

## **Self-Efficacy Beliefs of Pre-Service Teachers Regarding Online Teaching**

**Mariam Naz**

M. Phil Scholar

University of Management and Technology

**Ume Hani**

M. Phil Scholar

University of Management and Technology

**Dr. Yaar Muhammad**

Assistant Professor

University of Management and Technology

**yaar.muhammad@umt.edu.pk**

### **Abstract**

Technological advancement in the rapidly changing world of work demands its use in every field, including education. In the current scenario, online education is the new normal. Therefore, future teachers should be aware of multiple instructional strategies and suitable ways of using technology to assist in the development of 21st-century skills in learners. Keeping this fact into consideration, this study aims to explore the self-efficacy beliefs of pre-service teachers regarding online teaching. The technological pedagogical content knowledge framework was employed to understand and describe the self-efficacy beliefs of teachers for effective pedagogical practice in a technology-enhanced learning environment. Through the use of phenomenological case study design, this research investigates the self-efficacy level, understanding, and expectations of future teachers regarding effective online teaching. Koehler and Mishra's TPACK framework and Bandura's self-efficacy theory were used as the conceptual underpinnings of semi-structured interviews conducted with five pre-service teachers enrolled in a teacher education program. The study found a high level of self-efficacy perceived by pre-service teachers. Also, pre-service teachers were confident in using the TPACK framework for online teaching. The study suggests the use of technology-based materials in the courses of teacher education related to technology integration for enhancing self-efficacy beliefs of pre-service teachers regarding online teaching.

**Keywords:** *TPACK framework, Self-efficacy beliefs, Pre-service teachers, On-line teaching, 21<sup>st</sup> century skills*

### **1. Introduction**

Teachers' beliefs play a pivotal role in the successful adoption of technology (Eichelberger & Leong, 2019; Fives, Lcatena, & Gerard, 2015). Pre-service teachers' beliefs of their teaching and strategies are also very important. Learner-centred beliefs of teachers are considered to be

confidently associated with the use of technology in teaching (Tondeur, Scherer, Siddiq, & Baran, 2020). In addition, teacher's self-efficacy beliefs are essential as they determine a teacher's effectiveness in the classroom. Self-efficacy beliefs regarding the use of technology in class influence the teacher to make teaching meaningful and create a conducive learning environment. Therefore, it is crucial to know the efficacy and development of teachers in teacher education programs since educational researchers are showing their interest in teacher's self-efficacy and its importance in preparing novice teachers. Technology usage in instruction, different dimensions of self-efficacy play an essential part in the actions and thinking of teachers. The need to manage pre-service teacher's preparation for the integration of technology, pedagogical strategies, and content information is significant.

The main point on which e-teaching differs from conventional classroom instruction is that it totally depends on technology. There is a need for teacher candidates to be equipped with technological, pedagogical, and content knowledge before stepping into the online teaching endeavour (Koehler & Mishra, 2009). The placement of technology side by side with content and pedagogy and providing a systematic framework makes TPACK an efficient lens to explore online teaching (Eichelberger & Leong, 2019). Hence, the TPACK framework comes up with a channel to look at teaching that promotes technology (Eichelberger & Leong, 2019). Online classrooms depend on technology, which is why prospective teachers must understand the TPACK framework (Koehler & Mishra, 2009).

In recent years, many research studies highlighted the importance of self-efficacy perceptions of pre-service teachers, TPACK and integration of technology (e.g., Basaran, 2020; Chang & Wei, 2020; Furuta, Knezek, & Christensen, 2020; Jin & Harp, 2020; Nursyifa, Rahmadi, & Hayati, 2020; Putro, Hidayat, Jiono, & Nidhom, 2020; Tan et al., 2020). Sahin, Akturk, and Schmidt (2009) explored the relationship between the perception of pre-service teachers regarding TPACK domains and thinking about their capabilities to teach. The results showed that there was a possible relation between TPACK and self-efficacy belief towards instruction. It also showed that it requires further study to understand its complexity. Understanding the TPACK framework and its relation with the teacher's self-efficacy beliefs to employ technology in class requires more experience and research to make pre-service teachers prepare and successful. Abbitt (2011) found that knowledge presented in TPACK can provide a clue to test the perceptions of pre-service teachers about the integration of technology.

Attitudes of pre-service teachers regarding online teaching are very important. Not all the teachers are prepared enough to teach online by using TPACK. Although TPACK provides complete and effective domains of online teaching (Koehler & Mishra, 2009), there are still challenges to understand not only it but also the lack of guidance, consultancy and absence of required software.

