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Assessing e-learning readiness in the context of a higher education institution: Teaching staff perspective

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Abstract

The lack of an adequate e-learning readiness assessment has been characterized as a major cause of e-learning implementation failure. Consequently, overcoming the challenges leading to such failure requires the academic institution to carefully assess its readiness and make improvements based on the identified weaknesses. In response to this requirement, this study primarily focused on assessing the level of e-learning readiness for a Saudi public higher education institution, considering the perceptions of teaching staff. A questionnaire-based survey method was employed to conduct this assessment. A total of 233 valid responses were analyzed. The results demonstrated that all readiness dimensions examined for the institution had a readiness level higher than the expected level of readiness (i.e., 3.41) and less than the lower limit of the highest readiness level range (i.e., 4.2 to 5). These dimensions related to the preparedness of five crucial components within the institution: teaching staff, technology, business processes, finance, and leadership. Based on the obtained results, it is necessary to improve certain aspects of these dimensions to enhance their contribution to the overall sustainable readiness of the institution. Accordingly, the study recommended several areas for improvement.

Keywords: Administrative support, E-Learning readiness assessment, E-Learning, Higher education, Process readiness, Teaching staff readiness.

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Contents

Contribution of this paper to the literature
This research extends the current e-learning literature by providing further insights into the factors affecting e-learning readiness and identifying areas that need improvement within Saudi higher education. These findings are useful for policymakers and e-learning administrators aiming to implement effective innovations in digital education.

1. Introduction

E-learning has gained significant popularity as a crucial innovation that is increasingly spreading in the higher education sector worldwide (Al-araibi, Naz'ri bin Mahrin, Yusoff, & Chuprat, 2019a). It is rapidly becoming an integral component of the educational process, especially after the COVID-19 outbreak (Aulakh, Roul, & Kaushal, 2023). A primary aim of its adoption in higher education institutions is to provide learners with greater access to educational services (Al-araibi et al., 2019a; Widodo, Wibowo, & Wagiran, 2020). Compared to conventional learning, the e-learning environment is characterized by several advantages, including providing a wealth of educational resources to learners in various formats (e.g., rich media), offering significant flexibility by eliminating time and space constraints, and facilitating self-paced learning (Wang, Wei, Chen, & Wang, 2024) as well as reducing costs in many ways, such as providing learning chances for a large number of learners without the necessity for many facilities (Arkorful & Abaidoo, 2015).

In addition, e-learning has great potential to overcome many of the common problems in traditional learning settings, including limited classroom space, lack of sufficient teaching staff, and difficulties in accessing resources (Zahid & Agou, 2024). Consequently, the increasing use of e-learning solutions has been a trend in education long before the COVID-19 outbreak (Wang et al., 2024). It was estimated that the popularity of e-learning will increase despite the fact that academic institutions mostly rely on conventional methods in their educational processes (Stecuła & Wolniak, 2022). This popularity increases significantly when it comes to providing learning services to persons who cannot access formal education due to being in remote locations or because of work or other commitments (Shariq, Lutfy, Alahdal, & Abdullah Aldhali, 2022).

These e-learning benefits will not be realized without the readiness of the institution to implement such innovative learning methods (Kolo & Zuva, 2020). This readiness, often referred to as e-learning readiness, is considered an essential prerequisite for the successful implementation of e-learning initiatives in higher education (Kolo & Zuva, 2020; Rohayani, 2015). It enables institutions to overcome many of the challenges facing such successful implementation, especially in situations that impose a swift shift from conventional learning to it (e.g., the pandemic consequences) (Stecuła & Wolniak, 2022). These challenges include operating e-learning platforms, acquiring the knowledge and skills necessary to adopt this innovative learning method, and overcoming obstacles such as resistance to change (Stecuła & Wolniak, 2022). As such, this readiness has been considered by prior research as the most crucial aspect of e-learning adoption, compared to other factors that may influence the effectiveness of e-learning (Blacer-Bacolod, 2022). Moreover, this readiness has also been identified as one of the most significant determinants affecting the realization of desirable outcomes in e-learning adoption (Demir & Yurdugül, 2015). Accordingly, this readiness has become a major concern for many educational institutions seeking to adopt innovative learning methods, as they must be well prepared before embarking on such adoption (Blacer-Bacolod, 2022).

