Later, they defined the top five constructs of those elements in rank order according to their perceptions of the relative importance of the features of techno-effective teachers.

Then, Rep5, which is a computer program for processing FOCUS-ed grid analysis, was used to analyze the RepGrids. The results of the FOCUS-ed grid analysis showed the hierarchical structure of personal theories that were organized as "pairs," "clusters," and "isolated" items in trees. Pairs and clusters represented relationships between the constructs in personal theories, while isolated constructs demonstrated that the participants had not yet made up their minds to link these constructs with others in their cognition. Then, a follow-up interview was carried out with each participant to validate and expand the results. Finally, the researchers evaluated the content of the participants' constructs regarding TPACK through content analysis.

Results

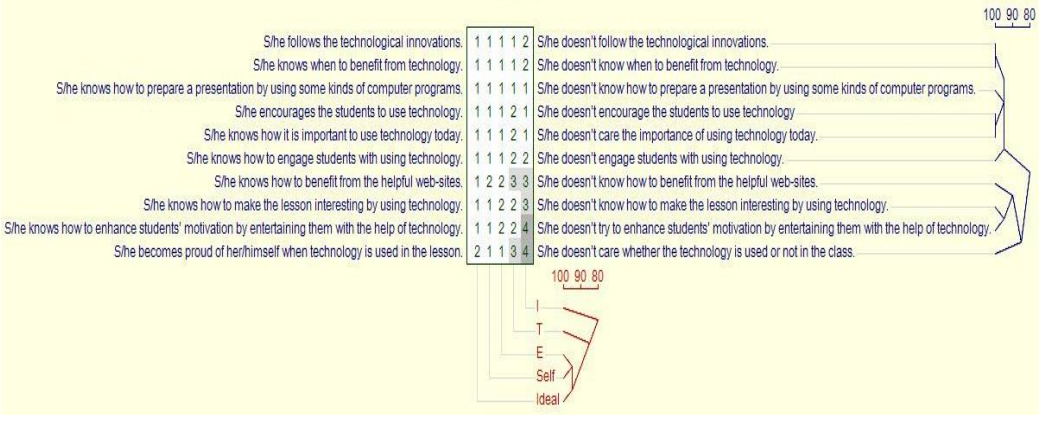
Structure of the Grids

Participant 1

The FOCUS-ed grid of Participant 1 consisted of ten constructs and five elements. As shown in Figure 3, the construct and element trees were drawn at an 80% cut-off point.

Figure 3

FOCUS-ed Grid Analysis of Participant 1



Note: Rank (priority) order was not given in the FOCUS-ed grid figures. Constructs appeared in order according to their initial position in the list. I = ineffectively; T = typically; E = effectively; Self = self-evaluation; Ideal = ideal self.

The FOCUS-ed grid of Participant 1 revealed two clusters and two isolated constructs in defining the qualities of a language teacher using technology effectively. In the first cluster, the construct with the highest priority in the rank order, "s/he follows technological innovations" and the construct "s/he knows when to benefit from technology" constituted a pair at 100 percent match level. Furthermore, there were two other tightly matched constructs; the fourth-highest priority-construct "s/he encourages students to use technology" and the second-highest priority-construct "s/he knows how it is important to use technology today" formed a pair at 100 percent level. These two constructs were associated with "s/he knows how to prepare a presentation by using some kinds of computer programs" at a 95 percent match level. In a more in-depth analysis of the FOCUS-ed grid, it was clear that Participant 1 was highly confident about her perspective. In the follow-up interview, she supported her position, stating that "the language teacher using technology effectively must know how to utilize technology, technological tools, and technological innovations to use this knowledge for effective language

teaching." She added that these features were among the necessary prerequisites for a language teacher to be able to use technology effectively in the teaching of English.

In the second cluster, the third-highest priority-construct, "s/he knows how to make lessons interesting by using technology" and the construct "s/he knows how to enhance students' motivation by entertaining them with the help of technology" constituted a pair at almost a 100 percent match level. These two constructs also coincided with the fifth-highest priority-construct "s/he knows how to benefit from helpful websites" at a match level of 90 percent. The participant clarified the association, explaining that "technological tools can be used to make the lesson interesting, so a language teacher must know how to benefit from it to motivate students."

Two isolated constructs, "s/he knows how to engage students with technology" and "s/he becomes proud of her/himself when technology is used in the lesson," were new in her conceptualization since they were not associated with other constructs.