## **2. Theoretical Framework**

The cognitive behaviourist theory of self-efficacy by Bandura (1997) and the TPACK framework developed by Koehler and Mishra (2009) are the underlining theories of this research study. Bandura's self-efficacy theory refers to individual behaviours based on their ability and expected outcomes. The TPACK framework defines the knowledge that teachers need for teaching with technology. Both of these theories are elaborated as below:

### **Self-efficacy Theory**

The theory of social learning by Bandura had self-efficacy as an emergent concept. It is the concept of capabilities of a person which he shows to tackle different challenging situations. It is the result of the judgment of an individual about his performance, which he shows under challenging circumstances. According to Bandura, self-efficacy can also be known as self-efficacy belief, self-efficacy perceptions, and self-efficacy judgment (Yenice, 2009). Bandura highlighted that self-perception is based on four interlinked sources and has importance in human life. They are summed up as performance achievements; these are related to individual experiences that he got while he is testing his skills. Vicarious experiences, these are the experiences that we learn from other people after observing them. Verbal persuasion is external support, which is important for an individual for its motivation and success. This can change individual behaviour towards their self-efficacy beliefs. Motivation processes, this is very important as it affects our potential and positive behaviour (Bandura, 1997).

Self-efficacy belief helps people in putting effort to deal with a difficult situation, how long they will stick to that problem and how long they will be able to manage that problem (Giles, Byrd, & Bendolph, 2016). The belief of a person regarding something is as important as its skills, motivation, and determination. Higher the self-efficacy belief higher is the performance of an individual (Locke & Latham, 2013). With regards to teachers, specifically, teaching decisions that he takes are highly controlled by their beliefs about self-efficacy regarding their own potential. Teacher self-efficacy depends on the situation and the subject they are teaching. It is never the

same: it depends on the situation and subjects and sometimes on the students they are teaching to. Pre-service teacher's self-efficacy may depend on their pre-service learning experiences and their competency, which they acquire during their learning process by examining their faculty, their teachers, and their mentors. Therefore, it is important for pre-service teachers to develop a strong bond with their mentors and should focus on their capabilities and learning experiences during their education.

### **TPACK Framework**

TPACK is abbreviated for technological pedagogical content knowledge. TPACK is an essential competency to be possessed by the forthcoming teachers to envision 21st century learning. It is basically the junction where technological knowledge, pedagogy, and content understanding are implemented together (Graham, 2011).

This framework is based on seven knowledge axioms to help teacher education programs with efficient technology integration (Mishra & Koehler, 2009). These knowledge constructs include technological knowledge (TK), pedagogical knowledge (PK), content knowledge (CK), pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPACK) (Graham, 2011; Koehler & Mishra, 2009).

Technological Knowledge (TK) is the awareness of technological tools like computers, projectors, educational and productivity hardware, and software; Content knowledge (CK) is concerned with the understanding a teacher has regarding any specific subject(s), and Pedagogical Knowledge (PK) is the knowledge of pedagogy which is teaching methods and strategies used to impart knowledge (Kazu & Erten, 2014). These three knowledge constructs, when coming together, give rise to the other four knowledge constructs of the recent areas of educational technology. Pedagogical Content Knowledge (PCK) is defined as the understanding of methods for the communication of content knowledge; Technological Content Knowledge (TCK) is the awareness of using technology for the presentation of content knowledge, and Technological Pedagogical Knowledge (TPK) is the awareness of how to utilise technology for the implementation of pedagogical practices while TPACK is the awareness of how to teach any content with pedagogy using the most appropriate technology (Chukwuemeka, Nsofor, Falode, & Aniah, 2019).

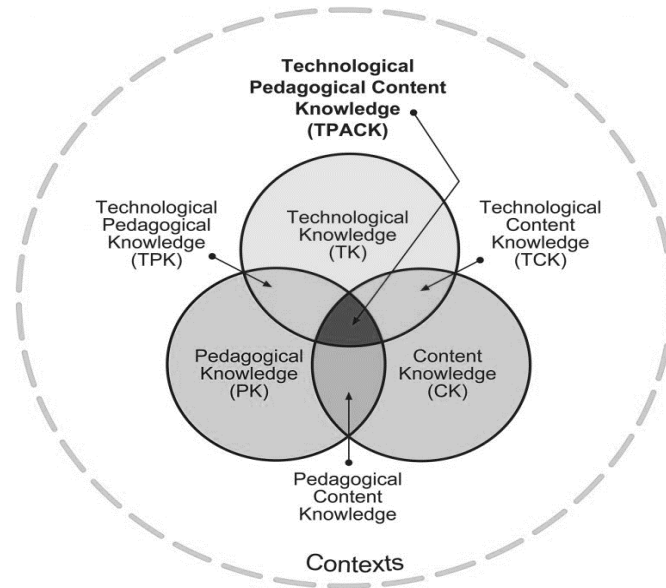


Figure 1: TPACK model outlining the pith concepts and interactions (Mishra & Koehler, 2009)

Schrum (1999) highlighted that accepting technology is different from the acceptance of other educational revolutions, and for these, teachers need to understand the reality that technology accommodation will help them in improvising their teaching and students' learning. Schrum's (1999) research support that adaptation of technology in education is challenging due to the fact that: (1) Technology usually demands more time to be learned and acquired expertly; (2) calls for teachers' complete access and effort to practice and become confident; (3) instructors can be afraid and anxious about IT; (4) it can demand a dramatic change for abolishment or replacement of existing work.

