



Teachers' readiness and usage of online teaching practices in the Kingdom of Saudi Arabia: An empirical investigation

Shahid Husain¹
Mohammad Athar Ali²
Mohd Afzal Saifi³
Sufyan Habib⁴
Mohammed Arshad Khan⁵



(✉ Corresponding Author)

¹Department of Accountancy, College of Administrative and Financial Sciences, Saudi Electronic University, Riyadh 11673, Saudi Arabia.

²Email: s.husain@seu.edu.sa

³Email: m.athar@seu.edu.sa

⁴Department of Finance, College of Administrative and Financial Sciences, Saudi Electronic University, Riyadh 11673, Saudi Arabia.

⁵Email: m.athar@seu.edu.sa

⁶Centre for Distance and Online Education Jamia Millia Islamia, New Delhi, India.

⁷Email: md.afzal005@gmail.com

⁸Department of Business Administration, College of Administration and Finance, Saudi Electronic University, Riyadh 11673, Saudi Arabia.

⁹Email: s.habib@seu.edu.sa

Abstract

The substantial disruption caused by the COVID-19 epidemic to the world's education system is only one of the many setbacks the world has recently experienced. The transition of the students from their offline learning mode to a fully digital approach was not easy from the beginning for them. The online teaching readiness heavily relied on their competencies and skills to adapt the pedagogy, training, technical skills, a proper mindset and new roles. This research endeavors to evaluate the readiness of the teachers belonging to higher education institutions (HEIs) to handle online education based on the online teaching readiness model. A systematic questionnaire with 30 statements was used by the researcher to collect and analyse data from 296 HEI lecturers in Saudi Arabia. Smart PLS3 was used to attain reliability, convergent, discriminate validity and model fitness. These programs will help equip the teachers with the necessary technical skills, pedagogy, competency and readiness to comprehend the requisite techniques of online teaching and the vital strategies for keeping their students engaged. Technical proficiency, pedagogy, competency and teaching readiness show a direct relationship with online education. On the other hand, attitude and training do not show any relationship with online education.

Keywords: Competencies skills, Online teaching and attitude, Pedagogy, Teaching readiness, Technical proficiency, Training.

Citation | Husain, S., Ali, M. A., Saifi, M. A., Habib, S., & Khan, M. A. (2023). Teachers' readiness and usage of online teaching practices in the Kingdom of Saudi Arabia: An empirical investigation. *Journal of Education and E-Learning Research*, 10(4), 855-867. 10.20448/jeelr.v10i4.5270

History:

Received: 23 June 2023

Revised: 5 September 2023

Accepted: 12 December 2023

Published: 28 December 2023

Licensed: This work is licensed under a [Creative Commons Attribution 4.0 License](https://creativecommons.org/licenses/by/4.0/)

Publisher: Asian Online Journal Publishing Group

Funding: This research is supported by Saudi Electronic University, Saudi Arabia (Grant number: 8166).

Institutional Review Board Statement: The Ethical Committee of the Saudi Electronic University, Saudi Arabia has granted approval for this study.

Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

Contents

1. Introduction	856
2. Concept Development	856
3. Review of Literature	857
4. Research Design and Methodology	859
5. Finding and Discussion	859
6. Discussion	864
7. Conclusion and Implication	865
References	865

Contribution of this paper to the literature

This research shows that teachers' levels of technical expertise, competency and pedagogy are crucial factors in raising the bar on their preparedness to apply effective teaching and learning strategies. All of the information obtained from this study can be used to design more successful training and development programs for educators.

1. Introduction

The coronavirus outbreak served as the first step to online learning for the majority of students and parents. The concept of blended learning or online instruction has actually been present for a longer period of time. For nearly two decades, the practice of online teaching and blended learning has existed around the world (Nortvig, Petersen, & Balle, 2018). However, it was not a regular practice or prevalent everywhere. Universities and colleges were the ones to adopt the medium of instruction in contrast to schools and other similar educational institutions. The students' learning experiences within academic institutions, disciplines and programmes experienced more substantial levels of disruption as a result of inconsistent use of the medium (Kebritchi, Lipschuetz, & Santiago, 2017). It is crucial to examine the various factors relating to the implementation of online teaching in universities and educational institutions to ensure all students find themselves on the same wavelength in terms of being well-versed with the medium of learning and getting the best quality (Dhawan, 2020). The last few decades have seen constant change in higher education as a result of developments in technology on a worldwide scale.

It includes the 21st-century technological revolution, the shifts in student demographics, the far more expensive college education and the constantly increasing competition among universities leading to the transition from traditional to online teaching (Perrotta & Bohan, 2020). Every traditional university and institution is converting to digital methods that prioritize online learning and digital teaching strategies. The shift to a digital learning ecosystem subsequently makes the 21st century the era of online education. The rise of online education is an important step in the modern educational field (Slattery, 2021). Online teaching has become popular because online learning course design and programs create greater accessibility to the academic resources and pedagogy needed for teachers which certainly expresses their readiness (Brockmann, 1994). The shifts in teaching pedagogy, combined with the rising cost of education and competition between universities are causing the transition from traditional to digital teaching methods (Brockmann, 1994). The contemporary scenario raises the question of teachers' readiness for online teaching practices which has brought about a revolution in the academic industry in the last few years. Technically, online teaching refers to the teaching practices conducted using mobile devices and computers. Online teaching has now become very useful for students and a preferred means of teaching for many teachers globally (Siregar, 2022).

In today's globalized and informative culture, it's not enough to be highly skilled in one field (Scherer, Howard, Tondeur, & Siddiq, 2021). The advancement of digitized modern-day learning also brings forth a new set of challenges for teachers in their daily professional activities. The responsibilities of a teacher were restricted to accumulating a specific quantity of knowledge but today the goal has drastically changed (Barrot, Llenares, & Del Rosario, 2021). Teachers today must continually use their creativity to solve challenges and choose the most effective teaching strategies for their students (Moyo & Maifala, 2022). This shift is associated with the fact that modern scientific and technological advancements call for an innovative approach to interpersonal interaction and conceptualization (Roddy et al., 2017). In addition, the fundamental purpose of education is to help individuals form their needs and capabilities for going beyond what they have studied, the skills of constant and versatile self-development throughout their lifetime.

The general expression for defining the readiness to teach online is "the state of faculty preparation to teach online" (Scherer et al., 2021). The broad definition of "readiness" here means being wholly prepared for an experience or action. In the context of teachers, their preparedness is attributed to an institution's physical and psychological preparation for online teaching experience or action. Having a staff that is both mentally and physically ready for e-teaching is what is meant by "readiness." A school's "strengths as well as shortcomings in technology attainment and training to inform policy decisions, position the institution technologically in the dynamic global market and to apply limited resources wisely across the boundaries of the institution can all be revealed by its readiness score" (Wingo, Ivankova, & Moss, 2017). Henceforth, the viewpoints of the teachers about preparedness along with those of their academic institutions correlate with their views about their readiness. The outlook on online preparedness will incorporate a mix of attitudes and experiences. Individual attributes, context and culture all play a role in shaping these perspectives (Coman, Ţiru, Meseşan-Schmitz, Stanciu, & Bularca, 2020). Individuals' expectations about their own OT (Online Teaching) expertise and knowledge in the future may be shaped by their own sense of efficacy and previous experiences in the field (Reyes, 2023). These characteristics signify individual readiness. For the best preparedness, the environment plays a significant role (Marin 2022). It is vital when OT is implemented in academic institutions. It may comprise resources and support systems along with the likelihood of professional growth (Roddy et al., 2017). All of these factors represent contextual readiness. In the study's context, the preparedness of the teachers' attributes refers to how much they are willing to be prepared for all the technical and communication proficiency along with training to adapt the various innovative OT practices.

2. Concept Development

Examining the scientific literature theoretically reveals the fundamental ideas behind the teacher's readiness for professional work which exhibits how the scientists have thoroughly examined it in its entirety in diverse ways (Martin, Budhrani, & Wang, 2019). However, there is an exception in their research that includes the different difficulties teachers face in being ready to receive the essential training through interactive methods in order to advance students' creative abilities. It is not a crucial area of investigation because it has not been thoroughly examined in pedagogical science and educational theory (Wingo et al., 2017). Furthermore, the idea of "teacher's readiness to learn by interactive methods as a condition for the development of student's creative abilities" does not appear to have a comprehensive definition in any of the books I checked. Despite the fact that there is a large body of literature on "teachers' readiness for professional activity which instructs on the grounds of theoretical as well as

practical issues concerning the interpretation of the notion of "teachers' openness to training through students' active participation as a necessary condition for cultivating students' imaginative capacities" (Los, De Jaeger, & Stoesz, 2021). Furthermore, defining the inner scope of teachers' preparedness through interactive methods also becomes crucial for providing the students with the appropriate creative skills.

