



# Virtual Professional Learning for School Teachers to Support Them in Online Environment

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In March 2020, the World Health Organization (WHO) declared the coronavirus disease 2019 (COVID-2019) epidemic a pandemic and whole education system came to a standstill. An immediate transformation from an offline mode to online mode of teaching learning was needed. Majority of teachers in India were not prepared for digital pedagogy. Regardless of serious difficulties and deep-rooted traditional teaching and learning methods, they quickly involved themselves in their professional learning virtually and adopted the online teaching methods to keep the system going on. Thus, the present study is focused to find the answers of the questions emerged out of this situation such as: (i) how teachers prepared themselves to come forward for gigantic initiative? (ii) How did they learn the digital online techniques? (iii) How the deficiencies of electronic gadgets, such as mobile phones and tablets were arranged in short span of time and made available to all the stakeholders? This is a qualitative study using phenomenological enquiry as an approach, participants were selected with purposive sampling technique and data were collected through the in-depth (semi-structured) interviews of 15 school teachers, 5 school heads, and 5 block education mentors from Punjab state of India. The findings of the study indicated that with continuous motivation, school teachers took the initiative to come forward for digital teaching and learning. Some teachers out of firm professional commitment managed to pursue their professional learning mainly through their own efforts. In addition, the Education Department provided online crash courses to teachers. The clusters of teachers having sound knowledge of technology collaboratively trained the teachers at block levels. Majority of teachers have their own gadgets but underprivileged sections were provided mobiles and tablets by the government and non-government agencies. A quick shift to virtual professional learning resulted in significant improvements in the learning outcomes of students. Hence, the study will motivate the teachers of other states to pursue virtual professional learning to update themselves. Additionally, it suggests that teachers ought to be part of forums, interest groups, and online professional communities to interact with peers and know how the rest of the world is doing with digital education.

**Keywords:** professional learning, virtual professional learning, school teachers, support, online environment

## INTRODUCTION

In contemporary world, education system is breaking the nut shell by adapting Information and Communication Technology (ICT) to get the qualitative advancement, which, in itself, is vital for the progress toward creating intellectual, skilled, and qualified individuals for the overall development of the country (Ansari et al., 2012). The proliferation of technology in India has accelerated the economic and social changes through the dissemination of information. The improvements can be seen in professional capabilities, private life, and the way people work, learns, and interact due to the rapid advancement in technology and enhanced work environment (Ala-Mutka, 2011). The recent decades have witnessed the education system embedded with digital technologies. Digital media plays an important role as schools and whole education system have been inclining toward the integration of digital learning platforms and online tools for teaching, learning (Blau and Shamir-Inbal, 2017), and to prepare learners to engage critically with information. Consequently, there is a need of digitally literate and competent teachers (Ministry of Economic Development of New Zealand, 2008).

Digital literacy skills entitled as “21st century learning skills” have permeated the classroom. Digital literacy has been seen as a key competence for the teachers. Conceptually, digital literacy can be referred as the technical competence and functional skills of an individual needed to operate digital tools; it is more subtle and situated practice associated with being able to create, understand, and communicate the meaning and knowledge in a world in which these processes are increasingly mediated *via* digital technologies. The areas of digital competence are grouped into the following categories: information and data literacy, communication and collaboration, digital content creation, safety, and problem solving. It implies the skills that are required to be possessed to use and successfully integrate ICT into the teaching-learning process. The development of digital literacy is being targeted throughout all the levels of education in majority of the countries (Janssen et al., 2013; Wang et al., 2021). It has become an integral part of the development of knowledge across disciplines and subjects. Digital literacy and media literacy are closely related to each other. Media literacy generally focuses to be critically engaged in media and it is a necessary ability of both teachers and students to find, evaluate, share, and create content using the internet. Whereas, digital literacy is more about being able to participate in digital media in wise, safe, and ethical ways. The results of numerous researches depict that computer and digital technologies have positively influenced various aspects of education, teaching and learning processes, and students’ learning achievements. Due to the outbreak of coronavirus disease 2019 (COVID-19), the importance of teachers’ digital literacy was escalated, all teachers around the world were forced to instruct online despite the fact that many of them were not digitally literate and they needed assistance in using digital tools (Ferdig et al., 2020).

Prior to the pandemic, there was a pre-existing digital divide in India. A report on the National Statistical Organization Survey on Digital Education Divide shows the stark digital

divide across the country. The survey was part of the NSO’s 75th round, conducted from July 2017 to June 2018 and it reported that across the country, only 23.8% of households had the facility of internet. There is massive rural-urban inequality in access to facilities, such as internet and smartphones. In India, out of total population of the country, 66% of population is rural but only 14.9% has the facility to use internet as compared with urban areas which have merely 42%. In addition, there is a wide divide in access between urban and rural households. Geographical positions and conditions are also the factors which cause greater digital exclusion. It is an issue referring to the gap that exists between individuals who have digital resources and those who lack access, those living in rural areas and in urban areas, the educated and uneducated, different economic classes, and on a global scale between more and less industrially developed nations. Some of the remote regions, such as cities surrounded with deserts, mountains, and thicket forests encounter severe problems in internet connectivity moreover these are home to tribal and marginalized communities which end up perpetuating existing disadvantages.

The COVID-19 pandemic aggravated the problems that are already existing in the education system of India. It was a quintessential adaptive and transformative challenge for teachers teaching at every level as neither teachers and schools nor parents and students were prepared for digital teaching and learning. All teachers regardless of the technological expertise and experience with digital learning practices, were required to quickly adapt to the online platforms and new modes of teaching, something that even in “usual” times can be experienced as a tectonic shift (Honan, 2012). The new normal became more digital than ever due to sudden and indefinite lockdown. However, for many people in India, life is put on standby as they do not have gadgets and access to stable internet connections. As a result, these individuals fall behind as society resumes life online.