Technologies can affect teachers' choices, actions, and their chances of being successful (Govender & Govender, 2009). An understanding of pre-service teachers' perceptions regarding educational technologies can pour light on their technology use in the classroom setting. Albion (1999) investigated the self-perceptions of 89 teacher candidates about technology accommodation in the classroom and concluded that teachers having higher rates of self-efficacy beliefs had greater technology accommodation in classrooms. In addition, findings of a study, having 45 future teachers as a sample, disclosed that there was a significant positive relationship between self-efficacy and technology accommodation, as pointed out by the TPACK paradigms. Also, Curts, Tanguma, and Peña (2008) revealed the same results after using a sample of 438 teachers in Texas. It was concluded that teachers' self-efficacy perception had an explicit impact on classroom

technology affiliation. Eichelberger and Leong (2019) conducted a study in the USA to understand the impact of perceptions regarding online teaching of college faculty on their online teaching. The results of this study showed that perceptions of technology integration have both positive and negative impact on online teaching. However, the failure of technology can be a halt for both teachers and learners. This can hinder both teaching and learning.

There is limited research to explore the self-efficacy beliefs of pre-service teachers regarding online teaching in the Pakistani context. This study aims to explore the self-efficacy perceptions of pre-service teachers regarding online teaching in a Pakistani university. The study seeks to answer the following question: What are the self-efficacy beliefs of pre-service teachers about using the TPACK framework for effective online teaching?

### **3. Methods and Materials**

This phenomenological case study research aims to explore the self-efficacy perception of pre-service teachers regarding online teaching. The case study method is appreciated when the focus of research is to elaborate and explain a phenomenon and the command on the behaviour of the event is impossible (Yin, 2018). Having a bound and defined case is of importance in case study research. In this study, the case is the experiences of teacher candidates registered in a technology integration course. The case study gathered data through semi-structured interviews and employed the Koehler and Mishra's TPACK framework and self-efficacy theory by Bandura for constructing the interview guide.

As our interest was to understand the beliefs of prospective teachers, hence this case study operated a phenomenological approach. Creswell and Poth (2018) suggested that “a phenomenological study describes the meaning for several individuals of their lived experiences of a concept or a phenomenon” (p. 57). Phenomenology can be considered as a structured path to study how masses perceive themselves in this world (Vagle, 2018). It was employed to explore online teaching related self-efficacy beliefs of pre-service teachers who were enrolled in an M. Phil Education Program and had successfully completed the course about titled *Technology Integration in Education*.

While both of the methods mentioned above are unique, Merriam and Tisdell (2016) elaborated that researchers can use case studies in combination with other methods to get an insight into a phenomenon.

### 3.1. Participants

Participants in this study were five university students of an education department sampled purposefully to yield the most relevant information. Participants were students enrolled in a Master of Philosophy in Education Program. All participants had passed a course of *Technology Integration in Education* in the same batch.

Table 1. Demographic Information of Participants

Participants	Age	Gender	Academic qualification	Prior teaching experience
Participant 1	25	Female	B.Ed. (Hons)	Nil
Participant 2	24	Female	B.Ed.(Hons)	Nil
Participant 3	32	Male	MA (Education)	Nil
Participant 4	24	Female	B.Ed.(Hons)	Nil
Participant 5	24	Female	B.Ed. (Hons)	Nil

### 3.2. Data collection

Semi-structured interviews were conducted with the participants, soliciting demographic information at first, and then 20 open-ended questions related to various dimensions of online teaching. In addition, several probing and follow-up questions were asked to elicit in-depth data. This interview helped us in finding the demographics of prospective teachers and their views about online teaching while considering TPACK. Open-ended questions were asked about the teacher's point of view regarding online teaching readiness and technology assistance. This type of interview was the best fit for our purpose because it allowed us to ask open and focused questions. Qualitative research has a benefit that it basically describes the behaviours and attitudes of people in accordance with their opinions, and semi-structured interviews allowed the participants to openly share their views while being focused on the concept of online teaching to be explored. The participant has a right to change the direction of the interview to their concerns.

