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THE EFFECTIVENESS OF AN ONLINE TRAINING MODULE FOR PRE-SERVICE AND IN-SERVICE TEACHERS: A CASE STUDY

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ABSTRACT

This study aims to understand the effectiveness of online training for pre-service and in-service teachers by exploring any differences between pre-service and in-service teachers' satisfaction and learning following an online professional training video. Additionally, the study focused on evaluating any differences in satisfaction and learning of pre-service and in-service teachers based on age, experience, subject taught, and grade level, as well as nationality. An online 20-minute video session was shown to the participants and a survey questionnaire, based on the Kirkpatrick Model, was used to explore their reactions and learning. The study employed Exploratory Factor Analysis (EFA) with independent sample t-test and ANOVA techniques to compare the training outcomes in pre-service and in-service teachers' satisfaction and learning. The results showed that the teachers were highly satisfied with the video assessment, content, and content structure. Moreover, there was no significant difference found in satisfaction levels or learning between in-service and pre-service teachers. Furthermore, no impact of age, experience, grade taught, or subject taught was found, though nationality was found to impact satisfaction with the video. The study recommends the expansion of similar online professional development programs, considering the high levels of satisfaction among pre-service and in-service teachers alike. Personalization of content to accommodate diverse learner needs, learning preferences, and backgrounds is suggested to further enhance satisfaction and learning outcomes. Lastly, this study's findings emphasize the need to improve teacher training programs, especially in different geographic and cultural contexts, to increase teaching efficacy and address the unique challenges teachers face.

Keywords: *pre-service teachers, in-service teachers, professional development for teachers, online training*

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INTRODUCTION

The rapid progression and incorporation of technology into various sectors of life have

prompted a significant shift in the educational sector by introducing novel teaching and learning methods. Digital learning platforms have become increasingly popular and a valuable resource for pre-service and in-service teachers. This study explores the effectiveness of an online training module for pre-service and in-service teachers.

Online training modules, or elearning, have gained significant attention for their flexibility, cost-effectiveness, and broad reach (Huang et al., 2020). They can facilitate various learning experiences, from enhancing professional development to fostering pedagogical skills (Baek & Sung, 2021). In the context of teacher training, these tools can offer opportunities for pre-service and in-service teachers to build their knowledge base, enhance pedagogical strategies, and adapt to the evolving educational landscape.

In this regard, pre-service teachers, still in their formal education process, and in-service teachers, who are active professionals seeking continued professional development, face different challenges and have distinct learning needs (Darling-Hammond et al., 2017). Pre-service teachers typically require comprehensive training that helps them understand the complexities of classroom teaching. In contrast, in-service teachers often seek specific upskilling opportunities to address the direct challenges they face in their classrooms (Broad & Evans, 2006). Despite the growing prevalence of online teacher training modules, their effectiveness, particularly for pre-service and in-service teachers, requires further investigation. A comprehensive understanding of this effectiveness can guide the development of these modules and help leverage their potential benefits, thus better preparing teachers for contemporary classrooms.

The widespread availability of mobile technology along with speedy internet connectivity has allowed people around the world to access online learning material at their own convenience. Following the global pandemic, during which online learning and teaching replaced face-to-face classes, virtual or blended courses are now common. Online learning allows a large audience of learners to receive high quality education on a wide variety of subjects at any given time. The main attributes of online learning are use of technological media, physical separation between teacher and pupil, and two-way communication (Fraj-Hussein et al., 2012; Sela, 2005). In addition, online learning offers a differentiated approach to categories of learners who have specific training and individual needs (Tudor et al., 2015). With the rapid development of technology, many new technologies have been utilized in online learning, such as interactive electronic books (Ericson

et al., 2016) and X (formerly Twitter) (Carpenter & Krutka, 2015). Today, the internet serves as a professional platform for teachers (Macia & García, 2016; Vavasseur & MacGregor, 2008), who often spend several hours a week in online learning spaces like websites, forums, or social networks (Campana, 2014; Trust, 2017).

Although digital technologies and online modules have emerged as an increasingly prevalent aspect of teacher training (Huang et al., 2020), there needs to be more understanding of how these tools impact both pre-service and in-service teachers differently. The effectiveness of these training modules remains to be determined, particularly in how they cater to the distinct needs and challenges of these two groups of educators (Baek & Sung, 2021). The need for clarity poses an issue for educational institutions looking to optimally integrate digital tools into their teacher training programs. Most research examines online training modules' impact on pre-service and in-service teachers separately (Broad & Evans, 2006), but comparative studies still need to be conducted. There needs to be a better understanding of the specific aspects of online training modules that are most beneficial or challenging for pre-service versus in-service teachers (Darling-Hammond et al., 2017).

There is a need for more qualitative insight into the experiences of both pre-service and in-service teachers as they engage with online training modules. Given the shift towards digital learning platforms, it is crucial to understand their impact on teacher training and professional development more thoroughly. This study will contribute to filling the identified research gaps, thus providing insight that can guide the development and implementation of more effective online teacher training modules. By examining the effectiveness of these modules, education institutions can make informed decisions about integrating such technologies into their teacher training programs. This study therefore aims to examine the effectiveness of an online training module for pre-service and in-service teachers through a case study approach. By gaining insight into the teachers' experiences and learning outcomes, the aim is to shed light on the potential of online training modules in shaping the future of teacher education and professional development. The study develops the following research objectives:

1. To investigate the impact of an online training module on pre-service teachers' knowledge and pedagogical skills.
2. To explore the effect of the same online training module on in-service teachers' professional development and teaching practices.
3. To compare the experiences and perceptions of pre-service and in-service teachers regarding the online training module.
4. To identify potential improvements in the online training module that cater to pre-service and in-service teachers' specific needs and challenges.

Finally, based on the five hypotheses developed below, the study seeks to answer the following research questions:

RQ1: Is there any difference between pre-service and in-service teachers' level of satisfaction with the online professional training video?

RQ2: Is there a difference between pre-service and in-service teachers' learning using the online professional training video?

RQ3: Is there a difference in satisfaction and learning based on age, subject taught, experience, and grade level of the pre-service and the in-service teachers?

RQ4: Is there a difference in satisfaction and learning based on the nationality of the pre-service and in-service teachers?

RQ5: Is there a difference in satisfaction and learning between the current study's teachers and the Handal et al. (2013) average?

