Spry Contemporary Educational Practices

ISSN: 2958-6690
Vol. 3, Issue. 1
(Jan-Jun 2024)
Page no: 119- 136
DOI: https://doi.org/10.62681/sprypublishers.scep/3/1/7

Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan

Dr. Rabia Ghaffar
Assistant Professor,
Govt. Graduate College for Women,
Wahdat Colony, Lahore,
Higher Education Department Punjab
rabia.edu2013@gmail.com

Farzana Jabeen Khoso
Assistant Professor,
Department of Teacher Education,
Shah Abdul Latif University Khairpur
farzanakhoso.1@gmail.com

Zahid Hussain Sahito
Assistant Professor,
Department of Teacher Education,
Shah Abdul Latif University Khairpur
zahid.sahito@salu.edu.pk

Received: 03-Feb-2024
Revised: 16-Feb-2024
Accepted: 27-Feb-2024

Abstract

Introduction: *This study evaluated District South Karachi public secondary school teachers' material, pedagogical, and technological skills. Effective teaching and learning need understanding teachers' Technological Pedagogical Content Knowledge (TPACK) as technology is increasingly integrated into teaching and learning.*

Methodology: *Simple descriptive survey was used. We targeted all secondary school teachers in District South Karachi, Pakistan. A random sample of 100 public secondary school teachers (26 males and 74 women) was chosen. Teachers' responses to a TPACK questionnaire were scored from severely disagree to highly agree. TPACK comprehension was considered satisfactory if scores above three.*

Results/Findings: *Analysis of the data revealed that teachers exhibited a favorable*

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

attitude toward TPACK knowledge. However, subject matter competence and classroom technology use should be improved. The findings show that secondary schools should focus on professional development to improve teachers' technology and content expertise.

Future Research Direction: *Future studies should examine how educational background, teaching experience, and professional development opportunities affect instructors' TPACK. Comparative research across districts or regions may reveal TPACK and educational practices differences. Longitudinal studies could examine how TPACK training affects teaching and student results over time.*

Keywords: Technological_Knowledge, Pedagogical_Knowledge, Pedagogical Content knowledge & technological Content knowledge.

Introduction

Numerous studies have revealed the main problems with Pakistan's educational system over the past few decades. Numerous traits have been cited in the literature, but it has usually been agreed upon that Pakistan's instructors are deficient in quality due to a lack of professional development (NPST, 2009). A country's human resource base, quantity, and quality determine its socioeconomic progress. How effectively this essential ingredient for the sustained development of society is provided depends on the efficacy of the educational system, in which the teacher is a universally predictable vital factor. Most teacher education institutes in Sindh pose risks to their teachers, especially the affiliated colleges and universities where insufficient numbers of highly qualified professionals teach specific subjects (Mishra & Koehler, 2006).

In today's technologically advanced world educational reforms are necessary to strengthen teacher preparation programs and elevate the degree of knowledge and skill educators hold. The teacher education institutions in Pakistan are working hard to improve their curriculum; nevertheless, they face numerous challenges, including the need for more highly educated and competent instructors. Numerous teacher education institutions actively train educators at various levels. Like many other countries, Pakistan's teacher education institutes provide the main frameworks for teacher growth through the teachers' professional development program (Qazi, Rawat, & Thomas, 2012).

Pakistani teacher education institutions must meet international standards. Consequently, they suggested that aspiring teachers be ready for the inevitable situations that could occur in the

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

classroom. Despite the Pakistani government's efforts to encourage technology integration in education, the NEP (2009) argues that educators should use this instrument better in the classroom. The 2009 National Education Policy of Pakistan articulated a strategic objective. To support the development of teachers' abilities and confidence in integrating technology into their lessons contend that teacher professional development in ICT must be given priority right now (Ali, et al., 2023: Ali, et al., 2020; Ali, et al., 2023). The constantly changing goals of education, coupled with changes in the apparent quality of programs and a better understanding of teachers' learning and thought processes, have led to discoveries about the impact of teachers' professional development and the best approaches to improve their knowledge and abilities (Jabeen, Ali, & Ahmad, 2023). The most crucial thing is for educators never to stop learning. Professional development for educators strengthens their pedagogical knowledge and skills in topic, teaching methodology, and technical proficiency, so improving their teaching practices (Ali, Ahmad, & Sewani, 2022; Ahmad, Rashid, & Ali, 2023). Educators can benefit from these three aspects of their knowledge. The rise of technology integration in education is the most significant development in this new field. As a result, educators must equip themselves with the technological know-how required to enhance their classroom instruction methods. Ali, Shah, and Ahmad, (2023) asserts that incorporating technology into instruction allows teachers to meet the needs of students who are already proficient with electronic devices.