### 3.3. Data analysis

Template analysis by means of NVivo 12 (Jackson & Bazeley, 2019) was used to manage the data and to support data analysis. The 'template analysis' approach was found to be more detailed and systematic and was, therefore, the primary approach used in the analysis of each case data. NVivo 12 was used to ensure rigour and transparency in the analysis processes without compromising creative and reflective analysis. For each case, the six key stages involved in template analysis defining a priori themes, transcribing the interview data and reading through the

transcripts to thoroughly familiarise our self to the main ideas, carrying out the initial coding of data using a priori themes, producing an initial template, and applying the template to the full data set for developing the template and finally using the ‘final’ template to interpret and write up the findings were used (King & Brooks, 2017).

#### **4. Findings**

The paper is concerned with five cases of pre-service teachers who were enrolled in an MPhil Education Program and had studied a course titled as *Technology Integration in Education*. Each case has been discussed in detail, preceded by its demographic description. Afterwards, each case is followed by a concise exposition.

##### **Participant 1**

Demographic profile: 25 years old female teacher candidate; source of account: authors directly contacted to the subject via a phone call.

She is a student of M. Phil Education and holds her last professional teaching degree from a public university. She uses technology on a daily basis; however, she concludes that her knowledge of new technologies is not profound. She questions the reliability of new technologies and does not feel confident in having enough skills for technology usage. She keeps her knowledge of content up-to-date but feels less confident in being knowledgeable about the applications of content in the real world. As far as her knowledge of pedagogical practices is concerned, she is well aware of using different teaching strategies for delivering different content. She also believes that she can use formative and summative assessment for the assessment of students.

She claims that she knows the purpose and objectives of a particular subject to be taught and have an understanding of strategies like storytelling to engage students and develop their thinking. She says, “I will teach them in story form so that they cannot get bored. They should be able to take interest and think of the topic as a story.” As far as her technological content knowledge is concerned, she believes that she is well aware of websites to access online materials but lacks confidence when it comes to the knowledge regarding technology for teaching specific content. She assumes the cognitive level of students to be the most determining factor for the use of technology and on this base; students can be assessed using technology. She considers herself to be moderately confident in using technology for effective teaching and to cope with individual differences. While answering to question regarding TPACK effectiveness, she says, “No, it’s not



the only way because, in TPACK, we only deal with technology, pedagogy and content. Furthermore, the quality of teaching is a vast concept that cannot only be dealt with TPACK.”

### **Commentary**

She appears to be a moderately knowledgeable person regarding technology, and it seems that she has a little skill in using technology for educational purposes. Most of her technology usage is limited to using mobile for social media gatherings. Her content and pedagogical knowledge, on the other hand, turns out to be her strong areas. She has a profound knowledge of content and also knows which pedagogy should be practised for the successful delivery of the lesson. However, she seems to be a little confused while using content knowledge in the real world. She comes up with a view which does not support TPACK. She seems to believe that there are other ways, other than TPACK, to make teaching effective.

### **Participant 2**

Demographic profile: 24 years old female pre-service teacher; source of account: authors directly contacted to the subject via a phone call; the origin of data: online interview.

She has done her graduation from a public university and currently pursuing her MPhil degree in Education. She uses technology on a daily basis and is familiar with some new technologies like Zoom and Google classroom, but sometimes she faces issues such as poor quality of internet or device errors, etc. She claims that as she is using technology on a daily basis, it means that she has sufficient skills.

She believes that she has an up to date knowledge about the content that she will teach in future. She reports, “I can also relate my content with different situations like if we tell them about the rights and roles in Social Studies. They can then apply it in their life.” She believes that student-centred approaches are the best, and learners should be taken according to their pace. She feels confident that she has sufficient knowledge about the purpose and objectives of certain content. She also claims that she has a well-rounded knowledge of teaching strategies to keep students active and engaged during the lesson: “Active learners will be seated with slow learners so that they can help each other. First, I will develop their understanding and then divide the content into parts.” She contends that she can use Google and websites provided by the Punjab government for searching online material aid. She is confident that she has enough knowledge for using technology

and she can use technology according to the content, level and need of the students. She adds:“I will make sure that the pace of students is matched with technology so that they can grasp the content and technology.”

She does not feel confident in coping individual differences via technology, but she says that she can give them activities for their homework on Google classroom or on WhatsApp and they will do it at home for better understanding. However, she claims that she is well prepared and confident enough to teach with the TPACK framework. She believes that it provides an easy way to comprehend effective teaching and student learning processes; however, she is also of the view that it is not the only way to describe quality teaching: There are other ways that can be effectively used for making teaching quality better.

### **Commentary**

She seems to be skilful in the use of technology. It is maybe due to her friendly attitude towards daily technology usage and optimism for technology use in education. She appears to be well aware of the content she would teach, and also it is clear that she knows about appropriate teaching methods for teaching specific content. She looks confident and eager to use technology for teaching. However, she does not seem confident in using technology for coping differences among students. She appears to be confident in using the TPACK framework for teaching effectively. However, she does not seem a supporter of TPACK because she thinks that there can be other ways to teach efficiently.