Undoubtedly, an inclusion of digital learning was essential for recovery from the ill effects of pandemic and halt of the education system. As the pandemic surge continued and school closure prolonged, teachers started finding new opportunities to learn not only how to teach online but also the tools and resources for virtual pedagogy. They were required to make a shift from classroom teaching to virtual teaching. Establishing connection with students through electronic modes and providing learning through virtual modes were the immediate measures that all teachers had to take within a short span of time (Allen et al., 2020). Teachers were irresistibly pressurized to adapt to the substitutive mode of teaching as quickly as possible but to learn the new ways of teaching, no support was available for the teachers which created confusion among them and putting them in a very stressful situation.

Due to recent turbulence faced by the education systems around the world, teachers strived hard to provide uninterrupted education to the learners and reducing the adverse effects of the pandemic on learners. The unexpected and unforeseen move toward remote learning divulged that there are many teachers who still struggle to use technology while teaching.

A survey conducted by research scholars from the University of Phoenix revealed that over 50% teachers were unprepared for online instruction. As the teaching learning process switched from face-to-face to virtual mode at untested and unprecedented level, teachers have to spend more time and efforts on preparing lessons and upgrade their teaching skills to meet the needs. Hence, to cater the needs of in-service teachers and enable them to be comfortable in using technology in teaching, virtual professional development programs are needed to support them now as well as in the post-COVID-19 world. Social distancing guidelines pushed toward the digital professional learning of teachers to support and help them manage online classrooms and professional growth as well.

Although in teacher education, the development of online course has been increased in recent years (Karchmer-Klein and Pytash, 2020), yet neither teacher educators nor pre-service teachers gain any systematic support, instructions to design good quality content, and distinctive online learning experiences (Archambault et al., 2016). Thus, the swap from physical classroom teaching to virtual means entails the advanced models of teachers' professional learning. Given constraints imposed by COVID-19, virtual professional learning programs were emerged to address the need of teachers which facilitated the teachers to discuss various issues that persist in teaching learning process in the collaboration of their colleagues (National Research Council, 2007a,b). Along with online coaching, virtual professional development provided specially tailored learning experiences that directly help teachers in their pedagogical practice (Affinito, 2018). Thus, virtual professional learning sessions for teachers have become a new norm.

## Professional Learning

Professional learning refers to the activities that stimulate the thinking as well as the professional knowledge of an individual. In addition, it ensures that the practice is up-to-date and critically informed. Teachers, who have extensive and enduring professional learning experiences, are more likely to provide high quality teaching and learning experiences to their students. Not only this, they positively inspire their students to achieve their best. It is mandatory for all teachers working at any educational level to be well-informed and updated with current knowledge in different domains. Therefore, teachers need to professionalize themselves more frequently and constantly (Guskey, 2000, 2002). The professional learning of teachers bestows rich opportunities to broaden their professional knowledge, gain experience to improve their teaching skills, and make school environment healthier and more academic.

Professional learning programs are often organized in formal settings, such as professional development programs, research groups of teachers, and formal mentoring programs, are the events which facilitate the professional learning of teachers (Timperley, 2011). In professional development programs, teachers learn from the informal interactions and conversations, collaborative academic planning, peer teaching, and mentoring among the colleagues (Little, 2012). Huberman (1989) holds the

view that all teachers go through various moments or cycles in their careers and identified five distinct phases. Based on those phases, Furlong and Maynard (1995) proposed three approaches to the professional learning that address the developmental phase and need of teachers. The three approaches are:

- (1) An apprenticeship model—In this model, novice teachers learn from experienced teachers till the former has developed an individual teaching style.
- (2) A competency-based model—This model aims at helping the teachers to learn a new set of teaching skills and become more proficient in the technical aspects of the teaching profession.
- (3) A reflective model—The third model to professional development helps the teachers with learning through reflection. It is an active process of education that leads to action which ought to be an essential part of all stages of a teachers' career cycle.

Darling-Hammond (1997) made an attempt to understand how teachers learn. She mentioned that teachers learn exactly the same way as their students learn. They do a lot of study, work hard, and reflect on what they have learnt. They learn through their collaboration with other teachers, observing the students as well as their work closely and by sharing what they have learnt. Furthermore, she laid stress on the idea that teacher learning cannot be sporadic or one off, instead, it ought to be ongoing and iterative to be effective. Similar ideas are expressed by Birman et al. (2000) when they state that professional learning needs to (a) be ongoing, (b) be long term, (c) focus on content, (d) be sustained, (e) promote active learning, and (f) be coherent.

## Virtual Professional Learning

Since the past few years, online teaching and learning has been gaining popularity as online sessions are more accessible, flexible and budget-friendly (Salmon, 2011) and it has become essential for the in-service teachers to be cognizant of pedagogical theories, teaching subjects (Chikasanda et al., 2013) and remote teaching skills (Salmon, 2011; Tschida et al., 2016). Thus, to prepare the teachers for teaching in an online environment and develop them professionally, professional development strategies have been designed, developed, and implemented.

The use of technology in education is growing rapidly and the reasons for developing online learning programs are often due to (1) their cost-effectiveness, (2) easy availability of learning and educational experiences, and (3) availability of teachers in the remote areas (Means et al., 2013). Given the growing number of online courses and the great changes that have occurred within the teaching learning process, the necessity of teachers' professional learning becomes more apparent and discernible. Tschida et al. (2016) expressed that the transition from face-to-face teaching to online teaching experience, not merely involves placing the content online but for many, this meant learning how to create websites for the classes, screen capturing of the presentations, hosting

the video conferences, providing online feedback to the students and parents, managing assignments, preparing lessons for the learners, and communicating with colleagues in completely different ways.