Similarly, it is vital to acknowledge the various and diverging perceptions of the teachers belonging to the higher education range concerning their preparedness for OT (Online Teaching). Their perceptions convey a multi-faceted problem (Kentnor, 2015). Specifically, concerning the immediate shift to fully online teaching, this transition comprised various vital alterations in the practice of teaching. The implied alterations in the teaching practice or the readiness for engaging in alteration at any level are an intricate affinity of individual, institutional, and cultural factors (Howard, Tondeur, Siddiq, & Scherer, 2021).

It is essential to investigate the relationship between these characteristics and the preparedness of the teachers for online teaching in order to understand it better (Mohebi & Meda, 2021). In addition, the stated problems might not impact all teachers similarly. The higher education teachers are not a homogenous group. The substantial affinities affecting one group may be wholly distinctive from those involving the other because of their diversified origins, online teaching experience and educational specialties. It is vital to comprehend some of the reasons why instructors adopt or reject new OT methods to provide appropriate assistance (Badiozaman, 2021).

The comprehension of the preparedness of the teachers for OT (Online Teaching) becomes imperative to ensure the success of OT efforts (Maheshwari, 2021). The crucial component necessary for the successful implementation of online courses and programs is often overlooked at universities that have not placed sufficient attention on recognizing the perception, abilities and experience of their professors. Providing a high-quality education is one of many goals that universities have for their online teaching initiatives (Kukulka-Hulme, 2012). That's why it's crucial to assess whether or not teachers are prepared to teach online. Otherwise, it could lead to disengaged students, teacher turnover and poor outcomes in the classroom.

The usefulness of the information on the preparedness of the teachers towards OT (Online Teaching) practices also becomes essential for determining their past experiences with technology and what's needed to move the training and development forward (Almahasees, Mohsen, & Amin, 2021). The ability of the teachers to come up with innovative ideas for developing and acquiring materials and teaching pedagogy as well as choosing the best application that corresponds with the materials and methods will determine the success of the teachers in teaching students online during the coronavirus epidemic. It is also crucial for teachers to develop models and the right strategies for learning that are relevant to students' character in their schools (Finefter-Rosenbluh, 2020). Moreover, implementing numerous applications in online education is also highly beneficial for both teachers and students. Teachers must be accustomed to teaching with sophisticated internet media that is efficiently packaged, simply accessible and easily comprehended by students. Saudi Arabia's support for online education is still in its development when compared to other nations particularly industrialized nations (Khan, Khojah, & Vivek, 2022).

3. Review of Literature

3.1. Teaching Pedagogy

Another common misconception among teachers is that in order to teach online, one must possess computer skills or be a "techie." An assertion in the book *Teaching Online: A Practical Guide* by the Authors (Metsäpelto et al., 2021) says that online instructors do not have to be proficient in technology. Pedagogy should be prioritized above technology (Zhou et al., 2022). In addition, "slapping classroom content online" is not what "online learning" is all about (Pedro & Kumar, 2020). It is also important to note that the use of a certain distribution channel such as the Internet or Blackboard, "should not define the pedagogical practice." As an alternative, online educators could use technology as "the mechanism through which they implement the best pedagogy for that course or topic" (Badiozaman, 2021).

All the teachers teaching online should rely on technology to improve the content of their courses. The outlook of the teachers should be positive towards using technology to facilitate the process of online education (Bawane & Spector, 2009). An appropriately good online pedagogy can be defined as one that highlights student-based learning while using various active learning exercises. "Interactivity, faculty, and student presence are essential in an effective online learning environment" (Roddy et al., 2017).

H0: Teaching pedagogy positively affects the teacher's readiness.

3.2. Technical Proficiency

According to Kukulka-Hulme (2012), technology is one of the fundamental factors that ensure vital and applicable alterations in the shift in higher education. It has immense prospects to promote flexible, student-based teaching to encourage exchange among students and staff enabling collaboration and communication asynchronously if integrated into pedagogy. Bruggeman et al. (2021) exhibit how numerous researchers conducted studies to examine many difficulties concerning OT (Online Teaching) and the possibilities of online practices that shape our developing pedagogies of teacher education. It describes broader references for the faculty that will help them sharpen their skills as online teachers and become captivating online teachers (Bawane & Spector, 2009). Everything involved in the process of online teaching is covered, with examples drawn from a variety of existing online courses, reflections from students and teachers and lessons learned from the virtual classroom (Martin et al., 2019). Henceforth, all teachers are required to possess prerequisite skills for combining ICT into teaching and mastering and school leaders have a function in facilitating its effective usage. The goal of this analysis is to properly examine how faculty leaders greatly aid in developing teachers' capacity to integrate ICT into their instruction and research at both the college-level and public secondary schools (Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, & Marczynski, 2011). It is clear from prior research that technological skills are necessary for teachers to manage OT (Online Teaching) properly.

Technology has made online education increasingly popular. There is a clear delineation between technical competence and technique in online education (Bolliger & Halupa, 2022). Today's online teachers must possess a wide range of skills in order to be effective. Online teachers need to constantly update their knowledge and

techniques due to the ever-changing nature of technology (Bessadok, 2022). The following strategies should be taken if you want your students to actively engage in their online classes: You must research various online teaching tools that might aid your students in remaining focused if you want to establish yourself as a competent online teacher (Scherer et al., 2021). Online instruction can be revolutionized with the help of impressive presentation skills. Presentations are an inevitable part of online education. There are a virtually infinite number of options for experimenting with online teaching methods. In addition, video conferencing is a powerful resource that deserves your immediate consideration (Bao, 2020). There are various resources available online to help you understand how to implement a learning management system.

H0: Technical proficiency positively affects the teacher's readiness.

3.3. Teacher Training

Additionally, the teachers have other duties that they must fulfil. They should make sure their students can understand and feel at ease in the online teaching environment in addition to being proficient at teaching a subject well (Lim, 2023). The teachers must also measure their progression, daily engagement and how much they can interact within the course. Additionally, the teachers engaged in online teaching documented that instead of receiving the training for online teaching before starting with the medium, they received the training only when they had already begun. They faced many challenges through the process, mainly relating to ensuring the continual engagement and perseverance of the students (Obizoba, 2016). According to Bates and Sangra (2011) and the model of reflection, teachers typically have limited understanding of and experience with their area of work before beginning their professional training. Through the course of the professional training the teachers receive, they will connect it with the experiences they have had which adhere to experiential knowledge (Fletcher & Bullock, 2015). Both the training they receive and the experiences they have already had are interdependent on one another for both sources of knowledge collectively guide the teachers in preparing the best way for executing their professional obligations. According to the current study, teachers who have received training already have a greater understanding of the fundamentals of pedagogy due to prior experience as well as other important factors such as self-efficacy and intrinsic motivation. The said knowledge was acquired by the teachers through their direct experiences teaching other subjects prior to the introduction of training (McNair, 2015).

H0: Teacher training positively affects the teacher's readiness.

3.4. Online Teaching Competencies

Higher education institutes (HEIs) and universities must switch to online teaching methods as a result of the coronavirus outbreak. Universities face a greater challenge because professors must go through a significant pedagogical transition and redefine their role in light of the changing relationships they have with students (Mwawasi, 2014). The global administrators and faculty of all universities and colleges have the capacity to move forward with the immediate adoption of ready-made, top-quality online instructional materials from the other acknowledged institutions in their curriculum. They keep improving their internal online capabilities at the same time. One can comprehend the knowledge of online instruction which incorporates components such as competency, humanistic as well as cognitive viewpoints through a variety of techniques. The point of commencement to properly define online teaching is through interaction and networked technologies which further move towards the recruiting, training, assessment and certification of online teachers (Cai, 2019). Moreover, what's also crucial is defining the teachers' capabilities in using online platforms to teach the students (Douglas, 2019). On the other hand, instructors have one of the most vital roles to play in the appropriate delivery of a learning approach as the learning functions heavily depend on the ability of teachers to shift from the traditional form of classroom obligations to the new and severely challenging job of teaching online (Goodyear, Salmon, Spector, Steeples, & Tickner, 2001). The precise definition of competency is protecting knowledge and the abilities to carry out a specifically skilled job and perform the benchmarks anticipated in the profession. Various studies conducted by researchers online investigated competencies in online technologies. The awareness of online teaching and learning has grown significantly worldwide at HEIs as a means of attracting a larger number of students and offering them flexible learning options. Several disciplines now include opportunities for online teaching and learning including health, business, accounting, psychology and information technology along with program levels such as associate to doctorate degrees (Snježana & Goran, 2015).