### **Participant 3**

Demographic profile: 32 years old male pre-service teacher; source of account: authors directly contacted to the subject via a phone call; the origin of data: online interview.

He has done his Master in Education from a public university and continuing his further education in a private sector university. He uses mobile technology more often. His house is in a rural area, so he declares that he faces difficulty in using technology, and sometimes he faces privacy issues. However, he regards himself as a skilful person who can use technology. He is currently doing specialisation degree and claims that his knowledge about the content is up to date. He says that if there is such a situation that needs to apply the knowledge practically, then he will be able to do that.

He assumes that every subject needs a special approach, so if there is a need, he will use audio-visual aids, storytelling methods and also group discussion. During lectures, pre-planned questions and the verbal question can be a way to assess student performance. Talking about individual differences, he says, “Different learners are everywhere; you just have to identify them. Check if that student can learn through grouping or by self-study. After identifying them, I will use a certain strategy.” He is sure that he has enough knowledge about purposes, and he considers that it is the appropriate selection of teaching approaches that will make students’ thinking and learning effective. As the use of technology in lessons is concerned, he says that he will see the situation and then make a decision regarding the use of appropriate technology. He also claims, “We cannot assess a student on the basis of technology. We have to assess a student on the basis of his or her knowledge. Then after that, with the help of technology, we will assign those grades.”

He is sure that he is prepared enough to teach with technology as the 21st century is the century of technology and every student is using technology so a teacher should be prepared for anything. He is confident enough to teach using TPACK as it develops his understanding and makes his teaching effective. He also believes that only TPACK can be a way to effective and quality teaching in Pakistan.

### **Commentary**

He appears to be a confident future teacher who is well rounded in all technological, pedagogical and content knowledge. It looks like he spends more of his day using technology. It turns out that he is well aware of teaching methods which should be used for quality teaching. However, he looks a stereotype when it comes to assessment using technology because according to him, we cannot assess students through technology and technology is merely for grade keeping. He appears to be a huge supporter of TPACK because he said that it is the only way that we can teach effectively in the modern era.

### **Participant 4**

Demographic profile: 24 years old female pre-service teacher; source of account: authors directly contacted to the subject via a phone call. Origin of data: online interview.

According to her, she has an interest in teaching, but she has no experience in teaching yet. In her interview regarding self-efficacy belief of pre-service using TPACK in online teaching, she responded that she often uses technology as it the need of today.

She is not very familiar with new technology as she says that when there is a need to be familiar with the technology we can get to know. She thinks that whenever she searches for something new or use new technology, she does not know how to use it for the first time, so she definitely faces challenges in using technology. She is certain about her skills related to technology, as she adds that she gets confused in relation to the use of a certain technology, but she believes that she has sufficient skills.

She wants to teach, but she is pre-service, but still, she finds herself confident in teaching with technology. She is of the view that if she teaches in future, she will get herself prepared for that particular content. She believes that her knowledge is not fully up to date, but she will try to update her knowledge whenever there is any need for this. Talking about the knowledge of content application, she narrates that she will use electronic flashcard and show them to make the learning of the students effective.

She elaborates that if she teaches science, she will use the demonstration method and role play method. She shares many methods to assess student performance to check whether her teaching is effective or not. She mentions as activities, questioning in a friendly atmosphere are conducive for students' learning. She also explains that there are many different learners in the classroom, so different strategies are required for them. She claims that "Group activities helps a lot. I will make groups and divide students accordingly, like I will place slow learners with some fast learner so that they can compete and help each other."

She talks about the aims and objectives of the content as an important factor for teaching students, and she elaborates that she has sufficient knowledge. She adds that by using role-play and demonstration method, she could make their thinking effective. Talking about the awareness about websites, she explains: "You should have access to websites, and social media for effective teaching, so mostly everybody has access to some extent."

She claims that due to the rapid technology change, teachers need to know which technology is suitable for teaching; therefore, she responds that she would check the content and then choose the technology.

She is confident in using technology to cope with individual differences, and she will use Google classroom for the assessment of student performance. She finds herself confident in using technology and TPACK framework in the 21st century for effective teaching. Considering TPACK the only way of quality teaching is not the statement she agreed with. She reports her belief by saying, “It is not the only way to quality teaching, but yes, it’s one of the finest and useful ways of quality teaching. It is a complete framework for teachers to teach in an online environment.