Furthermore, it is an effective teaching aid in circumstances involving every student in the educational journey is imperative. According to Halverson and Collins (2018), technology use promotes the idea that incorporating digital tools into the classroom opens up new avenues for curriculum development and improvement as well as for school improvement. Programs for teacher education equip educators to handle the demands of the teaching profession. Educators need to be able to adjust to the numerous technological advancements in education (Abanobi & Abanobi, 2017; Ali, et al., 2023).

Teachers establish a classroom atmosphere. Teachers need to understand how technology can support them in their work. Teaching is a random process that requires making connections between facts. According to Koehler and Mishra (2009), teachers are forced to adapt and learn in complex, dynamic classroom environments. Knowing the subject, teaching strategies, and student thinking and learning is also critical. Teachers must use technology to help students succeed (Mishra & Koehler, 2006). Teachers should use TPACK, since it establishes

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

technological integration, instructional techniques, and subject information in the classroom. Teachers employed in secondary education possess limited Technological, Pedagogical, and Content Knowledge (TPACK) expertise. This study investigates secondary school teachers' content and pedagogical and technological expertise in Karachi, Pakistan. So, this research will highlight the perceptions of teachers about their Technological Pedagogical and Content Knowledge in Karachi Pakistan.

Related Literature Review

The PCK extended framework of teacher knowledge (TPACK), created by Koehler and Mishra (2005) and Shulman (1986), serves as the theoretical foundation for this study. The standards for today's graduating class have changed regarding their technical and pedagogical content knowledge (TPACK). According to Shulman (1986), pedagogy and content were two distinct ideas in the past. In the late 19th and early 20th centuries, there was no such thing as pedagogy, and by the 1980s, content had become obsolete. In 1986, Shulman established the concept of "pedagogical content knowledge" (PCK) as an alternative to the existing approach. Prior research has examined the correlation between the various areas of the Technological Pedagogical Content Knowledge (TPACK) paradigm. For instance, Archambault and Crippen (2009) establish the teachers needed to be more confident in their use of technology despite their positive opinions toward pedagogy, content, and pedagogical materials. The TPACK framework highlights the interconnected domains of technology and content, as well as technology and pedagogy. According to Chai et al. (2010), pedagogical, content, and technology knowledge are essential within the TPACK framework. In order to complete the TPACK framework, teachers must develop technology-mediated instruction (Suleiman & Sharif, 2023).

Mishra and Koehler (2006) conceptualized TPACK as a framework that builds upon Shulman's (1986) concept of CK: Efficient technology relies on the representation of concepts and the use of pedagogical strategies to teach content constructively. Understanding what makes a concept difficult or easy to learn is crucial, as is utilizing technology to address students' challenges. These factors are all essential for improved teaching. Additional prerequisites involve understanding students' existing knowledge and epistemological frameworks and proficiency in using technology to enhance and expand upon prior knowledge. The higher education context has unique issues for teachers, according to Mitchell, Agle, and Wood, (1997), since

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

half of all professors in higher education are adjuncts mainly employed for their topic area knowledge or CK. When Shulman (1986) initially presented the idea of CK, he used this knowledge base also referred to as subject matter expertise and explained the paradigm, divided into CK and PK, during a debate between legislators and administrators on teacher professional certification. Shulman (1986) went on to say that a more thorough theoretical framework is needed to explain the relationship between CK and PK. He defined content knowledge as "the amount and organization of knowledge in the teacher's mind and that there are ways of representing that knowledge for students" (CK). A fundamental concept of pedagogy is needed, regardless of the sort of faculty that may be trained. He asserted that the first step in teaching is to comprehend what must be learnt and how it must be taught. Shulman proposed this theory (Saba, Shanzay, & Elshamy, 2023). A connection or correlation between CK and PK was initially proposed by Shulman (1987). This relationship, frequently represented as two intersecting circles, is the foundation upon which the PCK is built.