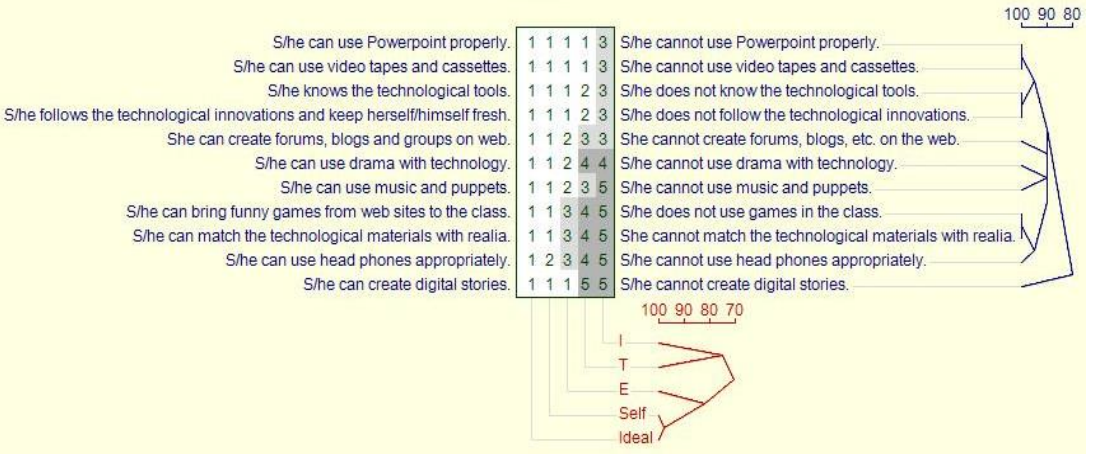
In addition to the links between the constructs, Figure 3 highlights the structure of elements (effective, typical, and ineffective teachers) and the nature of Participant 1's construction of "current self" and "ideal self" in her personal theories. As observed from her element relationships, she saw herself between effective and ideal and associated herself with the language teacher using technology effectively at around 95 percent. Moreover, she believed that she was an effective model.

Participant 2

Participant 2's grid consisted of 11 constructs and five elements. Her FOCUS-ed grid data in Figure 4 revealed the construct tree at an 80 percent and the element tree drawn at a 70 percent cut-off point.

Figure 4

FOCUS-ed Grid Analysis of Participant 2



In Figure 4, there were two construct clusters, one pair, and two isolated constructs. There were two pairs associated with each other within the first cluster at a 95 percent match level. The construct, namely, "s/he can use PowerPoint properly" and the construct "s/he can use videotapes and cassettes" formed the pair of a cluster matching at 100 percent.

The highest priority-construct, "s/he knows technological tools" and the second-highest priority-construct, "s/he follows technological innovations and keeps herself/himself fresh" were linked at a 100% match level and constituted the other pair of the first cluster. When clarifying this organization, Participant 2 stated that a language teacher using technology effectively needed to know how to use different technological tools by following technological innovations.

Moreover, the fourth-highest priority-construct, "s/he can use drama with technology" coincided with the fifth-highest priority-construct, "s/he can use music and puppets," at a 90 percent match level by forming a pair in her thinking system. Additionally, in the second cluster, the construct of "s/he can bring funny games from websites to the class" and the third-highest priority construct, "s/he can match technological materials with realia" formed a pair at a 100 percent match level associated with the construct, "s/he can use

headphones appropriately.*"* Participant 2 explained this association in the interview, stating "becoming a language teacher using technology effectively requires the utilization of the tools which show the reality and provide inductive learning."

As shown in Figure 4, the constructs of "s/he can create online forums, blogs and groups" and "s/he can create digital stories" were isolated. It meant Participant 2 could not associate these constructs with any other constructs. This suggested that she had not yet made up her mind in terms of those qualities of language teachers that used technology effectively. In her interview, she accepted that both constructs were new in her conceptualization and she was not sure about how to create forums, blogs, or groups on the Internet or how to create digital stories.

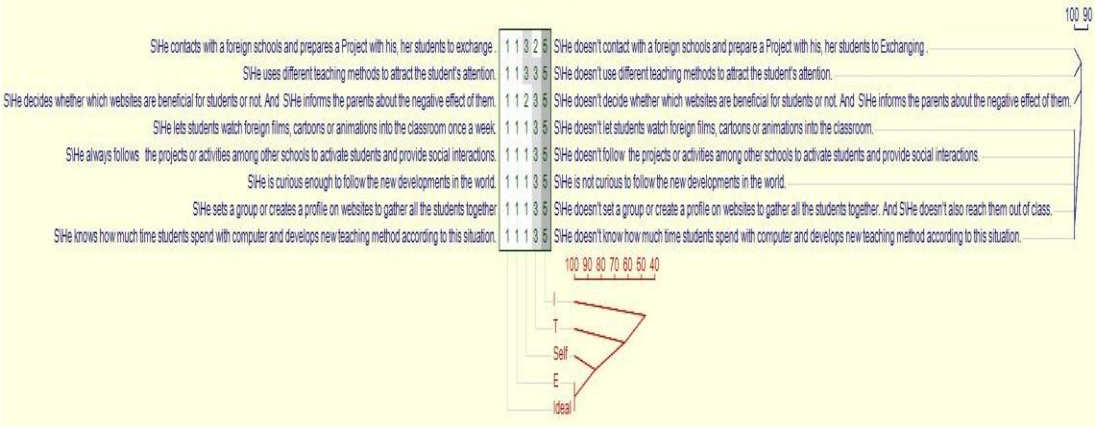
Regarding the element links, there were two pairs and one isolated item. Participant 2 matched the typical and ineffective teachers by forming a pair at almost 75 percent level. Moreover, she placed her current self and ideal self in a pair almost at 100 percent match level. These elements were also associated with the effective teacher at 80 percent match levels. This indicated that she placed herself very close to her ideal language teacher.