### **Commentary**

She seems to be very confident and skilful in using technology. She is very open to using different strategies for teaching and assessing students with individual differences. She has sufficient skills regarding technology, but she then adds that she might get confused in some technology as she is in the learning stage. She is aware of many websites that can be helpful for teaching different content. She is very clear about the goals and objectives of different content, and she finds it necessary as it helps students to know what they are learning. Regarding TPACK, she is optimistic that she would effectively use the TPACK framework in the 21st century and in her opinion, the TPACK framework is not the only way for quality teaching in the 21st century.

### **Participant 5**

Demographic profile: 24 years old female pre-service teacher; source of account: authors directly contacted to the subject via a phone call. Origin of data: online interview.

She frequently uses technology in her home and university. She believes that her knowledge about technology is up to date, and she is currently familiar with Zoom and Google classroom because of online classes. Her response to the challenges regarding technology use was that challenges mostly occur when dealing with technology, sometimes due to lack of skills in relation to using new technology and sometimes due to restricted sites. Talking about knowledge sufficiency, she adds, “I have sufficient skills, but if there is a new technology that I am dealing with, then that is a test of my skills as I have to learn some more skills to cope with that technology, but yes I have sufficient skills.”

According to her, she has sufficient knowledge and full command on the content, and whenever she teaches and whatever she teaches, she will make sure the teaching of application of the content knowledge. She adds that the application of the content is the need of our society, and

she knows how to apply the knowledge. Regarding her views about using appropriate approaches to teach the content, she states, “I will use different approaches in different situations. For example, if I am teaching science, I will use demonstration methods to make my students understand the concepts. And if I am teaching Islamiat, I will use the storytelling method and tell students about Islam. In this way, they will be able to learn quickly.”

She claims that she can use different pedagogical strategies for different learners by using, activity method, group discussions and sometimes demonstration methods. She mentions that objective and purpose are important, and she has sufficient knowledge about them. She feels that learning and thinking of student can be made effective whenever you use the appropriate method. Using websites in our day to day life is a new trend, and she thinks that it depends on the use of these websites: If we are using websites often, then we will have awareness. As far as the assessment of the student is concerned, she thinks that assessment is important. She elaborates, “I prefer to assess them by asking frequent questions before the lecture and also after the lecture. And I also use formal and summative assessments.”

Regarding her knowledge of technologies, she is confident that she has sufficient knowledge and then she adds, “As according to our curriculum and its nature, only a few technologies can help us to deal with. Our curriculum is not as vast and technical like the curriculum of other countries.”

Dealing with individual differences of students, she was not 100% confident as she responds that she has a lot to learn, but in assessing students with the help of technology, she is confident that she will use multimedia and create games on it. Students will enjoy solving games and teacher can assess them easily. Her views of her self-efficacy regarding teaching in the 21st century with the help of TPACK were very clear as she was confident that she is prepared enough. But she does not think that TPACK is the only way for quality teaching in the 21st century.

### **Commentary**

She seems to be interested in using technology on a daily basis. She has an up to date knowledge regarding technology, and she seems enthusiastic in teaching with different methods. She feels annoyed by the challenges faced while using technology. She is satisfied with her knowledge regarding technology, but she adds that she needs to learn time to time as the world is changing rapidly, and she can learn when there is a need for it. She has a clear understanding of the goals and objectives of the content. However, she thinks that she is not extremely confident in

assessing students with individual differences, but she is very hopeful to teach students with the help of TPACK in the 21st century. She does not consider the TPACK framework the only one way of quality teaching.

## **5. Conclusions**

This study was aimed at exploring and understanding the self-efficacy beliefs of pre-service teachers about online teaching. For this purpose, the TPACK framework was employed as a lens for analysis. There are two important aspects of the study, namely online teaching beliefs, and TPACK. Some of the competencies are essential for teachers in order to successfully incorporate technology for effective tutoring. TPACK is an eminent contribution to assess self-efficacy in online teaching, especially for the evaluation of teacher education programs (Corry & Stella, 2018). TPACK has seven sub-dimensions, which are important to be considered. This study analysed the data in terms of those seven themes.

The outcome of the research indicates that pre-service teachers had high levels of self-confidence in the knowledge of content. They assumed themselves to be good at the selection and use of instructional strategies for the effective delivery of lessons. Moreover, the pre-service teachers were confident to select and employ appropriate technology for pedagogical use and claimed preparedness for 21st-century teaching. These results are parallel to a recent study that concluded that pre-service teachers had high levels of self-efficacy in PK, CK, PCK, and TPK (Chukwuemeka, 2019).

All pre-service teachers depicted high levels of self-perception regarding technology awareness and its use in content delivery. This contradicts previous studies showing that TCK is the area of most difficulty for eight pre-service teachers (Basaran, 2020). This contradiction can possibly be referred to as the efficacy advancement of pre-service teachers (in this case) after studying technology integration as a course.

