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Qualitative exploration of the opportunities and challenges of online training according to the behavioral intention variables of the most trained teachers during the COVID-19 pandemic

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Abstract: The COVID-19 epidemic has given rise to a new situation that requires the qualification and training of teachers to operate in educational crises. Amidst the pandemic, online training has emerged as the predominant approach for delivering teacher training. The COVID-19 pandemic has created potential opportunities and challenges for online training, which may have a long-lasting impact on online training procedures in the post-pandemic era. This study aims to determine the primary potential and constraints of online training as seen by instructors. The Technology Acceptance Model (TAM) identified online training opportunities and challenges by examining the to-be-applied behavioral intention variables that influence trainees. These variables include individual, system, social, and organizational factors. The study has applied the Phenomenological technique to address the research issues, using the Semi-structured interview tool to get a comprehensive knowledge of the online training phenomena amongst the pandemic. A total of seven participants were selected from a list of general education teachers at the Central Education Office of the Education Department in Bisha Governorate. These people were deliberately selected because of their high frequency of completing training sessions throughout the epidemic. A series of interviews was conducted with these participants. The findings indicated that the primary prospects included both equal opportunities and digital culture within the individual factors, enrollment in training programs and variation in training programs across organizational characteristics, the use of digital material and electronic archiving within the system variables, engaging in the exchange of personal experiences, providing constructive criticism, and fostering favorable communication within the realm of social factors. However, the primary obstacles included deficiencies in digital competencies, compatibility of trainees' attributes, and dearth of desire as per individual factors, the temporal arrangement of training programs, as well as the lack of prior preparation and preparedness within the realm of organizational factors. Other challenges included the absence of trainer assessment, limited diversity of training exercises, and technological obstacles within the system factors, and ultimately the absence of engagement with the instructor, and lack of engagement with peers are within the social variable.

Keywords: online training; the Technology Acceptance Model (TAM); behavioral intention; the COVID-19 pandemic

1. Introduction

The COVID-19 epidemic has compelled educational institutions to make the shift to online platforms in order to uphold their instructional objectives. The Ministry of Education in Saudi Arabia has completely shifted to online platforms to ensure the continuity of the educational process (Tanveer et al., 2020) and to continue executing professional development programs in the area of education (Alhasan et al., 2021).

Training is a crucial component of teachers' professional growth since it facilitates the enhancement of their professional expertise and competencies (Ross, 2011). Online training is the process of acquiring knowledge and skills using online platforms, which may be either partly or fully conducted over the internet (Zainab et al., 2017). The online training system has been developed to provide sustained professional growth and adapt to the evolving needs of the teaching profession (Al-Nasheri and Alhalafawy, 2023). Online training facilitates the enhancement of teachers' knowledge and pedagogical abilities, allowing them to meet their professional development objectives in a convenient and cost-effective manner. This approach is not constrained by time or place (Philipsen et al., 2019).

Online training is distinguished by the wide range of tools used and the many ways and formats employed for online implementation. The study by Kalinina et al. (2020) highlights the substantial impact of this intervention on transforming traditional training methods and enhancing the proficiency of teachers. Online training fosters active engagement and collaboration among learners, promoting their interaction and participation in the training material (Alhalafawy et al., 2021; Hakim et al., 2022). Nusbaum (2020) research demonstrated the efficacy of online training in enhancing the professional growth of educators. In addition, Seraji and Khodaveisi (2019) validated that online training resulted in the enhancement of instructors' abilities and had a beneficial impact on their professional practices. The study conducted by Garg and Sharma (2020) revealed that online training enhances the efficacy and productivity of training, resulting in satisfaction and ongoing self-improvement. Clausen et al. (2020) also emphasized the significance and efficacy of using online training for the professional growth of educators in response to the COVID-19 epidemic.

Simultaneously, e-learning encounters multiple challenges, and it is vital to surmount the hurdles confronted by learners throughout the training procedure in order to guarantee its efficacy (Amin et al., 2019). Two primary obstacles identified by Wynants and Dennis (2018) hindered the completion of online professional development courses by teachers: insufficient social interaction and internal motivation. Moreover, a study conducted by Farooq et al. (2020) identified many barriers including inadequate teacher training and institutional support, connectivity issues with the internet, challenges in promoting learner engagement, difficulties in conducting assessments in digital settings, and problems in comprehending the intricacies of online training. In addition, a study conducted by Pölzl-Stefanec (2021) identified various difficulties encountered by participants, specifically teachers engaged in professional development programs. These challenges encompassed the utilization of specific computer software, inadequate instructional resources, limited or unreliable internet connectivity, accessibility to contemporary electronic devices, insufficient time to acquire the necessary technical competencies for course attendance, and a dearth of technical knowledge and skills, among other obstacles.

In response to the onset of the COVID-19 issue and the Kingdom of Saudi Arabia's complete transition to digital educational materials, it became imperative to provide instructors with prompt training and certification. Prior to the epidemic, electronic training was the only viable method available, and it was not officially used. Teachers are currently undergoing comprehensive and collaborative training through digital platforms for the very first time. This has created a significant opportunity to

study the use of electronic training during the pandemic, as it has yielded some positive outcomes but also faced numerous challenges due to the pandemic circumstances. The present research aims to investigate and evaluate this phenomenon by analyzing the perspectives of instructors engaged in online training during the crisis. This aligns with prior research indicating that electronic training offers significant prospects for professional development and enhancement of teaching methods and approaches. By using current technology and online resources, instructors may substantially benefit from those opportunities (Kosmas, 2017). Furthermore, study conducted by Wynants and Dennis (2018) substantiated that electronic training has presented several prospects for individuals participating in professional development programs. These opportunities include capturing learners' attention, delivering information to them, and fostering their active involvement. Furthermore, the adaptability and convenient availability of materials have made the training appropriate and advantageous for learners. Although the training sector at the Ministry of Education in the Kingdom of Saudi Arabia has received substantial support and financial investment, there has been a lack of research focusing on the opportunities and challenges that learners face in electronic training, particularly during the COVID-19 pandemic. The current study focuses on framing the experience of on-line training during the pandemic from the perspective of teachers to cover the lack of studies on this topic on the one hand and on the other hand to develop the structure of on-line training so that it is ready in case of any recurrence of any emergency. The importance of the current study is due to the fact that it is one of the studies that can provide results that can be built upon to develop on-line training both under normal training conditions and during emergencies. Therefore, this study aims to fill the research gap by gaining a more profound comprehension of the possibilities and difficulties of electronic training as seen by public school instructors during the COVID-19 epidemic. This will be achieved by addressing the following inquiries:

- 1) What were the opportunities for online training of general education teachers during the COVID-19 pandemic?
- 2) What were the challenges faced by general education teachers during online training during the COVID-19 pandemic?