Participant 3

Participant 3's FOCUS-ed grid given in Figure 5 included eight constructs and five elements, with the construct tree at a 90 percent and the element tree at a 40 percent cut-off point.

Figure 5

FOCUS-ed Grid Analysis of Participant 3



There was one cluster, one pair, and one isolated construct. The second-highest priority-construct, "s/he contacts foreign schools and prepares an exchange program" and the fifth-highest priority-construct, "s/he uses various teaching methods to attract students' attention" closely matched by constituting a pair at a 95 percent match level. In the follow-up interview, Participant 3 rationalized her view, stating that "a language teacher using technology effectively can attract the students' attention through technology." She elaborated that when she was a student, one of her teachers led them to carry out some projects that focused on communication through the Internet. She added that such kinds of methods enabled the students to concentrate on language more effectively.

In the cluster, the first-highest priority-construct, "s\he is curious enough to follow new developments in the world;" the third-highest priority-construct, "s/he always follows projects or activities with other schools to motivate students and provide social interactions;" the fourth-highest priority-construct, "s\he sets up a group or creates a profile on websites to gather all students together;" and the constructs of "s/he lets students watch foreign films, cartoons, or animations in the classroom once a week," and "s/he knows how much time students spend on computers and develops new teaching

methods according to this situation" were tightly matched at 100 percent match level. Thus, it could be inferred that Participant 3 was highly confident about her perspective and was not open to development. She supported this organization of constructs, stating that "a language teacher using technology effectively should follow technological innovations and have the ability to use different technological tools in the classroom."

Additionally, the construct of "s/he decides which websites are beneficial for students or not and informs parents about them" was placed in isolation, which indicated that Participant 3 had not established an association between these and the other features. In her follow-up interview, she explained that this isolated construct was new to her even though she had learned about the roles of teachers and technology in education before.

Content of the Grids

Regarding the TPACK framework, how these preservice teacher participants perceived technologically effective language teachers was another concern of this study. Figure 6 shows the categorization of the content of the participants' concretely observed constructs.

Figure 6

Observed Construct Categorization in Content Analysis

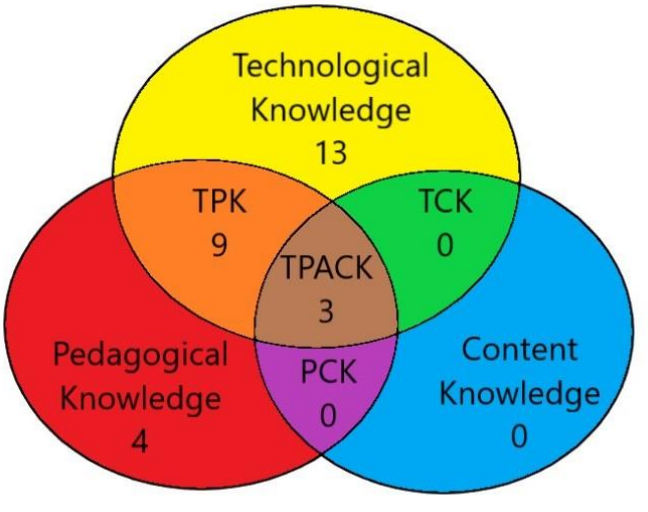


Figure 6 shows that the constructs were grouped into four main themes: TK, TPK, PK, and TPACK. The majority of the constructs were associated with TK (13 constructs), which was followed by TPK (9 constructs), PK (four constructs), and TPACK (three constructs), respectively. None of the constructs could be related to PCK, TCK, and CK. "S/he follows technological innovations," "s/he knows technological tools," and "s\he is curious enough to follow new developments in the world" were the first constructs in the rank order provided by Participants 1, 2, and 3, respectively, and all of them represented TK. In addition, the constructs "s/he knows how to make lessons interesting by using technology," "s/he can match technological materials with realia," and "s\he sets up groups or creates profiles on websites to gather all students together" were among the ones associated with TPK.

Participant 1 did not provide any construct of PK, while Participant 2 and Participant 3 had some PK constructs. Some samples for PK were "s/he can use music and puppets" and "s/he always follows projects or activities with other schools to motivate students and provide social interactions." In addition, the constructs of "s/he knows how to benefit from helpful websites," "s/he contacts foreign schools and prepares an exchange program," and "s/he decides which websites are beneficial for students, and s/he informs parents about them" were coded as TPACK.

This suggested that what dominated their personal conceptions, theories, and understandings of TPACK were the constructs related to TK and TPK.

Discussion

This study focused on revealing the personal conceptions or theories of three preservice teachers on what made teachers technologically effective with reference to TPACK. The nature of the repertory grid analysis, which was employed in this study, allowed the researchers to elicit participants' perceptions with minimal interference or bias. Naturally, the repertory grid analysis provided rich data about the actual perceptions of the participants eliciting how they

experienced the knowledge base of TPACK. Since only three preservice teachers participated in this study, our results cannot be generalized. However, this study portrayed a fragment of how the participants might be experiencing information and communications technology integration in English language teacher education programs in Turkey to contribute to their TPACK.