Teacher preparation for digital education is a twofold process. The first is the requirement of teacher preparation for adopting digital technology for teaching their students more efficiently. The second is to use digital medium to keep abreast of new development in education for their own professional growth. Virtual learning or e-learning offers flexibility and provides an opportunity to become independent learners using the innovative, efficient, informative, and effective tools of online learning. There are numerous technological aids that need to function expeditiously for the effective implementation of online learning system, and learner is required to know why, how, and when to employ online learning to get maximum benefits of the system (Subramaniam and Kandasamy, 2011). In the pandemic situation, Cloud-based Tools (CBTs) and Massive Open Online Courses (MOOCs) have gained noteworthy popularity among teachers which are frequently practiced for virtual professional learning. A variety of useful CBTs may be introduced in MOOCs with great acknowledgment from the teachers (Shehadeh and Guetl, 2016). Teachers get an increased access to the updated information along with mutual interactions and collaboration through virtual learning. Some latest internet tools, such as WebQuest and Web CT are now frequently employed in teaching to promote active learning.

Virtual teacher professional learning has numerous potential benefits for teachers, schools, districts, and states. It is an opportunity to change the practice of teachers, which is the most important factor impacting the students' achievement. Potential advantages of teachers' virtual professional learning are:

- Adaptable approach,
- Capacity to build professional community,
- New professional guidelines for commitment to liability, and
- Improvement in teacher retention rate by strengthening teachers to continue their own professional learning.

Along with its benefits, virtual professional learning has several barriers to its implementation and effective use. The digitizing of the classrooms was major challenge for the teachers. Pokhrel and Chhetri (2021) has pointed toward various limitations of online learning, such as poor online infrastructure, lack of training of teachers, interrupted information, inconvenient home environment for self-learning, inequality of opportunities, and lack of academic proficiency. Although the research literature in this field is in progress, various authors have indicated the limitations of online professional learning as:

- Knowledge about online technologies and programs
- Lack of favorable classroom environment
- Lack of support from administrators
- Lack of gadgets, access to technologies, and online materials
- Time, financial support, and family support

- Lack of concrete models of technology integration
- Teachers' beliefs and practices.

## REVIEW OF RELATED LITERATURE

### Studies Related to Professional Learning

Bennett et al. (2011) stated that professional learning is pertinent for improvements in the quality of teaching and learning in schools and professional development can be changed and modified according to gender and professional commitments.

Boud and Hager (2012) examined the role of professional learning on practice for teachers as professionals. The findings acknowledged that professional engagement is the broader development of the teachers by providing the greater opportunities of engagement in practices by focusing on needs to move from the analysis of individual knowledge, skills, and competencies to the analysis of environments and practices that generate in extending practice scope.

Duta (2012) conducted research on 68 university teachers to determine their professional development methods necessary for continuous professional learning. The research findings concluded that the professional development of teachers improves the quality of education by stressing the pedagogical training of teachers which further leads toward quality outputs in the teaching-learning process.

Stevenson et al. (2016) conducted research on 102 school leaders to determine the role of school leaders in supporting the professional learning of teachers. The findings highlighted two key areas: technology-mediated and informal learning which draw the attention of teachers to go for professional development.

Wabule (2016) conducted research on the 50 teachers of Uganda to study their continuous professional development: role and benefits. The findings of the research indicated that the professional development of teachers plays central role in organizational development. The results revealed that in teaching profession, initial training is not enough due to rapid changes in technology, social structures, ideologies, and the increased diversity of the classrooms. Professional learning is integrated with day-to-day challenges and opportunities of the profession to maintain professional integrity.

Lamptey and Corletey (2018) conducted research on teachers to understand their perception toward the facilitators of professional development activities and it was found that professional learning sessions were knowledgeable and enthusiastic. During the training sessions, teachers were provided opportunities to share their ideas and experiences with their fellow colleagues, as well as to provide feedback on the activities.

### Studies Related to Virtual Professional Learning

DeWert et al. (2003) in their study concluded that online discussions provided teachers with the opportunity to clarify their thinking about complex educational issues and make more informed decisions about their professional practice.

As Killion and Williams (2009) stated, “The advent of quality online professional learning combined with in-person, peer-based professional learning communities has enabled this approach to professional development to have the greatest success for increasing teaching quality and student learning.”

Russell et al. (2009) studied the face-to-face and online professional development for mathematics teachers and compared the effects of a professional development course delivered in an online and a face-to-face format. The effects examined included changes in the teachers’ pedagogical beliefs, instructional practices, and the understanding of teaching number-sense and related mathematical concepts. Both the formats of course were also delivered over the same 8-week period and required participants to invest approximately the same amount of time each week engaging in learning activities. Interestingly, the positive outcomes were comparable across both formats. Teachers who participated in the online course reported that they were more willing to take courses in the future online than did teachers in the face-to-face condition.

Tong et al. (2015) conducted study on “Teachers’ Perception of Virtual Professional Development in a Randomized Control Trial” across three geographic regions and it was found that teachers were overwhelmingly positive toward virtual professional training. The study further concluded that virtual professional development is a gateway to increase the scalability of strategies presented in the online setting.

Bates et al. (2016) in their research report “Online professional development: A primer,” asserted that many teachers are turning to the online professional development to meet their learning needs, but the vast array of available opportunities may be overwhelming. This article provides a framework for making sense of common online teacher learning opportunities. In addition, it suggests situations where online professional development may be the most useful and presents a challenge for educators to consider when engaging in online learning.

Hamid et al. (2020) conducted research on “the effectiveness of online learning in the COVID-19 period.” This research was conducted in May 2020 with a sample of 316. The results of the study revealed that supporting factors for the effectiveness of online learning in the COVID-19 period were the carrying capacity of network access and the ability of devices to access the internet and learners perceive that the implementation of online professional learning during the COVID-19 period has not been fully effective.

Ahadi et al. (2021) held a case study analysis on “the evaluation of an online teacher professional development workshop.” The evaluation approach was theoretically based in the synthesis of six seminal workshop evaluation models and structured around eight critical dimensions of educational technology evaluation. The evaluation approach demonstrated that the professional learning that was shifted into online mode in response to the COVID-19 unequivocally resulted in significant improvements to professional learning outcomes. More importantly, the evaluation approach is critically contrasted with previous evaluation models, and a series of recommendations for the evaluation of technology-enhanced teacher professional development workshops are proposed.