2. Literature review

2.1. Online training: Opportunities and challenges

According to McGuire and Gubbins (2010), online training has the potential to transform the conventional method of delivering training. Organizations, including educational institutions, have the potential to provide training to their staff using innovative approaches and techniques. This enables them to keep educators updated on teaching career requirements and educational benchmarks. Education institutions with various branches might use distance training to guarantee that all instructors adhere to the intended training goals (Pozo-Rico et al., 2020). Distance training may not only enhance the abilities of instructors, but also provide chances for personal development, which might possibly help them achieve their professional advancement goals (Garg and Sharma, 2020). In addition, online training aids educational

institutions in mitigating the substantial expenses linked to educating their educational staff (McGuire and Gubbins, 2010).

A recent study conducted by Boentert and Pistor (2021) has revealed that online training provides significant opportunities in three key areas. Firstly, there are substantial cost reductions in training expenditures, including the price of hardware, software, the development of digital culture for trainees, and other related charges. Second, expediting procedures via frequent and diverse online meetings, enabling prompt collaboration with trainers from other areas to improve efficiency and maintain effective professional communication. Third, by allocating work among the members of the organization, duties may be expedited without the need for travel.

A major challenge in traditional training is the limitation of trainees to specific schedules and locations. However, online training offers a novel solution that enables education staff, such as leaders, educational supervisors, and teachers, to optimize their time and energy by utilizing the distinct educational opportunities offered by online training platforms (Vandenberg and Magnuson, 2021). Online training offers notable potential as it enhances instructors' motivation to participate in supplementary training programs, expand teaching abilities, and modify instructional approaches (Dian and Rafiq, 2021). The effectiveness of online training in realizing its potential relies on many factors, including well-structured material, competent trainers, suitable technology, and a focus on feedback and explicit instructions (Evgeniy Aleksandrovich et al., 2021).

Meanwhile, e-learning encounters multiple challenges, as shown by studies investigating inadequacies in infrastructure, limited or absent IT skills, self-discipline concerns, content-related problems, policy-related challenges, and social dilemmas (Koi-Akrofi et al., 2020). Rony and Awal (2019) investigated the challenges encountered by learners using e-learning platforms during the COVID-19 pandemic. The study revealed that the primary challenges were related to technological obstacles, poor internet connectivity, and the trainers' inadequate proficiency in technology, which affected the quality of instruction. Furthermore, e-learning encounters substantial obstacles such as inadequate infrastructure, limited IT proficiency, lack of self-discipline, content-related problems, policy-related problems, and social hurdles (Koi-Akrofi et al., 2020). Within the context of training during the COVID-19 pandemic, a study conducted by Rony and Awal (2019) identified the primary challenges faced, which include technological barriers, limited internet connectivity, and trainers' lack of proficiency in technology.

2.2. The Technology Acceptance Model (TAM) and behavioral intention

The present research has utilized the TAM to ascertain the determinants that impact teachers' inclination to engage in training programs via electronic platforms amidst the COVID-19 epidemic. The TAM is a prominent model that elucidates the many elements that impact the adoption of technology. This model is particularly relevant in the context of current research on e-learning platforms. The TAM model, devised by Davis (1989), aims to comprehend the intentions of end users in utilizing technologies within organizations by considering two crucial factors: perceived usefulness, which denotes the user's belief in the technology's ability to enhance work

performance; and perceived ease of use, which reflects the user's perception of the effort required to become proficient in the technology. The model has been further developed to explore the determinants of perceived usability and ease of use (Venkatesh and Davis, 1996), called the Technology Accepting Model II (TAM2) to include the social influence process (personal norms, voluntarism, perception), cognitive process (function fit, output quality), and experience and their influence on intentions to actually use the technology (Venkatesh and Davis, 2000).

Relying on the Technology Acceptance Model (TAM) in general because the model priorities user experience means that the model can be used to explain the experience of trainees during the COVID-19 pandemic (Alghamdi et al., 2022). The teacher's experience of the online training structure during the pandemic affects the perceived usefulness and usability of the technology, if the user experience is poor, teachers may find the online training difficult to use and less useful, on the other hand if the teacher experience is good, trainees will find the online training easy to use and more useful (El Omari et al., 2022). User satisfaction is a critical factor in determining the acceptance of the technology, if teachers are satisfied with the online training experience during the pandemic, they are more likely to accept this type of training, if the teachers' experience is poor, teachers may become frustrated and abandon online training (Tang et al., 2022). Teacher loyalty is another important factor in the acceptance of online training. If teachers are loyal to online training, they are more likely to use it frequently and recommend it to others, and vice versa (Garrido-Gutiérrez et al., 2023). Teachers' experience of online training during the pandemic can also affect the adoption of online training as a mode of professional development, if the teachers' experience is good, teachers may be more likely to adopt online training, while if the experience is poor, the experience will not lead to the adoption of online training (El Omari et al., 2022).

Typically, characteristics pertaining to goals and actual use of information technology may be categorized into four distinct groups: 1) Personal factors, 2) Structural variables, 3) Cultural variables, 4) Institutional variables (Han and Sa, 2022; Utami, 2021). According to Marangunić and Granić (2015), after analyzing 85 research papers that used the TAM, it has been concluded that this model has emerged as the primary framework for comprehending consumers' attitudes and expectations around the adoption or refusal of technology. Hence, this research aims to use the TAM2 model as a framework to investigate the prospects and obstacles of e-learning encountered by public school instructors via digital training platforms amidst the COVID-19 epidemic.

3. Methodology

3.1. Approach

This study adopts the Phenomenology approach encompassing to comprehend the significance of a phenomenon by examining the events and experiences of individuals. This approach enables researchers to gain insight into how individuals shape their perception of reality (Creswell and Poth, 2016). The researcher has chosen this strategy to align with the objective of the study, which is to acquire a more profound comprehension of the opportunities and challenges encountered by

instructors during online training during the Covid-19 pandemic. Data was gathered via a semi-structured interview with a group of (7) participants that serve as a representative sample of instructors engaged in e-learning during the pandemic.

3.2. Participants

A total of (7) participants, both male and female, who are employed as public-school instructors in the education administration’s central office in the province of Bisha, have been purposefully selected. Throughout the COVID-19 pandemic, every participant engaged in online training courses offered by the education administration in the province of Bisha specifically designed for educators. A variety of factors were considered, including the participants’ major, teaching experience, and training hours throughout the duration of the pandemic. The age distribution of the participants was as follows: 26 to 54 years old, with an average age of 38.4 years. 14.4 years was the mean number of years of teaching experience among the participants. Four male participants and three female participants were in attendance. Participants were selected to be among the highest earners of training hours during the pandemic. The interviewing in this study was based on basic ethical aspects, including the fact that teachers participated voluntarily and could withdraw at any time from the study. The interviews are based on inquiries that do not cause any harm to the participants and therefore ethical approval was bypassed. This is consistent with the fact that all participants were over the age of 18, and consent was obtained from all participants. For data collection in the present investigation, semi-structured interviews were utilized. All interviews were conducted electronically and remotely in the evening after the teachers had finished their work. Male participants were allocated code (A), whereas female participants were assigned code (B). **Table 1** presents participant data.

Table 1. The characteristics of male and female instructors who participated in this study.