According to Shulman (1987), the interaction between different types of content knowledge and instructional practices occurred in teachers' minds. One of the most important objectives of the research that was carried out was to determine which behaviours and tactics employed by teachers are most likely to result in increased levels of achievement among students. In this remark, content and PK are connected to the concept of effective teaching. He concluded that it would be impractical to handle CK and PK individually. The conceptual framework for integrating educational technology with pedagogy, also known as TPACK, was developed by Koehler and Mishra (2005). This paradigm was founded on Shulman's (1987) claim of pedagogical computational knowledge. Within this approach, technological competence is recognized as an essential requirement for teachers who wish to incorporate technology into their lectures. A new junction is created due to the incorporation of technological knowledge, which ultimately leads to the development of TPACK. This paradigm was developed due to Mishra and Koehler's (2006) five-year study on faculty development and teacher professional development in higher education. According to Mishra and Koehler (2006), the focus of technology research at the time was less on "what teachers need to know in order to incorporate technology into their teaching appropriately" and more on how technology was integrated into the educational process. This was because technology was not yet widely integrated into the classroom and development of teachers (Ali, et al., 2023; Ali, Ahmad, & Sewani, 2022; Ahmad,

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

Ali, & Sewani, 2021). Through the consideration of technology as interrelated and the beginning of the process of specifying how educational technology integrates into pedagogical activities, Mishra and Koehler (2006) established Shulman's (1987) model of program-centered learning (PCK).

Mishra and Koehler (2006) looked at the pairwise interrelationships that lead to three base components, three intersecting pairs, and the ultimate consolidation of the three pairs into the resulting triad of TPCK. The results of this investigation shed light on the complex interactions between the three fundamental components. According to Mishra and Koehler (2006), the following has been determined to be the result: The technology-perception and comprehension (TPCK) framework is the cornerstone of effective technology-enhanced instruction. This framework necessitates an understanding of students' prior knowledge, epistemological ideas, and their utilization of technology (Nawaz, Noor, & Ahmed, 2023). It is also necessary to have an understanding of how concepts are represented through technology, pedagogical strategies that make use of technology to teach content constructively, an understanding of what makes concepts difficult or easy to learn, and an awareness of how technology can help address some of the challenges that students face (Ahmad, Sewani, & Ali, 2021; Ali, Ahmad, & Sewani, 2022).

Furthermore, Mishra and Koehler (2006) state that "no single technological solution applies to every teacher, every course, or every view of teaching." This is a statement that many other researchers support. There is a compelling way of thinking about successful technology integration, particularly successful technology integration into educational environments (Polly & Brantley-Dias, 2009; Sharik & Martin, 2019). The TPACK paradigm provides this approach to thinking. Because the framework offers a complex ecosystem, they agree that additional research should focus on the intricate relationships between the many TPACK components. They concluded that there is evidence to imply that learning technology is less successful or ineffective when the objectives are unclear and the technology's emphasis is diffuse.

In order to determine if a concentrated six-week sequence of in-person and online educational technology courses affected in-service teachers' ideas about instruction, technology, and the TPACK concept (Shin et al., 2009). As was previously noted, a teacher's expertise and experience impact their instructional leadership and actions in the classroom (Ahmad & Hamid, 2021; Ahmad, Thomas, & Hamid, 2020).

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

The authors assert that a conceptual analysis is frequently performed to support a word's or concepts universal understanding. As per Cox and Graham (2009), PCK was "content specific pedagogy and not a general knowledge of pedagogical methods," contrary to what Shulman (1987) had proposed. Cox and Graham (2009) also mentioned three problems in their conclusions. At first, they thought using the newly developed model and specific criteria to carry out thorough case studies with teachers currently working. Furthermore, examining the teacher's grade and TPACK proficiency levels is imperative. Furthermore, it is imperative for teacher training programmes to fully grasp the process by which instructors develop their Technological Pedagogical Content Knowledge (TPACK), especially in the context of secondary school. In reviewing two decades of policy papers on integrating technology into K-12 education in the United States, Culp et al. (2005) referenced the 1983 report titled "A Nation at Risk" by The National Commission on Excellence in Education. The report said that it is essential for all high school graduates to possess both knowledge and skill in operating the latest generation of computers (Oad, & Niazi, 2021). Rather than focusing on the requirements of the students in relation to the curriculum, many teachers' technological techniques tend to start and arrange teaching efforts based on the technology being used. Teachers need to understand the intricate relationships between various technologies and, in particular, the benefits and drawbacks of each technology to help students understand how specific technologies either help or impede. To address the intricate interplay of TPACK, pre-service or in-service education and training must be balanced (Harris et al., 2009; Ahmad, Bibi, & Imran, 2023; Ali, Ahmad, & Sewani, 2022).

