



Challenges Faced by B.Ed. (Hons.) Elementary Prospective Teachers for TPACK Implementation in Practicing Teaching During COVID – 19

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Abstract: This study aims to explain the challenges faced by B.Ed. (Hons.) elementary prospective teachers for TPACK implementation in practicing teaching during the COVID-19 pandemic. The study uses a phenomenological qualitative research approach. Twenty B.Ed.(Hons.) elementary 8thsemester prospective teachers from (IER), University of Punjab were purposively selected as samples. The researcher used Semi-structured interview protocols for the collection of data. Participants were mocked interview to ensure the validity of interview protocols. The data is analyzed by thematic analysis. The study concluded many challenges i.e. selection of technology aligned with goals of the lesson to be taught, execution of the technology integrated lesson plan, intermittent supply of internet, poor Wi-Fi speed, fluctuations in electric power supply, lack of skills in using digital devices and digital apps, uploading and downloading of materials in GCR, lack of students' engagement, assessment and evaluation while implementing TPACK. The study recommends that prospective teachers may be trained to implement technology integrated lessons and use Digital Devices and the latest digital Apps for implementing TPACK in practicing teaching.

Key Words: TPACK, Technology Integration, Digital Literacy (DL)

Introduction

The process of teaching and learning is based upon TPACK (Technological Pedagogical and Content Knowledge) and demands an alignment between technology integration, pedagogy and content knowledge (Mishra & Koehler, 2006; Roblyer & Doering, 2013). According to Lowyck (2014), the application of digital devices equipment and knowledge about the application of scientific devices are regarded as technology integration. Many previous researches have reported challenges, hindrances and barriers faced by the teachers for technology integration during instructions (Ertmer 2005; Georgina & Olson, 2008;

Georgina & Hosford, 2009). According to Hughes (2005) innovative use of technology creates learning opportunities for students where instructors blend their technological, pedagogical and content knowledge altogether, thus developing their skills for technology integration during the teaching and learning process. Song (2016) mentioned technology integration practices as a key component in teacher education programs as they digitally literate prospective teachers. It prepares prospective teachers to work in a digital environment therefore, they can develop their digital evaluation and critical skills to work in a digital environment. Technology integration requires that teachers must be familiar with

Citation: Shahid, F., & Abiodullah, M. (2022). Challenges Faced by B.Ed. (Hons.) Elementary Prospective Teachers for TPACK Implementation in Practicing Teaching During COVID – 19. *Global Educational Studies Review*, VII(II), 156-166. [https://doi.org/10.31703/gesr.2022\(VII-II\).15](https://doi.org/10.31703/gesr.2022(VII-II).15)

diverse pedagogical approaches. Therefore, teachers can effectively use technology for the development of 21st century skills among students, as every teacher education program must develop 21st century skills among prospective teachers ([Voogt et al., 2013](#)). TPACK framework highlights an alignment or connection between the contents, pedagogy and technology integration during classroom practices by the prospective teachers.

TPACK informs a strong understanding of how technology integration practices digitally literate prospective teachers, thus developing their digital skills. Therefore, technology integration and pedagogical and content knowledge do not exist in vacuity but begin during specific learning (Koehler et al., 2013). TPACK framework provides a theoretical lens that describes that teachers can design and integrate technology effectively during instructions. It also guides teachers on what kind of knowledge is essential for effective pedagogical practices during teaching and learning in a technological learning environment ([Lehiste, 2015](#); [Lin et al. 2013](#); [Mishra and Koehler 2006](#);2009).

Technology integration during classroom instructions depends on a major contributing factor i.e. preparation of prospective teachers that how they have been prepared for the integration of technology during practice ([Hughes, 2005](#); Maradiegue, 2012). This study investigated various challenges and hindrances faced by B.Ed. (Hons.) elementary prospective teachers for technology integration and TPACK implementation in the Pakistani context. Previous researches have highlighted many difficulties and challenges in the implementation of TPACK and technology integration by prospective teachers. This study aims to explore the challenges and hindrances faced by B.Ed. (Hons.) elementary teachers for the integration of technology during their own classroom practices or practice teaching. This study is unique on its own as it represents a case. Therefore, it is imperative to conduct this study to explore the challenges and hindrances

faced by B.Ed. (Hons.) elementary prospective teachers. This study provided relevant research data in order to put forward the recommendations to the Government of Punjab, Higher Education Department to make necessary reforms as there were very few studies that had investigated the use of educational technology and technology integration during teaching practice in the Pakistani context.