No	Major	Age	Teaching experience span	Training hours during the pandemic
A1	Arabic Language	26	2	90
A2	Computer	38	12	88
A3	Science	47	23	84
A4	Math	41	18	58
B1	Social Studies	32	8	74
B2	Arts	31	7	67
B3	Islamic Studies	54	31	78

3.3. Data collection and analysis

Interviews with participants were conducted using a semi-structured approach (Creswell and Poth, 2016). A series of interconnected queries were designed in order to collect information from the participants. Thematic analysis was performed using MAXQDA software to extract the primary themes of opportunities and challenges for online training based on the behavioral intentions associated with individual variables, system variables, social variables, and organizational variables, following the

collection of participant responses. **Table 2** presents the query models that have been put to the participants.

Table 2. Semi-structured interview question models and their derivative questions.

Behavioral intention	Main question	Derivative questions
Individual Variables	What are the most significant personal benefits you have gained from online training?	<ul style="list-style-type: none"> • Kindly elaborate the specific characteristics and content of the training sessions in which you were engaged during the COVID-19 pandemic. • Kindly elucidate the personal prospects that were accessible to you via online instruction throughout the COVID-19 pandemic. • Kindly elucidate the individual challenges you encountered when undergoing online training within the COVID-19 pandemic. • Please provide an overview of the skills you gained via online training during the COVID-19 pandemic. • Kindly describe the influence of your digital prowess on your professional growth via remote training amongst the COVID-19 pandemic.
System Variables	What are the most significant features of online training software systems that contribute to professional growth during COVID-19?	<ul style="list-style-type: none"> • Please outline how electronic training programs may help with professional growth at COVID-19 pandemic. • Please outline the challenges presented by online training programs for professional growth during COVID-19 pandemic. • Please report your experiences dealing with the information during online training amid the COVID-19 pandemic. • Please discuss the challenges you have had when dealing with the information during online training amid the COVID-19 pandemic. • Describe the opportunities that existed for you while assessing training programs during online training amid the COVID-19 pandemic. • Explain the challenges you faced in assessing training programs during online training amid the COVID-19 pandemic. • Please explain the possibilities accessible to you for participating in training activities during online training amid the COVID-19 pandemic. • Please detail the challenges you encountered when participating in training activities during online training amid the COVID-19 pandemic. • Please explain the opportunities accessible to you for participating in training activities during online training amid the COVID-19 pandemic. • Please detail any challenges you encountered when participating in training activities during online training amid the COVID-19 pandemic. • Please outline the potential for electronic evaluation during online training amid COVID-19 pandemic. • Please detail the challenges you encountered with electronic assessments during online training amid the COVID-19 pandemic.
Organizational Variables	How would you define the crisis-related measures put in place to support online training processes?	<ul style="list-style-type: none"> • Could you kindly elaborate on the process by which training programs were organized for you throughout the Covid-19 pandemic? • Could you elaborate on the opportunities that arose as a result of the crisis-related procedures that were executed in order to streamline online training processes? • kindly elaborate on the challenges you encountered while implementing the procedures that facilitated electronic training processes during the crisis. • Explain the opportunities that were revealed for you to enroll in training programs via online training amidst the Covid-19 pandemic. • Describe the challenges you encountered when attempting to enroll in training programs via online training amidst the Covid-19 pandemic. • Could you clarify the impact that the scheduling of the training programs had on your professional growth while participating in online training amidst the Covid-19 pandemic? • Could you provide more detail on the impact that the caliber of training programs has had on online training in the midst of the Covid-19 pandemic? • Could you elucidate on the opportunities that were accessible to you as you planned for online training in the midst of the Covid-19 pandemic. • Could you elucidate on the challenges that you encountered in your readiness for online training amidst the Covid-19 pandemic.

Table 2. (Continued).

Behavioral intention	Main question	Derivative questions
Social Variables	Describe how the social structure of online training affected professional development processes throughout the pandemic?	<ul style="list-style-type: none"> • Please speak about the opportunities that were available to you when interacting with the trainer during online training amid the COVID-19 pandemic. • Please discuss the challenges you faced when interacting with the trainer during online training amid the COVID-19 pandemic. • Please also clarify the opportunities that were available to you when interacting with your fellow trainees during online training amid the COVID-19 pandemic. • Please also explain the challenges you encountered when interacting with your fellow trainees during online training amid the COVID-19 pandemic. • Describe the social opportunities of online training on the professional development processes of teachers during the pandemic. • Describe the social challenges of online training on the professional development processes of teachers during the pandemic.

The semi-structured interviews have been carried out with teachers to examine the opportunities and challenges of online training experienced by public school teachers during the COVID-19 pandemic. The interviews were then coded, and the related codes were organized into interconnected groups. Following the process of grouping, themes were assigned to each homogenous group, resulting in the following thematic map. **Table 3** shows the main themes that were reached according to the thematic analysis processes based on behavioral intention variables.

Table 3. Themes reached according to the behavioral intention variables.

Opportunities/Challenges	Behavioral intentions variables	Themes
Online Training Opportunities	Individual Variables	<ul style="list-style-type: none"> • Equal opportunities • Digital culture
	Organizational Variables	<ul style="list-style-type: none"> • Enrollment in training programs • Diversity in training program
	System Variables	<ul style="list-style-type: none"> • Digital content • Electronic Archiving
	Social Variables	<ul style="list-style-type: none"> • Exchange of experience • Sharing viewpoints and engaging positively
Online Training Challenges	Individual Variables	<ul style="list-style-type: none"> • Digital skills • Trainees' aptitude assessment • Lack of motivation
	Organizational Variables	<ul style="list-style-type: none"> • Training programs timing • Lack of Proper Training Preparation
	System Variables	<ul style="list-style-type: none"> • Calendar and evaluation • Training activities • Technical barriers
	Social Variables	<ul style="list-style-type: none"> • Interaction with the trainer • Interaction with peers

4. Results

4.1. Online training opportunities for teachers during the COVID-19 pandemic

Based on the participants' responses, a set of opportunities have emerged during the online training amid the COVID-19 pandemic. The participants' feedback has been

categorized into four main themes according to the variables of behavioral intention, as follows:

4.1.1. Opportunities based on individual variables

Equal opportunity

From the perspective of educators, the paramount consequence of online training opportunities is that trainees have a degree of equitable access to training opportunities. All educators are afforded the same opportunity to access training programs provided via electronic systems from the comfort of their own homes. The majority of the available training courses are offered at various periods, permitting a greater number of learners to enroll. This ensures that all educators have an equal opportunity to access these courses. One trainee noted the following in relation to this context:

“The training courses during the pandemic were diverse and frequent, and I could access any course I desired. Furthermore, there were no classes specifically allocated for either men or women; all courses were accessible for registration, providing me with a perception of equality in training options”. (B3).