As a term, e-learning readiness is generally viewed in terms of the mental and physical preparedness of institutions to implement e-learning (Rohayani, 2015). It can also be regarded in this general form as the capabilities of the institution along with the capacities of other key educational stakeholders (e.g., teaching staff) to effectively implement electronic media that enable e-learning (Darab & Montazer, 2011). In addition, it is also viewed in terms of a set of factors that should be achieved prior to an e-learning implementation being considered successful (Jaoua, Almurad, Elshaer, & Mohamed, 2022). However, given the generic nature of these views, the current study adopted a specific characterization of e-learning readiness, which implies that the institution has the ability to ensure the necessary facilitators to effectively implement e-learning innovations, such as adequate technological infrastructure, financial capacity, technical skills, top management support, clear implementation policies, and well-designed content (Saekow & Samson, 2011).

The assessment of such e-learning readiness was identified by prior research as a crucial enabler for enhancing the effectiveness of e-learning implementation in higher education and preventing failures that hinder this process (Rohayani, 2015). This assessment raises institutions' awareness of what is necessary to optimally facilitate e-learning in a specific implementation context (Coopasami, Knight, & Pete, 2017). In its essence, this assessment helps institutions ensure that they have the necessary facilitators (such as organizational infrastructure and support) to implement successful e-learning, as well as identify potential barriers (e.g., lack of technical resources and staff expertise) that could lead to implementation failure (Zine et al., 2023). Accordingly, it enables institutions to evaluate their levels of e-learning readiness, identify shortcomings, and then develop improved strategies to implement e-learning effectively (Al-araibi, Mahrin, & Yusoff, 2019b). In this sense, Al-araibi et al. (2019a) included that the lack of this assessment is a major cause of e-learning adoption failure in many organizational contexts. Consequently, overcoming the obstacles and the challenges leading to such failure requires the institution to assess its readiness and make improvements based on the identified weaknesses.

To assess an institution's readiness for e-learning, several factors are taken into account, such as policy, technical resources, human resources, budget and finance, skills, attitudes, and experience (Rohayani, 2015). The availability of each of these factors varies between academic institutions, even within the same country, due to a number of reasons, such as the technology divide. Therefore, such availability represents an issue that must be carefully addressed by each institution when assessing its overall readiness to implement e-learning innovations. In this vein, focusing on the Saudi higher education context, multiple studies reported challenges hindering such availability in some Saudi institutions, including insufficient technical skills of teaching staff regarding the adopted education platform (Jarelnape et al., 2024) inappropriate infrastructure, lack of financial support, inadequate policies (Quadri, Muhammed, Sanober, Qureshi, & Shah, 2017) unstable internet connectivity, as well as unsatisfactory technical support and training (El Zawaidy & Zaki, 2014). Additionally, Almaiah, Al-Khasawneh, and Althunibat (2020) addressed challenging issues related to course design, change management, the technical aspects of e-learning

systems, and computer self-efficacy. Therefore, assessing e-learning readiness at the institutional level within the Saudi context is essential to address the challenges impacting the availability of such readiness factors.

This necessity has been generally asserted by emphasizing that there is still a need to determine the factors, including challenges, that influence e-learning systems at the level of individual institutions, despite the existence of statistical information demonstrating the capabilities of the Saudi environment to accommodate large numbers of learners and educators during the COVID-19 outbreak (e.g., average data usage per capita rose to 900 MB/s and the number of Internet users reached 97.86% of the population) (Alkabaa, 2022). Furthermore, this necessity persists due to the potential exposure to future crises, such as the COVID-19 pandemic, which hinder the normal functioning of educational processes and necessitate a complete shift to e-learning as an alternative educational method (Al-Rikabi & Montazer, 2024). An additional indicator of this necessity is the lack of empirical studies evaluating Saudi e-learning readiness post-pandemic. This deficiency is due to most previous studies focusing on investigating e-learning before and during the pandemic. Even recent research indicates a scarcity of studies focusing on the current state of e-learning after the pandemic (Alshathry & Alojail, 2024).

In response to this necessity, the current study assesses the extent to which a set of the most common dimensions in IT innovation readiness models contribute to the overall institutional readiness for implementing e-learning innovations post-pandemic, specifically in the Saudi higher education setting. These dimensions pertain to the preparedness of five crucial organizational components in the institution, namely teaching staff, technology, processes, finance, and leadership. They are referred to here as teaching staff readiness, technical readiness, process readiness, financial readiness, and administrative support, respectively. These dimensions have been examined due to their high potential to significantly contribute to the overall e-learning readiness of educational institutions, which stems from their frequent inclusion in measurement models developed to assess such readiness (Blacer-Bacolod, 2022; Demir & Yurdugül, 2015; Schreurs & Al-Huneidi, 2012). In addition, they collectively represent a major part of the supportive environment needed for the successful implementation of e-learning innovations. As such, each of these dimensions is assessed here as a crucial factor in shaping e-learning readiness at the institutional level.