LITERATURE REVIEW

Constructivist Learning Theory

Bada and Olusegun (2015) highlighted constructivism as a paradigm for teaching and learning, emphasizing that learners actively construct their knowledge through their experiences. By adopting the constructivist learning theory (CLT), the study aligns with this paradigm and acknowledges the importance of learner engagement and active participation in the learning process. In addition, Fernando and Marikar (2017) discussed how the

CLT promotes participatory teaching methods. This approach encourages learners to actively participate in their learning and engage in meaningful activities and collaborative discussions. The study can foster a participatory learning environment that encourages learners to construct knowledge through interaction and collaboration by employing constructivist principles. Woo and Reeves (2007) argued the importance of meaningful interaction in web-based learning from a social constructivist perspective. CLT emphasizes the role of social interaction and dialogue in knowledge construction. The study facilitates knowledge construction through dialogue, reflection, and collaborative problem solving by incorporating meaningful interactions in the online learning environment.

Cakir (2008) provided a literature review on constructivist approaches to learning in science and their implications for science pedagogy. The review supports the CLT in science education, highlighting its potential for promoting deeper conceptual understanding, critical thinking, and scientific inquiry skills. The study can leverage these insights to design science learning experiences that align with constructivist principles. In addition, Ültanir (2012) examined the constructivist approach in the educational philosophies of Dewey, Piaget, and Montessori. The article highlights the learner-centered nature of constructivism, emphasizing the importance of active engagement, hands-on experiences, and the integration of learners' prior knowledge. By drawing on the perspectives of these educational philosophers, the study can provide a theoretical grounding for applying constructivist principles in the research context.

Karagiorgi and Symeou (2005) explored the translation of constructivism into instructional design. The article discusses the potential and limitations of applying constructivist principles in designing learning environments and instructional strategies. The study can refer to this work to consider how to effectively implement constructivist learning activities and assessments that align with the research objectives.

Kirkpatrick Model

The Kirkpatrick Model is a classic tool for evaluating the effectiveness of training and development courses. Originating in the business field in the 1950s (Kulkarni & Naiknaware, 2018), the

model focuses on four fundamental aspects of the perceived effectiveness of training and development: reaction, learning, behavior, and results (McFarlane, 2006). As a model, it is readily applicable to the evaluation of other fields, including education (Heydari et al., 2019). Originally, this model was developed to be used when evaluating systems within any business organizational context, such as medicine, science, or any other field. However, it is currently being used in most schools and companies that manage their system as if they are managing a business. The reason behind this is that the importance of training in today's work fields is evident, because jobs have become complex with the constantly changing world, and organizations need to understand the investment related to their time and the resources of employees (Kulkarni & Naiknaware, 2018).

Heydari et al. (2019) explained how the model is applied in other fields with a slight change in the elements' name. Heydari referred to "reaction" as the response of the trainee to the training experience, such as their feeling or impression toward the training program (Rajeev et al., 2009), learning as the outcome of the knowledge the trainee had gained and their change of attitude (Alsalamah & Callinan, 2021), behavior as the improvement in the behavior when practicing the new knowledge and skills in the new workplace (Kirkpatrick & Kirkpatrick, 2009), and, finally, results as the ultimate impact of training (Heydari et al., 2019). Although, different models are used to help develop the educational sector, Heydari et al. (2019) emphasize that Kirkpatrick's model is suitable in assessing educational programs. Several studies have been conducted in the educational sector using Kirkpatrick's model for evaluating teachers' development and skills. For example, a study conducted by Dewi and Kartowagiran (2018) in Indonesia aimed to evaluate an internship program for a group of teacher candidates by using Kirkpatrick's evaluation program. The evaluation revealed that teachers were very satisfied with the internship program. Dewi and Kartowagiran (2018) found that the determiners of quality of education are the teachers' skills and that the teachers tend to be qualified when they have the competencies to plan, teach, evaluate, guide, train, research, and conduct community service. Similarly, another study by Johnston et al. (2018) found that for educators

to get valuable feedback that will support them in progressing and improving their teaching methods, an effective evaluation must be conducted. The outcome of the evaluation in the study by Johnston et al. (2018) revealed that more research and training is needed to assist teachers in their career development. Another study by Mahmoodi et al. (2019) used the Kirkpatrick Model to evaluate in-service teachers. The results showed that most teachers were well prepared and worked hard in increasing their professional growth. However, according to the study by Mahmoodi et al. (2019), teachers needed to learn and use the new teaching methodology (such as using technology) for more fruitful outcomes.

Online Professional Development

Professional development (PD) for teachers can take many forms, including university courses, local and national conferences, workshops, and specialized institutions. For the purpose of this review, online professional development (OPD) is defined as structured and formal professional learning that is provided entirely online and results in changes to teacher knowledge, behavior, and practices. Evidence of the effectiveness of such learning includes increased teacher capacity to collaborate with internal and external coworkers, increased ability to reflect on their practice, increased confidence in their teaching practice, or the implementation of teaching practices learned from OPD and their effect on student outcomes (Pittenger & Doering, 2010).

A wide range of online interactive activities have been designed to improve teachers' professional knowledge, skills, and teaching practices, and to contribute to their personal, social, and emotional growth (Avidav, 2000). The use of OPD in teacher education has long been advocated in the United States, according to policy documents such as the US Department of Education (2010), and research has shown that online and face-to-face PD can have similar learning outcomes for both teachers and students (Fishman et al., 2013). OPD can help to increase teacher self-efficacy by providing self-directed learning based on teachers' curricular and pedagogical needs (Ericson et al., 2016). Lieberman and Mace (2010) advocated that there are high chances of teachers connecting with a community of teachers who face similar issues in the classroom.

Challenges of Online Professional Development

Despite the advantages of OPD, challenges exist in designing and implementing effective OPD (Ericson et al., 2016; Macia & García, 2016; McNamara, 2010; Trust, 2017). First, it is challenging to engage teachers in online learning and nurture sustainable OPD (Ericson et al., 2016; Hur & Hara, 2007). Second, while online learning provides opportunities for learners to access learning resources in a flexible way, retention is often low (De Freitas et al., 2015). For example, in a study of OPD for teachers using interactive electronic books, Ericson et al. (2016) reported that 45 teachers participated in the study, but only five completed the OPD, reflecting a completion rate of just 11%. Third, designing effective OPD to provide appropriate content that meets teachers' needs is a challenge (Creemers et al., 2012; Vrasidas & Zembylas, 2004). Many professional development programs fail to align with curriculum needs (Creemers et al., 2012). Fourth, even within the same curriculum, teachers' different needs for improvement are often not fully considered since they have different backgrounds and experiences (Creemers et al., 2012; Ross, 2011; Gal-Ezer & Stephenson, 2010; Ni & Guzdial, 2012).