Digital culture

The online training environment during the pandemic has bolstered trainees’ digital literacy and facilitated the acquisition of digital competencies that were previously non-essential for instructors. In light of the complete digitization of the training environment, it is essential for educators to possess the necessary digital competencies in order to effectively instruct their students in this new setting. Trainees perceived that the online training environment implemented throughout the pandemic had overall strengthened the digital literacy of instructors, therefore inspiring trainees to diversify their online training endeavors. Within this specific framework, a trainee brought attention to the following:

“I was eager to participate in all of the training classes available throughout the pandemic, and I learned a variety of digital skills that permitted me to deliver online training. I believed that my culture was more suited for online training operations since I met all of the prerequisites”. (A1).

4.1.2. Opportunities related to organizational variables

Ease of enrollment

Enrollment in online training programs is facilitated by a simple enrolment process, allowing trainees to join based on their own willingness. Enrolling in conventional training programs required navigating intricate nomination processes that presented challenges in accessing the training programs. The use of organizational protocols pertaining to online training has significantly improved the procedures involved with effortless enrolment processes. Within this particular framework, a trainee brought attention to the subsequent:

“The process of signing up my data for a course was highly efficient and simple. I found it very convenient to sign up and the organizational process was seamless in terms of completing the necessary information, selecting the training schedule, and receiving immediate feedback, which provided me with a sense of ease and reassurance”. (A3).

Diversity in training programs

The primary aspect of the online training procedure during the pandemic is the extensive range of training programs available. Several participants pointed out that online training enhanced the variety in the implementation of training programs, making them more suitable for instructors with diverse degrees, needs, interests, and talents. The variety of training programs has culminated in streamlined organizational processes, since there are no significant jams that disrupt the regularity of the training process. Within this particular framework, a single participant made the following statement:

“The training courses were diverse and numerous, and I was able to choose the ones that suited me from these programs. The training programs were suitable for my major and the major of my colleagues in the lab. I did not face any problem in choosing a suitable training course. I felt that the numerous and varied training programs were among the most important organizational factors in training during the pandemic.” (A4).

4.1.3. Opportunities related to system variables

Digital content

The training content given encompasses multimedia content including a diverse range of movies, photos, and animations, giving a unique chance for instruction during the epidemic. Participants have conveyed their gratitude for the quality of the digital material of the training sessions they attended during the epidemic. The digital information is diverse and stimulates the senses, hence improving the trainees' capacity to comprehend the training program's content in a favorable manner. Within this particular framework, one individual involved in the discussion made the following statement:

“The most distinguishing feature of the training programs provided during the pandemic was the digital media relied upon in delivering digital content. The digital content was rich in multimedia and unique in its delivery. The digital content gave me a sense of diversity in content sources”. (B1).

Electronic archiving

Several participants deliberated on the significance of electronic archiving training programs for the purpose of saving them and enabling instructors to access and evaluate them at their convenience. Electronic archiving has significantly contributed to the sustainability of the training process by enabling learners to access and evaluate training materials and relevant information at their convenience. A participant made the following statement:

“I constantly refer back to the content of the training programs; all the content, especially the multimedia, which was saved, which helped me easily retrieve the content. The most distinguishing feature of e-learning, in my opinion, is the process of archiving and reusing the content at the right time”. (A4).

4.1.4. Opportunities related to social variables

Exchange of experience

Participants have pointed out that the most significant online training opportunities for teachers were the exchange of educational and learning experiences

among participants. Online training has facilitated the seamless transfer of experiences between teachers, irrespective of their practical locations, educational levels, and job grades. The exchange of experiences has significantly improved the participants' knowledge and helped them acquire skills that boosted their performance in an emergency situation. With reference to the above mentioned, one participant said:

"I have gained multiple experiences during training in online training programs offered during the pandemic. I was able to communicate with my fellow trainees and exchange experiences with them, which significantly impacted my expertise and reflected on my overall acquisition rate of all training content." (B2).

Breaking social barriers

Some participants have pointed out that online training has helped eliminate social boundaries among trainees. Online training enables instructors to actively participate and share their thoughts without feeling embarrassed or fearful. Online training during the pandemic has improved learners' capacity to face the fear of participation and surmount the obstacles of embarrassment and anxiety resulting from engaging in training programs with a high number of participants. One participant in this context has expressed the following:

"I have participated in a large and diverse number of training programs that were offered during the pandemic, and I did not feel ashamed or afraid, unlike the regular training programs that I used to participate in before the pandemic. I feel that online training reduces my stress and encourages me to express my opinion freely." (A3).

4.2. COVID-19 pandemic challenges for online teachers' training

4.2.1. Challenges of individual variables

Digital skills

Although digital culture provided a crucial training opportunity during the pandemic, mastering digital skills required for electronically delivered training programs has been identified as an important challenge for learners. Participants have said that digital skills remained an important challenge hindering instructors from benefitting from online training during the COVID-19 pandemic. One participant in this context has expressed the following:

"I do not have much experience in using computers and information technology, and I felt that this had a significant impact on the training process. I faced several challenges in dealing with the training materials as it required specific skills that I did not master." (A2).

Trainees' aptitude assessment

The training programs have enforced certain delivery and engagement techniques on trainees, causing some to believe that the framework of some programs does not align with their aptitude. Participants feel that the training packages given during the pandemic did not consider their individual traits as trainees. One participant in this context has expressed the following:

"Some training programs have focused on a specific training method, with some emphasizing synchronous training as the basis. Additionally, some training

programs were implemented without consulting us as trainees to know our opinion on the appropriate delivery of the course, which gave me the feeling that all courses were of the same pattern and theme.” (A4).

Lack of motivation

Some participants’ responses suggested that a lack of motivation has hindered participation in training programs, presenting a substantial challenge that prevented many trainees from benefitting from online training programs during the pandemic. The lack of motivation hindered instructors’ professional growth and affected the goals of online training during the COVID-19 pandemic. One participant in this context has expressed the following:

“I did not find any motivation from the education administrations to encourage me to enroll in training programs during the pandemic. My participation in these courses was solely based on watching the training course advertisements, and motivation is an important factor to consider when increasing enthusiasm for participating in training courses.” (B3).

4.2.2. Challenges of organizational variables

Training program timing

Several trainees have noted that the timing of the training sessions was not suitable for them since the online training did not address the specific circumstances of certain trainees during the pandemic and their varying family and social responsibilities. The online training elements have not provided any advantages, and the trainees’ availability for online programs had not been coordinated. One participant in this context has expressed the following:

“Some training courses timings did not suit me, and despite the diversity in training programs, the training schedule must be more flexible and include flexible timings that allow trainees to join programs without any time constraints.” (A2).

Lack of proper training preparation

Some participants noted inadequate preparation of trainees for the training programs, lacking rigorous programs to prepare them for online training, which presented an important challenge for instructors during the COVID-19 pandemic. It is crucial and appropriate for online training to be supplemented by many programs to equip and qualify participants in those programs. One participant noted. One participant in this context has expressed the following:

“The online training conducted during the pandemic was rapid and unexpected. No preparatory programs were provided to prepare us for this type of training, and none of the officials inquired about our capabilities and skills required for this training. We relied on ourselves to deal with this type of program that was abruptly introduced.” (A1).