The assessment of these readiness dimensions was conducted at a Saudi public higher education institution that seeks to enhance its educational service delivery by adopting various e-learning innovations, namely Prince Sattam bin Abdulaziz University (PSAU). PSAU has established an e-learning unit that focuses on developing a stimulating e-learning environment, applying e-learning quality standards, and improving teaching staff's skills in designing e-courses (Vice Rectorate of Academic and Educational Affairs, 2025). As such, assessing the PSAU e-learning readiness in terms of these dimensions is an essential complement to the efforts of this unit. This assessment was carried out based on the PSAU teaching staff's perceptions of these dimensions. Teaching staff, compared to other key e-learning stakeholders, plays a crucial role in developing, managing, and facilitating the delivery of e-learning programs. The absence of these critical staff members' views on e-learning can lead to the implementation of e-learning strategies that may not achieve the desired outcomes (Nwagwu, 2020). Focusing on the Saudi context, Alqahtani et al. (2022) emphasized that teaching staff were not given much attention, even during the pandemic, to study their challenges and perceptions of online teaching, compared to students. As such, it is essential to gather teaching staff perceptions regarding their institution's preparedness to implement e-learning innovations.

In addition, it is necessary to evaluate teaching staff's perceptions of their readiness for e-learning innovations. This stems from the importance of teaching staff readiness as an essential element in the overall e-learning readiness of their institution. Teaching staff readiness is a critical success factor for e-learning initiatives, as higher success rates of these initiatives are associated with sufficient levels of such readiness. Furthermore, if teaching staff are not prepared for e-learning, it is trivial how prepared their students are (Çınar, Ekici, & Demir, 2021). Accordingly, it is essential to assess the level of teaching staff readiness and the factors that may significantly influence it. These factors include demographic attributes (e.g., education level and e-learning usage experience) and other organizational readiness dimensions (e.g., technological infrastructure readiness and administrative support).

To this end, the main research question of this study is: What is the perception of teaching staff at PSAU regarding their institution's readiness for e-learning? Additionally, the following related questions were also examined:

i. Do teaching staff's demographic attributes (gender, age, education level, academic rank, teaching experience, e-learning usage experience) influence their perception of their institution's readiness for e-learning?
ii. Is teaching staff readiness for e-learning impacted by their demographic attributes?
iii. Is teaching staff readiness for e-learning impacted by the other examined organizational readiness dimensions (i.e., technical readiness, process readiness, financial readiness, and administrative support)?

2. Literature Review

2.1. E-Learning Readiness Assessment Dimensions

Numerous models have been developed over the past years to identify the dimensions that can be used for e-learning readiness assessment (Nwagwu, 2020). These models have been characterized as instruments that assist educational organizations in measuring their capability levels and identifying gaps to develop strategies for implementing and adopting e-learning systems (Al-Rikabi & Montazer, 2024). Among these models, Mercado (2008) considered two main dimensions for evaluating the institutional readiness: administrative support and resource support. The administrative support comprises the commitment (e.g., the obligation of institutional leaders to implement technological solutions to achieve strategic academic objectives), policies (e.g., those focused on creating and managing the e-learning environment), and instructional (e.g., supporting the development and delivery of online courses) sub-dimensions. Resource support is indicated by the provision of three categories of resources necessary to enhance e-learning implementation: financial (e.g., having a budget for e-learning initiatives), human (e.g., availability of adequate and experienced personnel to support e-learning), and technical (e.g., ensuring appropriate technological infrastructure for creating and maintaining an online learning environment).