In order for language teachers to use technology effectively, they must integrate the technology into pedagogical and content knowledge and vice versa. Therefore, a techno-effective teacher needs to be equipped with TPK, TCK, and PCK. Any qualitative analysis of TPACK should identify whether preservice teachers conceptualized knowledge and skills as related to the core components of the TPACK framework, which were identified in this study as TPK, TCK, and PCK. When the results of this study were analyzed holistically, it was found that the participants had varied conceptions of the traits of "techno-effective" teachers. These qualities were well-structured, with several pairs of clusters with a significance level of approximately 80 percent, despite occasional isolated ideas.

The overall constructs elicited showed that the participants had clear ideas on what they considered the components of TPACK. However, content analysis of their constructs uncovered difficulties in connecting their PCK, TCK, and CK to form an ultimate conceptualization of TPACK.

Most of the constructs elicited were in the area of TK (13 constructs), which was followed by TPK (nine constructs), PK (four constructs), and TPACK (three constructs), respectively. When content analysis and FOCUS-ed grid data analysis of the constructs were considered together, it became apparent that TPACK was still a developing concept for the participants. However, the participants were confident about the relations between some constructs that matched at a very high level of cut-off point. In other words, they had already determined the qualities of techno-effective teachers without highlighting any integration between TK and CK as TCK or PK and CK as PCK. In their constructs, TK and TPK dominated their personal theories and understandings of TPACK. These results showed that the

three participants positioned TK at the top of techno-effectiveness with a technocentric approach. They focused less on PK on the development of TPACK, which was contrary to the literature pointing out that PK has a more significant impact on the development of TPACK (Chai, Koh & Tsai, 2010). The participants perceived only loose connections between technology and content, and they also had difficulties connecting content with pedagogy when defining the qualities of techno-effective teachers. One reason for this might be that PK and CK may not be well integrated into their teacher education programs (Bostancıoğlu & Handley, 2018). Although the English language teacher education curriculum in Turkey is supposed to integrate general education courses and content courses along with world knowledge courses (YÖK, 2018a; 2018b), the actual application of the curriculum might not reflect this as how participants conceptualized techno-effective teachers did not suggest any integration of PK and CK. What is more, the technological tools elicited suggested limited TK. This result complied with the findings of Turgut (2017c) suggesting that participants might perceive "technology integration as technological devices rather than transforming teaching and learning" (p.13).

When the participants put their constructs into priority rank order to represent the similarities between their models of teachers using technology, TK and TPK were emphasized. The exception was Participant 3 who focused on TPACK as a priority, which may be an unconscious choice, since the related construct was isolated in the FOCUS-ed grid data. Participant 3 stated that it was a new term in her repertoire. Then, how did they manage to mention certain constructs in TPK and TPACK when they had a minimal number of constructs in PK, and no constructs in CK and PCK? The answer may manifest itself in the analysis of those areas. For instance, the constructs under TPACK were quite vague when they were analyzed in detail: Participant 1 claimed that techno-effective teachers knew how to benefit from helpful websites. The construct was naturally supposed to reflect TPACK since a teacher needed to understand and use various websites first (TK), to judge whether the content of the website was appropriate for the content of the course (CK), and to use this tool in a pedagogically

acceptable way so that it would benefit students (TPK). However, the conceptualization of Participant 1 on this item was limited, and she was unable to fully explain what she meant by "helpful websites" and what kind of actions of the teacher would prove that s/he appropriately benefited from these websites. Therefore, although the construct might be considered to reflect TPACK, its development remained incomplete. Hence, Participant 1 may have either mentioned it by chance or because she had heard about it in a course or from some other source, but she was not sure what helpful websites were and how to decide whether teachers successfully used those websites in their teaching. This phenomenon may suggest that their teacher training courses did not integrate pedagogy and content well enough to cultivate TPACK, or that the participants did not have any hands-on experience integrating technology, content, and pedagogy (Baran & Uygun, 2016). It is also possible that a disconnect exists between theory and practice in teacher training, teaching, managing learning processes, and designing learning environments (Kartal & Başol, 2019), which might hinder the integration of various domains of TPACK in the minds of preservice teachers.

Participant 1 seemed to connect the "benefiting" action with following technological innovations at a 100 percent match level, which was later connected to the actions of "preparing presentations" through some computer programs, appreciating the importance of using technology in the classroom and encouraging students to use technology. These connections did not fully provide concrete examples of, for instance, how teachers could integrate technology while delivering a specific piece of content knowledge with a specific teaching method, or with a specific approach to teaching and learning. The participant explained that "the language teacher using technology effectively must know how to utilize technology, technological tools, and technological innovations to use this knowledge for effective language teaching" to reflect a techno-centric approach for the use of technology. However, there were no key terms referred to such as integration, re-evaluation, or reconsideration. Moreover, no

differentiation was made between technological innovations and the tools for pedagogically accepted forms of delivery by this participant.