Another study, held by Kavaric et al. (2021), explores the Montenegrin higher education teachers’ perceptions of the challenges of online learning during the lockdown period. A total of 120 teaching staff from all faculties in four universities in Montenegro completed a questionnaire and the analytical findings revealed that all teachers experienced challenges.

Morra et al. (2021) in their study highlighted the importance of engaging educators in virtual professional development activities and reported that these endeavors ultimately benefit educators across the globe by not only equipping them with various pedagogical tools and resources for their online instruction but also paving the way toward establishing international partnerships and collaborations.

From the above reviews, it can be inferred that the professional learning of teachers enrich them with perspectives that upgrade and improve their knowledge, experience in participation, competencies in teaching, and innovation. The spread of COVID-19 forced to replace the face-to-face classes with online learning (Pokhrel and Chhetri, 2021) and brought a stormy wave in teaching and learning. Teachers had to make big leap in their pedagogies and it became urgent need to transform the learning environment. However, such pedagogical transformation is not at all easy for teachers who have been practicing traditional teaching methods. Therefore, they need proper training to improve their pedagogical knowledge and ICT skills and competencies (Jingtao et al., 2010; Baranova et al., 2021) to help them manage online learning effectively and, thus, meet the learning needs of students using student-centered pedagogy. On the basis of above discussion, the main purpose of this study is to find: how the teachers pursued their professional learning in a country with deep-rooted traditional teaching and learning methods while coping with pandemic, overcoming the deficiencies of gadgets and digital gap persistent in the education system.

## RESEARCH QUESTIONS

- (i) How teachers prepared themselves to come forward for gigantic initiative?
- (ii) How did teachers learn the digital online techniques?
- (iii) How the deficiencies of electronic gadgets, such as mobile phones and tablet, were arranged in a short span of time and made available to all the stakeholders?

The present study is focused to find the answers of the questions emerged out of this situation.

## METHODOLOGY

This is a qualitative study using phenomenological enquiry as an approach to find the virtual professional learning of the teachers. This approach is based on the paradigm of social constructivism and personal viewpoint (Lester, 1999) to know the subjective experience of different stakeholders (school teachers, school heads, and block education mentors) about the virtual professional learning of teachers.

## Participants

As a qualitative approach has been employed, participants were selected with a purposive sampling technique to focus on population with particular characteristics that are of interest, (Saldana and Omasta, 2017) who are using online platforms for teaching and updating themselves through virtual professional learning and best enable us to answer our research questions. Data were collected through the in-depth (semi-structured) interviews of 15 school teachers, 5 school heads, and 5 block education mentors from Punjab state of India. The semi-structured interviews are conducted to collect the data as these allow participants to express themselves consistently with their experiences and understanding (Patton, 2002).

## Data Collection

The focus of the present research is to explore virtual professional learning for school teachers to support them in an online environment. The potential participants were selected from the scrutinized list prepared by district education officers. For ethical considerations, informed consent was taken from the selected participants. They were informed that it is a voluntary participation and conversations will be strictly used for the purpose of study and confidentiality will be maintained. All the participants were explained the purpose of the study and interviews were fixed with the consent of participants. Due to the restrictions in place during COVID-19 pandemic, interviews were conducted virtually/telephonically with selected participants which lasted for about 15–20 min each and were audio recorded. Afterward, all the recordings were transcribed. The interviews were semi-structured and open-ended to garner the in-depth accounts of teachers' virtual professional learning. The conversations were recorded for further analysis as suggested by Saldana and Omasta (2017).

## Data Analysis

Thematic analysis was done to know about the virtual professional learning that teachers pursued to adjust in an online teaching environment. All the interviews were recorded and were transcribed afterward. The information obtained from the participants was coded manually as advised by Saldana and Omasta (2017) and were classified according to the respective groups. After coding, the data are categorized into themes. Yildirim and Simsek (2005) have suggested that direct citations must be included in the descriptive analysis so that it can conspicuously reflect the interviews. The video recordings are preserved for further comparative investigation in future.

## FINDINGS

During the pandemic situation, all the teachers including those who were experienced technology users and had the experience of teaching elementary classes online and fully remotely were required to utilize various skills to operate unfamiliar platforms which were aimed to offer remote classroom instructions. Initially, there was no institutional arrangement for the teachers' professional learning and they were on their own to find out

the opportunities for learning to teach alternatively, but as the pandemic continued, the professional learning of teachers remained an ongoing process, they used varied coping strategies to stay aware of the situation and search ways to help their professional development (Mac Intyre et al., 2020). Additionally, teachers were asking their friends, mentors, seniors, and experts the ways to cope up with the changing needs. So, in this context, professional learning was more collaborative and self-regulated.

The first research question is—“How teachers prepared themselves to come forward for gigantic initiative?” Due to the sudden shutdown of schools for an indefinite period, the education system was totally paralyzed and education being the life line of society was collapsing. The gigantic initiative was referred to put meaning into the system by some alternative methods and look for the models and best practices to be followed for online teaching and learning that too in a short span of time. Some teachers out of their firm professional commitment and ethics, came forward to take the responsibility of teaching by virtual mode, for which they were not trained. By interviewing the teachers, it was revealed that with continuous motivation and effective leadership from the administrators, teachers decided to accept to curb the difficulties and overcome the challenges. School teachers at all levels identified opportunities available around them and attended different training programs in a more self-directed learning mode. Teachers themselves made efforts for the gigantic initiative of virtual professional learning and the above finding is supported by the literature review and findings of researchers (Coombe and Khan, 2017; Kuchah and Shamim, 2018).