This study explored the challenges and hindrances faced by B.Ed. (Hons.) elementary teachers for TPACK implementation during practice teaching. The major significance of the study was that the prospective teachers might have a better understanding of the difficulties of technology integration and it may help them to improve their technology integration skills for the teaching process. This study would be significant for the technology integration skill development of prospective teachers as well as for the in-service teachers improved classroom instructions and effective TPACK implementation.

There is a dire need to develop the skills of prospective teachers so that they can effectively integrate technology during teaching and learning process. Various teacher education programs have been designed across the globe to develop the teaching skills of prospective teachers as there is a shift in the teaching and learning process across the globe due to the pandemic COVID – 19. Academic activities have been shifted to online teaching and learning. Intensive use of technology has made possible the continuation of academics and other social life activities (online interaction and communication across the globe, video conferencing and online presentations, zoom meetings and etc.) in order to keep people safe from the coronavirus ([Wiederhold, 2020](#)). The present study attempts to explore the challenges and hindrances faced by B.Ed. (Hons.) elementary prospective teachers for the integration of digital and technological practices, TPACK implementation during their own classroom practices. For this purpose, the

study focused on different aspects of the problems, such as challenges and hindrances related to preparing and implementing technology integrated lesson plans, hindrances for technology integration during practice teaching, difficulties in using technology for classroom instructions, prediction regarding future challenges and hindrances while integrating technology during teaching. The following research question guided the study: What kind of challenges and hindrances B.Ed. (Hons) Elementary prospective teachers faced in TPACK implementation during their practice teaching?

Theoretical Background

TPACK is a framework that develops an understanding among teachers of the skillful use of technology during the teaching and learning process. Therefore, this framework provides a guiding alignment among the knowledge related to the use of technology, pedagogy for integrating technology and contents to be taught during classroom

practices. Therefore, this framework improves the competencies and skills of the teachers for effective use of technology during the process of teaching (Voogt et al., 2013).

Mishra and Koehler (2006) developed a technology integration framework on the basis of Shulman's work (1986). As they both believe that Shulman's work has no sufficient grounds for reflecting 21st century teachers' knowledge needs. Therefore, the third technological knowledge (TK) domain was added for preparing 21st century teachers with basic skills for integrating technology during the teaching process. As figure given below represents six knowledge domains i.e.

1. Technological knowledge (TK)
2. Pedagogical knowledge (PK)
3. Content Knowledge (CK)
4. Technological Pedagogical Content Knowledge (TPK)
5. Pedagogical Content Knowledge (PCK)
6. Technological Content Knowledge (TCK)

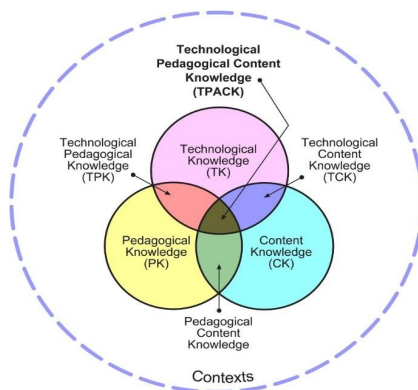


Figure 1. Technological Pedagogical Content Knowledge by Koehler & Mishra, (2009)

The alignment of above mentioned six domains altogether becomes today's TPACK. These six domains altogether produced the seventh domain as TPACK (Koehler & Mishra, 2009). Previous researches had described many challenges and hindrances faced by teachers i.e. challenges related to lack of access to sufficient digital devices, internet connectivity, incompatible software and lack of access to

various websites (Bauer & Kenton, 2005; Hershey et al., 2015; Sadaf et al., 2016; Stolle, 2008). Other reported hindrances were unavailability of technical support (Bauer & Kenton, 2005; Blackwell et al., 2014; Hershey et al., 2015; Stolle, 2008; Zhao et al., 2002) and administrative support for technology integration during instructions (Blackwell et al., 2014; Hershey et al., 2015; Sadaf et al.,

2016; Zoch et al., 2014). Some other reported hindrances were limited time frame for technology integration and restriction of the scripted lesson plan.