A similar phenomenon may be observed with Participant 3's first construct (s/he contacts foreign schools and prepares exchange programs) and her third construct (s/he decides which websites are beneficial for students, and s/he informs parents about them). Organizing a student exchange project through connections with foreign schools required a certain knowledge of technology that should be integrated into content knowledge and pedagogically accepted forms of application and delivery of this knowledge. In a similar vein, judging the appropriateness and usefulness of websites required knowledge of content relevance and pedagogy. Interview analysis also reflected the lack of such a concrete perspective in those skills. For instance, when asked to expand her ideas on the connection between her first and second constructs (s/he uses various teaching methods to attract students' attention), Participant 3 struggled to rationalize the connection between the two. She stated that techno-effective language teachers could attract students' attention through technology first, and then she jumped in with an example of how one of her teachers carried out a project in which they were communicating with students from other parts of the world. It supported the argument that preservice teachers tended to favor technology as modeled by their teacher trainers (Korkut, 2016), and this modeling affected their TPACK perception and attitude towards information and communications technology (Baran et al., 2019; Turgut, 2017a). Participant 3's argument was completed with a generalization that such methods could make students concentrate on language.

Another interesting finding was related to how the participants perceived themselves as techno-effective language teachers. Participant 1 associated herself with the *effective* teacher model at around a 95 percent cut-off point and connected this position with the *ideal self* at around the same significant cut-off point. Nevertheless, the nature of these constructs, their rank order, and interview with Participant 1 demonstrated that this association between effective and current self might be based on a techno-centric perspective, suggesting

that having appropriate TK was sufficient to be considered techno-effective. First, only one construct of Participant 1 could be defined in the area of TPACK, which was not elaborated on. Secondly, although TPK constituted the majority of the constructs elicited from Participant 1, she prioritized TK in the rank order. Finally, she explained the association not with TPK, or TPACK, but by a super techno-centric perspective, claiming that being among a generation raised with technology might be the only reason that she associated herself with an effective model of teaching. Such a perception may reflect the fact that the current generation of preservice teachers might consider themselves self-efficient at integrating technology not based on TPACK but based on their rich knowledge of technology (Nazari et al., 2019; Turgut, 2017b).

Participant 2 also portrayed a similar perspective between effective and ideal; however, the way she associated herself with the ideal model was different from that of Participant 1. Participant 2 constructed a pair with the ideal model at a 95 percent cut-off point, which could be interpreted as her perceiving her qualities as more similar to that of the ideal model than to the effective model. What is more, the rank order of Participant 2 also prioritized TK, although she provided concrete examples of how technology could be used in pedagogically acceptable ways. Therefore, Participant 2 only mentioned very typical examples of using technology in the classroom as criteria for being an effective teacher although she was quite clear that the ideal model should have more than those skills. However, this idea was not very clear in the mind of the preservice teacher as demonstrated by isolated constructs such as “creating digital stories” and “creating forums, blogs, and groups on the web.” It may be assumed that this was because either the content of the teacher education program in which she was enrolled did not integrate TPACK into its curriculum, or the teacher educators in the program did not act as role models of techno-effective language teachers.

Participant 3, on the other hand, positioned herself in between typical and effective, while her association of effective and ideal self matched at a 100 percent cut-off point. She associated herself with this

model at an 85 percent cut-off point. Her FOCUS-ed grid revealed tightly matched constructs, implying her certainty about the qualities of techno-effective teachers despite some isolated constructs. This meant she was quite sure about the essential qualities of an ideal model. Additionally, many of her constructs were based on PK, which was followed by TPACK, TPK, and TK. Although her elaboration of TPACK was limited, the effective teachers that Participant 3 idealized were effective role models from real life who employed TPACK through her first construct (contacting foreign school and preparing exchange programs). Furthermore, the rank order of Participant 3, although based on TK as the very first item, prioritized TPACK and PK even though she could not elaborate on the components of those items.

Overall, all three preservice teachers who participated in this study either perceived themselves as currently effective, which was connected to a quite close ideal model, or they already associated themselves with the ideal model, far better than a merely effective teacher. They also tightly matched the effective and the ideal model while acknowledging themselves as between a typical and effective model.

Conclusion and Implications

This study through repertory grid analysis provided qualitative data on how the participants conceptualized the practices of technologically effective teachers; however, the results cannot be generalized due to relying on responses from only three participants. Also, the results were difficult to classify within the TPACK framework due to its hazy boundaries (Valtonen et al., 2020). Nevertheless, this study elicited the personal conceptions or theories of three preservice teachers on three issues: the nature of each preservice teacher's construction of techno-effective teachers, the nature of each preservice teacher's construction of "current self" and "ideal self" as a techno-effective teacher, and how the preservice teachers' perceptions related to the TPACK framework. All three preservice teachers generally perceived TK as a defining attribute of techno-effective teachers, even though this conflicted with previous studies that claim PK and CK as

the core components of TPACK (Chai et al., 2010). They did not have a fully developed concept map in their minds about the qualities of effective teachers in terms of TPACK and usually associated them with a distant ideal model which they struggled to describe, their limited conceptions of TPACK and lack of professional teaching experience made their TPACK cognition tightly structured, and this might hinder their further development in TPACK. Finally, the preservice teacher participants' conceptualizations of the constructs were generally based on the models of their teachers, and due to their lack of teaching experience, they frequently failed to associate some components of their constructs or elaborate them.