In addition, with self-efforts they learnt to take virtual classes successfully on platforms, such as Zoom, Google Meet, and Microsoft team. During the interview, session teachers shared that they had to learn and relearn to operate and handle the digital tools for effective class delivery. Google meet and Zoom were the commonly learned and used digital tools by most of the teachers for online classes followed by the Google Classroom.

Participants expressed that the frequent interruptions on the internet was a big hurdle to get reconnected due to the limited knowledge and skills in handling online features. The results made it evident that there were differences in the digital skills and competencies among many school teachers, but some of them had to rely on their technology savvy family members to digitalize their teaching. The observation of the participant “A,” a school teacher was,

*“I had no idea, what the Google Meet, Team link and Zoom were. When the block mentor explained and provided training on how to use it, I realized I have gained enough understanding and have learnt it, but when I had to use it to take class online, I was not able to use it properly. I had to take help of my family member also to operate it properly.”*

Another school teacher, participant “B,” also gave similar response,

*“Information and Communication Technology is not that can be easily learnt by attending a training session alone, we have to use and practice it in order to attain mastery on it.”*

*"I have been compelled to learn to use digital gadgets than I probably have in the past few years. . . ."*

Participant "D," a block education mentor in his interview mentioned that,

*"Fatal pandemic has effected the cognitive (growing knowledge) and non-cognitive (motivation, emotions, anxiety and values) behavior of all the stakeholders. But some of the school teachers of the state Punjab decided to surmount the situation."*

He further told that,

*"A team of three teachers worked for the revolutionary change at their own level and without having IT background or expert support, they developed a digital app named as 'Punjab Educare App' with their dedication coupled with indigenous innovations."*

Thus, teachers managed to pursue their professional learning mainly through their own self propelling efforts. Moreover, the district education departments performed significant role in providing virtual professional learning opportunities to the teachers.

Second research question was probed to enquire "how school teachers learnt the digital online techniques?" This objective was realized through narrative enquiry for which teachers, school heads, and block education mentors were interviewed, and it was found that teachers in Punjab state were provided capsule courses organized by government to effectively use online applications and other digital modules. The clusters of teachers having the sound knowledge of technology were assigned to train the teachers at district and block level. The response goes with the study done by Djatmiko (2011). Djatmiko stated that "Collaboratively planned individual development is appropriate for teacher who is moving toward autonomy but still needs some assistance from staff developer or colleague in planning and implementing his or her professional development."

The responses of other teachers "E" and "F" were—

*"Training provided by the block mentors enabled us to teach virtually. We were told how to create online lessons and deliver them to students."*

*"... at regular intervals, district mentors organized virtual workshops to train and acquaint teachers with upcoming technical applications and programs which helped us to share the content with students. These trainings helped in online evaluation."*

From the responses, it was inferred that commercial agencies played pivotal role to facilitate online learning programs. For the professional learning of the teachers, the State Education Board teamed up with Khan Academy for taking the government high and senior secondary schools spanning across the state under their wing. Khan Academy is an American based non-profit educational organization that offers practice exercises, instructional videos, and personalized learning dashboard that empower learners to study at their own pace in and outside of the classroom.

A block education mentor in his interview stated that,

*"I already heard about online professional courses are available, but I did not know where to go online to find them. . . .but Collaboration*

*of Khan Academy with state education department has facilitated extensive training programs for teachers, so the teachers become able to provide quality online learning to the students."*

A school teacher acknowledged that the role of online training provided to them by the state board in learning digital techniques.

*"... the digital platforms have proved a boon for us teachers. When whole world got stagnant, we could manage to attain training to use such digital modules to teach, evaluate, provide feedback to the students online and most importantly our professional learning."*

Third and last research question—"How the deficiencies of electronic gadgets, such as mobile phones and tablet, were arranged in a short span of time and made available to all the stakeholders." India, a union of states, is a multicultural, multi-lingual, and multi-religion country with complex socio-economic conditions. Due to the differences in geographical positions, conditions, and socio economic status, there exists a wide digital divide. Due to the economic disparity in the country, the deficiency of digital devices to be used for academic purpose among the students' population was quite high in India but majority of the teachers have their own gadgets to be used for their teaching and learning process. However, a few teachers did not own smart devices to operate digital platforms. Teachers have responded to these challenges in myriad ways. School administrators and state government helped teachers in the time of need. In addition, the participant "G" responded that,

*"State administrators began to develop professional development supports and more consistent instructional strategies. In some cases, government also provided additional technology access by lending Chromebooks or other devices. . . and remote provision of professional development sessions for teachers."*

To succeed in a virtual classroom, teachers need a computer, laptop, or Chromebook along with access to a reliable internet connection.

Participant "H," a primary school teacher shared her experience,

*"Our school have adequate resources and school managers helped the teachers who did not have adequate devices. . . , they lend devices to the teachers and pioneered the programs for the professional learning of teachers in short period of time."*

State government and other non-government organizations extended support by providing mobile/tablets along with internet connectivity to the needy teachers.

A school teacher participant "F" explained that,

*"Initially to make us able to attain digital literacy, our school set up mobile hotspots for the teachers to use for their learning as well as teaching purpose. Lately, we partnered with telecommunications companies to increase the internet access."*

Thus, teachers are the best human resource and it proved right during the pandemic. With consistent hard work, commitment, and dedication, teachers emerged with embodying leadership for the persistence of education system in country. They have a radically important role in ensuring uninterrupted education. To facilitate online learning, teachers had to upskill in technology

and learn new hybrid models of teaching without ample preparation, infrastructure, and time to do so. They quickly identified opportunities available around them and attended different training programs in a more self-directed and self-propelled learning mode. To overcome the problems, they learnt highly effective techniques and applied them to strengthen the whole education system in the testing times.