According to [Sprague & Katradis \(2015\)](#), many scholars have suggested a dire need to explore various instructional strategies for the integration of technology and skill development among prospective teachers. It was further urged by the Education department of the United States (2017) that there is a critical need to explore technology integration skills among prospective teachers. Teaching with the use of technology is a 21st century skill development challenges across the globe. According to Ramorola (2014), teachers have faced many challenges and hindrances to technology integration in the teaching and learning process. Some of them were: technophobia, an insufficient supply of technical/ digital resources, lack of availability of policy on technology, security and risk problems, inadequate time and computer illiteracy.

Technology integration is a skillful use of the latest technological devices and apps. It further refers to comprehension and application of the latest technology during classroom practices. Technology integration represents a teacher's decision regarding the selection of technology aligned with the goals of the lesson during classroom practices (Koh et al., 2014). The study believes that technology integration is a proficient application of technology and skillful use of the latest digital devices and digital apps. Therefore, the successful application of technology during the process of teaching and learning is based on intelligent decision-making for the selection of technology aligned with curriculum goals and contents.

Digital Literacy (DL) is an ability to read and navigate digital materials with fluency. Digital literacy is digital competence for describing electronic literacy ([Boechler et al., 2014](#)). The study believes that digital literacy is a skill or competence of an individual to read,

share, and edit digital information by using various digital apps.

Research Methodology

This study used a hermeneutic phenomenology qualitative research approach. The phenomenological studies provide the essence of the phenomenon. Such studies help in exploring the perspectives of those who have experienced the phenomenon. Does a phenomenological study aim to seek information in both terms of what was experienced? And how was it experienced? Thus, such studies could be used better to explain challenging problems (Teherani et al., 2015). This study was carried out at the Institute of Education and Research (IER) University of the Punjab Lahore, Pakistan. The purposive sampling technique was used for the categories to determine the participants as a sample among B.Ed. (Hons.) elementary prospective teachers. Many authors have suggested various sample sizes for conducting a phenomenological study. However, [Ellis \(2016\)](#) suggested a sample size between 6 and 20 individuals. Therefore, the study had selected twenty B.Ed. (Hons.) prospective elementary teachers purposively as sample who were enrolled in 8th semester of B.Ed. (Hons.) elementary program. Interview protocols were developed for the prospective teachers. A semi-structured interview was used as a tool to collect data for this study. For the achievement of in-depth information, questions were in open-ended form. The questions asked were about the challenges and hindrances faced by B.Ed. (Hons.) elementary prospective teachers (e.g. challenges faced by B.Ed. (Hons.) elementary prospective teachers for TPACK implementation during practice teaching i.e. preparation of technology integrated lesson plan and implementation of technology integrated lesson plan or teaching with technology). One mock semi-structured interview was conducted to ensure the validity and judgmental reliability of the tool. Data was collected by the researcher herself personally.

Data Coding and Analysis

Table 1. Distribution of Codes According to Sub–Theme 1

Challenges and Hindrances for Technology Integrated Lesson Planning and its Implementation.	Prospective Teachers N*
Selection of the contents according to the goals of the lesson	09
Selection of instructional strategies	10
Selection of technology integrated activities aligned with the goals of the lesson.	14
Disruptive availability of the internet.	20
Poor audibility of sound	08
Low level of students engagement	09
Low level of students' motivation and learning	06
Dealing with technology while sharing videos, digital photos, and presentations on shared screen, uploading of the instructional plan and etc...	20
Using Digital Devices during instructions	08
Using Digital Apps during instructions	03
Software compatibility and uncertain technical malfunctioning during instructions	04
Lack of skills to assess students' work or comments while teaching with technology	08
Time management	12

Table 2. Distribution of Codes According to Sub-theme 2

Challenges and Hindrances for Practicing Teaching.	Prospective Teachers N*
Poor supply of internet while practicing teaching	20
Rejoining of the online class by students	20
Repeated instructions	14
Uncertain malfunctioning of digital devices and digital apps	20
Lack of training for using technical gadgets	20
Lack of skill to take students' responses when teaching with technology especially online teaching	20
Lack of backup plan for technology integration during instructions	20

Table 3. Distribution of Codes According to Sub-theme 3

Challenges and Hindrances for Classroom Instructions.	Prospective Teachers N*
Lack of communication due to disruptive instructions	08
Load shedding of electricity	06
Fluctuated supply of internet	20
The use of selected technology later proved to be inappropriate	14
Discipline problems while teaching online	08
Problem with assigning and submission of online tasks	14
Poor interaction with the students, thus poor feedback achieved from students during instructions	14

Data Analysis

Data was Analyzed by Thematic Analysis.