Subsequent models included larger sets of dimensions. For instance, Azimi (2013) identified technological resources, human resources, finance, psychological factors, and content as measures of e-learning readiness in colleges of education. Technological resources include the ICT infrastructure necessary to support e-learning, such

as an official website, dedicated server, adequate equipment, and sufficient internet bandwidth. The human resources factor involves the availability of skilled and motivated teaching staff to implement e-learning. The financial readiness factor pertains to having sufficient funds to support e-learning initiatives. Psychological readiness encompasses the attitudes of teaching staff and students towards e-learning. The content factor refers to the characteristics of the current content that will be transferred to the e-learning environment. Nwagwu (2020) explored five dimensions as significant predictors of the e-learning readiness of Nigerian universities, namely ICT-equipment readiness, training readiness, public/society readiness, financial readiness, and content readiness. These dimensions mainly concern the possession of appropriate equipment for e-learning implementation, the technical competencies of those involved, environmental aspects within which the implementation is carried out, having an adequate budget for the process, and the usefulness and availability of e-learning materials. More recently, the model suggested by Sulistiyani, Meutia, and Firmansyah (2024) included the dimensions of policy, human resources, infrastructure, technology, and finance as adequate measures to evaluate the level of readiness for online learning in a higher education institution in Indonesia.

Some studies have highlighted the most commonly used dimensions in previous models developed to evaluate the readiness of educational institutions for e-learning. Among these studies, Al-Rikabi and Montazer (2024) indicated that the majority of prior e-learning readiness models contain the dimensions of human resources readiness, financial readiness, technological readiness, content, and culture. Similarly, Demir and Yurdugül (2015) pointed out that prior e-learning readiness models share a certain set of factors, including human resources, finance, technological infrastructure, content, technology use competency, and leadership. In addition, Rohayani (2015) identified two attributes of individuals involved in the education process (e.g., teaching staff), namely skills and attitudes, as among the most influential factors of e-learning readiness in higher institutions.

2.2. E-Learning Readiness Assessment for the Saudi Educational Institutions

The Saudi government has increasingly concentrated its efforts on implementing e-learning solutions in the higher education sector to realize an expanded scope of online education in the country (Aman, Albarrak, Sherfudeen, & Ansari, 2022). As such, several initiatives have been undertaken to implement sustainable e-learning strategies in the Saudi educational environment (Zahid & Agou, 2024). Much of this implementation has been enforced during the pandemic in response to government restrictions imposed to slow the spread of the coronavirus (e.g., lockdowns and isolation). Consequently, the Saudi education sector, encompassing all K–12 schools and universities, experienced a rapid shift during the 2019-2020 academic year from conventional face-to-face learning to e-learning (Ministry of Education, 2020; Ministry of Health, 2020; Oraif & Elyas, 2021). This shift actually took place after the suspension of conventional learning in all Saudi educational facilities, which was declared by the Ministry of Education (MOE) to begin on March 9,2020 (Ministry of Education, 2020; Ministry of Health, 2020). However, several challenges to this unprecedented shift were identified by Ministry of Education (2020), including technical obstacles that hinder students' learning, the digital divide, infrastructure capacity limitations, and a lack of overall readiness to adopt distance learning. Although the solutions implemented by MOE helped effectively overcome many of these challenges, there is a need to further assess the readiness for e-learning adoption at the institutional level after the pandemic period.

However, only a few studies had been conducted to assess the e-learning readiness of educational institutions in the Saudi context, even before the pandemic. Among these studies, Alshammari (2019) pointed out that five dimensions constitute applicable measures for e-learning readiness in the Saudi higher education setting, namely management, technology, administrative and resource support, interface design, and pedagogy. The main aspects encompassed in these dimensions include the degree of development and training available to educators involved in e-learning, accessibility of technologies necessary to facilitate such learning, provision of administrative support needed to augment the e-learning process, website and content design, and linking content to desired outcomes, respectively. Al-araibi et al. (2019b) used the Delphi technique to assess the technological aspects of e-learning readiness in higher education institutions based on the opinions of experts from five countries, including Saudi Arabia. Their findings identified eight technological factors as influential determinants of e-learning readiness. These factors are hardware, software, system flexibility, connectivity, security, technical skills and support, data centers, and cloud computing.

Some studies were carried out to address e-learning readiness during the outbreak. Alsobhi, Meccawy, and Meccawy (2021) assessed the readiness of King Abdulaziz University for e-learning during the outbreak and found that the dimensions of human resources, standards, management, and content had high levels of readiness. Alshahrani (2021) noted that although the implementation of e-learning technologies has prepared Saudi universities to continue their educational activities during the pandemic, the assessment of these universities' readiness depends on specific factors such as the availability of e-learning resources, system accessibility, and learner engagement.