Comprehending teachers' Technological Pedagogical Content Knowledge (TPACK) is essential for successful integration of technology in classrooms. This study makes a valuable contribution to the enhancement of teacher preparedness and competency in using technology for teaching and learning by evaluating teachers' perceptions and highlighting areas that require development. Both studies share the common objective of enhancing educational quality and outcomes in Pakistan. They do so by tackling obstacles associated with the integration of technology and the training of teachers, albeit within distinct educational settings and contexts (Phulpoto, Oad, & Imran, 2024).

Methodology

Utilizing a survey sample derived from questions posed using the descriptive approach, the

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

researcher obtained information about the topic of study. This researcher discovered the opinions of public secondary school teachers regarding their understanding of TPACK. All male and female public secondary school teachers in District South Karachi were the study's population. One hundred male and female secondary school teachers were randomly recruited from the South Karachi district as a sample. Examining the teachers' proficiency in TPACK was conducted primarily through a survey questionnaire consisting of 23 research questions. One of 100 questionnaires was given to each respondent, who was instructed to carefully read the statements and choose the appropriate response on a five-point Likert scale, where one indicated "strongly disagree." Two indicate disapproval, three neutralities, and four and five firm agreements. The research questionnaire was divided into two pieces. The first part of the questionnaire was designed to gather demographic information on teachers, including their gender, and the second part was made to evaluate instructors' TPACK expertise. Therefore, it was a good fit for this study. The instrument was piloted on 24 male and 76 female secondary school teachers in District South Karachi after the face validity was confirmed by expert opinion. The quantitative research approach was used in this study, and crucial phases were pre-planned. The supervisor gave his or her approval for the questionnaire's creation. The questionnaire was constructed using Koehler and Mishra's TPACK model. In-person visits to the secondary schools were used to collect data. The researcher visited the school after receiving permission from the concerned school head and the appropriate authorities. Teachers were given guidelines regarding the questionnaire. Data analysis was done using descriptive statistics of the participants' frequency and percentage distribution.

Data Analysis of Study

Once the screening procedure was finished, the collected data was loaded into SPSS version 22 to calculate the frequency, percentage, and mean distribution.

Demographics

The demographic information of the individuals who participated in the research is presented in Table 1, which comprises the various demographics. Among the instructors that participated in this study, the table reveals that just 26% of male and 74% of female instructors did so. Furthermore, a respectable number of teachers (38%) had between ten and fifteen years of experience in the classroom, and the majority (41%) qualified for B.Ed. degree.

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

Table 1:

Demographics		Frequency	Percent
Gender	Male	26	26%
	Female	74	74%
	Total	100	100%
Experience	5-10 Yrs	26	26%
	10-15 Yrs	38	38%
	15-20 Yrs	36	36%
	Total	100	100%
Academic Qualification	Graduate	25	25%
	Master	18	18%
	B.Ed.	41	41%
	M.Eds.	16	16%
	Total	100	100%

Table 2 Technological Knowledge (T_K)

S. No	Items	N	Mean	Std. Deviation
1.	T-K1	100	4.450	0.817
2.	T-K2	100	4.400	0.915
3.	T-K3	100	4.350	0.920
4.	T-K4	100	4.200	0.845
5.	T-K5	100	4.250	0.856
Technological Knowledge Overall		100	4.330	0.820

Table 2 presents teachers' perspectives about TPACK in secondary schools. This item, designated "TK1," received a maximum rating of 4.450 from respondents. TK2 (4.400), TK3 (4.350), TK4, (4.200), and TK5 (4.250) subsequently follow. The respondents obtained an overall mean score of 4.330 when queried about the technological knowledge in secondary schools of the participants.

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

Table 3 Pedagogical Knowledge (P_K)

S. No	Items	N	Mean	Std. Deviation
1.	PK_1	100	4.480	0.956
2.	PK_2	100	4.390	0.988
3.	PK_3	100	4.270	0.933
4.	PK_4	100	4.265	0.879
5.	PK_5	100	4.255	0.946
Overall Pedagogical Knowledge		100	4.332	0.806

Table 3 presents the findings of a survey on secondary school teachers' perception of pedagogical knowledge. The respondents rated item "PK_1" the highest, with an average score of 4.480. Following that, PK2 received a score of 4.390, PK3 received a score of 4.270, PK4 received a score of 4.265, and PK5 received a score of 4.255. The instructors' evaluation of the Pedagogical knowledge element of TPACK yielded a mean score of 4.332.