Following Themes and Sub-themes were Being Emerged from the Data.

Table 4. Thematic Analysis

Themes	Sub – Themes	Evidences
Challenges and hindrances faced by TPACK implementation	Challenges and hindrances for technology integrated lesson planning and its implementation	<p>"We had faced many problems while implementing TPACK during our practice teaching, for example, selection of contents according to selected objectives, non- availability of continuous internet facility for making an instructional plan, poor audibility of sound to the students, student engagement, motivation, technology handling (playing of videos or showing off digital photos via the online shared screen), internet connectivity issue at both ends i.e. teacher and students, problem in uploading my instructional plan in GCR, electricity or disruption in power supply, charging of device or low battery of the device, selection of instructional activities for slow learners, there was no outdoor physical activity due to COVID – 19 so, it was very difficult to manage students in online activity, the problem with the microphone, aligned selection of technology, instructional strategies, time management for the selected activity, the problem with technology integration, sometimes lack of technical skills to operate digital Apps, lack of training at students end while studying with technology, lack of response from students through online teaching, selection of instructional strategies was challenging, the search of relevant digital instructional materials, inability to assess students activities during teaching and learning process off and even on the camera and many others issues related to teaching with technology." [Participant I,II,III ,IV,V,VI,VII, VIII,IX, X, XI,XII,XIII,XIV,XV,XVI,XVII,XVIII, XIX & XX]</p> <p>"We had faced many hindrances for example load shedding of electricity, drop or poor internet signals, issues related to online sharing of digital photos, distortion in playing videos for better understanding of pupils, loss of internet connection and absence from class sometimes students get disconnected from the online class, implementation of activity while teaching with technology, use of more efforts for students engagement, sudden error with technical gadgets, digital devices, apps, lack of training at students end while studying with use of technology (opening of the mic in GCR, sharing of the screen, camera usage and etc.), lack of skill of using digital App at students end thus, hinder their learning, lack of awareness about taking students responses during instructions via learning through technology online, lack of a backup plan for technology integration if it fails to achieve lesson goals and etc." [Participant I,II,III ,IV,V,VI,VII, VIII,IX, X,XI,XII,XIII,XIV,XV,XVI,XVII,XVIII, XIX &XX]</p> <p>"I have faced many difficulties, for instance, while presenting a chart in teaching English to my students, I have faced communication issue, students were unable to listen to my voice what I was teaching to them, in my view I had completed my lesson but I had to repeat my lesson again because I was disconnected, secondly I was not able to view comment section opened for student's opinion.</p> <p>Load shedding of electricity was also a serious issue. I had used examples instead of videos or animations all students were engaged. We have explained to students with the help of games too, for example my friend had given puzzle game to students before teaching CPU (central processing unit) brain of the computer. Similarly, I should think in a creative way. I can engage students in studies with the help of technology." [Participant I] "There was problem for handling digital devices and apps, disruption in communication with students and etc." [Participant I,VII,XI,XII,XIII,XVIII,XIX,XX] "There was another challenge of using selected technology i.e. playing of animated videos, animations, playing of recorded videos, distortion in mic, sound quality and inability</p>
Challenges and hindrances during practicing teaching		
Classroom instructions and difficulty in technology integration		

Themes	Sub – Themes	Evidences
		to listen comments from students, problem with submission of online tasks and assignments, noisy learning environment due to unmuting of mic by students and etc.” [Participant I,II,V,VII,VIII,XI,XII, XII, XIII,XV, XVII,XVIII,XIX,XX] “I had not faced any technological difficulty during instructions” [Participant IX]

Findings and Discussion

This study attempted to explore the challenges and hindrances faced by B.Ed. (Hons.) elementary prospective teachers for the implementation of Technological, Pedagogical and Content Knowledge (TPACK) during practice teaching.