Equipping preservice teachers with TPACK is a challenging task. As in this case, the participants might not have sufficient knowledge to use technology to successfully support teaching and learning in a particular L2 context. Due to the COVID-19 pandemic, virtual and distance learning environments and programs have been utilized more than ever to minimize disruption of learning and sustain education (Karataş & Tuncer, 2020). With the increasing reliance on online meetings, webinars, and online courses in English language teacher education, TPACK has become a critical concept not only for preservice teachers but also for teachers and teacher-trainers. This study has suggested that in order to develop TPACK in preservice teachers, appropriate and effective integration of information and communications technology into English language teacher education curricula and programs is needed (Öz, 2015; Li & Xia, 2016; Ersanlı, 2016), with the quality and variety of technology integration practices (Kay, 2006) taken into careful consideration. In order to address this need, the content of the English language teacher education programs should be updated to include effective courses that identify and use technology both for presenting contents and for achieving desired learning outcomes. Integrating courses or developing programs with design-based perspectives and fieldwork or practical teaching with technology are possible pathways to improve TPACK (Baran & Uygun, 2016; Baran et al., 2019; Gill & Dalgarno, 2017; Kurt, 2010; Kurt et al., 2013; Turgut, 2017c; Ersanlı, 2016). Future studies in the field

might employ other methods to retrieve rich data from a larger group of preservice teachers to elicit their perceptions of TPACK and the qualities of a teacher who is able to use technology effectively. Such studies could reveal how best to integrate information and communications technology into existing English language teacher education programs to improve TPACK of preservice teachers.

About the Authors

Tuçe Öztürk Karataş holds a Ph.D. in English Language Teaching from Çukurova University and has been teaching at an undergraduate level in the ELT Department at Mersin University. Her research explores language assessment and testing, distance education, foreign language teaching/learning, and teacher education. http://orcid.org/0000-0002-3844-3574

Hasan Çağlar Basol has a PhD in English Language Teaching and an MA in English Language and Literature. He is a faculty member at Selcuk University Department of English Language and Literature. https://orcid.org/0000-0003-0251-3232

References

Abera, B. (2014). Applying a technological pedagogical content knowledge framework in Ethiopian English language teacher education. In T. Issa, P. Isaías, & P. Kommers (Eds.), *Multicultural awareness and technology in higher education: global perspectives*. (pp. 286–301). IGI Global.

Archambault, L. M., & Barnett, J. H. (2010). Revisiting technological pedagogical content knowledge: Exploring the TPACK framework. *Computers & Education*, *55*(4), 1656–1662. https://doi.org/10.1016/j.compedu.2010.07.009

Atar, C., Aydın, S., & Bağcı, H. (2019). An investigation of preservice English teachers' level of techno pedagogical content knowledge. *Journal of Language and Linguistic Studies*, *15*(3), 794–805. https://doi.org/10.17263/jlls.631517

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*, 29(4), 749–764. https://doi.org/10.1080/09588221.2015.1047456

Baran, E., & Uygun, E. (2016). Putting technological, pedagogical, and content knowledge (TPACK) in action: An integrated TPACK-design-based learning (DBL) approach. *Australasian Journal of Educational Technology, 32* (2), 47–63. https://doi.org/10.14742/ajet.2551

Baran, E., Canbazoglu Bilici, S., Albayrak Sari, A., & Tondeur, J. (2019). Investigating the impact of teacher education strategies on preservice teachers' TPACK. *British Journal of Educational Technology 50* (1), 357–370. https://doi.org/10.1111/bjet.12565

Bostancıoğlu, A., & Handley, Z. (2018). Developing and validating a questionnaire for evaluating the EFL 'Total PACKage': Technological pedagogical content knowledge (TPACK) for English as a foreign language (EFL). *Computer Assisted Language Learning*, *31*(5-6), 572–598. https://doi.org/10.1080/09588221.2017.1422524

Chai, C. S., Koh, J. H. L., & Tsai, C.-C. (2010). Facilitating preservice teachers' development of technological, pedagogical, and content knowledge (TPACK). *Educational Technology & Society*, *13* (4), 63–73. Retrieved from https://www.jstor.org/stable/10.2307/jeductechsoci.13.4.63

Elas, N. I. B., Majid, F. B. A., & Suthagar, A. (2019). Development of technological pedagogical content knowledge (TPACK) for English teachers: The validity and reliability. *International Journal of Emerging Technologies in Learning (iJET)*, *14*(20), 18–33. https://doi.org/10.3991/IJET.V14I20.11456

Ersanlı, C. Y. (2016). Improving technological pedagogical content knowledge (TPACK) of pre-service English language teachers.

International Education Studies, *9*(5), 18–27. http://dx.doi.org/10.5539/ies.v9n5p18

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of research on Technology in Education*, *42*(3), 255–284. https://doi.org/10.1080/15391523.2010.10782551

Figg, C., & Jaipal, K. (2009). Unpacking TPACK: TPK characteristics supporting successful implementation. In I. Gibson, R. Weber, K. McFerrin, R. Carlsen, & D. A. Willis (Eds.), *Proceedings of Society for Information Technology Teacher Education International Conference 2009* (pp. 4069–4073). Chesapeake, VA: AACE. Retrieved from https://www.learntechlib.org/primary/p/31295/

Habibi, A., Yusop, F. D., & Razak, R. A. (2019). The role of TPACK in affecting preservice language teachers' ICT integration during teaching practices: Indonesian context. *Education and Information Technologies*, 1–21. https://doi.org/10.1007/s10639-019-10040-2

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

Hughes, J. (2005). The role of teacher knowledge and learning experiences in forming technology-integrated pedagogy. *Journal of technology and teacher education*, *13*(2), 277–302. Retrieved from https://www.learntechlib.org/primary/p/26105/

Gill, L., & Dalgarno, B. (2017). A qualitative analysis of preservice primary school teachers' TPACK development over the four years of their teacher preparation programme. *Technology, Pedagogy, Education, 26*(4), 439–456. https://doi.org/10.1080/1475939X.2017.1287124

Graham, C. R. (2011). Theoretical considerations for understanding technological pedagogical content knowledge (TPACK).