4.2.3. Challenges of system variables

Challenges in the assessment of training programs

Among the obstacles cited by the participants was the difficulty of evaluating and assessing training programs during online training in the midst of the COVID-19 pandemic. Certain responses suggested that the trainees lacked the capacity to assess

both the trainer and the training program in its entirety. The sustainability and effectiveness of a training program are contingent on the trainers' ability to assess the program and all of its components so that it can be modified to meet the aspirations of the trainees. One participant in this context has expressed the following:

"I did not have any option through which I could evaluate the training program or the trainer. I did not feel that my voice was heard regarding the evaluation of the program, to the extent that some courses presented by the same trainer repeat the same mistakes, which in my opinion is due to the lack of trainee evaluation."
(A4).

Inappropriateness of training activities

Some participants have noted that the training exercises lacked diversity and were not appropriate for instructors, making them challenging to utilize in online training sessions. Training activities should be tailored to the trainees' ability and should not be standardized, regardless of whether all trainees comprehend them. One participant in this context has expressed the following:

"Training activities in the courses are few, and some are difficult to implement online. I believe that the training activities were not sufficiently suitable. I felt with some of my colleagues that the activities were not suitable for us in terms of age or skill level."(A4).

Technical barriers

Trainees have identified technological challenges, particularly bad internet connection, as a key hurdle to their training. Training during the pandemic coincided with a time when many were working, studying, and training from home, which overloaded the internet network and data download speeds. One participant in this context has expressed the following:

"The challenges of the internet and other technical complications prevented me from fully benefiting from the training program content. The trainer's voice was sometimes unclear, with interruptions in the sound, which affected my understanding of all the presented content." (B1).

4.2.4. Challenges of social variables

Challenges in trainer-trainee interaction

In this regard, the participants acknowledged the challenge of trainer-trainee communication, as some participants noted that text messaging was the method of communication utilized between them. Rarely and only occasionally was voice communication employed. Furthermore, a number of training programs failed to account for the learners' visual interaction, which was one of the barriers to their participation. One participant in this context has expressed the following:

"I did not feel that the communication between me and the trainer was effective; the connection was very weak. I also do not prefer using text interaction. Face-to-face meetings through virtual sessions were not available, so the main issue I faced was how to interact and receive support from the trainer" (B3).

Challenges in peer interaction

Some participants have pointed out that the absence of in-person interaction with peers hinders trainees from participating in training programs, developing social

communication skills, and impacts the overall efficacy of online training. Successful training is built upon effective and constructive communication among trainees. One participant in this context has expressed the following:

“The communication between us as trainees was not positive or effective, the mechanisms of face-to-face interaction were absent, and there was no plan to implement interaction between us as trainees. For several occasions, I needed effective communication with my other colleagues” (A3).

5. Discussion

5.1. Online training opportunities

The findings of the research suggest that public education instructors are presented with a multitude of online training opportunities throughout the duration of the COVID-19 pandemic. One of the individual variables encompassed in these opportunities is equitable opportunity; participant responses indicated that online training permits individuals of any location to partake in training programs. This is consistent with the findings of Nedeva and Dimova (2010), who noted that online education permits students to participate completely in discussion forums and work remotely. An opportunity was also presented by digital culture, as participants noted that online training enhances their digital culture and provides them with exposure to educational technologies and developments in the field. This aligns with the research conducted by Arif and Azhar (2021), which discovered that educators who engaged in online training courses amidst the COVID-19 crisis exhibited enhanced expertise and comprehension of digital application usage in comparison to the period preceding the pandemic. The principal opportunity in relation to organizational variables was the facilitation of registration in training programs, which enabled instructors to effortlessly enroll in and choose appropriate programs. This finding aligns with the research conducted (Dian and Rafiq, 2021), which observed that throughout the COVID-19 pandemic, educators in both public and private education sectors registered for diverse digital training courses on platforms including Google Meet and Zoom. An additional opportunity presented itself in the form of the variety of online training programs, which enabled digital training platforms to facilitate the participation of a large number of education specialists from various locations and with diverse areas of expertise in order to train instructors. In relation to system variable opportunities, a considerable number of respondents emphasized the notable potential for apprentices to benefit from digital content that is accessible through electronic environments amidst the COVID-19 pandemic. This is consistent with findings from prior research that online education provides substantial prospects for enhancing teaching methodologies and advancing professional development through the utilization of contemporary technologies and digital materials. The identification of electronic archiving of training programs as an opportunity was underscored by its significance in safeguarding training programs for instructors to consult at any time for the purpose of learning and review. In the context of social variable opportunities, participants emphasized the value of the exchange of educational experiences among teachers enrolled in training programs, citing the convenience of sharing experiences amongst themselves. This finding aligns with the research conducted by Zheng and

Zhang (2021), which proposes that electronic training environments enable trainees to share their experiences and facilitate digital training.

5.2. Online training challenges

On the other hand, the findings of the research suggest that public education instructors encountered many challenges in their utilization of online training amidst the COVID-19 pandemic. The challenges encompass various individual factors, the foremost of which is digital skills. These skills are regarded as critical obstacles that have presented instructors with considerable challenge. Some of these instructors lacked proficiency in digital technologies, which impeded their ability to engage in digital training platforms and obstructed their progress in online training. This aligns with the results reported by Koi-Akrofi et al. (2020), which suggested that one of the obstacles encountered by online training is the lack of or inadequate information technology proficiency. Moreover, learner patterns and traits were also noted as additional challenges. Participants revealed that the effectiveness of online training is impacted by variations in learner profiles and learning styles. To meet the training objectives of every student, digital training systems must thus take these variations into account.

The current study participants were also confronted with the obstacle of a dearth of motivation in the training environment. This could potentially be ascribed to the absence of digital incentives, including points, badges, or leaderboards, integrated into the training platform. The Georgia Education Department's practice of issuing certificates to learners enrolled in online courses to empower them with teaching skills and make them accessible to anyone, anywhere, is noteworthy. Badges may be earned by trainees for no cost or in accordance with their training requirements (Misra, 2014). Therefore, it is essential to offer incentives overall, and digital incentives in particular, on digital platforms. Despite the flexibility of online training platforms allowing trainees to access them remotely and at their convenience, trainees encountered challenges with the scheduling of synchronous training sessions in the professional development program amid the COVID-19 pandemic. Participants emphasized that issues related to preparation and preparedness align with Farooq et al. (2020) results, which identified inadequate teacher training and lack of institutional support for online training courses as obstacles in online training.

Truong and Murray (2020) found that instructors confront issues related to system factors, particularly in receiving quick feedback during digital training sessions. The research revealed that the training exercises for instructors were limited in variety and not appropriate, which hindered their implementation. This is consistent with Samu (2020) research, which validates that the challenges encountered by those implementing online courses mostly include the design, preparation, and execution of courses in digital settings. Designing training activities on digital platforms necessitates a structured design that offers interaction, is compatible with digital settings, and accomplishes online training goals.