The above discussion sets the basis to look into Online Teacher Professional Development (OTPD), its effectiveness, and the challenges that are being faced by teachers as they continuously sharpen and develop their skills through online learning. OTPD refers to courses, workshops, or learning modules that are delivered in an online format for the professional development of teachers. However, such opportunities reflect a plethora of purposes, goals, subject areas, pedagogies, and delivery methods (Dede, 2006; Ross, 2011), and they may be asynchronous, synchronous, or blended. For learning to take place there needs to be access to online resources such as videos and websites and interactive discussions through blogs, wikis, and podcasts (Yendol-Hoppey & Dana, 2010). Dana et al. (2017) added that practitioner inquiry can be utilized, and flipped learning in higher education is another feature (Lee et al., 2017).

Essentials of Online Professional Development

The information presented in any online training module needs to be developed to facilitate the learner's comprehension and recall of the material being presented. As such, the course structure

needs to be presented in a step-by-step manner that is easy to follow and facilitates the learning process. Learners can steadily advance through a course to achieve the training goals they have set for themselves if the training content is divided into smaller subsections for easy understanding and recall. This is a strategy that helps make training provided via a learning system easier to understand and retain (Heydari et al., 2019). Learner engagement needs to be the focus, and as such, the online content—textual or audio-visual—needs to be conducive to facilitating learning. It is much more probable that students will finish the course if the teacher can hold their attention from one module to the next (Heydari et al., 2019). Finally, the content needs to be directly linked with the students' goals and should allow for the development of transferable skills.

THEORETICAL DEVELOPMENT OF THE HYPOTHESES

Pre-service and in-service teachers' satisfaction

In-service teachers have completed their education and are actively teaching in schools. Studies have shown that in-service teachers' satisfaction can be influenced by various factors, including working conditions, salary, professional development opportunities, administrative support, and collegial relationships (Darling-Hammond & Sykes, 2003; Grissom et al., 2013; Ronfeldt et al., 2015). The demands of classroom management, student performance expectations, and workload also affect their satisfaction levels (Stronge, 2013). Existing research suggests a difference exists between pre-service and in-service teachers' satisfaction. Pre-service teachers often enter the profession with high expectations and idealized views of teaching, which can influence their initial satisfaction levels (Ingersoll & Strong, 2011). However, as they transition into in-service teaching positions, they face the realities and challenges of the profession, which affect their satisfaction (Ingersoll, 2001). In-service teachers, conversely, have experienced the practical aspects of teaching and are influenced by various contextual factors that affect their satisfaction (Darling-Hammond & Sykes, 2003; Grissom et al., 2013; Ronfeldt et al., 2015). Therefore, we propose the following research hypothesis:

H₁ = There is a difference in satisfaction between pre-service and in-service teachers.

Pre-service and in-service teachers' learning

Pre-service teachers, referring to individuals undergoing teacher education programs, engage in learning experiences that lay the foundation for their future teaching careers. Research indicates that pre-service teachers acquire theoretical knowledge, pedagogical strategies, and content knowledge during coursework (Cochran-Smith & Zeichner, 2005). Their learning experiences often involve classroom observations, supervised teaching practice, and reflection on their teaching approaches (Bakkenes et al., 2010). Pre-service teachers engage in formal instruction, coursework, and opportunities to apply their learning in controlled settings. In-service teachers, who have completed their teaching education and are actively teaching, engage in ongoing professional learning throughout their careers. Their learning experiences occur within the context of their classrooms, schools, and professional development programs. In-service teachers participate in professional development workshops, collaborative learning communities, mentoring programs, and action research projects (Garet et al., 2001; Lieberman & Pointer Mace, 2010). Their learning often focuses on refining instructional strategies, classroom management and assessment practices, and addressing the specific needs of their students (Day & Sachs, 2004). Pre-service teachers primarily engage in formalized learning within controlled environments, where they acquire foundational knowledge and pedagogical techniques (Cochran-Smith & Zeichner, 2005). In contrast, in-service teachers' learning is often situated in their everyday teaching contexts, allowing for the application of knowledge and skills in real-world settings (Garet et al., 2001). In-service teachers' learning focuses on refining and adapting instructional practices based on their experiences and the needs of their students (Day & Sachs, 2004). Therefore, we propose the following research hypothesis:

$H_2 =$ A difference in learning exists between pre-service and in-service teachers.

Effect of age, subject taught, experience, and grade level on teachers' satisfaction and learning

Research suggests that age affects teachers' satisfaction. Younger teachers may experience higher levels of job satisfaction due to their enthusiasm and idealism (Kalkan, 2020). In contrast,

older teachers may exhibit higher levels of job satisfaction stemming from their experience, confidence, and fulfillment derived from their long-term commitment to the profession (Ingersoll & Strong, 2011). The subject taught also plays a role in teachers' learning experiences. Teachers specializing in different subjects may engage in subject-specific professional development, curriculum design, and instructional practices (Opfer & Pedder, 2011). For example, Science, Technology, Engineering, and Math (STEM) teachers may participate in training programs focused on integrating technology and inquiry-based instruction, while Humanities teachers may engage in discussions on critical thinking and literary analysis.

Experience is a significant factor in teachers' job satisfaction. Novice teachers often face classroom management and lesson planning challenges, which can affect their satisfaction levels (Borman & Dowling, 2008). However, as teachers gain experience and expertise, their satisfaction increases due to improved instructional strategies and greater confidence in their teaching abilities (Ingersoll & Strong, 2011). In addition, the grade level at which teachers work can influence their learning experiences. Elementary school teachers, for example, may engage in professional development related to early literacy instruction, differentiated instruction, and social-emotional learning (Pianta et al., 2008). In contrast, high school teachers may focus on content-specific professional development and instructional strategies that cater to the needs of adolescent learners. Therefore, we offer the following research hypothesis:

$H_3 =$ Differences in age, subject taught, experience, and grade level affect teachers' satisfaction and learning.

Effect of nationality on teachers' satisfaction and learning

A teacher's nationality can influence their satisfaction and learning, as cultural and contextual factors significantly shape their experiences. Research suggests that teachers' satisfaction levels may vary across different nationalities due to variations in educational systems, societal values, and support structures. For instance, a study by Ahmad et al. (2017) examined job satisfaction among teachers in different countries and found variations in satisfaction levels based on cultural factors such as individualism versus collectivism.

Additionally, teacher-learning experiences differ based on nationality, with opportunities for professional development and support varying across countries. Studies by Zeng and Day (2019) and Day and Gu (2014) explored the impact of national context on teacher learning and highlighted differences in professional learning opportunities and cultural expectations. Understanding these variations is essential for policymakers and educational leaders to develop strategies that promote teachers' satisfaction and provide culturally responsive professional development programs. Therefore, we offer the following research hypothesis:

H_4 = Differences in nationality affect teachers' satisfaction and learning.