Computers & Education, *57*(3), 1953–1960. https://doi.org/10.1016/j.compedu.2011.04.010

Kartal, G. & Başol, H.Ç. (2019). Generic teacher competencies and the English language teacher education program in Turkey. *Novitas-ROYAL (Research on Youth and Language) 13* (2), 134–155. Retrieved from https://files.eric.ed.gov/fulltext/EJ1231978.pdf

Karataş, T. Ö., & Tuncer, H. (2020). Sustaining language skills development of pre-service EFL teachers despite the COVID-19 interruption: A case of emergency distance education. *Sustainability, 12*(19), 81–88. https://doi.org/10.3390/su12198188

Kasim, M. Z. B. M., & Singh, C. K. S. (2017). A review of research on pre-service teachers' technological pedagogical content knowledge for teaching English language. *International Journal of Academic Research in Business and Social Sciences*, *7*(10), 436–448. https://doi.org/10.6007/IJARBSS/v7-i10/3391

Kay, R.H. (2006), Evaluating strategies used to incorporate technology into preservice education: A review of the literature. *Journal of Research on Technology and Education, 38* (4), pp. 383–408. https://doi.org/10.1080/15391523.2006.10782466

Keating, T., & Evans, E. (2001). Three computers in the back of the classroom: preservice teachers 'conceptions of technology integration. In *Society for Information Technology & Teacher Education International Conference* (pp. 1671–1676). Association for the Advancement of Computing in Education (AACE). Retrieved from https://www.learntechlib.org/primary/p/17023/

Kelly, G. A. (1955). *Psychology of personal constructs***.** New York: Norton,

Koehler, M.J., & Mishra, P. (2008). Introducing TPCK. In AACTE committee on innovation and technology (Ed.), *The handbook of technological pedagogical content knowledge (TPCK) for educators* (pp. 3–29). Mahwah, NJ: Lawrence Erlbaum Associates.

Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge?, *Contemporary Issues in Technology and Teacher Education, 9*(1), 60–70. Retrieved from https://www.learntechlib.org/primary/p/29544/

Korkut, P. (2016). The Dispositions of student teachers regarding the use of technology in education. *Cumhuriyet International Journal of Education-CIJE 5* (USOS Özel Sayı), 44–57. Retrieved from https://dergipark.org.tr/en/pub/cije/issue/29854

Kurt, G. (2010). *Developing technological pedagogical content knowledge of Turkish preservice teachers of English through a design study*. (Unpublished Doctoral Dissertation, Yeditepe University, İstanbul, Turkey.

Kurt, G., Mishra, P., & Kocoglu, Z. (2013). Technological pedagogical content knowledge development of Turkish preservice teachers of English. Paper presented at the meeting of the Society for Information Technology and Teacher Education, New Orleans, LA. Retrieved from https://punyamishra.com/wp-content/uploads/2013/03/Kurt-Mishra-SITE2013-paper.pdf

Li, W., & Xia, G. (2016). An empirical study on college English teacher's TPACK: Theory and application. *IOSR Journal of Engineering*, *6*(4), 1–4.

Lundeberg, M., Bergland, M., Klyczek, K., & Hoffman, D. (2003). Using action research to develop preservice teachers' confidence, knowledge and beliefs about technology. *The Journal of Interactive Online Learning*, *1*(4), 1–16. Retrieved from http://www.ncolr.org/issues/jiol/v1/n4/using-action-research-to-develop-preservice-teachers-confidence-knowledge-and-beliefs-about-technology.html

Mishra, P., & Koehler, M. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Nazari, N., Nafissi, Z., Estaji, M., & Marandi, S. S. (2019). Evaluating novice and experienced EFL teachers' perceived TPACK for

their professional development. *Cogent Education, 6*(1), 1632010. https://doi.org/10.1080/2331186X.2019.1632010

Niess, M. L. (2005). Preparing teachers to teach science and mathematics with technology: Developing a technology pedagogical content knowledge. *Teaching and Teacher Education, 21*(5), 509–523. http://dx.doi.org/10.1016/j.tate.2005.03.006

Niess, M. L. (2011). Investigating TPACK: Knowledge growth in teaching with technology. *Journal of Educational Computing Research, 44* (3), 299–317. https://doi.org/10.2190%2FEC.44.3.c

Niess, M. L., Suharwoto, G., Lee, K., & Sadri, P. (2006). Guiding inservice mathematics teachers in developing TPCK. Paper presentation for the American Education Research Association Annual Conference, San Francisco, CA. Retrieved from https://www.learntechlib.org/primary/p/22684/