Moreover, competencies are crucial in developing fellowship among teachers and students and essential for appropriate teaching and stimulation. The norms and standards previously successful in a conventional classroom setting "must now be modified to facilitate effective online teaching". According to Patel (2019), the professional growth and development of online teachers are also vital because it helps them improve their core competencies. They need to make advancements in how they communicate, developing heightened communication skills as well as their written communication abilities. Online teachers should "recognize the tone of their writing and pay attention to the nuances of words" given that the majority of programmes involve communication between teachers and students through emails, discussion board posting as well as other kinds of texts (Richey, Klein, & Nelson, 2004). On the other hand, the time management capabilities of the teachers and students hold substantial importance among the asynchronous programs. (Downing & Dymont, 2013).

H0: Online teaching competencies positively affect the teacher's readiness.

3.5. Teacher Attitude

Many studies have investigated teachers' attitudes towards readiness (Kisanga, 2016). Personal traits (mediated factors) such as teachers' gender (Venkatesh, Thong, & Xu, 2016), years of teaching experience (Smirnov & Bogun, 2010), and computer use (Gururaja, 2021) are also connected with teachers' attitudes. Liaw, Huang, and Chen (2007) have discovered that "variables such as age, sex, prior experience with computers, technology acceptability and individual learning styles are key issues when considering technology adoption by students." Users' positive attitudes are critical to the successful implementation of any technology, no matter how advanced or adaptable it is. A nationwide lockdown has provided an opportunity for educators to make greater use of online resources. The

preparedness stage is now the only viable method of instruction for maintaining the COVID-19 standard. Students around the world have shown moderate interest in online education especially during the current lockdown caused by the COVID-19 epidemic (Radha, Mahalakshmi, Kumar, & Saravanakumar, 2020). According to the aforementioned sources, no studies of teachers' opinions on online education have been conducted in any of the countries studied so far. Therefore, this study's primary objective is to investigate several aspects of educators' perspectives on online education.

H0: Teacher attitude positively affects the teacher's readiness.

3.6. Teaching Readiness

The term "teacher readiness" refers to a teacher's mental and physical preparedness to carry out instruction (Inan & Lowther, 2010). To be considered "teacher ready," a prospective educator must demonstrate an aptitude for and familiarity with, the pedagogical practices and content areas in which they would be working.

Previous research on teacher preparedness in Malaysia has shown that teachers are not always equipped for educational reform (Alazzam, Bakar, Hamzah, & Asimiran, 2012). Al Malihi (2015) in Saudi Arabia and Ekwueme, Ekon, and Ezenwa-Nebife (2015) in Nigeria found that teachers were not adequately prepared for a change in education policy in their respective countries. According to Lynch, Smith, and Menter (2016), readiness" refers to the willingness of educational workers to actively participate in reform initiatives. This definition is based on the work of Doe et al. (2020), organizational leaders not only have administrative responsibilities as part of their job descriptions but they are also the best candidates for optimizing human investments. Effective leaders restrict their focus, polish their talents and motivate their staff to get the best out of their team members (Khan, Kamal, Illiyani, & Asif, 2021). As a result, we contend that something is wrong if a leader does not have followers who are devoted to the objective, excited about progress and skilled at the tasks. This concept is all over the leadership and educational effectiveness research.

H0: Teacher readiness positively affects online teaching.

4. Research Design and Methodology

The current investigation is a descriptive cross-sectional study. This survey-based research project aims to investigate educators' preparedness for online instruction. The researchers employed a modified web questionnaire split into two parts to acquire first-hand or original data from the teachers. Questions in section A of the survey were designed to elicit narratives about participants' experiences with online education while those in section B probed participants' knowledge of and comfort with various aspects of online education infrastructure as well as their instructors' technical abilities, course design expertise, pedagogical approaches and general outlooks on the field. Technical competence, course design competency, teaching pedagogy, teachers' training and attitude are the five key latent variables that were derived from the statements used in this research to collect the sample dataset. The researchers designed all of these statements on a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5) with the respondents' preparedness for and familiarity with online instruction in mind.

The survey was carried out from May to September 2022 on a sample of 296 teachers from universities and colleges in Saudi Arabia. The researchers have obtained additional data regarding the knowledge and comprehension of the instructors who participate in this investigation. This ensures that researchers will have adequate numbers of teachers from which to draw sample populations for their studies. The researchers polled people using a convenience sampling method to gather the data they needed. SPSS was applied for descriptive statistics and SmartPLS3 was used to achieve reliability, convergent validity, discriminant validity and model fitness in the analysis of the dataset of samples collected from the teachers. We used SmartPLS 3.0 to perform path analysis in the suggested model and check for a meaningful association between all of the research variables by employing Structural Equation Modeling (SEM).

5. Findings and Discussion

5.1. Background Information of the Respondents

Table 1 displays the results of the survey questions asked about the demographic variables of interest. Primary sources were used to compile the information displayed here.

Table 1. Baseline data of the participants (N= 296).

Basis	Categories	F	%
Gender	Male	211	71.283
	Female	85	28.716
Age group	Up to 25 years	73	24.66
	26-30 years	109	36.82
	31-40 years	62	20.94
	41 and above	53	18.08
Cou course of teaching	IT (Computer science, statistics and mathematics)	72	24.32
	Business (Accounting, sectorial practice, supply chain, and marketing)	65	21.95
	Engineering (Agric, mechanical, civil and electrical)	93	31.41
	Art and design (Fashion and industrial art)	66	22.29
Teaching experience	Up to 5 years	93	31.41
	6 to 10 years	69	23.31
	11-15 years	83	28.04
	More than 15 years	51	17.22
Which device(s) do you use for online teaching?	Smartphone	43	14.52
	Laptop/Desktop	188	63.51
	Tablet	44	14.86
	Ipad	21	7.09

Table 1 depicts the demographic statistics of participants based on their age group, gender, course of teaching, teaching experience which device(s) do you use for online teaching? It reveals that 71.283% of sample respondents were males (M) while 28.716% were females (F). The following data indicates that at least 24.66% of the total respondents are part of the age group up to 25 years. A majority of 36.82% fit into the age group of 26-30 years, 20.94% were part of the age group of 31-40 years and 18.08% belonged to the age group of 41 and above.

The course of teaching demonstrates that 24.32% of respondents represent IT, 21.95% belong to business, 31.41% belong to engineering and 22.29% represent art and design. Teaching experience denotes that 31.41% of respondents represent up to 5 years, 6 to 10% belong to 23.31, 28.04% belong to 11-15 years and 17.22% represent more than 15 years.

The following is a breakdown of respondents' device(s): which devices do you use for online teaching? 14.52 percent of respondents used smartphones, 63.51 percent used laptops or desktops, 14.86 percent used tablets and 7.09 percent used I pad.

5.2. Measurement Model Evaluation

The measurements of convergent validity, internal consistency and discriminant validity are used to test the measuring model.