The interview findings aligned with Rony and Awal (2019) study on challenges encountered by trainees on online training platforms during the COVID-19 pandemic. The study emphasized that major obstacles were related to technological barriers and

poor internet connectivity. Despite online training's capacity to create an interactive environment for trainees to engage with trainers and peers, teachers encountered challenges in this area, potentially stemming from the training methods employed by trainers in virtual training settings (Yoon et al., 2024). Finally, it is necessary to expand the use of technological innovations in online training processes in order to enhance the opportunities for quality training and overcome the challenges and difficulties facing training (Abd El Bakey et al., 2023; Al-Hafdi and Alhalafawy, 2024; Al-Hafdi and AlNajdi, 2024; Al-Nasheri and Alhalafawy, 2023; Alanzi and Alhalafawy, 2022a, 2022b; Alhalafawy et al., 2021; Alhalafawy and Tawfiq, 2014; Alhalafawy and Zaki, 2022, 2019; Alshammary and Alhalafawy, 2022, 2023; Alsayed et al., 2024; Alzahrani and Alhalafawy, 2023, 2022; Alzahrani et al., 2023, 2022; Najmi et al., 2023, 2024; Saleem et al., 2024; Zeidan et al., 2017, 2015).

6. Conclusion

The main objective of the current study is to identify the opportunities and challenges of online training faced by public education teachers during the COVID-19 pandemic, according to the variables of behavioral intention based on the Technology Acceptance Model, which included four main variables: individual variables, organizational variables, system variables, and social variables. The study's findings regarding opportunities were derived from an analysis of the interviews conducted with the participants. These findings were subsequently categorized based on the behavioral intention variables as per the Technology Acceptance Model. The results indicated that the primary opportunities encompassed digital culture and equal opportunities, as measured by the individual variables. These opportunities have also encompassed diversity in training programs and enrollment in training programs with respect to organizational variables, system variables pertaining to electronic archiving and digital content, positive interaction, the exchange of experiences, and the positive expression of opinions in all social variables. However, inadequate motivation based on individual variables and the need to match the characteristics of trainees were also significant obstacles. Concerning organizational variables, the timing of training programs and the absence of readiness and preparation are of particular significance. Among the system variables are the lack of educator evaluation, the insufficiency of diversity in training activities, and the existence of technical obstacles. In conclusion, the social variables include an absence of engagement with both the instructor and peers. Institutions concerned with training processes may utilize the findings of the present study to inform the development and expansion of training systems in response to the most significant opportunities presented by online training throughout the pandemic. Furthermore, educational institutions that are concerned with teacher professional development processes may find it crucial and essential to develop strategies to circumvent the obstacles identified in the current study. Failure to do so could impede the enrollment of a substantial number of teachers in training programs designed to enhance their professional development. In the context following Covid-19 pandemic, the findings of the present study can be utilized as a foundation for professional development procedures. In the event of an emergency, the findings of the present study may also serve as a guide for the management of training

environments. Subsequent research in this domain may progress towards the creation of adaptive training environments that are tailored to the specific attributes of the participants and the establishment of intelligent training environments to assist educators in times of academic crisis. Additionally, an examination of the application of generative AI models to aid educators in times of academic crises might be pertinent.

7. Limitations

The research was constrained by a small sample size of just seven participants. However, this number was restricted to trainees who had completed training courses and were able to provide detailed replies. This research suggests investigating the phenomena with a bigger sample size to have a more comprehensive and profound understanding. The second constraint of the research was its restriction to a certain geographical location, namely the Bisha Governorate in the Kingdom of Saudi Arabia. The present study suggests doing research across wider geographical regions to explore the potential and limitations of online training experienced by public school instructors during the Covid-19 pandemic. The research was also restricted to examining the opportunities and challenges of online training experienced by male and female instructors during the Covid-19 pandemic. The study suggests pursuing research that focuses on the opportunities and challenges of online training experienced by instructors during the Covid-19 pandemic.

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References

- Abd El Bakey, F. M., Abo Shadi, G. I., & El-Refai, W. Y. (2023). Mobile Training Context for In-Service Teachers. *International Journal of Emerging Technologies in Learning (IJET)*, 18(19), 205–226. <https://doi.org/10.3991/ijet.v18i19.37685>
- Alanzi, N. S., & Alhalafawy, W. S. (2022a). Investigation The Requirements for Implementing Digital Platforms During Emergencies from The Point Of View Of Faculty Members: Qualitative Research. *Journal of Positive School Psychology (JPSP)*, 9(6), 4910–4920.
- Alanzi, N. S., & Alhalafawy, W. S. (2022b). A Proposed Model for Employing Digital Platforms in Developing the Motivation for Achievement Among Students of Higher Education During Emergencies. *Journal of Positive School Psychology (JPSP)*, 6(9), 4921–4933.
- Alghamdi, A. M., Alsuhaymi, D. S., Alghamdi, F. A., et al. (2021). University students' behavioral intention and gender differences toward the acceptance of shifting regular field training courses to e-training courses. *Education and Information Technologies*, 27(1), 451–468. <https://doi.org/10.1007/s10639-021-10701-1>
- Al-Hafdi, F. S., & Alhalafawy, W. S. (2024). Ten Years of Gamification-Based Learning: A Bibliometric Analysis and Systematic Review. *International Journal of Interactive Mobile Technologies (IJIM)*, 18(07), 188–212. <https://doi.org/10.3991/ijim.v18i07.45335>
- Al-Hafdi, F. S., & AlNajdi, S. M. (2024). The effectiveness of using chatbot-based environment on learning process, students'