2.3. Theoretical Background of the Selected Readiness Dimensions

The current study did not focus on validating any of the previous e-learning readiness models, whether proposed for the Saudi environment or other contexts. Instead, it concentrated on examining dimensions common in prior research, namely staff (human resources) readiness, financial readiness, technical readiness, process readiness, and administrative support. These dimensions were included in several assessment models devised to evaluate readiness for e-learning (Schreurs & Al-Huneidi, 2012). This is because such dimensions are necessary to facilitate change initiatives in the organizational environment (Oketch, 2013) and specifically constitute essential elements of the organizational readiness for IT-based changes (Shahrasbi & Paré, 2014) including the implementation of e-learning. Accordingly, these dimensions can serve as appropriate measures to assess e-learning readiness at the institutional level, especially in developing countries like Saudi Arabia. These dimensions are outlined below.

Staff readiness is a key human resources dimension frequently included in e-learning readiness assessment models (Al-Rikabi & Montazer, 2024; Demir & Yurdugül, 2015). It was identified as a crucial facilitator for the successful adoption of various technological solutions (e.g., Yazici (2014)). It encompasses several human-related aspects, such as IT skills and experience, willingness to use innovations, and the extent of involvement in implementing IT initiatives and projects (Snyder-Halpern, 2001). It is mainly constituted by the capability to

effectively use technology, which is necessary for implementing e-learning innovations. Consequently, staff must have the technological knowledge and skills necessary to utilize such innovations (Al-Rikabi & Montazer, 2024).

Technical readiness reflects the degree to which an organization possesses the technological resources required to successfully implement IT innovations (Shahrasbi & Paré, 2014). These resources include stable network connectivity, sufficient hardware and software components, and skilled technical staff. The availability of such resources was indicated by prior research as a critical factor in supporting the e-learning adoption (Azimi, 2013; Nwagwu, 2020) and ensuring the success of its projects (Patil & Undale, 2023). Additionally, such technical readiness was found by Abdullah and Toycan (2017) as the most influential factor, among the studied dimensions, on the e-learning implementation.

Process readiness encompasses the level of compatibility between technological innovation and the practices and processes currently implemented in the adopting organization (Martin, Beimborn, Parikh, & Weitzel, 2008; Shahrasbi & Paré, 2014). A low level of this compatibility involves redesigning processes prior to implementing the technological innovation (Shahrasbi & Paré, 2014; Snyder-Halpern, 2001). This process redesign bridges the gap between existing processes and those entailed by the technological innovation (Shahrasbi, 2016). In the e-learning environment, the main processes that should be compatible with the adopted innovation include teaching, students' achievement assessment, and learning resource delivery. Ensuring such compatibility (i.e., process readiness) has been indicated by several studies as having a positive influence on adoption (Van den Berg & Van der Lingen, 2019) and usage (Aldwsry, 2012) of an innovation.

Financial readiness is primarily indicated by possessing the financial resources needed to cover multiple basic costs, including those incurred during the installation of technological innovations, as well as the implementation of subsequent enhancements and ongoing expenditures throughout its usage (Nilashi, Ahmadi, Ahani, Ravangard, & bin Ibrahim, 2016). It is often included as an essential dimension in the e-learning readiness assessment models (Al-Rikabi & Montazer, 2024; Demir & Yurdugül, 2015). This is due to the inevitable substantial costs associated with e-learning, including expenses related to adopting innovative tools, developing courseware, training staff, and redesigning business processes (Darab & Montazer, 2011).

Administrative support includes leadership involvement in core activities before and after the implementation of technological innovations, such as embedding IT initiatives in the organizational strategic plan, managing IT innovation implementation projects, and ensuring supportive environments for the effective implementation of these innovations (Snyder-Halpern, 2001). In the e-learning context, administrative support is one of the most cited dimensions in institutional e-learning models (Bacolod, 2023). It largely involves the leaders' commitment to shifting from conventional delivery of education to e-learning, as well as establishing the policies, procedures, and support required to facilitate this shift (Mercado, 2008).

3. Methodology

A questionnaire-based survey method was implemented to address the research questions of the present study. Accordingly, the data collection instrument was a questionnaire designed to gather the perceptions of potential respondents regarding the readiness dimensions involved in answering these questions, namely staff readiness, technical readiness, process readiness, financial readiness, and administrative support. The questionnaire was developed based on the selection of the most relevant measurement items for these dimensions from the literature on organizational readiness for IT innovations, including e-learning. The selected items are shown in Tables 3 through 7. The total number of these items was 16. In addition to these items, the questionnaire consisted of six questions about key demographic attributes of the potential respondents (i.e., gender, age, education level, academic rank, teaching experience, e-learning usage experience). The content validity of the questionnaire was verified by five researchers in the fields of IT and business research. Based on their feedback, minor modifications were made to some items to ensure clarity and relevance to the context of higher education institutions' readiness for e-learning. The responses to all items were closed-ended. They were rated, except for the demographic attributes, on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