The findings of the study revealed that there is a high level of self-efficacy in pre-service teachers regarding the use of the TPACK framework effectively. These results are accordant with the results of work done by Wright and Akgunduz (2018). Instructors having extraordinary perceptions about their efficacy on TPACK have more chances to use technology effectively in their instruction (Canbazoğlu Bilici, Yamak, Kavak, & Guzey, 2013). This shows that the higher the self-efficacy beliefs regarding TPACK higher is the efficacy perception of online teaching.

The findings of this study are somewhat similar to the findings of Redmond and Lock (2019). From the current study, it was evident that self-efficacy beliefs of pre-service teachers and their perceptions toward TPACK were positive (Redmond & Lock, 2019). They believed that their knowledge about TPACK and online teaching is adequate. Most of the pre-service teachers think that TPACK is one of the ways to quality teaching, learning, and assessment cycle. Only one pre-service teacher thinks that TPACK is the only way to quality teaching. He also showed disagreement in assessing students using technology. Therefore, according to overall perceptions of pre-service teachers, we can say that the TPACK framework can be helpful in making teaching successful and quality based. TPACK is a framework that provides knowledge that supports teachers to transfer their understanding of content into practice, in which technology and pedagogy help students in better understanding of content and developing different skills.

Pre-service teachers' perception of technological knowledge is adequate as they also believe that their efficacy regarding the use of TPACK is like a learning need that can be ongoing and will develop from time to time.

The sample of this study was limited, so the results may not be generalized to all pre-service teachers because it was limited to only one private institute and to only one program. Therefore, we cannot say that students from all other universities and programs perceive the same. Furthermore, this study is accomplished in an urban university where teachers can perceive TPACK as a straightforward approach to be used; pre-service teachers in rural universities having less access to technological equipment and well-trained teachers may have different perspectives.

It is recommended that the TPACK framework should be included as a basic component in the curriculum of teacher education programs that will increase the self-efficacy of pre-service teachers and develop their pedagogical skills. In technology integration courses, technology-based instructional material and projects should be designed to develop pre-service teachers' understanding of TPACK. Students with low levels of computer proficiency should be trained through non-credential courses and workshops. More resources and training programs regarding TPACK should be incorporated, especially in rural areas and the public sector, where the quality of education can be preferable. Also, research in other areas of Pakistan should also be carried out as there is limited research regarding TPACK and online teaching here. Future research studies



should consider the exploration of perceptions and practices of both pre-service and in-service teachers regarding TPACK-21.

## References

- Abbitt, J. T. (2011). An investigation of the relationship between self-efficacy beliefs about technology integration and technological pedagogical content knowledge (TPACK) among preservice teachers. *Journal of Digital Learning in Teacher Education*, 27(4), 134-143.
- Albion, P. R. (1999). Self-efficacy beliefs as an indicator of teachers' preparedness for teaching with technology. Retrieved from [http://eprints.usq.edu.au/6973/1/Albion\\_SITE\\_1999\\_AV.pdf](http://eprints.usq.edu.au/6973/1/Albion_SITE_1999_AV.pdf)
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W H Freeman and Company.
- Basaran, B. (2020). Examining preservice teachers' tpack-21 efficacies with clustering analysis in terms of certain variables. *Malaysian Online Journal of Educational Technology*, 8(3), 84-99.
- Canbazoglu Bilici, S., Yamak, H., Kavak, N., & Guzey, S. S. (2013). Technological pedagogical content knowledge self-efficacy scale (TPACK-SeS) for pre-service science teachers: Construction, validation, and reliability. *Eurasian Journal of Educational Research*(52), 37-60.
- Chang, L.-Y. W., & Wei, J.-C. V. (2020). *Pre-service chinese teachers implementing a TPACK framework in an online teaching context*. Paper presented at the Program Booklet of the 3rd Pan-Pacific Technology-Enhanced Language Learning & Critical Thinking Meeting (PPTCELL 2020), University of North Texas.
- Chukwuemeka, E., Nsofor, C., Falode, O., & Aniah, A. (2019). Assessing pre-service teachers' technological pedagogical content knowledge self-efficacy towards technology integration in colleges of education in South-West Nigeria. *Journal of Science, Technology, Mathematics and Education (JOSMED)*, 15(3), 131-141.
- Corry, M., & Stella, J. (2018). Teacher self-efficacy in online education: a review of the literature. *Research in Learning Technology*, 26. doi:<https://journal.alt.ac.uk/index.php/rlt/article/view/2047>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design : choosing among five approaches* (4th ed.). Los Angeles: SAGE.
- Curts, J., Tanguma, J., & Peña, C. M. (2008). Predictors of hispanic school teachers' self-efficacy in the pedagogical uses of technology. *Computers in the Schools*, 25(1-2), 48-63. doi:10.1080/07380560802157766
- Eichelberger, A., & Leong, P. (2019). Using TPACK as a framework to study the influence of college faculty's beliefs on online teaching. *Educational Media International*, 56(2), 116-133.