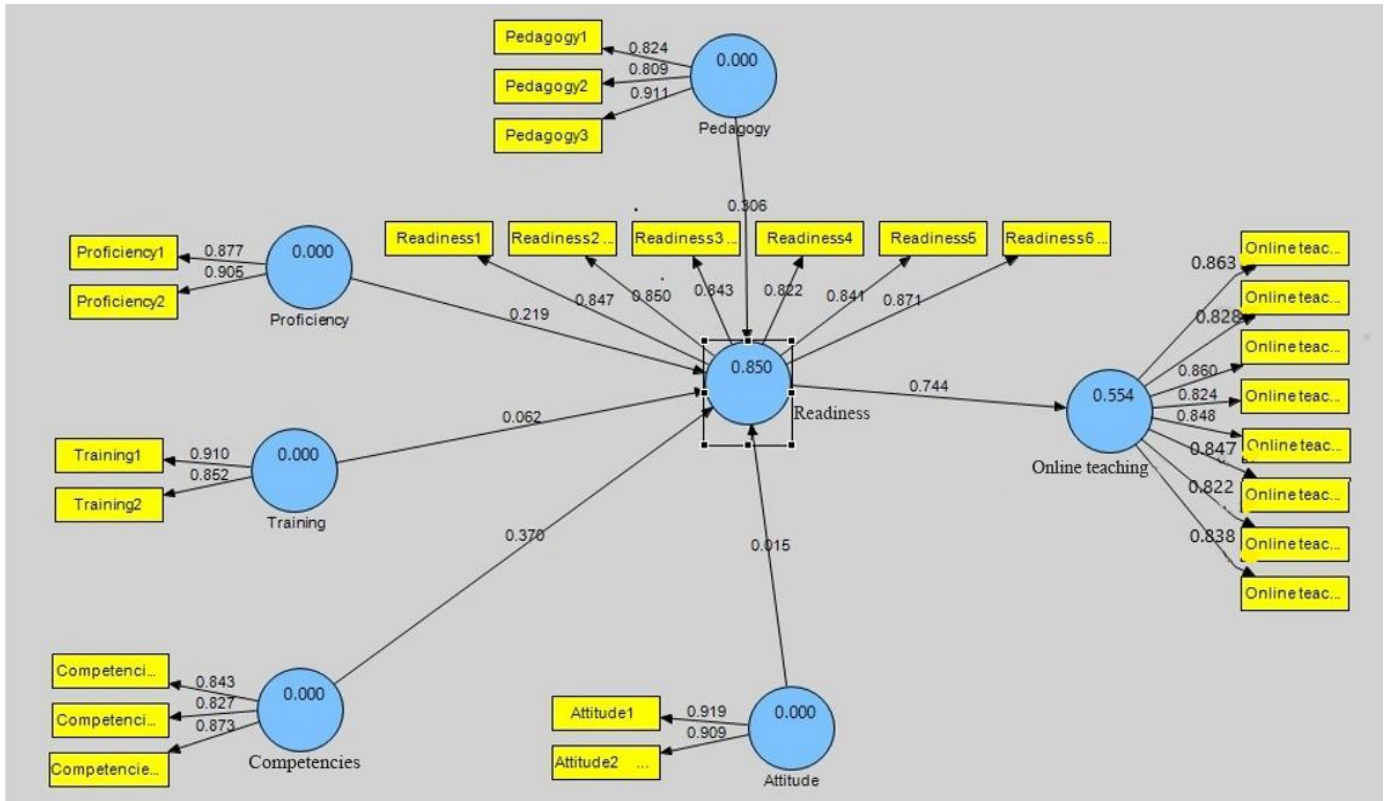


Figure 1. Measurement model from SmartPLS 3.0.

The result of factor analysis which serves as a data reduction technique to explain the relationships between observed variables using a smaller number of components is represented in Figure 1 as factor loadings. Factor loadings are represented by coefficients found in a factor pattern matrix or a factor structure matrix. While the second matrix provides product-moment correlation coefficients between common factors and observed variables, the first matrix contains regression coefficients that multiply common components by observed variables also known as manifest variables. Pedagogy, proficiency, training, competencies and attitude are represented by circles since they are the independent variables used by the researcher in the study whereas readiness is represented by circles which indicate the mediating variables used by the researcher. However, online teaching is indicated as a dependent variable.

Table 2. Mean, standard deviation and factor loading.

Statements	Mean	SD	Loading
Pedagogy			
The incorporation of multimedia, simulations, etc., into online instruction allows for more authentic assessment than conventional techniques.	4.720	0.802	0.819
Educators might adopt a new method of instruction namely online instruction with the help of today's state-of-the-art tools for online instruction.	4.233	0.765	0.813
My classroom routine includes online learning assignments with pertinent real-world applications (By referring to actual clinical instances, for instance, or by considering the practical applications of acquired knowledge).	3.710	1.164	0.932
Technical proficiency			
At least one synchronous online education tool, such as Zoom, Microsoft Teams, Canvas, etc. is recognizable to me.	3.173	0.884	0.842
I am familiar with learning management system capabilities to improve student learning (such as uploading learning resources reading materials, audio or video files etc. synchronous and asynchronous communication, publishing feedback, building forums, and so on).	4.20	0.977	0.804
Training			
I am excited to take part in online seminars, discussion forums, webinars, etc. as a	4.320	0.790	0.891

Statements	Mean	SD	Loading
student in order to improve my abilities as an online educator.			
It is better for teachers to be aware of data security relating to particular software or applications.	4.093	1.068	0.772
Course design and competency			
Online teaching facilitates a more adaptive learning approach than offline teaching.	3.193	0.869	0.881
When using copyrighted resources for teaching, I will adhere to the law and fair use principles.	4.140	0.875	0.903
I have experience creating online learning activities that encourage student interaction with one another, with the course materials and with the instructor.	4.293	0.933	0.857
Attitude			
Online teaching reduces stress and anxiety.	4.217	0.767	0.913
When it comes to online education, automated grading has several advantages over the traditional grading approach.	4.447	0.882	0.927
Teacher readiness			
Adopting multidimensional measures of teacher effectiveness.	3.211	0.876	0.912
Adopting multidimensional measures of teacher effectiveness.	4.080	0.904	0.876
Attracting and placing highly effective teachers.	3.897	0.987	0.897
Designing career pathways and differentiating compensation.	4.098	0.875	0.903
I feel comfortable recording and reporting student marks using the learning management system.	3.753	0.932	0.881
I have experience developing a wide variety of instructional resources (Lectures, handouts, manuals, assignments, etc.) for use in virtual classrooms.	3.227	0.832	0.834

The average of all the elements in each construct is shown in Table 2. Scores above 3 suggest that investors are optimistic about teachers. In this research, a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5) has been used by the researcher. All elements in each construct have factor loadings that are greater than the minimum threshold of 0.70. This means that all the claims provide an adequate justification for the theoretical premises upon which they are based.

5.3. Convergent Validity Result

The Cronbach alpha, Rho and convergent validity of the measurement model results of the present study are shown in Table 2.

Table 3. Convergent validity result.

Constructs	Cronbach's alpha	Rho-A	Composite reliability (C.R)	Average variance explained (AVE)
Pedagogy	0.852	0.851	0.922	0.784
Technical proficiency	0.823	0.824	0.845	0.742
Teacher training	0.726	0.728	0.865	0.772
Course design and competency	0.805	0.803	0.853	0.741
Teacher attitude	0.771	0.773	0.865	0.797
Teachers' readiness	0.912	0.916	0.932	0.721
Effectiveness of online teaching	0.891	0.881	0.921	0.732

All eight constructs are within the prescribed range with Composite Reliability (C.R) values greater than 0.7 and "Average Variance Extracted" (AVE) values greater than 0.5 (Ventre & Kolbe, 2020). When the Cronbach's alpha or "rho-a" value was greater than 0.7, it indicated that the survey was internally consistent. Therefore, the constructs' convergent validity was established (Khanifar, Molavi, Jandaghi, & Niya, 2012).

5.4. Discriminant Validity Result

Discriminant validity was tested using the Fornell-Larcker and cross-loading criteria. Evidence of discriminant validity indicates "the degree to which the measure distinguishes from other things in the nomological net".

Table 4. Discriminant validity–Fornell-Larcker criterion.

Constructs	Pedagogy	Technical proficiency	Teacher training	Course design and competency	Teacher attitude	Teachers readiness	Effectiveness of online teaching
Pedagogy	0.889						
Technical proficiency	0.781	0.884					
Teacher training	0.823	0.746	0.845				
Course design and competency	0.797	0.832	0.811	0.876			
Teacher attitude	0.819	0.732	0.801	0.754	0.845		
Teachers' readiness	0.822	0.787	0.785	0.766	0.798	0.927	
Effectiveness of online teaching	0.832	0.822	0.844	0.841	0.823	0.814	0.869

Table 5. Discriminant validity–loading and cross-loading criterion.

Constructs	Pedagogy	Technical proficiency	Teacher training	Teachers readiness	Effectiveness of online teaching	Teacher attitude	Course design and competency
Pedagogy1	0.919	0.762	0.778	0.769	0.722	0.778	0.806
Pedagogy2	0.921	0.742	0.727	0.758	0.680	0.728	0.765
Pedagogy3	0.834	0.599	0.673	0.600	0.777	0.685	0.710
Technical proficiency1	0.640	0.857	0.651	0.717	0.580	0.625	0.696
Technical proficiency2	0.763	0.915	0.728	0.811	0.681	0.736	0.786
Teacher training1	0.714	0.727	0.901	0.791	0.655	0.725	0.763
Teacher training2	0.729	0.634	0.872	0.625	0.778	0.673	0.723
Teachers readiness1	0.697	0.749	0.635	0.867	0.605	0.619	0.741
Teachers readiness2	0.666	0.712	0.704	0.853	0.609	0.701	0.734
Teachers readiness3	0.795	0.736	0.760	0.833	0.705	0.689	0.803
Teachers readiness4	0.609	0.706	0.696	0.854	0.585	0.646	0.706
Teachers readiness5	0.657	0.707	0.639	0.867	0.621	0.642	0.739
Teachers readiness6	0.628	0.753	0.678	0.845	0.644	0.683	0.722
Effectiveness of online teaching1	0.680	0.544	0.668	0.576	0.832	0.595	0.625
Effectiveness of online teaching2	0.650	0.559	0.632	0.616	0.844	0.620	0.681
Effectiveness of online teaching3	0.646	0.581	0.671	0.653	0.863	0.635	0.726
Effectiveness of online teaching4	0.693	0.608	0.706	0.620	0.868	0.662	0.712
Effectiveness of online teaching5	0.688	0.600	0.659	0.624	0.842	0.656	0.713
Effectiveness of online teaching6	0.700	0.650	0.732	0.656	0.868	0.681	0.733
Effectiveness of online teaching7	0.662	0.604	0.656	0.611	0.833	0.688	0.700
Effectiveness of online teaching8	0.730	0.630	0.673	0.646	0.891	0.686	0.695
Teacher attitude 1	0.788	0.703	0.749	0.738	0.739	0.922	0.783
Teacher attitude 2	0.707	0.699	0.701	0.695	0.679	0.911	0.703
Course design and competency1	0.732	0.734	0.718	0.717	0.632	0.657	0.813
Course design and competency2	0.705	0.640	0.717	0.667	0.806	0.695	0.808
Course design and competency3	0.739	0.747	0.720	0.837	0.695	0.725	0.921