Table 4 Pedagogical Content Knowledge (PCK)

S. No	Items	N	Mean	Std. Deviation
1.	PCK1	100	4.470	0.981
2.	PCK2	100	4.390	0.965
3.	PCK3	100	4.335	0.946
4.	PCK4	100	4.220	0.952
Pedagogical Content Knowledge Overall		100	4.353	0.870

Table 4 demonstrates that educators believe about pedagogical content knowledge of secondary school teachers. With a mean score of 4.470, the item "PCK_1" received the highest points from the responders. "PCK_2," which had a score of 4.390, PCK_3 (4.335), and PCK_4 (4.220) came next. The average participant score for the pedagogical content knowledge in secondary education system was 4.353.

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

Table 5 Technological Content Knowledge ***(TCK)***

S. No	Items	N	Mean	Std. Deviation
1	TCK1	100	3.940	0.889
2	TCK2	100	3.930	0.879
3	TCK3	100	3.920	0.894
4	TCK4	100	3.910	0.867
Technological Content Knowledge Overall		100	3.925	0.877

According to Table 5, the item "TCK_1" received the highest score from respondent's opinions regarding technological content knowledge in Karachi's secondary schools. Its mean score was 3.940, while the next highest scores went to TCK_2 (3.930), TCK_3 (3.920), and TCK_4 (3.910). A mean score of 3.925 indicates how teachers feel overall about technological content knowledge in secondary schools.

Table 6 Technological Pedagogical and Content Knowledge (TPACK)

S. No	Items	N	Mean	Std. Deviation
1.	TPCK-1	100	4.460	0.889
2.	TPCK-2	100	4.455	0.886
3.	TPCK-3	100	4.350	0.877
4.	TPCK-4	100	4.315	0.863
5.	TPCK-5	100	4.305	0.867
Technological Pedagogical and Content Knowledge Overall		100	4.377	0.863

Table 6 presents the teachers' opinions regarding TPACK in Karachi's secondary schools. Item TPCK_1 was ranked highest by respondents, with a mean score of 4.460. Item TPCK_2 (4.455), item TPCK_3 (4.350), TPCK_4 (4.315), and item TPCK_5 (4.305) came after it. With a mean score of 4.377, teachers' overall thoughts about TPACK in secondary schools in Karachi, Pakistan.

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

Table 7 Overall Factors of TPACK

S. No	Factors	N	Mean	SD	Decision.
1.	Technological_Knowledge	100	4.330	0.820	(S-A)
2.	Pedagogical_Knowledge	100	4.332	0.806	(S-A)
3.	Pedagogical_Content_Knowledge	100	4.353	0.870	(S-A)
4.	Technological_Content_Knowledge	100	3.925	0.877	(S-A)
5.	TPCK	100	4.377	0.863	(S-A)

Table 7 shows how public secondary school teachers feel about Technological Pedagogical and Content Knowledge. With a mean score of 4.353, respondents put the factor "Pedagogical Knowledge" at the top of the list. It was followed by "lack financial resources "(4.275), "lack of school supervision" (4.206), "lack of co-ordination" (4.201), and "curriculum issues" (3.931).

Findings and Discussion

The study's conclusions provide insight into how teachers see technological pedagogy and subject-matter expertise. Being proficient in TPACK enhances student learning and shows that teachers are confident. The following summarizes the study's main findings on teachers' perceptions of TPACK. In this survey, 24% (n=24) of the participants are men, and 76% (n=76) of the participants are women, making up 100% (n=100) of the total respondents. Of the total respondents in the current survey, 26% are between the ages of 20 and 30, 38% are between the ages of 31 and 40, and 36% are 41 years of age and beyond. According to the study, 24% of the participants have earned a graduate degree (B.A. or B.Sc.), 18% have a master's degree, 41% have a bachelor's degree in education, and 16% have an M.Ed. According to the current study, 26% of participants have five to ten years' experience, 38% have ten to fifteen years' experience, and 36% have fifteen to twenty-five years or more experience overall.