Current study's findings in relation to Handal et al. (2013)

Understanding the factors contributing to teachers' satisfaction and learning is crucial for the development of effective educational policies and practices. Research in this area reveals varied findings based on different contexts and factors. For instance, Handal et al. (2013) examined the retention of mathematics and science teachers in rural and remote schools. Their study highlighted teachers' particular challenges in these settings, including limited resources, isolation, and professional development opportunities. The findings indicated that teachers' satisfaction and learning experiences in rural and remote areas differed from those in urban settings. Factors such as community support, access to resources, and professional learning networks were identified as crucial for promoting teacher satisfaction and ongoing learning. This study contributes to understanding the specific factors that affect teachers' satisfaction and learning in rural and remote contexts. Finally, we offer the following research hypothesis:

H_5 = There is a difference between the current study's teachers' satisfaction and learning and the Handal et al. (2013) average.

METHODOLOGY

A quantitative method design was employed in this study to explain and understand the perceived effectiveness of the online training modules for pre-service and in-service teachers. Quantitative data collection and analysis were used to address the study questions. Inferential statistics were used to run a one-sample *t*-test with a posttest survey for only a group of participants. Descriptive statistics was used to understand the pre-service and in-service teachers' satisfaction of the online professional training modules.

Context of the Study

This research was conducted among teachers (pre-service and in-service) from the United Arab Emirates (UAE), Ghana, Kenya, Pakistan, and Nigeria. The research aimed to evaluate the perceptions of pre-service and in-service teachers about the effectiveness of the learning videos. The respondent teachers were asked to self-evaluate their reactions and learning immediately after watching the video. The survey questionnaire on which the teachers responded was developed using the first two levels of the Kirkpatrick Model as the framework (reaction and learning), and was guided by the instruments developed by Heydari et al. (2019) and Homklin (2014) in similar studies. The first part of the survey included demographic questions, followed by questions to gauge the teachers' reactions and learning.

The research aimed to evaluate the training effectiveness of seven videos about learning environment. The videos were selected because they highlight the main components of an authentic learning environment in the classroom. We identified the following videos as being an important part of an effective learning environment that all teachers need to know and practice:

- Demonstrate knowledge of play as part of the learning environment
- Understand how to identify and integrate strategies that motivate students
- Identify the various ways students process information (multiple intelligence)
- Demonstrate knowledge of Piaget's Theory of Cognitive Development

- Demonstrate knowledge of the importance of social and emotional learning
- Understand the basics of differentiated learning
- Flexible Classrooms

Population and Sample

Training in the UAE, Ghana, Kenya, Pakistan, and Nigeria has progressed. Many highly skilled private companies, professionals, government agencies, and regulatory bodies in Nigeria and the UAE are now offering planning training classes in different places throughout the countries. This learning training, designed as training courses, training sessions, webinars, and meetings, is offered in many countries all over the world, including Nigeria, Kenya, the United Kingdom, the UAE, Ghana, Pakistan, South Africa, the United States, and a number of other nations. The respondents from the UAE, Ghana, Kenya, Pakistan, and Nigeria participated in the study.

Participants

The study included 300 participants from various countries, including but not limited to Pakistan and Kenya. Participants were selected using purposive sampling, a nonprobability sampling technique widely used in online survey research when the population is known and available (Palinkas et al., 2015). As the research aimed to explore pre-service and in-service teachers' satisfaction with OPD videos, this diverse participant pool was sought to better understand the relevance of such programs across different stages of a teaching career. The randomly selected sample (based on the selection criteria as discussed below) was therefore from different countries (the UAE, Ghana, Kenya, Pakistan, and Nigeria). The final sample selected for this study was 216 participants based on the criteria set by the researchers to be defined as: (i) willing to participate in the study, (ii) specialized in science, mathematics, languages, social studies or early childhood education, (iii) for in-service teachers to be currently working full time in schools and for pre-service teachers to be attending practicum courses, (iv) completed or currently enrolled in bachelor, diploma or master's in education. Participants were provided with a full explanation of the study and had the choice not to

participate if they were unwilling. A consent form was sent to them by email, and all participants were made aware that their submissions would remain anonymous.

Instrumentation

The teachers' survey consisted of 10 demographic factors to learn about each teacher's profile. Multiple-choice questions were used to ask participants about their gender, age range, grades taught, qualification, years of experience, and subjects taught. The second section of the survey was modelled using the Kirkpatrick Model's first two steps of reactions and learning. For gauging reactions, a satisfaction survey was found suitable, and as such, the teachers were asked about their satisfaction with the online professional training. This section included four categories that were developed based on the Kirkpatrick Model for evaluating respondents' reactions. More specifically, this included an assessment of respondents' satisfaction with the video or video assessment (8 items), content assessment (7 items), content structure (3 items), and, based on the Kirkpatrick Model, the respondents' perceptions of their learning (5 items). A total of 23 items were included in the survey, which used a five-point Likert scale: 5 = *Very satisfied*, 4 = *Satisfied*, 3 = *Neither*, 2 = *Dissatisfied*, 1 = *Very dissatisfied*.

Procedure

Data collection was conducted via an online survey distributed to the participants. This method allows for convenient, time-efficient data collection and encourages honest responses due to the perceived anonymity of online surveys (Evans & Mathur, 2018). The participants accessed the training videos online, the same as the real-world implementation of such online professional development resources.

Ethical Considerations

Apart from obtaining informed consent, the study ensured the confidentiality and anonymity of the participants by not asking for any personally identifiable information in the survey. Moreover, participants were informed of their right to withdraw from the study without any repercussions, as recommended by the Ethical Guidelines for Educational Research (BERA, 2018). Any potential risks or discomfort associated with the study were communicated to the participants beforehand,

ensuring ethical conduct per the principles of beneficence and respect for persons (American Psychological Association, 2016).

Methods of Data Analysis

The collected data were analyzed using Statistical Package for the Social Sciences SPSS, a widely used software for statistical analysis in social science. Descriptive statistics were computed to understand the central tendency and dispersion of the satisfaction levels and learning outcomes. Independent sample *t*-tests were performed to compare the means of different groups, such as pre-service versus in-service teachers and teachers from different nationalities (Field, 2013). Finally, regression analysis was conducted to identify predictors of satisfaction and learning outcomes. First, the demographic information was analyzed using frequency and percentages to learn more about the participants. In order to address the first two research questions of the study, one-way ANOVA was used to determine if there was any significant difference between the pre-service and in-service teachers. Further, to address Research Questions 3 and 4, one-way ANOVA was used to determine if there was any significant difference between the pre-service and in-service teachers based on age, subject taught, experience, grade level, and nationality.