Challenges and Hindrances Faced by B.Ed. (Hons.) Elementary Prospective Teachers

The participants of the study had mentioned a variety of challenges and hindrances to TPACK implementation during practice teaching. Participants had varied views about their challenges and hindrances to TPACK implementation. However, some common challenges were:

- Preparation of technology integrated lesson plan
- Execution of technology integrated lesson plan
- Practice teaching and TPACK implementation
- Classroom instructions with technology integration
- Teaching – learning process for both teachers and students

Preparation of Technology Integrated Lesson Plan

“It was challenging for B.Ed. (Hons.) elementary prospective teachers to prepare technology integration lesson plans for TPACK implementation. There was a lack of skill in selecting the contents regarding selected objectives. The selection of activities and teaching pedagogies aligned with the goals/objectives of the lesson as well as with the contents was challenging for prospective

teachers. There was no continuous supply of internet facility for the preparation of lesson plans. The selection of technology for teaching contents and achieving the goals of the lesson was very challenging for prospective teachers. Due to COVID – 19, technology handling, students, motivation, students’ engagement and time management for the successful implementation achievement of aligned goals and teaching and learning of contents via technology was challenging for prospective teachers. The handling of technology at both ends i.e. prospective teachers and students was challenging. The selection of activities and technologies aligned with the goals of the lesson was challenging. It was challenging to choose technology integrated activities for slow learners while planning instructions. As students were not engaged in physical classrooms or outdoor activities due to COVID – 19, Therefore, students were to teach through online classes. Therefore, careful selection of the technology and activities for teaching contents was crucial.

The involvement of the students in the process of teaching and learning via technology integration was challenging for prospective teachers. The uploading of instructional plan via GCR was challenging”. [Participant I,II,III ,IV,V,VI,VII, VIII,IX, X, XI,XII,XIII,XIV, XV,XVI, XVII,XVIII, XIX & XX]

Execution of Technology Integrated Lesson Plan

Due to COVID – 19 this practice, teaching was totally dependent on technology integration. Therefore, carefully selected activities and their implementation for achieving the goals of the lesson were challenging for prospective teachers. Technology handling for students' engagement, participation and motivation was

problematic for prospective teachers. This was because sometimes there was a distorted supply of internet facilities sometimes at teachers' end and sometimes at the students' end. The sound quality of the teacher was not appropriate hence, there was poor audibility of sound for the students. Distorted instructions were conveyed to the students due to fluctuated internet facilities of poor Wi-Fi signals.

Sometimes, there was a problem with the microphone thus, this was challenging to engage students while teaching contents with technology. Some other challenges for TPACK implementation and execution of technology integrated lesson plans were lack of technology integration skills i.e. no sufficient knowledge for using the latest digital devices and digital apps, lack of training for students while learning through technology, lack of skills of prospective teachers for accessing students' work while teaching with technology. Lack of students' response while teaching with technology in an online class". [Participant I,II,III,IV,V,VI,VII,VIII,IX,X,XI,XII,XIII,XIV,XV,XVI,XVII,XVIII,XIX & XX]

Practice Teaching and Tpack Implementation

"During practice teaching and TPACK implementation B.Ed. (Hons.) elementary prospective teachers had faced many hindrances i.e. load shedding of electricity, poor internet facility, technical error in sharing and upload of digital photos in GCR, some uncertain disconnection from students/teachers from an online class or specifically while implementing any of the activities, distortion in playing videos, uncertain error with the technical gadgets, digital devices or apps during instructions, lack of technical training for using technology. Sometimes students could not respond to teachers' instructions due to some errors with the headphone, the opening of mic in GCR, camera usage, and sharing of materials or screens during the process of teaching and learning. Therefore, lack of such technical skills hindered students' learning. There was no backup plan if

technology uncertainly failed to achieve goals of the lesson and etc..". [Participant I,II,III,IV,V,VI,VII,VIII,IX,X,XI,XII,XIII,XIV,XV,XVI,XVII,XVIII,XIX & XX]

Classroom Instructions with Technology Integration (TPK)