- performances and perceptions: A mixed exploratory study. *Education and Information Technologies*.
<https://doi.org/10.1007/s10639-024-12671-6>
- Alhalafawy, W. S., & Tawfiq, M. Z. (2014). The relationship between types of image retrieval and cognitive style in developing visual thinking skills. *Life Science Journal*, 11(9), 865–879.
- Alhalafawy, W. S., & Tawfiq Zaki, M. Z. (2022). How Has Gamification Within Digital Platforms Affected Self-Regulated Learning Skills During the COVID-19 Pandemic? Mixed-Methods Research. *International Journal of Emerging Technologies in Learning (IJET)*, 17(06), 123–151. <https://doi.org/10.3991/ijet.v17i06.28885>
- Alhalafawy, W. S., & Zaki, M. Z. (2019). The Effect of Mobile Digital Content Applications Based on Gamification in the Development of Psychological Well-Being. *International Journal of Interactive Mobile Technologies (IJIM)*, 13(08), 107. <https://doi.org/10.3991/ijim.v13i08.10725>
- Alhalafawy, W. S., Najmi, A. H., Zaki, M. Z. T., et al. (2021). Design an Adaptive Mobile Scaffolding System According to Students' Cognitive Style Simplicity vs Complexity for Enhancing Digital Well-Being. *International Journal of Interactive Mobile Technologies (IJIM)*, 15(13), 108. <https://doi.org/10.3991/ijim.v15i13.21253>
- Alhasan, A. S., Alahmadi, S. M., Altayeb, Y. A., et al. (2021). Impact of COVID-19 Pandemic on Training and Well-Being in Radiology Residency: A National Survey of Diagnostic Radiology Trainees in Saudi Arabia. *Academic Radiology*, 28(7), 1002–1009. <https://doi.org/10.1016/j.acra.2021.03.019>
- Al-Nasheri, A. A., & Alhalafawy, W. S. (2023). Opportunities and Challenges of Using Micro-learning during the Pandemic of COVID-19 from the Perspectives of Teachers. *Journal for ReAttach Therapy and Developmental Diversities*, 6(9), 1195–1208.
- Alshammary, F. M., & Alhalafawy, W. S. (2022). Sustaining Enhancement of Learning Outcomes across Digital Platforms during the COVID-19 Pandemic: A Systematic Review. *Journal of Positive School Psychology*, 6(9), 2279–2301.
- Alshammary, F. M., & Alhalafawy, W. S. (2023). Digital Platforms and the Improvement of Learning Outcomes: Evidence Extracted from Meta-Analysis. *Sustainability*, 15(2), 1305. <https://doi.org/10.3390/su15021305>
- Alsayed, W. O., Al-Hafdi, F. S., & Alhalafawy, W. S. (2024). Non-Stop Educational Support: Exploring the Opportunities and Challenges of Intelligent Chatbots Use to Support Learners from the Viewpoint of Practitioner Educators. *Journal of Ecohumanism*, 3(3), 212-229. <https://doi.org/10.62754/joe.v3i3.3331>
- Alzahrani, F. K. J., Alshammary, F. M., & Alhalafawy, W. S. (2022). Gamified Platforms: The Impact of Digital Incentives on Engagement in Learning During the COVID-19 Pandemic. *Cultural Management: Science and Education*, 6(2), 75–87. <https://doi.org/10.30819/cmse.6-2.05>
- Alzahrani, F. K. J., Alhalafawy, W. S., & Alshammary, F. M. (2023). Teachers' Perceptions of Madrasati Learning Management System (LMS) at Public Schools in Jeddah. *Journal of Arts, Literature, Humanities and Social Sciences*, (97), 345–363. <https://doi.org/10.33193/JALHSS.97.2023.941>
- Alzahrani, F. K. J., Alshammary, F. M., & Alhalafawy, W. S. (2022). Gamified Platforms: The Impact of Digital Incentives on Engagement in Learning During the COVID-19 Pandemic. *Cultural Management: Science and Education*, 6(2), 75–87. <https://doi.org/10.30819/cmse.6-2.05>
- Alzahrani, F. K., & Alhalafawy, W. S. (2023). Gamification for Learning Sustainability in the Blackboard System: Motivators and Obstacles from Faculty Members' Perspectives. *Sustainability*, 15(5), 4613. <https://doi.org/10.3390/su15054613>
- Amin, M. Z. M., Rashid, R. A., & Teh, K. S. M. (2019). Investigating Issues and Challenges in Employing Action Research for Teacher Training in Malaysian Context. *International Journal of Education and Practice*, 7(1), 30–40. <https://doi.org/10.18488/journal.61.2019.71.30.40>
- Arif, Z., & Azhar, A. (2021). Covid-19 Pandemic: Impact on skill improvement of the Indonesian teachers in using online learning applications. *ELS Journal on Interdisciplinary Studies in Humanities*, 4(4), 400–412. <https://doi.org/10.34050/elsjish.v4i4.18753>
- Boentert, A., & Pistor, P. (2021). Turning digital in international training programmes: Chances, Challenges & Perspectives. *Zeitschrift für Hochschulentwicklung*, 16(2), 83–94.
- Challenges of Online Medical Education in Pakistan During COVID-19 Pandemic. (2020). *Journal of the College of Physicians and Surgeons Pakistan*, 30(1), 67–69. <https://doi.org/10.29271/jcpsp.2020.supp1.s67>
- Clausen, J. M., Bunte, B., & Robertson, E. T. (2020). Professional development to improve communication and reduce the homework gap in grades 7–12 during COVID-19 transition to remote learning. *Journal of Technology and Teacher Education*, 28(2), 443–451.

- Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.
- Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), 319. <https://doi.org/10.2307/249008>
- Dian, H., & Rafiq, M. (2021). Effectiveness of Teacher Training Using Online Media During COVID-19 Pandemic in Indonesia. *Proceedings of the 4th International Conference on Research of Educational Administration and Management (ICREAM)*.
- Danchikov, E. A., Prodanova, N. A., Kovalenko, Y. N., et al. (2021). potential of online learning in modern conditions and its use at different levels of education. *Linguistics and Culture Review*, 5(S1), 578–586. <https://doi.org/10.21744/lingcure.v5ns1.1442>
- Garg, S., & Sharma, S. (2020). User Satisfaction and Continuance Intention for Using E-Training: A Structural Equation Model. *Vision: The Journal of Business Perspective*, 24(4), 441–451. <https://doi.org/10.1177/0972262920926827>
- Garrido-Gutiérrez, P., Sánchez-Chaparro, T., & Sánchez-Naranjo, M. J. (2023). Student Acceptance of E-Learning during the COVID-19 Outbreak at Engineering Universities in Spain. *Education Sciences*, 13(1), 77. <https://doi.org/10.3390/educsci13010077>
- Hakim, K. M. I. A. R., Arbarini, M., & Raharjo, T. J. (2022). An Implementation of Online Blended Learning Training and Learning Management System in The Covid-19 Pandemic. *Journal of Nonformal Education*, 8(2), 249–256. <https://doi.org/10.15294/jne.v8i2.37439>
- Han, J.-H., & Sa, H. J. (2021). Acceptance of and satisfaction with online educational classes through the technology acceptance model (TAM): the COVID-19 situation in Korea. *Asia Pacific Education Review*, 23(3), 403–415. <https://doi.org/10.1007/s12564-021-09716-7>
- Kalinina, I. G., Enova, I. V., & Tolkova, N. M. (2020). Professional development of a teacher on the Yandex. Textbook platform as a necessary condition for improving the quality of education in a modern school. *SHS Web of Conferences*, 87, 00017. <https://doi.org/10.1051/shsconf/20208700017>
- Kosmas, P. (2017). Online Sharing of Knowledge Among In-service Teachers for Professional Development Purposes. *Proceedings of the 2017 9th International Conference on Education Technology and Computers*. <https://doi.org/10.1145/3175536.3175557>
- Marangunić, N., & Granić, A. (2014). Technology acceptance model: a literature review from 1986 to 2013. *Universal Access in the Information Society*, 14(1), 81–95. <https://doi.org/10.1007/s10209-014-0348-1>
- McGuire, D., & Gubbins, C. (2010). The Slow Death of Formal Learning: A Polemic. *Human Resource Development Review*, 9(3), 249–265. <https://doi.org/10.1177/1534484310371444>
- Misra, P. K. (2014). Online training of teachers using OER: Promises and potential strategies. *Open Praxis*, 6(4), 375. <https://doi.org/10.5944/openpraxis.6.4.155>
- Najmi, A. H., Alameer, Y. R., & Alhalafawy, W. S. (2024). Exploring the Enablers of IoT in Education: A Qualitative Analysis of Expert Tweets. *Journal of Infrastructure, Policy and Development*, 8(8).
- Najmi, A., Alhalafawy, W., & Zaki, M. (2023). Developing a Sustainable Environment Based on Augmented Reality to Educate Adolescents about the Dangers of Electronic Gaming Addiction. *Sustainability*, 15(4), 3185. <https://doi.org/10.3390/su15043185>
- Nedeva, V., & Dimova, E. (2010). Some advantages of e-learning in English language training. *Trakia Journal of Sciences*, 8(3), 21–28.
- Nusbaum, R. M. (2020). *Examining the experiences of teachers in online professional development: a teacher education twitter-based professional learning network [PhD thesis]*. Montana State University-Bozeman.
- Omari, A. E., Tridane, M., & Belaaouad, S. (2022). Teacher e-Training and Student e-Learning during the Period of Confinement Caused by Covid-19 in Case of Morocco. *International Journal of Advanced Computer Science and Applications*, 13(2). <https://doi.org/10.14569/ijacsa.2022.0130294>
- Philipsen, B., Tondeur, J., Pareja Roblin, N., et al. (2019). Improving teacher professional development for online and blended learning: a systematic meta-aggregative review. *Educational Technology Research and Development*, 67(5), 1145–1174. <https://doi.org/10.1007/s11423-019-09645-8>
- Pözl-Stefanec, E. (2021). Challenges and barriers to Austrian early childhood educators' participation in online professional development programmes. *British Journal of Educational Technology*, 52(6), 2192–2208. Portico. <https://doi.org/10.1111/bjet.13124>