Additionally, a one-sample *t*-test was used to compare participants' mean scores to a specific

value identified by Handal et al.'s (2013) questionnaire score range, presented in Table 1, to answer Research Question 5. Handal et al. (2013) developed a questionnaire score range to describe the data and decide the improvements occurring in the data using a Likert scale. In addition, the World Bank (2021) mentioned that pre-service and in-service primary and secondary school teachers are expected to be on the intermediate level of using technology. Accordingly, the hypothesized value identified in this study for teachers in the one-sample *t*-test is the above-average score ($m = 4$) presented by Handal et al. (2013) and higher than the intermediate level identified by the World Bank (2021) to determine if the participants' mean scores are significantly higher than above-average after the online professional training program was conducted.

RESULTS

Demographic information

Table 2 summarizes the demographic information: 41.7% (90) were males and 58.3% (126) were females. The age range differed among participants: 11.6% (25) ranged from 18 to 24 years old, 58.3% (126) ranged from 25 to 34 years old, 21.8% (47) ranged from 35 to 44 years old, and 8.3% (18) ranged from 45 to 54 years old. The grades taught were 10.2% (22) teaching kindergarten students, 46.3% (100) grades 1–5, 18.5% (40) grades 6–9, 18.5% (40) grades 10–12, and 6.5% (14) undergraduate students. Regarding qualification, 48.6% (105) were pre-service teachers, 17.6% (38) were studying or had completed a diploma in education, and 33.8% (73) were studying or had completed a master's in education. For experience, 2.3% (5) had no teaching experience, 36.6% (79) had less than five years of experience, 38.4% (83) had 6–10 years of experience, 13.4% (29) had 11–15 years of experience, and 9.3% (20) had more than sixteen years of experience. Finally, the subjects taught by participants also differed, where 18.1% (39) are specialized in science, 16.2% (35) in mathematics, 33.3% (72) in languages, 15.3% (33) in social studies, and 17.1% (37) in early childhood education.

Validity and Reliability

For content validity, the survey was sent to two specialists in education to give their opinions on: (i) the suitability of the instrument in achieving the purpose of the study, (ii) the appropriateness of the

Table 1.
Questionnaire Score Range

Score Range	Description
1.0 < x < 1.5	Very low
1.5 < x < 2.0	Low
2.0 < x < 2.5	Moderately low
2.5 < x < 3.0	Slightly below average
3.0	Average
3.0 < x < 3.5	Slightly above average
3.5 < x < 4.0	Moderately high
4.0 < x < 4.5	High
4.5 < x < 5.0	Very high

Table 2.
Demographic Information of Participants

Demographics		Frequency	Percentage
Gender	Male	90	41.7%
	Females	126	58.3%
Age	18–24 years old	25	11.6%
	25–34 years old	126	58.3%
	35–44 years old	47	21.8%
	45–54 years old	18	8.3%
Grades	Kindergarten	22	10.2%
	Grades 1–5	100	46.3%
	Grades 6–9	40	18.5%
	Grades 10–12	40	18.5%
	Undergraduate	14	6.5%
Qualification	Pre-service	105	48.6%
	Diploma	38	17.6%
	Master's	73	33.8%
Years of experiences	No experience	5	2.3%
	<5 years	79	36.6%
	6–10 years	83	38.4%
	11–15 years	29	13.4%
	>16 years	20	9.3%
Subjects	Science	39	18.1%
	Mathematics	35	16.2%
	Languages	72	33.3%
	Social Studies	33	15.3%
	Early Childhood Education	37	17.1%

items to the subsection they were part of, (iii) the accuracy of the language used, and (iv) the length of the survey. Few suggestions were received from experts, which resulted in rewording two of the items to align more aptly with the purpose of the study.

Regarding the construct validity, Exploratory Factor Analysis (EFA) was used to identify the underlying relationship between the measured variables. For the in-service and pre-service teachers' satisfaction of the video assessment, the value of Kaiser-Meyer-Olkin (KMO) was 0.969 and the Bartlett's Chi-Square approximation was 3417.48 with $p < 0.001$. For the content assessment, the

value of KMO was 0.952, and the Bartlett's Chi-Square approximation was 2752 with $p < 0.001$. For the content structure, the value of KMO was 0.782 and the Bartlett's Chi-Square approximation was 814.61 with $p < 0.001$. Finally, for learning, the value of KMO was 0.914 and the Bartlett's Chi-Square approximation was 2124.70 with $p < 0.001$.

For the tool reliability, the internal consistency coefficient (Cronbach's Alpha) used for all the survey sections was ≤ 0.996 , with the following value for each category: video assessment (≤ 0.999), content assessment (≤ 0.98), content structure (≤ 0.96) and learning (≤ 0.98), which are considered suitable for the study.

Descriptive Statistics

This section presents the descriptive information about the pre-service and in-service teachers' reaction (satisfaction) on the survey items within the four categories: video assessment, content assessment, content structure, and learning; and the pre-service and in-service teachers' learning from the video.

The videos contained an animated script about learning environments. Ensuring accessibility is an important consideration, and the videos are publicly available to every individual. Below are links to the seven videos:

1. **Video 1:** Demonstrate knowledge of play as part of the learning environment (3.17k subscribers, and 369 reviews) <https://www.youtube.com/watch?v=0QcK4BL1SL4&list=PL7IK2zH0NXnyty4BbNf3kWdMv1jyGkJw4&index=8&t=47s>
2. **Video 2:** Understand how to identify and integrate strategies that motivate students (3.17k subscribers, and 466 reviews) <https://www.youtube.com/watch?v=ZxU64nmrYuM&list=PL7IK2zH0NXnyty4BbNf3kWdMv1jyGkJw4&index=3>
3. **Video 3:** Identify the various ways students process information (multiple intelligence) (3.17k subscribers, and 287 reviews) <https://www.youtube.com/watch?v=Cj4S-5t4LBI&list=PL7IK2zH0NXnyty4BbNf3kWdMv1jyGkJw4&index=13>
4. **Video 4:** Demonstrate knowledge of Piaget's theory of cognitive development (3.17k subscribers, and 1.8k reviews) <https://www.youtube.com/>