## DISCUSSION AND IMPLICATIONS

This research was aimed to explore how school teachers in Punjab prepared themselves for the virtual professional learning to support themselves in an online teaching environment and enhance their abilities to use digital techniques. The study inferred that through self-learning efforts, teachers looked for the models and best practices for their professional learning and get accustomed with new modes of teaching. Despite incredible growth of the Internet and digital tools in India, there exists the issue of accessibility of gadgets, sufficient and reliable bandwidth for internet connection in many regions. To overcome the challenges of remote learning, teachers from Punjab without any budgetary planning and IT expertise designed a learning app named as “Punjab Educare App<sup>5</sup>,” which soon became the epicenter of digital education in the state and gradually adopted by many other states of India. Not only this, for accelerating the pace of qualitative improvement in education and to make teachers well-versed in the use of advanced IT applications, capacity building programs were organized by the Education Department. No doubt, orientation/refresher courses organized by governmental and other non-governmental agencies are equally important for the professional development of teachers (Killion and Williams, 2009) but best professional growth in any field can come with self-efforts. The concept of self-learning for the professional development of teachers is getting momentum at international level. Unlike traditional professional learning, self-directed professional development opens learning possibilities for teachers in any place and at any time (Bates et al., 2016). Teachers acquired a wide variety of skills and gained access to training at their own pace and have been responsible for setting remote work and providing guidance to learners as well as parents. At any place where schools are reopening, teachers remain on the front line, coping with the needs of students, working on catch-up programs, and other remedial initiatives. The virtual professional learning of teachers helped them to solve challenges associated with online teaching and learning process (Russell et al., 2009). It can rightly be marked that if all the teachers adopt the attitude of self-learning, they can emerge as victorious in any challenging situation.

The teachers around the world had gained valuable experiences during the pandemic which they will apply in normal classroom teaching in the future as well. The study will assist the teachers of other state as well as teachers teaching at college or university level to get motivation to pursue the virtual professional learning to update themselves. A few simple measures need adequate consideration to uplift the virtual professional learning of teachers to help them

combat the challenges and meet future needs. So, based on the findings of the study, a set of recommendations can be applied to overcome the challenges and to prepare the teachers to harness the potential of digital technology to keep them professionally up to date.

## Implications of the Study Are

- (1) For the wide-ranging educational reforms, it is vital to develop and implement effective ICT-enabled teacher education program.
- (2) Teachers are required to explore digital technologies (learning management system [LMS], apps, web portals, and digital laboratories), repositories of Open Educational Resources (OERs) at the national/state/global level.
- (3) They should attend webinars, online training programs, online courses on ICT—pedagogy content integration, and use appropriate technology for teaching learning as well as assessment and use digital resources embedded in Alternative Academic Calendars (AAC) developed by the National Council of Educational Research and Training—a central agency for school education for different stages. They ought to know about the copyrighted as well as Free and Open Source (FOSS) e-contents and tools for learning.
- (4) The teachers of 21st century need to be part of forums, interest groups, and online communities to interact with peers and know how the rest of the world is doing with digital education.
- (5) The lack of support from the school administrators is one amongst the barriers of virtual professional learning, thus the best ways of making administrators aware of the potential of online professional development is to have them participate in an online learning process. They should be encouraged to provide training to the teachers and the students at school, college, and university levels to get used to employ the latest technological tools to develop an effective online teaching-learning system (Wan, 2020).
- (6) Administrators sometimes assume that the virtual professional development can be done on teachers’ own time away from school, but this expectation is unfair and counterproductive. Teachers need to be given the same number of opportunities to participate in online professional development as they would if it was a face-to-face workshop.
- (7) Although the professional development content is available online but this material does not necessarily cover all needs for all teachers. Some areas of the curriculum, some age groups, and some teacher backgrounds are still not addressed as there are different needs at the beginning of the professional learning and at the end. So, it is required to develop comprehensive content to support the teacher’s professional development.

## Limitations

There are three major limitations in this study that could be addressed in future research. First, the small sample size. Amongst the huge population of teachers, school heads and block education mentors in the state, generalizing the results

based on 25 respondents only is the limitation of the current study and the use of purposive sampling technique in which the sample's representation is not guaranteed. Second, the nature of study is not longitudinal. Third, the data were collected through semi structured interview in which participants were asked open-ended questions, thus the data accuracy is limited to the respondents' subjective viewpoints, which is possible to be changed in the future.

## CONCLUSION

India is a developing country where many hurdles persist in its development. The COVID-19 pandemic added more problems to the already existing issues of poverty, unemployment, and many other problems created due to natural disasters. Due to the lack of digital infrastructure and awareness, majority of the teachers in India were reluctant to adapt technology in teaching learning process. However, since the dawn of pandemic situation, teachers have invested their quality time and resources to learn new ways of teaching and they participated in various online learning opportunities to grow as efficient teachers. The study has indicated that teachers were very active during the pandemic to find the ways of helping their students to the best possible ways they could. The pandemic emergency gave the real opportunity to teachers to experience the integration of information technology in the teaching and learning of all subjects. The teachers' journey of virtual professional learning during the pandemic served dual purpose for them. It was mandatory for them to be digitally literate and competent in using the online education tools and at the same time, they also had to learn how the contents could be delivered online.

## REFERENCES

- Affinito, S. (2018). *Literacy Coaching: Transforming Teaching and Learning with Digital Tools and Technology*. London: Heinemann.
- Ahadi, A., Bower, M., Singh, A., and Garrett, M. (2021). Online professional learning in response to COVID-19—towards robust evaluation. *Future Internet* 2021:56. doi: 10.3390/fi13030056
- Ala-Mutka, K. (2011). *Mapping Digital Competence: Towards a Conceptual Understanding*. Sevilla: Institute for Prospective Technological Studies. doi: 10.13140/RG.2.2.18046.00322
- Allen, J., Rowan, L., and Singh, P. (2020). Teaching and teacher education in the time of COVID-19. *Asia Pac. J. Teach. Educ.* 48, 233–236. doi: 10.1080/1359866x.2020.1752051
- Ansari, M., Khan, W. A., Ahmad, R., and Suhail, M. (2012). Virtual professional learning communities for teachers' enrichment. *Int. J. Inform. Sci. Educ.* 2, 1–11.
- Archambault, L., Kennedy, K., Shelton, C., Dalal, M., McAllister, L., and Huyett, S. (2016). Incremental progress: re-examining field experiences in K-12 online learning contexts in the United States. *J. Online Learn. Res.* 2, 303–326.
- Baranova, S., Nimante, D., Kalniņa, D., and Oļesika, A. (2021). Students' perspective on remote on-line teaching and learning at the University of Latvia in the first and second COVID-19 period. *Sustainability* 13, 1–14. doi: 10.26803/ijlter.19.6.1