Nordin, H., Davis, N., Faekah, T., & Ariffin, T. (2013). A case study of secondary preservice teachers' technological pedagogical and content knowledge mastery level. *Procedia-Social and Behavioral Sciences*, *103*, 1–9. http://doi.org/10.1016/j.sbspro.2013.10.300

Öz, H. (2015). Assessing preservice English as a foreign language teachers' technological pedagogical content knowledge. *International Education Studies, 8*(5), 119–130. http://dx.doi.org/10.5539/ies.v8n5p119

Özdemir. M. (2016). An examination of the techno-pedagogical education competencies (TPACK) of preservice elementary school and preschool teachers. *Journal of Education and Training Studies 4*(10), 70–78. https://doi.org/10.11114/jets.v4i10.1816

Pamuk, S. (2012). Understanding preservice teachers' technology use through TPACK framework. *Journal of Computer Assisted Learning, 28,* 425–439. https://doi.org/10.1111/j.1365-2729.2011.00447.x

Pamuk, S., Ergun, M., Cakir, R. Yilmaz, H.B., & Ayas, C. (2015). Exploring relationships among TPACK components and development of the TPACK instrument. *Education and Information Technologies 20*, 241–264. https://doi.org/10.1007/s10639-013-9278-4

Pierson, M. E. (2001). Technology integration practice as a function of pedagogical expertise. *Journal of Research on Computing in Education, 33*(4), 413–430. https://doi.org/10.1080/08886504.2001.10782325

Rosenberg, J. M., & Koehler, M. J. (2015) Context and technological pedagogical content knowledge (TPACK): A systematic review. *Journal of Research on Technology in Education, 47*(3), 186–210. https://doi.org/10.1080/15391523.2015.1052663

Sarıçoban, A., Tosuncuoğlu, İ., & Kırmızı, Ö. (2019). A technological pedagogical content knowledge (TPACK) assessment of preservice EFL teachers learning to teach English as a foreign language. *Journal of Language and Linguistic Studies*, *15*(3), 1122–1138. https://doi.org/10.17263/jlls.631552

Sendan, F., & Roberts, J. (1998). Orhan: a case study in the development of a student teacher's personal theories. *Teachers and Teaching: theory and practice*, *4*(2), 229–244. https://doi.org/10.1080/1354060980040203

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4–14. http://dx.doi.org/10.3102/0013189X015002004

Shulman, L.S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*(1), 1–21. https://doi.org/10.17763/haer.57.1.j463w79r56455411

Solak, E., & Çakır, R. (2014). Examining preservice EFL teachers' TPACK competencies in Turkey. *The Journal of Educators Online, 11*(2), 1–22. Retrieved from https://files.eric.ed.gov/fulltext/EJ1033263.pdf

Tseng, J. J., Cheng, Y. S., & Yeh, H. N. (2019). How preservice English teachers enact TPACK in the context of web-

conferencing teaching: A design thinking approach. *Computers & Education*, *128*, 171–182. https://doi.org/10.1016/j.compedu.2018.09.022

Turgut, Y. (2017a). An Analysis of TPACK integration into English language teacher education programs: a comparative study of Turkey and Denmark. *Journal on English Language Teaching, 7*(4). 1–15. Retrieved from https://files.eric.ed.gov/fulltext/EJ1173821.pdf

Turgut, Y. (2017b). A comparison of preservice, in-service and formation program for teachers' perceptions of technological pedagogical content knowledge (TPACK) in English language teaching (ELT). *Educational Research and Reviews. 12*(22), 1090–1106. https://doi.org/10.5897/ERR2017.3311

Turgut, Y. (2017c). Tracing preservice English language teachers' perceived TPACK in sophomore, junior, and senior levels. *Cogent Education*, *4*(1), 1368612. https://doi.org/10.1080/2331186X.2017.1368612

YÖK (2018a). *Yeni öğretmen yetiştirme lisans programları*. Retrieved from https://www.yok.gov.tr/Documents/Kurumsal/egitim_ogretim_dairesi/Yeni-Ogretmen-Yetistirme-Lisans-Programlari/AA_Sunus_%20Onsoz_Uygulama_Yonergesi.pdf

YÖK (2018b). *Yeni İngilizce öğretmenliği lisans programı*. Retrieved from https://www.yok.gov.tr/Documents/Kurumsal/egitim_ogretim_dairesi/Yeni-Ogretmen-Yetistirme-Lisans-Programlari/Ingilizce_Ogretmenligi_Lisans_Programi.pdf

Valtonen, T., Lappanen, U., Hyypia, M., Sointu, E., Smits, A., & Tondeur, J. (2020). Fresh perspectives on TPACK: Preservice teachers' own appraisal of their challenging and confident TPACK areas. *Educational and Information Technologies, 25,* 2823–2842. https://doi.org/10.1007/s10639-019-10092-4

Appendix: The RepGrid Form

Participant: **Date:**

Construct No	Triads	Emergent Constructs (Similarities)	Elements	Rating Scale 1 ← 2 3 4 → 5					Elements	Implicit Constructs (Contrasts)
				E	T	I	Self	Idea l		
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										

Rank Order: 1. 2. 3. 4. 5.