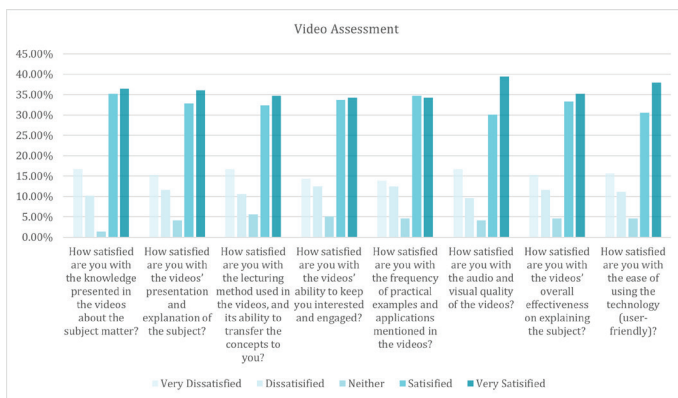
watch?v=dd_JhPb7ah8&list=PL7IK2zH0NXnyty4BbNf3kWdMv1jyGkJw4&index=14&t=15s

- Video 5:** Demonstrate knowledge of the importance of Social and Emotional Learning (3.17k subscribers, and 166 reviews) <https://www.youtube.com/watch?v=0tFzEvlBotQ&list=PL7IK2zH0NXnyty4BbNf3kWdMv1jyGkJw4&index=17&t=23s>
- Video 6:** Understand the basics of differentiated learning (3.17k subscribers, and 202 reviews) <https://www.youtube.com/watch?v=Bzibzic0Evw&list=PL7IK2zH0NXnyty4BbNf3kWdMv1jyGkJw4&index=23&t=5s>
- Video 7:** Flexible Classrooms (3.17k subscribers, and 368 reviews) <https://www.youtube.com/watch?v=WDp7HyI0yl0&list=PL7IK2zH0NXnyty4BbNf3kWdMv1jyGkJw4&index=29&t=45s>

Video assessment

Figure 1 shows the video assessment category where pre-service and in-service teachers showed high satisfaction in the survey items. However, the highest satisfaction was shown in two items: the audio and visual quality of the videos and the ease of using the technology.

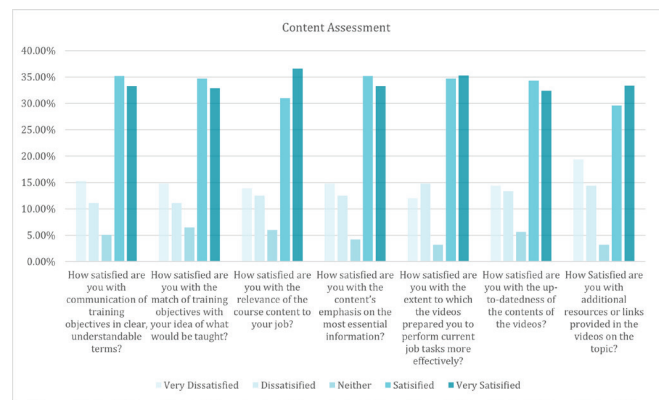
Figure 1. Video Assessment



Content assessment

Figure 2 also shows high satisfaction from pre-service and in-service teachers with the content assessment items. However, the highest item is about the relevance of the course content to their job.

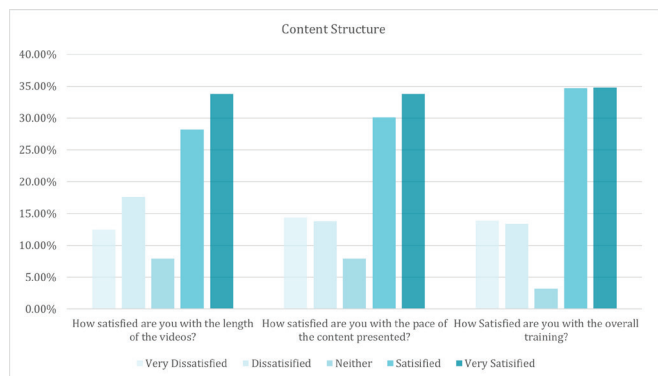
Figure 2. Content Assessment



Content structure

Figure 3 presents the items of the content structure where pre-service and in-service teachers showed high satisfaction with it.

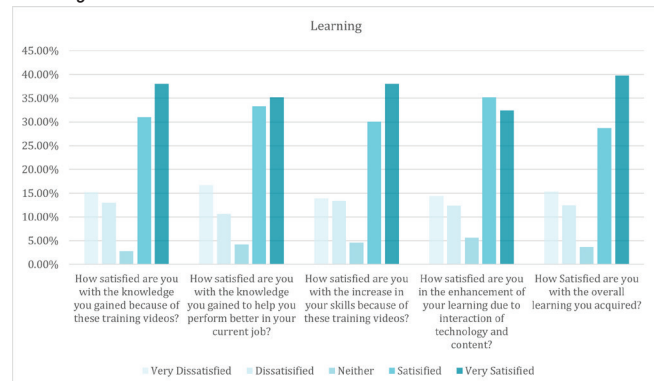
Figure 3. Content Structure



Learning

As part of the Kickpatrick's Model, an evaluation of the respondents' learning was also made using the survey. Figure 4 presents the pre-service and in-service teachers' satisfaction in all items of the learning category.

Figure 4. Learning Satisfaction



ONE-WAY ANOVA

Difference of satisfaction and learning with video between pre-service and in-service teachers

The results showed no significant difference between the pre-service and in-service teachers' satisfaction and perceived learning using the online professional training videos. In comparing pre-service teachers who were holding or currently had a bachelor's degree in education with in-service teachers who were holding or currently have a bachelor's, diploma, and/or master's degree in education, there were no significant differences in responses between the two groups. Table 3 depicts the p values of the two groups.

Table 3.

P Values-Pre-service and In-Service Respondents

	Pre-service	In-Service
Reaction/Satisfaction— Video Assessment	0.424	0.767
Reaction/Satisfaction— Content Assessment	0.381	0.717
Reaction/Satisfaction— Content Structure	0.342	0.955
Learning	0.370	0.85

The significant value of pre-service compared to in-service teachers is $p = 0.424$ and 0.767 in video assessment, $p = 0.381$ and 0.717 in content assessment, $p = 0.342$ and 0.955 in content structure, and $p = 0.370$ and 0.85 in learning categories, respectively. Accordingly, the alternate hypotheses were rejected, and this confirmed the null hypothesis where the mean of participants' scores was not significantly different.

H_0 = There is no difference between pre-service and in-service teachers' satisfaction.

H_0 = There is no difference between pre-service and in-service teachers' learning.