The majority of poll respondents concurred that teachers are capable of handling their technical issues. TK1. According to most survey respondents, teachers know that TK2 may pick up technology quickly. Most survey respondents said teachers should stay current with crucial new technologies, such as TK3. Most survey respondents concurred that teachers must possess the

technical know-how to employ technology in TK4. Most poll respondents said teachers have had enough chances to deal with various technologies, including TK5. Most poll respondents concurred that teachers should use PK1 to evaluate students' performance in a classroom. Most survey respondents concurred that educators can modify their methods to suit the needs of various students. PK2. The majority of poll respondents concurred that teachers can evaluate students' learning in a variety of methods. PK3. Most survey respondents concurred that teachers know typical student misconceptions and understandings. PK4. Most respondents to the study acknowledged their ability to plan and execute effective classroom management. PK5. Most survey respondents concurred that they are skilled at choosing instructional strategies to teach students mathematical thought and learning. PCK1. Most survey respondents concurred that they can choose instructional strategies that effectively direct students' thinking and literacy development. PCK2. Most survey respondents concurred that they know how to choose efficient teaching strategies to direct students' scientific thinking and learning. PCK3 The majority of survey respondents concurred. They are skilled at choosing efficient teaching strategies to direct students' thinking and social studies learning. PCK4 Most survey respondents concurred that they know the technology that can be used to comprehend and do mathematical tasks. TCK1. Most survey respondents concurred that they know the tools available for literacy comprehension and practice. TCK2. Most survey respondents concurred that they know technologies that can be used to comprehend and conduct science. TCK3 Most survey respondents concurred that they know technologies that can be used to comprehend and complete social studies tasks. TCK4. Most survey respondents concurred that they can integrate technology, mathematics, and instructional strategies in their lessons. TPACK1. Most survey respondents concurred that they can integrate technology, literacy, and instructional strategies in their lessons. TPACK2. Most survey respondents concurred that they can effectively integrate science, technology, and instructional strategies into their lessons. TPACK3. The majority of respondents to the survey agreed that teachers can choose educational tools to complement their TPACK4 lessons. Most poll respondents concurred that they can select technology to improve a lesson's content. TPACK7.

The following is a ranking of the Technological, Pedagogical, and Content Knowledge that public secondary school teachers assigned. Respondents ranked "Pedagogical Knowledge" as the most critical component, giving it a mean score of 4.353. Following this, "Pedagogical

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

Knowledge" came in at 4.332, "Technological Knowledge" at 4.330, "Technological Content Knowledge" at 3.925, and the overall TPACK mean score at 4.377, indicating that participants were in significant agreement about the use of TPACK in the classroom.

Conclusion

The performance outcomes of the teacher's Perceptions of topic knowledge and technology pedagogy indicate that most teachers use TPACK. The study's conclusions are beneficial and encouraging for teachers. According to Vrasidas and McIsaac (2001), constructivism is based on the use of cultural and technological means for knowledge building, communication, and information exchange. Although "TPACK theory may not exist in practice, "three factors: pedagogical content knowledge, technological-curricular content knowledge, and technological knowledge" was acknowledged. When seasoned teachers think about how to teach a particular subject, it can be challenging to discern between content, pedagogy, and technology because teaching strategies are frequently regarded as a component of the material, which is especially true When considering an online setting (Archambault & Barnett, 2010; Ali, et al., 2020; Ali, et al., 2023). Based on their assessments of teachers' competencies and performance, most instructors believed most teachers were well-versed in technological pedagogy and subject matter (Ahmad, Rashid, & Ali, 2023). As revealed by the study, implementing TPACK can enhance instructors' efficiency in the classroom. The secondary school teacher might utilize his distinct aptitudes to convey knowledge. Shulman (1986) and CK, Mishra, and Koehler (2006) assert that it is crucial for effective teaching with technology. Proficiency in understanding the conceptual representation of technologies, employing pedagogical strategies that effectively utilize technologies for content instruction, awareness of the challenges and facilitators of concept acquisition, and understanding how technology can mitigate student difficulties are all essential. Additionally, familiarity with students' existing knowledge and skepticism towards technology is crucial (Ahmad, et al., 2023). The study findings indicated that secondary school teachers demonstrated the highest proficiency in subject matter and technical and pedagogical comprehension.

Recommendations

Based on what the study found and what it concluded, the following suggestions were made:

- The critical component to successfully achieving the learning objectives is TPACK. It is a key

that makes understanding possible for the kids. In order to accomplish this goal, educators must comprehend how to employ technology in a way that can support students' academic performance.