## WEBLIOGRAPHY

- <http://www.oneworld.net/updates/news/pandemic-baring-digital-divide-india/>
- [PRAGYATA\\_Guidelines\\_English.pdf \(ncert.nic.in\)](https://ncert.nic.in/PRAGYATA_Guidelines_English.pdf)
- [https://ncte.gov.in/website/PDF/NCFTE\\_2009.pdf](https://ncte.gov.in/website/PDF/NCFTE_2009.pdf)
- <https://www.borgenmagazine.com/digital-divide-in-india/>
- <https://www.punjabeducare.org/>

## DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

## ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

## AUTHOR CONTRIBUTIONS

BS was responsible for writing up the final version of the manuscript. BK organized the conceptual framework and wrote the first draft of the manuscript. RZ shares the intellectual ownership and helped to shape the manuscript. JS was responsible for research proposal and data collection. All authors contributed to manuscript revision and approved the submitted version.

- Bates, M. S., Phalen, L., and Moran, C. (2016). Online professional development: A primer. *Phi Delta Kappan* 97, 70–73. doi: 10.1177/0031721716629662
- Bennett, J., Braund, M., and Lubben, F. (2011). *The Impact of Targeted Continuing Professional Development (CPD) on Teachers' Professional Practice in Science: An Evaluation of the Classroom Impact of Courses Provided by the National Network of Science Learning Centres (NNSLCS)*. London: CPD.
- Birman, B. F., Desimone, L., Porter, A. C., and Garet, M. S. (2000). Designing professional development that works. *Educ. Leadersh.* 57, 28–33.
- Blau, I., and Shamir-Inbal, T. (2017). Digital competences and long-term ICT integration in school culture: the perspective of elementary school leaders. *Educ. Inform. Technol.* 22, 769–787. doi: 10.1007/s10639-015-9456-7
- Boud, D., and Hager, P. (2012). Re-thinking continuing professional development through changing metaphors and location in professional practices. *Stud. Contin. Educ.* 34, 17–30. doi: 10.1080/0158037x.2011.608656
- Chikasanda, V. K. M., Otrél-Cass, K., Williams, J., and Jones, A. (2013). Enhancing teachers' technological pedagogical knowledge and practices: a professional development model for technology teachers in Malawi. *Int. J. Technol. Design Educ.* 23, 597–622. doi: 10.1007/s10798012-9206-8
- Coombe, C., and Khan, R. (2017). *Best Practices in ELT: Voices From the Classroom*. Dubai: TESOL Arabia Publications, 146–156.
- Darling-Hammond, L. (1997). *Doing What Matters Most: Investing in Quality Teaching*. New York, NY: National Commission on Teaching & America's Future.