Impact of age, subject taught, experience, and grade level on pre-service and in-service teachers' satisfaction and learning with video

In addition, the one-way ANOVA test was run to compare the participants' age groups, subject taught, teaching experiences, and grade level taught. The results also showed no significant difference among participants' satisfaction in all

survey categories. As such the H_3 is rejected and the null hypothesis is accepted:

H_0 = There is no difference based on age, subject taught, experience, and grade level on teachers' satisfaction and learning.

Impact of nationality on pre-service and in-service teachers' satisfaction and learning with video

Regarding nationality, the results showed no significant difference between the countries selected. However, there was a significant difference found when comparing Pakistani participants' satisfaction and Kenyan participants' satisfaction in video assessment category ($p = 0.11$), in content assessment category ($p = 0.004$), in content structure ($p = 0.009$), and in learning categories ($p = 0.008$). As such, H_4 was accepted:

H_4 = There is a difference in teachers' satisfaction and learning based on nationality.

THE EXTENT TO WHICH THE ONLINE PROFESSIONAL TRAINING MODULES AFFECT TEACHERS' SATISFACTION

One-sample t-test

A one-sample t -test was run to compare the participants' (pre-service and in-service teachers) mean about their satisfaction in attending the online professional training modules to the above-average mean proposed ($m = 3$) as defined by Handal et al. (2013). Table 4 presents the mean of participants' video assessment satisfaction ($M = 3.62$, $SD = 1.406$), which was significantly higher than the mean set ($m = 3$), $t(215) = 6.541$, $p < .05$ ($\eta^2 = 0.40$); communication and collaboration skills ($M = 4.07$, $SD = 0.540$) was significantly higher than the percentage set ($m = 3.5$), $t(18) = 4.67$, $p < .05$ ($\eta^2 = 0.54$); critical thinking, problem-solving, and decision-making skills ($M = 3.93$, $SD = 0.498$) was significantly higher than the percentage set ($m = 3.5$), $t(18) = 3.79$, $p < .05$ ($\eta^2 = 0.44$); creativity and innovation skills ($M = 3.92$, $SD = 0.571$) was significantly higher than the percentage set ($m = 3.5$), $t(18) = 3.21$, $p < .05$ ($\eta^2 = 0.36$); and using technology as a tool ($M = 3.84$, $SD = 0.572$) was significantly higher than the percentage set ($m = 3.5$), $t(18) = 2.604$, $p < .05$ ($\eta^2 = 0.27$). Thus, the results support the conclusion that the participants' range of mean is higher than the average demonstrated by Handal et al. (2013).

Table 4.
One-sample t-test

One-sample Test							
	Test Value=3						
	t	df	Significance		Mean Difference		95% Confidence Interval of the Difference
			One-Sided p	Two-Sided p		Lower	Upper
Video Assessment	6.541	215	<.001	<.001	.62616	.4375	.8148
Content Assessment	6.244	215	<.001	<.001	.58532	.4005	.7701
Content Structure	6.044	215	<.001	<.001	.57099	.3848	.7572
Learning	6.435	215	<.001	<.001	.62407	.4329	.8152

As such, H_5 is accepted:

H_5 = There is a difference between the current study's teachers' satisfaction and learning and the Handal et al. (2013) average

DISCUSSION

The study successfully answered the first research question: Is there any difference between pre-service and in-service teachers' level of satisfaction with the online professional training video? More specifically, the satisfaction was expressed to all three aspects of the training, namely, video assessment, content assessment, and content structure, as discussed in the following sections. The findings showed that teachers were satisfied with the knowledge presented in the videos about the subject matter. They appreciated the videos' presentation and explanation of the subject. They stated that the videos motivated them to keep engaged in learning. This result contradicts previous studies that highlighted a challenge engaging teachers in online learning and nurturing sustainable OPD (Ericson et al., 2016; Hur & Hara, 2007). On the contrary, they liked the audio and visual quality of the videos and the effectiveness in explaining the content. They found that the OPD is user-friendly and were satisfied using the videos.

According to the findings of this research, there is no significant difference in satisfaction levels between pre-service and experienced teachers. Both sets of teachers were satisfied with the content presented and with its relevance to them. In contrast, Günbatar (2019) found that in-service teachers had much higher online professional

training satisfaction levels than pre-service teachers. However, the highest level of satisfaction was shown in this study by both pre- and in-service teachers about the relevance of the course content to their job. This result contradicts a previous study that mentioned that, although online learning provides opportunities for learners to access learning resources in a flexible way, retention is often low (De Freitas et al., 2015). This result confirms that the OPD was designed to meet teachers' needs and provide appropriate content. It was mentioned previously that designing effective OPD to provide appropriate content that meets teachers' needs is a challenge (Creemers et al., 2012; Vrasidas & Zembylas, 2004).

We found that both sets of teachers were satisfied with the length of the videos, regardless of the content and overall training. These findings also indicate that the online videos need to be developed in a manner so that their structure is engaging, they are of appropriate length to hold the viewers' attention, and the pace of learning is suitable to ensure retention and learning. Next, we answered the second research question: Is there a difference between pre-service and in-service teachers' learning using the online professional training video? The teachers showed high satisfaction in gaining new knowledge to perform better in their current jobs. Ericson et al. (2016) emphasized that the OPD can help to increase teacher self-efficacy by providing self-directed learning based on teachers' curricular and pedagogical needs. They felt that the OPD increased their skills in teaching, using, and interacting with technology. This is similar to a

previous study that mentioned the improvement of teachers' professional knowledge, skills, and teaching practices through the use of online interactive activities (Avidav, 2000). The current study also provided an answer to the third research question: Is there a difference in satisfaction and learning based on age, subject taught, experience, and grade level of the pre-service and the in-service teachers? It was found that these factors did not have any impact on either the satisfaction or the learning of either pre-service or in-service teachers. Most previous literature has not differentiated between teachers' grade, experience, or subject taught, although there are some studies that have found that efficacy with technology (which is higher for younger learners) impacts both the satisfaction and learning outcomes of learners (Wang et al., 2013). However, in the current study, even age has not been found to impact satisfaction or learning.

In addition, the result for the fourth research question, is there a difference in satisfaction and learning based on nationality of the pre-service and in-service teachers? was also positive, with the findings indicating a difference based on respondents' nationality. A significant difference was found was between Pakistani and Kenyan participants in all survey categories: content assessment, content structure, video structure, and learning. This is in conformity to what has already been stated by several studies as a challenge—that even within the same curriculum, teachers' different needs for improvement are often not fully considered since they have different backgrounds and experiences (Creemers et al., 2012; Gal-Ezer & Stephenson, 2010; Ni & Guzdial, 2012; Ross, 2011).