- Teachers should learn to utilize technology appropriately in specific situations and with discipline as part of their training. More emphasis should be put on understanding the subject covered in class and utilizing the appropriate technologies.
- It is widely accepted that public schools do not have enough technical resources, which affects students' learning outcomes. Stack holders are required to provide technological resources to public schools.
- The study recommended placing greater emphasis on TPACK-based teacher training programs.
- Because this study was quantitative and just descriptive, it is recommended that similar studies be conducted using a qualitative or mixed-methods research methodology.

References

Abanobi, C. C., & Abanobi, C. H. (2017). Teacher Education in Nigeria; Challenges and way forward in the global community. *International Journal for Social Studies*, *3*(8), 39-46.

Ahmad, N., Ali, Z., Saba, F., Yaqoob, N., & Ullah, N. (2023). Teachers' Perceived Knowledge of Self-Concept and Its Influence on Their Teaching Practices. *International Journal of Multicultural Education, 25*(2), 152-166

Ahmad, N., Ali, Z., & Sewani, R. (2021). Secondary School Teachers' Perceptions of their Head Teachers Instructional Leadership and its Effect on Teachers' Professional development in Karachi Pakistan. *Journal of Development and Social Sciences, 2*(3), 362-377.

Ahmad, N., Bibi, N., & Imran, M. (2023). Effects of teacher's motivation on students' academic performance at public secondary schools in Karachi Pakistan. *AITU Scientific Research Journal*, *1*(2), 20-32.

Ahmad, N., & Hamid, S. (2021). An Analysis of Instructional Leadership Practices of Primary School Head-Teachers on Teacher Effectiveness: A Qualitative Study of Teachers' Perceptions. *Pakistan Languages and Humanities Review, 5*(2), 193-209. http://doi.org/10.47205/plhr. 2021(5-II)2.16

Ahmad, N., Rashid, S., & Ali, Z. (2023). Investigating Primary School Teachers' Perceptions about Professional Development and its Impact on Students Achievement. *Journal of Social Sciences Review*, *3*(1), 809-823.

Ahmad, N., Sewani, R., & Ali, Z. (2021). Impact of Head-teachers' Instructional Approaches on Teachers competencies at Campus Schools in Karachi. *Pakistan Social Sciences Review, 5*(4), 131-146

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

Ahmad, N., Thomas, M., & Hamid, S. (2020). Teachers Perception Regarding the Effect of Instructional Leadership Practices of Primary School Head teachers on Teacher Effectiveness. *Journal of Research and reflections in Education*, *14*(2), 231-248.

Ali, Z., Ahmad, N., & Sewani, R. (2022). Examining Elementary School Teachers' Professional Proficiencies with Technology Integration and Their Impact on Students' Achievement. *Journal of Positive School Psychology*, *6*(7), 2950-2968

Ali, Z., Ahmad, N., Rehman, H. U., Ullah, N., & Zahra, T. (2023). Investigating Teacher Educators' Perceptions on Technology Integration in Teacher Preparation Programs. *Journal of Social Sciences Review*, 3(2), 341-355. https://doi.org/10.54183/jssr.v3i2.272

Ali, Z., Rehmat Shah, D., & Ahmad, N. (2023). Determining the Science, Technology, Engineering, and Mathematics Teaching Capabilities of Educators in Karachi, Pakistan. *Journal of Positive School Psychology*, *6*(7), 11-28.

Ali, Z., Thomas, M., Ahmed, N., Ahmed, I., & Ahmed, I. (2020). Assessment of Pre Service Teacher's Perceptions on Technological Pedagogical and Content Knowledge (TPACK) in Karachi Pakistan. *International Journal of Scientific & Engineering Research*, *11*(3), 1402-1407.

Ali, Z., Ullah, N., Ahmad, N., Yaqoob, N., & Saba, F. (2023). Teachers' Perceptions of Curriculum Change and the Need of Professional Development for Effective Teaching Practices. *Multicultural Education*, *9*(1). 83-90

Ali, Z., Younis, S., Ahmad, N., Saba, F., & Ullah, N. (2023). Teachers' Perspective of Technology Integration Effects on Students Learning At University Level. *GRADIVA*, *62*(5), 29-38.

Archambault, L. M., & Barnett, J. H. (2010). Revisiting technological pedagogical content knowledge: Exploring the TPACK framework. *Computers & Education*, *55*(4), 1656-1662.

Archambault, L., & Crippen, K. (2009). Examining TPACK among K-12 Online Distance Educators in the United States. *Contemporary Issues in Technology and Teacher Education*, *9*, 71-88.

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*, 63-73.