- DeWert, M., Babinski, L. M., and Jones, B. D. (2003). Safe passages: providing online support to beginning teachers. *J. Teach. Educ.* 54, 311–320. doi: 10.1177/0022487103255008
- Djatkiko, I. W. (2011). *Self-Directed Professional Development Approach: an Alternative to Enhance Vocational Teacher's Character*. Publishing Institute, 97. Available online at: <https://www.researchgate.net/publication/228843043>
- Duta, N. V. (2012). Professional development of the university teacher—inventory of methods necessary for continuing training. *Procedia Soc. Behav. Sci.* 33, 1003–1007. doi: 10.1016/j.sbspro.2012.01.273
- Ferdig, R. E., Baumgartner, E., Hartshorne, R., Kaplan-Rakowski, R., and Mouza, C. (2020). *Teaching, Technology and Teacher Education During the Covid-19 Pandemic: Stories from the Field*. Chesapeake, VA: Association for the Advancement of Computing in Education.
- Furlong, J., and Maynard, T. (1995). *Mentoring Student Teachers: The Growth of Professional Knowledge*, 1st Edn. London: Routledge. doi: 10.4324/9780203355237
- Guskey, T. R. (2000). *Evaluating Professional Development*. Thousand Oaks, CA: Corwin press.
- Guskey, T. R. (2002). Professional development and teacher change. *Teach. Teach. Theory Pract.* 8, 381–391. doi: 10.1080/135406002100000512
- Hamid, R., Sentyro, I., and Hasan, S. (2020). Online learning and its problems in the COVID-19 emergency period. *J. Prima Edukasia* 8, 85–94. doi: 10.21831/jpe.v8i1.32165
- Honan, E. (2012). 'A whole new literacy': teachers' understanding of students' digital learning at home. *Aust. J. Lang. Lit.* 35, 82–98.
- Huberman, M. (1989). On teachers' careers: once over lightly, with a broad brush. *Int. J. Educ. Res.* 13, 347–362. doi: 10.1016/0883-0355(89)90033-5
- Janssen, J., Stoyanov, S., Ferrari, A., Punie, Y., Pannekeet, K., and Sloep, P. (2013). Experts' views on digital competence: commonalities and differences. *Comput. Educat.* 68, 473–481. doi: 10.1016/j.compedu.2013.06.008
- Jingtiao, Z., Yuanyuan, F., and Xiaoling, M. (2010). The latest progress report on ICT application in Chinese basic education. *Br. J. Educ. Technol.* 41, 567–573. doi: 10.1111/j.1467-8535.2010.01083.x
- Karchmer-Klein, R., and Pytash, K. E. (Eds). (2020). *Effective Practices in Online Teacher Preparation for Literacy Educators*. Hershey, PA: IGI Global. doi: 10.4018/978-1-7998-0206-8
- Kavaric, M., Kavaric, A., and Djokovic, R. (2021). Challenges in online teaching during the COVID-19 pandemic: higher education survey in Montenegro. *Innov. Educ. Teach. Int.* doi: 10.1080/14703297.2021.2013287
- Killion, J., and Williams, C. (2009). Online professional development 2009. *Multimed. Internet Sch.* 16:810.
- Kuchah, K., and Shamim, F. (2018). *International Perspectives on Teaching English in Difficult Circumstances: Contexts, Challenges and Possibilities*. London: Palgrave Macmillan.
- Lamprey, R. B., and Corleley, A. (2018). "Building strong libraries and library association through continuing professional development, the case of Ghana Library Association," in *Proceedings of the World Library and Information Congress and 77th IFLA General Conference and Assembly*, San Juan.
- Lester, S. (1999). *An Introduction to Phenomenological Research*. Taunton: Stan Lester Developments.
- Little, J. W. (2012). "Professional community and professional development in the learning-centered school," in *Teaching Learning that Matters: International Perspectives*, eds M. Kooy and K. van Veen (London: Routledge), 22–46.
- Mac Intyre, P. D., Gregersen, T., and Mercer, S. (2020). Language teachers' coping strategies during the Covid-19 conversion to online teaching: correlations with stress, wellbeing and negative emotions. *System* 94:102352. doi: 10.1016/j.system.2020.102352
- Means, B., Toyama, Y., Murphy, R., and Baki, M. (2013). The effectiveness of online and blended learning: a meta-analysis of the empirical literature. *Teach. Coll. Rec.* 115, 1–47. doi: 10.1007/s11948-017-9869-3
- Ministry of Economic Development of New Zealand (2008). *The Digital Strategy 2.0. Development*. Wellington: Ministry of Economic Development of New Zealand.
- Morra, C. N., Adkins-Jablonsky, S. J., and Raut, S. A. (2021). Leveraging virtual experiences for international professional development opportunities during the pandemic and beyond. *J. Microbiol. Biol. Educ.* 22, 22.1.82. doi: 10.1128/jmbe.v22i1.2511
- National Research Council (2007a). *Enhancing Professional Development for Teachers: Potential Uses of Information Technology: Report of a Workshop*. Washington, DC: The National Academies Press. doi: 10.17226/11995
- National Research Council (2007b). *Obstacles to Online Teacher Professional Development." Enhancing Professional Development for Teachers: Potential Uses of Information Technology: Report of a Workshop*. Washington, DC: The National Academies Press. doi: 10.17226/11995
- Patton, M. Q. (2002). *Qualitative Research and Evaluation Methods*, 3rd Edn. Thousand Oaks, CA: Sage.
- Pokhrel, S., and Chhetri, R. (2021). A literature review on impact of COVID-19 pandemic on teaching and learning. *High. Educ. Future* 8, 133–141. doi: 10.1177/2347631120983481
- Russell, M., Carey, R., Kleiman, G., and Joanne Douglas Venable, J. D. (2009). Face-to-face and online professional development for mathematics teachers: a comparative study. *J. Asynchronous Learn. Netw.* 13, 71–87.
- Saldana, J., and Omasta, M. (2017). *Qualitative Research: Analyzing Life*. London: SAGE.
- Salmon, G. (2011). *E-moderating: The Key to Teaching and Learning Online*. New York, NY: Routledge.
- Shehadeh, A., and Guetl, C. (2016). *The Application of Cloud-Based Tools in MOOCs: Experiences and Findings*. Available online at: [https://www.researchgate.net/publication/316274898\\_The\\_Application\\_of\\_Cloud-Based\\_Tools\\_in\\_MOOCs\\_Experiences\\_and\\_Findings](https://www.researchgate.net/publication/316274898_The_Application_of_Cloud-Based_Tools_in_MOOCs_Experiences_and_Findings)
- Stevenson, M., Hedberg, J. G., O'Sullivan, K. A., and Howe, C. (2016). Leading learning: the role of school leaders in supporting continuous professional development. *Prof. Dev. Educ.* 42, 818–835. doi: 10.1080/19415257.2015.1114507
- Subramaniam, N., and Kandasamy, M. (2011). The virtual classroom: a catalyst for institutional transformation. *Aust. J. Educ. Technol.* 27, 1388–1412. doi: 10.14742/ajet.900
- Timperley, H. (2011). *Realizing the Power of Professional Learning*. London: McGraw-Hill Education.
- Tong, F., Irby, B. J., and Lara-Alecio, R. (2015). Teachers' perception of virtual professional development in a randomized control trial. *Int. J. N. Technol. Res.* 1, 58–61.
- Tschida, C., Hodge, E., and Schmidt, S. (2016). "Learning to teach online: negotiating issues of platform, pedagogy and professional development," in *Handbook of Research on Learning Outcomes and Opportunities in the Digital Age*, ed. V. Wang (Hershey, PA: IGI Global), 664–684. doi: 10.11124/jbisir-2015-1919
- Wabule, A. (2016). Continuous professional development: what role and who benefits? Reflections on teacher development in Uganda. *Afr. Educ. Rev.* 13, 141–156. doi: 10.1080/18146627.2016.1229575
- Wan, Y. S. (2020). *Education During COVID-19*. Hershey, PA: Information Science Reference.
- Wang, X., Zhang, R., Wang, Z., and Li, T. (2021). How does digital competence preserve university students' psychological well-being during the pandemic? An investigation from self-determined theory. *Front. Psychol.* 12:652594. doi: 10.3389/fpsyg.2021.652594
- Yildirim, A., and Simsek, H. (2005). *Qualitative Research Methods in the Social Sciences*. Ankara: Seckin Publishing.

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