Additionally, in answer to the fifth research question, the results showed that the pre-service and in-service teachers' satisfaction after using the OPD video is significantly higher than the range proposed as average by Handal et al. (2013). Interesting to note is that in content assessment, teachers stated that they gained confidence in their teaching practices to implement what they had learned. Pittenger and Doering (2010), who emphasized that the OPD has positive impact on teachers' teaching practices, reflections, and collaboration with external and internal coworkers, highlighted similar results. They felt that the teachers were introduced to updated video content and provided

with additional resources through links offered in the videos on the topic.

Practical Implications

Based on the study's findings, several practical implications are derived. The study showed that teachers expressed high satisfaction with the online professional training videos. This suggests that well-designed OPD programs with engaging content, clear presentation, and user-friendly interfaces can effectively motivate and engage teachers in online learning. Attention should be given to the audio and visual quality of the videos to ensure effectiveness in explaining the content. Furthermore, the structure of the videos, including appropriate length and pace, should be considered to enhance learning and retention. The study found that both pre-service and in-service teachers were satisfied with the relevance of the course content to their job. This highlights the importance of developing OPD programs tailored to teachers' specific needs and incorporating content applicable to their classroom practices. By addressing the professional needs of teachers, OPD effectively enhances their professional knowledge, skills, and teaching practices.

The study identified significant differences in satisfaction and learning based on the participants' nationality. This emphasizes the need to consider cultural and contextual factors when designing OPD programs. Customizing the content and instructional approaches to account for the diverse backgrounds and experiences of teachers from different countries can help ensure their engagement and maximize the effectiveness of the training. The study found that the OPD program increased teachers' self-efficacy and skills in teaching and using technology. This suggests that OPD can be crucial in building teachers' confidence and competence in integrating technology into their teaching practices. Providing opportunities for self-directed learning and addressing teachers' curricular and pedagogical needs can further enhance their self-efficacy and technological proficiency. The study did not find significant differences in satisfaction and learning based on age, subject taught, experience, and grade level. This indicates that these factors may not significantly affect the effectiveness of OPD programs. Therefore, educational policymakers and program designers should focus on creating inclusive and equitable OPD opportunities that cater to the diverse needs of all teachers,

irrespective of their demographic characteristics. By considering these practical implications, educational institutions and policymakers can develop and implement effective OPD programs that promote teachers' satisfaction, enhance their learning outcomes, and ultimately contribute to their professional growth and improved classroom practices.

CONCLUSION

COVID-19, an unprecedented global pandemic, has influenced the way pre-service teachers and in-service teachers are prepared and/or able to develop professionally. It has shifted the ways in which opportunities are created for teachers to continue preparing or developing their skills, knowledge, and abilities. The use of OPD modules and training has emerged as a result. The current study offers a case study that presents a distinct lens to explore the potentiality of the effectiveness of online training modules on pre-service and in-service teachers during a global pandemic. Kirkpatrick's model of training evaluation used in this case study has enabled us to uncover the pre-service and in-service teachers' satisfaction with and their learning through online professional training modules. The teachers' satisfaction was measured based on the quality of video, its content and content structure, and learning was measured using a set of five items. The research found no significant difference in either satisfaction or learning of the pre-service and in-service teachers. Moreover, no significant differences were found for age, grade level, teacher experience, or subject taught. However, difference in satisfaction and learning were found between teachers from different nationalities. Additionally, the results yielded from this case study indicate that teachers were more satisfied with online training than previous studies show.

Through four categories and elements: (a) video assessment—consisting of 8 aspects, (b) content assessment—consisting of 7 aspects, (c) content structure—consisting of 3 aspects, and (d) learning—consisting of 5 aspects, 23 total aspects were explored to unpack the question: What is the effect of online professional training modules on pre-service and in-service teachers? Hypotheses and research questions were imperative to consider. The first research question being: Is there any difference between pre-service and in-service teachers' satisfaction from the online professional

training modules? The second one being: To what extent do the online professional training modules affect teachers' satisfaction? The results from this case study indicate that teachers were more satisfied with online training than what existing studies show. However, beyond "being satisfied" comes "being engaged." Further insight can be gained through continued research with a diverse participant sample from a range of learning institutions that include diverse cultural contexts and multiple ways to collect, generate, and analyze relevant data (i.e., questionnaires, focus group interviews conducted over a period of time, and recurrent analyses of self-assessments upon module completion).

Professional development training for both pre-service and in-service teachers should be satisfying. Moreover, contemporary times call for training also to be applicable, accessible, sustainable, and successful. Implications for next steps are numerous. For example, longitudinal and correlative studies would be of value, especially those aiming to explore the effectiveness of a wide range of contexts, including hybrid-learning environments with beginning and advanced coursework, and skill application. Last, further exploration is needed on the nuances of the utilization and application of "adaptive," "continued," and "ongoing" professional development modalities for teachers preparing to enter classrooms (not self-contained) and those teachers already engaged in teaching in self-contained classrooms.

Limitations and Future Directions

The present study has its limitations. First, it is based on the teachers' self-reported satisfaction and learning outcomes, which can be influenced by many factors such as personal bias, social desirability bias, or even lack of self-awareness about accurate learning outcomes. A more objective measure of learning outcomes, such as pre- and post training tests, could enhance the validity of the findings. Second, the study considered only two countries: Pakistan and Kenya. Although a difference in satisfaction levels was noted based on nationality, this finding may not be generalizable to teachers from other cultural or geographic backgrounds. Third, the study needs to address the potential differences in technical infrastructure or internet connectivity between the two groups of teachers (pre-service and in-service), which could significantly affect their experience and satisfaction

with the OPD videos. Lastly, this study did not evaluate the long-term effects and sustainability of the satisfaction and learning outcomes. The impact of such training should be assessed over time to understand its effectiveness and persistence.

The findings from this study open several avenues for future research. Given the potential influence of cultural context on levels of satisfaction with online professional training, further research could expand to include teachers from more diverse countries. Future research could also include a more comprehensive demographic profile, such as the technical literacy or digital proficiency of teachers, as these factors may also influence satisfaction and learning outcomes. Furthermore, future studies could consider more objective measures of learning, such as pre- and post-training tests, to provide a clearer picture of the impact of OPD videos on teachers' knowledge and skills. Longitudinal studies would also be beneficial to investigate the sustainability of the satisfaction with and learning outcomes of the training. They help us understand whether the initial positive reactions to the training translate into long-term improvements in teaching practices and the extent to which the acquired knowledge and skills are retained over time. Last, future research could explore ways to personalize online professional training to better cater to different teachers' diverse needs and preferences. By doing so, the efficacy of these online programs is significantly improved, leading to even higher satisfaction and learning outcomes.

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