Collins, A., & Halverson, R. (2018). *Rethinking education in the age of technology: The digital revolution and schooling in America*. Teachers College Press.

Cox, S., & Graham, C. R. (2009). Using an elaborated model of the TPACK framework to analyze and depict teacher knowledge. *TechTrends*, *53*(5), 60-69.

Culp, K. M., Honey, M., & Mandinach, E. (2005). A retrospective on twenty years of education technology policy. *Journal of Educational Computing Research*, *32*(3), 279-307.

Government-of-Pakistan. (2009). *National professional standards for Teachers in Pakistan*. Islamabad: Policy and Planning Wing.

Harris, J., & Mishra, P. K., & Koehler M. (2009). Teachers' technological pedagogical content

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

knowledge and learning activity types: Curriculum-based technology integration reframed. *Journal of Research on Technology in Education, 41*(4), 393–416.

Jabeen, M., Ali, Z., & Ahmad, N. (2023). Factor Effecting on Quality Teaching Learning at Public Sector Schools in Karachi Pakistan. *Journal of Educational Research and Social Sciences Review (JERSSR), 3*(1), 92-98.

Koehler, M. J., & Mishra, P. (2005). What Happens When Teachers Design Educational Technology? The Development of Technological Pedagogical Content Knowledge. *Journal of Educational Computing Research, 32*, 131-152.

Koehler, M. J., & Mishra, P. (2009). What Is Technological Pedagogical Content Knowledge? *Contemporary Issues in Technology and Teacher Education, 9*, 60-70

Mishra, P., & Koehler, M. J. (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

Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of management review*, *22*(4), 853-886.

Nawaz, A., Noor, Z., & Ahmed, T. (2023). Russian-Ukraine Conflict in the New Global Order and Its Impact on the Indo-Pak Region: A Critical Analysis. Journal of Indian Studies, 9(2), 193-206.

Polly, D., & Brantley-Dias, L. (2009). TPACK: Where do we go now? *TechTrends*, *53*(5), 46.

Phulpoto, S. A. J., Oad, L., & Imran, M. (2024). Enhancing Teacher Performance in E-Learning: Addressing Barriers and Promoting Sustainable Education in Public Universities of Pakistan. *Pakistan Languages and Humanities Review, 8(1),* 418-429.

Qazi, W., Rawat, K. J., & Thomas, M. (2012). The role of practicum in enhancing student teachers' teaching skills. *American Journal of Scientific Research, 44*(12), 44-57.

Oad, L., & Niazi, S. (2021). Effects of The Organizational Factors on Teachers' Retention: Perceptions of Private Secondary School Teachers of Lyari Town. Pakistan Journal of Educational Research, 4(1). https://doi.org/10.52337/pjer.v4i1.150.

Saba, F., Shanzay, M., & Elshamy, E., (2023). Examining the Leadership Abilities of Head Teachers in Public Sector Primary Schools at Karachi Pakistan. *AITU Scientific Research Journal, 2*(1), 19-25.

Shin, T., Koehler, M., Mishra, P., Schmidt, D., Baran, E., & Thompson, A. (2009, March). Changing technological pedagogical content knowledge (TPACK) through course experiences. In *Society for information technology & teacher education international conference* (pp. 4152-4159). Association for the Advancement of Computing in Education (AACE).

Suleiman, A. U., & Sharif, H. B. (2023). Knowledge, Attitudes and Perception of Some Selected Communities in Kaduna State towards Emerging Viral Zoonoses. *AITU Scientific Research Journal, 1*(4), 1-16.

Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard*

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7

educational review, *57*(1), 1-23.

Shulman, L.S. (1986) Those Who Understand: Knowledge Growth in Teaching. *Educational Researcher, 15*, 4-14. http://dx.doi.org/10.3102/0013189X015002004

Vrasidas, C., & McIsaac, M. S. (2001). Integrating technology in teaching and teacher education: Implications for policy and curriculum reform. *Educational Media International*, *38*(2-3), 127-132.

Zamir, S., & Thomas, M. (2019). Effects of University Teachers' Perceptions, Attitude and Motivation on Their Readiness for the Integration of ICT in Classroom Teaching. *Journal of Education and Educational Development*, *6*(2), 308-326.

How to Cite: Ghaffar, R., Khoso, F. J., & Sahito, Z. H., (2024). Assessing Secondary School Teachers' Perceptions of Their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP), 3(1),* 119-137.
https://doi.org/10.62681/sprypublishers.scep/3/1/7