Table 4 depicts the Fornell-Larcker criterion wherein the "square roots of average variance extracted" from the available constructs are used to arrive at the desired outcome. The values were as follows: pedagogy (0.889), technical proficiency (0.884), teacher training (0.845), course design and competency (0.876), teacher attitude (0.845), teacher's readiness (0.927) and effectiveness of online teaching (0.869). It exceeded the correlation values observed between the individual constructs and the other constructs. As a result, we met the Fornell-Larcker requirement for discriminant validity (Fornell & Lacker, 1981).

Each construct in Table 5 has a loading that is greater than any cross-loading it shares with any other construct across the columns, satisfying the cross-loading condition. Thus, in accordance with the cross-loading requirement, we have evidence of discriminant validity (Henseler, Ringle, & Sarstedt, 2015).

5.5. Structural Equation Model

Multicollinearity must be verified while analyzing the structural model for accuracy. The model did not show multicollinearity because the Variance inflation factor (VIF) values were in the range of 1.709 to 3.155 (Akinwande, Dikko, & Samson, 2015). We used the bootstrapping technique (5000 resamples) to check the accuracy of the structural model and verify the validity of our hypotheses.

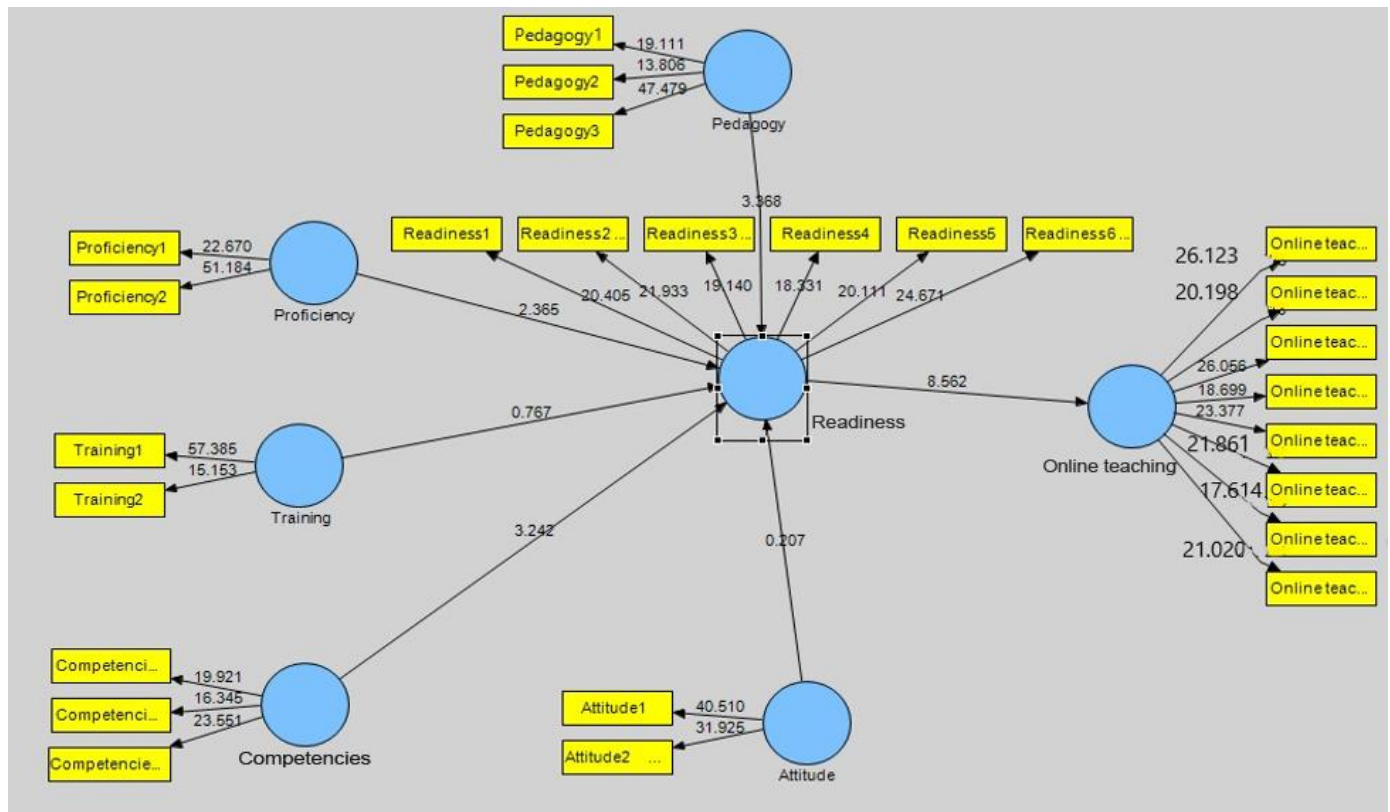


Figure 2. Structural equation model (SEM).

Figure 2 represents the t-value which is a statistic that expresses how much of a difference there is between the sample data and the mean. There is more evidence against the null hypothesis as it increases in magnitude. According to this PLS-SEM model, if the regression weights have t values of more than 1.96, then each path is significant at the 5% level or better (i.e. the estimated path parameter is significant). The results of the SEM model are shown in the table below.

Table 6. Direct impact of teaching pedagogy on teachers' readiness.

Hypothesis	Path	B	t-value	Result
H01	Teaching pedagogy → teachers' readiness	0.354	3.26	Supported

Table 6 shows that hypotheses Ho1 were supported and that teaching pedagogy was directly and positively related to teacher readiness ($\beta = 0.354$, t-value = 3.26, and $p < 0.001$).

Table 7. Direct impact of technical proficiency on teachers' readiness.

Hypothesis	Path	B	t-value	Result
H02	Technical proficiency → teachers' readiness	0.309	2.34	Supported

Table 7 shows that hypotheses Ho2 were supported and that technical proficiency was directly and positively related to teacher readiness ($\beta = 0.309$, t-value = 2.34, and $p < 0.001$).

Table 8. Direct impact of teacher training on teachers' readiness.

Hypothesis	Path	B	t-value	Result
H03	Teacher training → teachers' readiness	0.042	0.746	Not supported

Table 8 shows that hypotheses Ho3 were not supported and that teacher training was not directly and positively related to teacher's readiness ($\beta = 0.042$, t-value = 0.746, and $p = N.S$).

Table 9. Direct impact of online teaching competencies on teaching readiness.

Hypothesis	Path	B	t-value	Result
H04	Online teaching competencies → teaching readiness	0.452	3.42	Supported

Table 9 shows that hypotheses Ho4 were supported and that online teaching competencies were directly and positively related to teaching readiness ($\beta = 0.452$, t-value = 3.42, and $p < 0.001$).

Table 10. Direct impact of teacher attitude on teachers' readiness.

Hypothesis	Path	B	t-value	Result
H05	teacher attitude → teachers' readiness	0.017	0.281	Not supported

Table 10 shows that hypotheses Ho5 were not supported, and that teacher attitude was not directly and positively related to teacher's readiness ($\beta = 0.017$, t-value = 0.281, and $p = N.S.$).

Table 11. Direct impact of teacher readiness on online teaching.

Hypothesis	Path	B	t-value	Result
H06	teacher readiness → online teaching	0.629	8.52	Supported

Table 11 shows that hypotheses Ho6 were supported and that teacher readiness was directly and positively related to online teaching ($\beta = 0.629$, t-value = 8.52, and $p < 0.001$).