- Pozo-Rico, T., Gilar-Corbí, R., Izquierdo, A., et al. (2020). Teacher Training Can Make a Difference: Tools to Overcome the Impact of COVID-19 on Primary Schools. An Experimental Study. *International Journal of Environmental Research and Public Health*, 17(22), 8633. <https://doi.org/10.3390/ijerph17228633>
- Rony, H. A. Z., & Awal, S. T. (2019). University teachers' training on online teaching-learning using online platform during COVID-19: A case study. *Bangladesh Education Journal*, 18(2), 57–64.
- Ross, J. D. (2011). *Online professional development: Design, deliver, succeed*. Corwin Press.
- Saleem, R. Y., Zaki, M. Z. T., & Alhalafawy, W. S. (2024). Improving awareness of foreign domestic workers during the COVID-19 pandemic using infographics: An experience during the crisis. *Journal of Infrastructure, Policy and Development*, 8(5), 4157. <https://doi.org/10.24294/jipd.v8i5.4157>
- Samu, B. (2020). Teaching practice in pre-service language teacher education: challenges of the transition from face-to-face to online lessons. Available online: <https://conference.pixel-online.net/files/foe/ed0010/FP/6251-TPD4730-FP-FOE10.pdf> (accessed on 16 January 2024).
- Seraji, F., & Khodaveisi, S. (2019). Teachers' professional development through online learning environment: A phenomenological study. *Interdisciplinary Journal of Virtual Learning in Medical Sciences*, 10(4), 40–53.
- Tang, T. T., Nguyen, T. N., & Tran, H. T. T. (2022). Vietnamese Teachers' Acceptance to Use E-Assessment Tools in Teaching: An Empirical Study Using PLS-SEM. *Contemporary Educational Technology*, 14(3), ep375. <https://doi.org/10.30935/cedtech/12106>
- Tanveer, M., Bhaumik, A., Hassan, S., et al. (2020). Covid-19 pandemic, outbreak educational sector and students online learning in Saudi Arabia. *Journal of entrepreneurship Education*, 23(3), 1–14.
- Truong, M. T., & Murray, J. (2020). Understanding obstacles to online professional development through the lens of EFL teachers' attitudes: A qualitative study in Vietnam context. *Call-Ej Journal*, 21(3), 23–40.
- Utami, T. L. W. (2021). Technology adoption on online learning during Covid-19 pandemic: implementation of technology acceptance model (TAM). *Diponegoro International Journal of Business*, 4(1), 8–19. <https://doi.org/10.14710/dijb.4.1.2021.8-19>
- Vandenberg, S., & Magnuson, M. (2021). A comparison of student and faculty attitudes on the use of Zoom, a video conferencing platform: A mixed-methods study. *Nurse Education in Practice*, 54, 103138. <https://doi.org/10.1016/j.nepr.2021.103138>
- Venkatesh, V., & Davis, F. D. (1996). A Model of the Antecedents of Perceived Ease of Use: Development and Test. *Decision Sciences*, 27(3), 451–481. <https://doi.org/10.1111/j.1540-5915.1996.tb01822.x>
- Venkatesh, V., & Davis, F. D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, 46(2), 186–204. <https://doi.org/10.1287/mnsc.46.2.186.11926>
- Wynants, S., & Dennis, J. (2018). Professional Development in an Online Context: Opportunities and Challenges from the Voices of College Faculty. *Journal of Educators Online*, 15(1). <https://doi.org/10.9743/jeo2018.15.1.2>
- Yaw Koi-Akrofi, G., Owusu-Oware, E., & Tanye, H. (2020). Challenges of Distance, Blended, and Online Learning: A Literature based Approach. *International Journal on Integrating Technology in Education*, 9(4), 27–39. <https://doi.org/10.5121/ijite.2020.9403>
- Yoon, M., Choi, K., Yoon, S., et al. (2023). Task type matters: The impact of virtual reality training on training performance. *Journal of Computer Assisted Learning*, 40(1), 205–218. Portico. <https://doi.org/10.1111/jcal.12874>
- Zainab, B., Awais Bhatti, M., & Alshagawi, M. (2017). Factors affecting e-training adoption: an examination of perceived cost, computer self-efficacy and the technology acceptance model. *Behaviour & Information Technology*, 36(12), 1261–1273. <https://doi.org/10.1080/0144929x.2017.1380703>
- Zeidan, A. A., Alhalafawy, W. S., & Tawfiq, M. Z. (2017). The Effect of (Macro/Micro) Wiki Content Organization on Developing Metacognition Skills. *Life Science Journal*, 14(12).
- Zeidan, A. A., Alhalafawy, W. S., Tawfiq, M. Z., et al. (2015). The effectiveness of some e-blogging patterns on developing the informational awareness for the educational technology innovations and the King Abdul-Aziz University postgraduate students' attitudes towards it. *Life Science Journal*, 12(12).
- Zheng, H., & Zhang, L. (2021). Online training of prospective language teachers: exploring a new model. *The World Universities' Response to COVID-19: Remote Online Language Teaching*, 199–214. Internet Archive. <https://doi.org/10.14705/rpnet.2021.52.1273>