B.Ed. (Hons.) elementary prospective teachers had experienced various challenges during practice teaching while giving instructions through technology integration and TPACK implementation. There was a communication problem between teachers and students during the process of instructions. One of the teachers faced a problem in sharing digital charts, repeated instructions due to distortion in the voice thus time wasted due to repeated instructions to the students, fluctuation in internet facility, unavailability of opening students' comments during online class via GCR, selection of activities, challenge to use selected technology i.e. playing of animated videos, playing of recorded videos, problems with online submission of online tasks or assignments." [Participant I,II,V,VII,VIII,XI,XII,XII,XIII,XV,XVII,XVIII,XIX,XX]

There was distortion in classroom environment due to students' negligence (one of the students left her mic open, multiple sounds could be listened at her back end due to unmuting of mic by students and etc..)". [Participant I,VI,XI,XII,XIII,XVIII,XIX,XX]

Discussion

The study explored many challenges and hindrances for TPACK implementation by B.Ed. (Hons.) elementary prospective teachers. The main challenges were planning of a technology integrated lesson plan, distorted supply of internet facility or poor speed of Wi-Fi, the sound quality of both teachers and students; fluctuation in electricity supply, ambiguous sound quality, time wastage, repeated instructions by prospective teachers, lack of training for using digital devices & latest digital apps, lack of back – up for uncertain technological error during the process of teaching and learning. Prospective teachers

had faced problems in the selection of relevant technology (aligned with the goals of the lesson and contents of the lesson to be taught during class). During lesson planning specifically, access to the selected technology was kept under consideration. However, students' assessment and evaluation of their learning activities were challenging while preparing and integrating the technology instructional plan. The results of the study were also consistent with the previous research ([Arcueno et al., 2021](#)) that the selection of the technology is challenging for preparing a technology integrated lesson plan. The alignment between the selected technology, goal and contents of the lesson has been mandatory.

The execution of technology integrated lesson plan was challenging because of the intermittent supply of internet or Wi – Wi speed during the instructional process. The readiness of students for the use of digital devices and the latest digital apps during practicing teaching was also challenging. Therefore, the results of the study were also consistent with previous researchers (DepEd, 2020; [Ferri et al., 2020](#)).

Many of the previous studies had explored challenges and hindrances faced by prospective teachers however, the results of the study were consistent with ([Juanda et al., 2021](#)) that teachers had faced disruptive internet connectivity as a challenge during the process of teaching and learning. Lack of necessary skills for technology integration and ignorance of dealing with sudden technical error during practicing teaching was a reported challenge in many of the previous studies. TPACK framework had been reported as a combination of technological, pedagogical skills and knowledge of the contents.

Therefore, creating meaningful activities for students' motivation and engagement during class with technology integration was very much challenging. Hence, the results of the study were also consistent with the study of [Taopan et al., 2020](#). Another, crucial challenge prospective teachers and students both had faced the usage of technological or digital devices and the latest digital apps during the process of teaching and learning. There was a

lack of professional or technical training for the integration of technology, usage of digital devices and the latest digital apps. Therefore, skill development for the effective use of technology by teachers and students (both) has been essential for successful TPACK implementation. As previously mentioned, it was suggested that the completion of pedagogical tasks (research & communication) required learning and adapting technological skills for the integration of the latest technology ([Mishra & Mathew, 2006](#); Koehler et al., 2013).

Conclusion and Recommendations

It has been concluded on the basis of these research findings that the B.Ed. (Hons.) elementary prospective teachers have faced many challenges and hindrances to TPACK implementation. The main challenges were: the lesson planning of technology integrated lesson plan, challenges for the execution of technology integrated lesson plans, challenges for the practicing teaching while implementing TPACK and challenges during the instructional process (TPK). The highlighted problems and hindrances were the disruptive supply of internet facility, electric supply, intermittent supply of Wi-Fi, poor sound quality, sudden uncertain technological error during instructions, lack of training for using the latest digital devices and digital apps, hindrances in communication with the students, their engagement, motivation, assessment and evaluation and etc. Therefore, the study had recommended the following recommendations:

- Prospective teachers may be trained in a way to implement technology integrated lessons and meet technological challenges and sudden errors during their classroom instructions.
- Prospective teachers and students may learn and adapt the use of Digital Devices and latest digital Apps for teaching – learning purpose so that teachers may engage, assess, evaluate students and manage their time effectively while practicing teaching and implementing TPACK.

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