6. Discussion

6.1. Competency Framework

The theoretical framework given in guided our examination of teachers' abilities to administer the various stages of the online learning process (Baran, Correia, & Thompson, 2013) which allows teachers to self-evaluate and exchange information on their performance in a variety of areas (including course design, communication, time management, and technology) (Paliwal & Singh, 2021). However, when COVID-19 broke out, UG and PG instructors' course design, communication, and time management skills were insufficient for online education despite the fact that teachers' acceptance of online teaching was faster due to teachers' improved level of technical competencies.

The results of this study support the notion that teachers' effectiveness on reflective model tasks improves with experience (Baran & Correia, 2014) and can be enhanced by incorporating both formal education and practical experience. Teachers' preparedness to adopt online teaching was reinforced by both the pedagogical information they obtained in the exposure course and the subject-specific knowledge they already possessed. This study's findings show that instructors' self-efficacy and intrinsic motivation are related to their competence to undertake online teaching (Bolliger, Shepherd, & Bryant, 2019). Therefore, these factors should be considered while designing new curricula based on competency.

6.2. Proficiency

According to Tschannen-Moran and Hoy (2001), instructors' confidence in their abilities to plan and execute the sequence of steps necessary to finish a teaching assignment in a specific context can help boost their readiness (Chiu, 2022). Teachers who have self-confidence can break the mould and find answers to difficult questions. It is important for schools and universities to offer courses and training that boost teachers' self-assurance which improves their preparedness to teach. The results of Endot, Jamaluddin, Mohd Ayub, and Mohd Puad (2021) show that teachers' proficiencies have increased after receiving training and classroom experience.

6.3. Attitude

According to the findings, the vast majority of teachers hold negative views on online education. Teachers' widespread lack of confidence in their own e-learning abilities is the main cause of this mentality. Another study indicated that prior experience with e-learning as well as one's gender were important predictors of e-learning adoption after a pandemic (Kar, 2020).

Many studies have looked at how teachers feel about e-learning (Kisanga, 2016). Gender (Yada, Leskinen, Savolainen, & Schwab, 2022), years of teaching experience (Bruggeman et al., 2021) and computer use in the classroom are all personal traits (mediated factors) that are connected with teachers' attitudes. Acceptance of technology among students was shown to depend on several aspects including but not limited to age, sex, prior computer experience, level of interest in technology and each student's unique learning style. It is suggested that consumers' good attitudes regarding the technology are crucial to its successful deployment regardless of how advanced or capable the technology itself may be.

6.4. Pedagogy

Muñoz Carril, González Sanmamed, and Hernández Sellés (2013) suggest that online educators with many years of service also have greater faith in their own pedagogical abilities to instruct through the internet. Similar findings were seen in Shea (2019) which showed instructors' prior experience (as measured by the frequency of OT) was critical to their motivation to keep doing OT. Furthermore, this study found a positive relationship between online teaching experience and self-efficacy. However, new teachers reported significant difficulties in these areas as well as in understanding how to use online pedagogy and technology effectively. Recent research shows that the number of years a teacher has spent teaching online affects how they approach developing and leading online courses based on instructors' perceptions of their readiness for OT as conducted by Cheng, Lu, Xie, and Vongkulluksn (2020). It was discovered that those with little or no experience teaching online had lower levels of confidence in their own abilities (Khan, Vivek, et al., 2021).

6.5. Limitations of the Study

It is crucial to note a few limitations of the current study. The first limitation of the study is its limited scope. The researchers were only able to locate institutes in Saudi Arabia. Researchers in other fields may wish to do a similar study using a sample of universities from a wider range of geographic locations. Second, the professors who participated were chosen at random. The extent to which our results are vulnerable to selection bias can be collected through cross-validating the latent profiles and the impact of their variables using a random sample technique. On the other hand, the consistency of the profiles using sub-samples chosen at random suggests that this bias is most likely quite minimal.

The five key components of pedagogy, training, competency, attitude and technology proficiency reflected the readiness of instructors for OT.

Fourth, we evaluated teachers once based on their preparation, individual characteristics and the classroom environment. This approach provides information on the composition and determination of the profiles (e.g., levels of the constructs across profiles, predictive variables) while longitudinal follow-up measurements could provide further details on teachers' transformation between profiles, changes in readiness constructs and context-sensitive adaptations. Researchers may have a greater chance of estimating true contextual effects and gaining a deeper comprehension of the implications of organizational traits if they use multilevel study designs.

All questions were provided in English, independent of the respondents' original language as the fifth distinctive characteristic of our study. It is possible that some terminology or survey questions were interpreted differently between nations given that many teachers may have spoken English as a second language. It's difficult to determine the long-term effects of linguistic prejudice but the study's focus on college professors raises the possibility. The teachers who took part in the study probably had a good command of the English language and could follow the main ideas and steps of the study without any trouble. Nevertheless, it is crucial to track any linguistic bias in the readiness ratings. However, we do recommend further study that rigorously compares the impact of various sampling methods on the profile count, structure and predictability. We encourage further research towards broadening the conceptualization and measurement of this term as readiness may involve different modules. Participation in continuing education is one possible avenue for such enlargements.

7. Conclusion and Implications

This study aimed to determine whether academics in Saudi Arabian universities were prepared to teach online after the pandemic caused them to convert to emergency remote or online instruction. These results also highlight the need for universities and other educational institutions to create helpful faculty development programs through which all teachers in HEIs can be equipped with the technical proficiency, pedagogical knowledge, competency and teaching readiness necessary to effectively instruct their students through online mediums. Technical proficiency, pedagogy, competency and teaching readiness show a direct relationship with online education. On the other hand, attitude and training do not show any relationship with online education.

The most pressing challenge facing universities in Saudi Arabia right now is fostering online teacher communities through promoting holistic, inclusive professional growth for educators. Additionally, our findings suggest that universities should develop online teaching-learning software and user-friendly virtual tools as well as carefully place the existing tools, in order to help teachers develop online teaching readiness competencies such as course design, time management, communication and the required technical skills. Online teaching communities, associated management, the Saudi Arabian education system and private players must collaborate to improve online teaching readiness, strengthen online teaching and learning and develop an extensive support ecosystem if the online higher education system is to succeed.

Teachers' dedication is crucial to the success of any new pedagogy or curriculum. This study's results show that teacher preparedness is a critical determinant of a change's ultimate success. This research shows that teachers' levels of technical expertise, competency and pedagogy are crucial factors in raising the bar on their preparedness to apply effective teaching and learning strategies. All of the information obtained from this study can be used to design more successful training and development programs for educators. The results of this study have important implications for the development of online education and can be used by a wide range of stakeholders. It is crucial to give students almost the same exposure and experience when most colleges choose the online teaching option. As a result of the epidemic, teachers are free to experiment with new ways of facilitating online learning modules that encourage greater student engagement and result in deeper more lasting learning. In this research, we set out to provide evidence that teachers in Saudi Arabia's higher education institutions (HEIs) have grown increasingly adept at managing online learning in the moment.

References

- Akinwande, M. O., Dikko, H. G., & Samson, A. (2015). Variance inflation factor: As a condition for the inclusion of suppressor variable (s) in regression analysis. *Open Journal of Statistics*, 5(07), 754-767. <https://doi.org/10.4236/ojs.2015.57075>
- Al Malihi, J. F. (2015). Saudi efl teachers' readiness and perceptions of young learners teaching at elementary schools. *English Language Teaching*, 8(2), 1-86. <https://doi.org/10.5539/elt.v8n2p86>
- Alazzam, A.-O., Bakar, A. R., Hamzah, R., & Asimiran, S. (2012). Effects of demographic characteristics, educational background, and supporting factors on ICT readiness of technical and vocational teachers in Malaysia. *International Education Studies*, 5(6), 229-243. <https://doi.org/10.5539/ies.v5n6p229>
- Almahasees, Z., Mohsen, K., & Amin, M. O. (2021). Faculty's and students' perceptions of online learning during COVID-19. *Frontiers in Education*, 6, 1-10. <https://doi.org/10.3389/educ.2021.638470>
- Radiozaman, I. F. A. (2021). Exploring online readiness in the context of the COVID 19 pandemic. *Teaching in Higher Education*, 1-19. <https://doi.org/10.1080/13562517.2021.1943654>
- Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. *Human Behavior and Emerging Technologies*, 2(2), 113-115. <https://doi.org/10.1002/hbe2.191>
- Baran, E., & Correia, A.-P. (2014). A professional development framework for online teaching. *TechTrends*, 58(5), 95-101. <https://doi.org/10.1007/S11528-014-0791-0>
- Baran, E., Correia, A.-P., & Thompson, A. D. (2013). Tracing successful online teaching in higher education: Voices of exemplary online teachers. *Teachers College Record*, 115(3), 1-41. <https://doi.org/10.1177/016146811311500309>