- Fives, H., Lacatena, N., & Gerard, L. (2015). Teachers' beliefs about teaching (and learning). In H. Fives & M. G. Gill (Eds.), *International handbook of research on teachers' beliefs* (pp. 249-265). New York: Routledge.
- Furuta, T., Knezek, G., & Christensen, R. (2020). Implications of hands-on technological creation experiences and tpack assessments for preservice teacher education. *Journal of Digital Learning in Teacher Education*, 34(4), 387-390.
- Giles, R. M., Byrd, K. O., & Bendolph, A. (2016). An investigation of elementary preservice teachers' self-efficacy for teaching mathematics. *Cogent Education*, 3(1), 1160523.
- Govender, D., & Govender, I. (2009). The relationship between information and communications technology (ICT) integration and teachers' self-efficacy beliefs about ict. *Education as Change*, 13(1), 153-165. doi:10.1080/16823200902943346
- Graham, C. R. (2011). Theoretical considerations for understanding technological pedagogical content knowledge (TPACK). *Computers & Education*, 57(3), 1953-1960.
- Jackson, K., & Bazeley, P. (2019). *Qualitative data analysis with NVivo* (3rd ed.). London: SAGE Publications Limited.
- Jin, Y., & Harp, C. (2020). Examining preservice teachers' TPACK, attitudes, self-efficacy, and perceptions of teamwork in a stand-alone educational technology course using flipped classroom or flipped team-based learning pedagogies. *Journal of Digital Learning in Teacher Education*, 36(3), 166-184.
- Kazu, I. Y., & Erten, P. (2014). Teachers' technological pedagogical content knowledge self-efficacies. *Journal of Education and Training Studies*, 2(2), 126-144.
- King, N., & Brooks, J. M. (2017). *Template analysis for business and management students*. London: Sage.
- Koehler, M., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)? *Studies in English Language Teaching*, 8(1), 60-70.
- Locke, E. A., & Latham, G. P. (2013). Goal setting theory, 1990. In *New developments in goal setting and task performance*. (pp. 3-15). New York, NY, US: Routledge.
- Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). San Francisco, CA: John Wiley & Sons.
- Nursyifa, A., Rahmadi, I. F., & Hayati, E. (2020). TPACK capability preservice teachers civic education in the era of industrial revolution 4.0. *JPI (Jurnal Pendidikan Indonesia)*, 9(1). Retrieved from <https://doi.org/10.23887/jpi-undiksha.v9i1.17982>.
- Putro, S. C., Hidayat, W. N., Jiono, M., & Nidhom, A. M. (2020). Contribution of tpack for a pedagogical capability in the vocational pre-service teachers for electrical engineering education. *Jurnal Pendidikan Teknologi dan Kejuruan*, 26(2), 173-182.
- Redmond, P., & Lock, J. (2019). Secondary pre-service teachers' perceptions of technological pedagogical content knowledge (TPACK): What do they really think? *Australasian Journal of Educational Technology*, 35(3). Retrieved from <https://doi.org/10.14742/ajet.4214>.

- Sahin, I., Akturk, A. O., & Schmidt, D. (2009). *Relationship of preservice teachers' technological pedagogical content knowledge with their vocational self-efficacy beliefs*. Paper presented at the Society for information technology & teacher education international conference, Waynesville, NC USA.
- Schrump, L. (1999). Technology professional development for teachers. *Educational technology research and development*, 47(4), 83-90.
- Tan, C. K., Nguyen, B., Lee, K. W., Kang, H. C., Tan, C. K., & Jalan, U. (2020). Original Paper The Impact of the Design Teams Approach on Preservice Teachers' TPACK in the Vietnamese Context. *Studies in English Language Teaching*, 8(1), 85-103.
- Tondeur, J., Scherer, R., Siddiq, F., & Baran, E. (2020). Enhancing pre-service teachers' technological pedagogical content knowledge (TPACK): a mixed-method study. *Educational technology research and development*, 68(1), 319-343.
- Vagle, M. D. (2018). *Crafting phenomenological research*. London: Routledge.
- Wright, B., & Akgunduz, D. (2018). The relationship between technological pedagogical content knowledge (TPACK) self-efficacy belief levels and the usage of web 2.0 applications of pre-service science teachers. *World Journal on Educational Technology: Current Issues*, 10(1), 52-69.
- Yenice, N. (2009). Search of science teachers' teacher efficacy and self-efficacy levels relating to science teaching for some variables. *Procedia social and behavioral sciences*, 1(1), 1062-1067.
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). New York: Sage publications.