- Barrot, J. S., Llenares, I. I., & Del Rosario, L. S. (2021). Students' online learning challenges during the pandemic and how they cope with them: The case of the Philippines. *Education and Information Technologies*, 26(6), 7321-7338. <https://doi.org/10.1007/s10639-021-10589-x>
- Bates, A. W., & Sangra, A. (2011). *Managing technology in higher education: Strategies for transforming teaching and learning*. Jossey-Bass: An Imprint of Wiley.
- Bawane, J., & Spector, J. M. (2009). Prioritization of online instructor roles: Implications for competency-based teacher education programs. *Distance Education*, 30(3), 383-397. <https://doi.org/10.1080/01587910903236536>
- Bessadok, A. (2022). Analyzing student aspirations factors affecting e-learning system success using a structural equation model. *Education and Information Technologies*, 27(7), 9205-9230. <https://doi.org/10.1007/s10639-022-11015-6>
- Bolliger, D. U., & Halupa, C. (2022). An investigation of instructors' online teaching readiness. *TechTrends*, 66(2), 185-195. <https://doi.org/10.1007/s11528-021-00654-0>
- Bolliger, D. U., Shepherd, C. E., & Bryant, H. V. (2019). Faculty members' perceptions of online program community and their efforts to sustain it. *British Journal of Educational Technology*, 50(6), 3283-3299. <https://doi.org/10.1111/BJET.12734>
- Brockmann, W. (1994). On the role of machine learning in knowledge-based control. In *Machine Learning: ECML-94: European Conference on Machine Learning Catania, Italy, April 6-8, 1994 Proceedings, Springer Berlin Heidelberg*, 7, 343-346.
- Bruggeman, B., Tondeur, J., Struyven, K., Pynoo, B., Garone, A., & Vanslambrouck, S. (2021). Experts speaking: Crucial teacher attributes for implementing blended learning in higher education. *The Internet and Higher Education*, 48, 100772. <https://doi.org/10.1016/j.iheduc.2020.100772>
- Cai, M. (2019). Professional self-development based on informal learning: A case study of foreign language teachers in a university of China. *Open Journal of Social Sciences*, 7(12), 26-38.
- Cheng, S.-L., Lu, L., Xie, K., & Vongkulluksn, V. W. (2020). Understanding teacher technology integration from expectancy-value perspectives. *Teaching and Teacher Education*, 91, 103062. <https://doi.org/10.1016/j.tate.2020.103062>
- Chiu, T. K. (2022). School learning support for teacher technology integration from a self-determination theory perspective. *Educational Technology Research and Development*, 70(3), 931-949. <https://doi.org/10.1007/S11423-022-10096-X>
- Coman, C., Țiru, L. G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective. *Sustainability*, 12(24), 10367. <https://doi.org/10.3390/su122410367>
- Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, 49(1), 5-22. <https://doi.org/10.1177/0047239520934018>
- Doe, T., Willis, R., Peddell, L., Lynch, D., Yeigh, T., & James, S. (2020). Readiness', talent management and adaptive solutions to enable teachers in indigenous schools to improve their teaching. *International Journal of Innovation, Creativity and Change*, 14(11), 153-167. <https://doi.org/10.53333/ijcc2013/141151>
- Douglas, A. S. (2019). Learning to teach: A focus on the personal rather than the technical aspects of teacher education. *Teacher Education Advancement Network Journal*, 11(1), 71-83.
- Downing, J. J., & Dymont, J. E. (2013). Teacher educators' readiness, preparation, and perceptions of preparing preservice teachers in a fully online environment: An exploratory study. *The Teacher Educator*, 48(2), 96-109. <https://doi.org/10.1080/08878730.2012.760023>
- Dray, B. J., Lowenthal, P. R., Miszkiewicz, M. J., Ruiz-Primo, M. A., & Marczynski, K. (2011). Developing an instrument to assess student readiness for online learning: A validation study. *Distance Education*, 32(1), 29-47. <https://doi.org/10.1080/01587919.2011.565496>
- Ekwueme, C. O., Ekon, E. E., & Ezenwa-Nebife, D. C. (2015). The impact of hands-on-approach on student academic performance in basic science and Mathematics. *Higher Education Studies*, 5(6), 47-51. <https://doi.org/10.5539/hes.v5n6p47>
- Endot, Z., Jamaluddin, R., Mohd Ayub, A., & Mohd Puad, M. (2021). Teacher readiness in implementing the teaching of design and technology and its relationship with self-efficacy and intrinsic motivation. *International Journal of Human Resource Studies*, 11(4S), 111122-111122. <https://doi.org/10.5296/ijhrs.v11i4s.19234>
- Finefter-Rosenbluh, I. (2020). 'Try walking in my shoes': Teachers' interpretation of student perception surveys and the role of self-efficacy beliefs, perspective taking and inclusivity in teacher evaluation. *Cambridge Journal of Education*, 50(6), 747-769. <https://doi.org/10.1080/0305764X.2020.1770692>
- Fletcher, T., & Bullock, S. M. (2015). Reframing pedagogy while teaching about teaching online: A collaborative self-study. *Professional Development in Education*, 41(4), 690-706. <https://doi.org/10.1080/19415257.2014.938357>
- Fornell, & Lacker. (1981). Discriminant validity assessment: Use of Fornell & Larcker criterion versus HTMT criterion discriminant validity assessment: Use of Fornell & Larcker criterion versus HTMT criterion. *Journal of Physics: Conference Series PAPER*, 890(1), 1-6.
- Goodyear, P., Salmon, G., Spector, J. M., Steeples, C., & Tickner, S. (2001). Competences for online teaching: A special report. *Educational Technology Research and Development*, 49(1), 65-72. <https://doi.org/10.1007/BF02504508>
- Gururaja, C. S. (2021). *Teacher's attitude towards online teaching*. Paper presented at the National Virtual Conference" New Education Policy: A Quality Enhancer for Inculcation of Human Values in Higher Education Institutions.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135. <https://doi.org/10.1007/s11747-014-0403-8>
- Howard, S. K., Tondeur, J., Siddiq, F., & Scherer, R. (2021). Ready, set, go! Profiling teachers' readiness for online teaching in secondary education. *Technology, Pedagogy and Education*, 30(1), 141-158. <https://doi.org/10.1080/1475939X.2020.1839543>
- Inan, F. A., & Lowther, D. L. (2010). Factors affecting technology integration in K-12 classrooms: A path model. *Educational Technology Research and Development*, 58, 137-154. <https://doi.org/10.1007/s11423-009-9132-y>
- Kar, S. (2020). Teachers' attitudes towards online teaching (e-learning) during Covid-19 lockdown. *Journal of Information and Computational Science*, 10(8), 351-358.
- Kebritchi, M., Lipschuetz, A., & Santiago, L. (2017). Issues and challenges for teaching successful online courses in higher education: A literature review. *Journal of Educational Technology Systems*, 46(1), 4-29. <https://doi.org/10.1177/0047239516661713>
- Kentnor, H. E. (2015). Distance education and the evolution of online learning in the United States. *Curriculum and Teaching Dialogue*, 17(1), 21-34.
- Khan, M. A., Kamal, T., Illiyani, A., & Asif, M. (2021). School students' perception and challenges towards online classes during COVID-19 pandemic in India: An econometric analysis. *Sustainability*, 13(9), 4786. <https://doi.org/10.3390/su13094786>
- Khan, M. A., Khojah, M., & Vivek. (2022). Artificial intelligence and big data: The advent of new pedagogy in the adaptive e-learning system in the higher educational institutions of Saudi Arabia. *Education Research International*, 2022, 1-10. <https://doi.org/10.1155/2022/1263555>
- Khan, M. A., Vivek, V., Khojah, M., Nabi, M. K., Paul, M., & Minhaj, S. M. (2021). Learners' perspective towards e-exams during COVID-19 outbreak: Evidence from higher educational institutions of India and Saudi Arabia. *International Journal of Environmental Research and Public Health*, 18(12), 6534. <https://doi.org/10.3390/ijerph18126534>
- Khanifar, H., Molavi, Z., Jandaghi, G. R., & Niya, M. J. M. (2012). Factors influencing the intendency of e-banking: An integration of TAM & TPB with eservice quality. *Journal of Applied Sciences Research*, 46(3), 8072-8079.
- Kisanga, D. H. (2016). Determinants of teachers' attitudes towards e-learning in Tanzanian higher learning institutions. *International Review of Research in Open and Distributed Learning*, 17(5), 109-125. <https://doi.org/10.19173/irrodl.v17i5.2720>
- Kukulka-Hulme, A. (2012). Chapter one: Language learning defined by time and place: A framework for next generation designs. *Innovation and Leadership in English Language Teaching*, 6(2), 3-20.
- Liaw, S.-S., Huang, H.-M., & Chen, G.-D. (2007). Surveying instructor and learner attitudes toward e-learning. *Computers & Education*, 49(4), 1066-1080. <https://doi.org/10.1016/j.compedu.2006.01.001>
- Lim, J. (2023). Impact of instructors' online teaching readiness on satisfaction in the emergency online teaching context. *Education and Information Technologies*, 28(4), 4109-4126. <https://doi.org/10.1007/s10639-022-11241-y>
- Los, R., De Jaeger, A., & Stoesz, B. M. (2021). Development of the online and blended teaching readiness assessment (OBTRA). *Frontiers in Education*, 6, 1-8. <https://doi.org/10.3389/feduc.2021.673594>

- Lynch, D., Smith, R., & Menter, I. (2016). Building school readiness for teaching improvement: The first step. *International Journal of Innovation, Creativity and Change*, 2(4), 103-121.
- Maheshwari, G. (2021). Factors affecting students' intentions to undertake online learning: An empirical study in Vietnam. *Education and Information Technologies*, 26(6), 6629-6649. <https://doi.org/10.1007/s10639-021-10465-8>
- Marin, E. (2022). Teachers' self-assessment ability to teach in an inclusive school environment. *American Journal of Education and Learning*, 7(2), 85-97. <https://doi.org/10.55284/ajel.v7i2.708>
- Martin, F., Budhrani, K., & Wang, C. (2019). Examining faculty perception of their readiness to teach online. *Online Learning*, 23(3), 97-119. <https://doi.org/10.24059/olj.v23i3.1555>
- McNair, D. E. (2015). Lessons from the virtual classroom: The realities of online teaching. *Journal of College Student Retention: Research, Theory & Practice*, 17(2), 264-269. <https://doi.org/10.1177/1521025115578237>
- Metsäpelto, R. L., Poikkeus, A. M., Heikkilä, M., Husu, J., Laine, A., Lappalainen, K., . . . Suvilehto, P. (2021). A multidimensional adapted process model of teaching. *Educational Assessment, Evaluation and Accountability* 143-172. <https://doi.org/10.1007/s11092-021-09373-9>
- Mohebi, L., & Meda, L. (2021). Trainee teachers' perceptions of online teaching during field experience with young children. *Early Childhood Education Journal*, 49(6), 1189-1198. <https://doi.org/10.1007/s10643-021-01235-9>
- Moyo, C., & Maifala, S. (2022). Navigating the new Covid-19 Normal: The challenges and attitudes of teachers and students during online learning in Qatar. *International Journal of Learning, Teaching and Educational Research*, 21(8), 368-383. <https://doi.org/10.26803/ijlter.21.8.21>
- Muñoz Carril, P. C., González Sanmamed, M., & Hernández Sellés, N. (2013). Pedagogical roles and competencies of university teachers practicing in the e-learning environment. *International Review of Research in Open and Distributed Learning*, 14(3), 462-487. <https://doi.org/10.19173/irrodl.v14i3.1477>
- Mwawasi, F. M. (2014). Technology leadership and ICT Use: Strategies for capacity building for ICT integration. *Journal of Learning for Development*, 1(2), 132-158.
- Nortvig, A.-M., Petersen, A. K., & Balle, S. H. (2018). A literature review of the factors influencing e-learning and blended learning in relation to learning outcome, student satisfaction and engagement. *Electronic Journal of E-learning*, 16(1), 46-55.
- Obizoba, C. (2016). Effective facilitation methods for online teaching. *International Journal of Higher Education Management*, 2(2), 1-12.
- Paliwal, M., & Singh, A. (2021). Teacher readiness for online teaching-learning during COVID-19 outbreak: A study of Indian institutions of higher education. *Interactive Technology and Smart Education*, 18(3), 403-421. <https://doi.org/10.1108/ITSE-07-2020-0118>
- Patel, R. (2019). Teaching and learning in competencies of university teachers practicing in the e-learning environment. *Think India Journal*, 10(7), 7572-7580.
- Pedro, N. S., & Kumar, S. (2020). Institutional support for online teaching in quality assurance frameworks. *Online Learning*, 24(3), 50-66. <https://doi.org/10.24059/olj.v24i3.2309>
- Perrotta, K. A., & Bohan, C. H. (2020). A reflective study of online faculty teaching experiences in higher education. *Journal of Effective Teaching in Higher Education*, 3(1), 50-66. <https://doi.org/10.36021/jethe.v3i1.9>
- Radha, R., Mahalakshmi, K., Kumar, V. S., & Saravanakumar, A. (2020). E-Learning during lockdown of Covid-19 pandemic: A global perspective. *International Journal of Control and Automation*, 13(4), 1088-1099.
- Reyes, J. (2023). Teachers' ability, attitude, and acceptance towards distance learning. *Journal of Digital Educational Technology*, 3(2), ep2307. <https://doi.org/10.30935/jdet/13349>
- Richey, R. C., Klein, J. D., & Nelson, W. A. (2004). Developmental research: Studies of instructional design and development. *Handbook of Research for Educational Communications and Technology*, 2(1), 1099-1130.
- Roddy, C., Amiet, D. L., Chung, J., Holt, C., Shaw, L., McKenzie, S., . . . Mundy, M. E. (2017). Applying best practice online learning, teaching, and support to intensive online environments: An integrative review. *Frontiers in Education*, 2, 1-10. <https://doi.org/10.3389/feduc.2017.00059>
- Scherer, R., Howard, S. K., Tondeur, J., & Siddiq, F. (2021). Profiling teachers' readiness for online teaching and learning in higher education: Who's ready? *Computers in Human Behavior*, 118, 106675. <https://doi.org/10.1016/j.chb.2020.106675>
- Shea, P. (2019). Bridges and barriers to teaching online college courses: A study of experienced online faculty in thirty-six colleges. *Online Learning Journal*, 11(2), 73-128. <https://doi.org/10.24059/OLJ.V11I2.1728>
- Siregar, E. (2022). Antecedents of E-learning readiness and student satisfaction in institutions of higher education during the COVID-19 pandemic. *Journal of Education and E-Learning Research*, 9(3), 155-165. <https://doi.org/10.20448/jeelr.v9i3.4111>
- Slattery, D. (2021). Transitioning from emergency remote teaching to quality online delivery: An Irish professional development perspective. *Journal of Learning Development in Higher Education*, 22. <https://doi.org/10.47408/jldhe.vi22.789>
- Smirnov, E., & Bogun, V. (2010). Information and communication technology in science learning as a tool for "scientific thinking" in engineering education. *Natural Science*, 02(12), 1400-1406. <https://doi.org/10.4236/NS.2010.212171>
- Snježana, B., & Goran, B. (2015). *Assessment of competencies of online teachers: Pilot Study and survey evaluation*. Paper presented at the The Sixth International Conference on E-Learning (ELearning-2015).
- Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education*, 17(7), 783-805. [https://doi.org/10.1016/S0742-051X\(01\)00036-1](https://doi.org/10.1016/S0742-051X(01)00036-1)
- Venkatesh, V., Thong, J. Y., & Xu, X. (2016). Unified theory of acceptance and use of technology: A synthesis and the road ahead. *Journal of the Association for Information Systems*, 17(5), 328-376. <https://doi.org/10.17705/1jais.00428>
- Ventre, I., & Kolbe, D. (2020). The impact of perceived usefulness of online reviews, trust and perceived risk on online purchase intention in emerging markets: A Mexican perspective. *Journal of International Consumer Marketing*, 32(4), 287-299. <https://doi.org/10.1080/08961530.2020.1712293>
- Wingo, N. P., Ivankova, N. V., & Moss, J. A. (2017). Faculty perceptions about teaching online: Exploring the literature using the technology acceptance model as an organizing framework. *Online Learning*, 21(1), 15-35.
- Yada, A., Leskinen, M., Savolainen, H., & Schwab, S. (2022). Meta-analysis of the relationship between teachers' self-efficacy and attitudes toward inclusive education. *Teaching and Teacher Education*, 109, 103521. <https://doi.org/10.1016/j.tate.2021.103521>
- Zhou, Y., An, X., Li, X., Li, L., Gong, X., Li, Y., . . . Tsai, C.-C. (2022). A literature review of questionnaires for the assessment of online learning with a specific focus on the factors and items employed. *Australasian Journal of Educational Technology*, 38(1), 182-204. <https://doi.org/10.14742/ajet.6719>