The sources of the items used to assess each readiness dimension are as follows. Teaching staff readiness (TSR) was measured through three items to assess technical skills, experience, and willingness to use e-learning innovations effectively. These items were extracted from Snyder-Halpern (2001) and Cheon, Lee, Crooks, and Song (2012). The 4 items assessing technical readiness (TR) were derived from the technological readiness self-assessment proposed by Karp and Fletcher (2014). These items measure the extent to which the technological resources necessary for implementing e-learning innovations are available, stable, and compatible with these innovations. Process readiness (PR) was measured by 3 items from Shahrasbi (2016) to evaluate the compatibility of the e-learning innovation with the extant learning and assessment processes as well as favored educational practices in the adopting institution. Financial Readiness (FR) was assessed based on two items taken from Shahrasbi (2016) and Van den Berg and Van der Lingen (2019). These items measure the institution's ability to provide the financial support necessary to operate and maintain the adopted e-learning innovation. Evaluating administrative support (AS) was carried out based on four items measuring the extent to which senior leaders are committed to providing policies and procedures, as well as the support and encouragement necessary for the successful implementation of e-learning innovations. These items were adapted from Snyder-Halpern (2001) and Fadelelmoula (2018).

To assess the degree to which the institution is ready in terms of each of these items, the levels of readiness identified by Aydın and Tasci (2005) (Figure 1) were adopted. These levels were widely used in the institution's readiness for e-learning literature (e.g., (Ayele & Birhanie, 2020; Oketch, 2013)). According to Aydın and Tasci (2005) a mean score of 3.41 is defined as the expected level of readiness (M_{etr}) for the item. This mean score was identified by determining the critical value that defines the threshold points of the readiness levels: 4 intervals/5 categories = 0.8. For academic institutions, these readiness levels are interpreted as follows. The level ranging from 1 to 2.6 indicates that the institution is not ready and requires significant work to become ready, whereas the level from 2.6 to 3.4 suggests that the institution is not ready and requires some work to be ready. The level from 3.4 to 4.2 indicates that the institution is ready but requires a few improvements to implement e-learning, while the level from 4.2 to 5.0 signifies that the institution is prepared to proceed with e-learning implementation (Ayele & Birhanie, 2020).

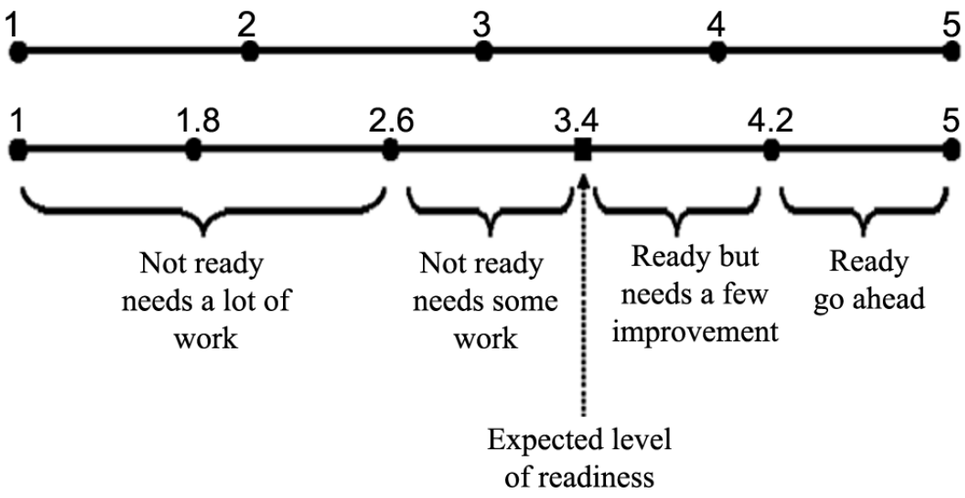

Figure 1. Levels of readiness identified.
Source: Aydın and Tasci (2005).

For the data gathering process, the teaching staff of the studied higher education institution, Prince Sattam bin Abdulaziz University, constituted the target population of this study. The questionnaire was distributed electronically and in hard copy, using the convenience sampling method, to a sample of 312 teaching staff across five main campuses of the institution. After a data collection period of six weeks, 251 responses were received, resulting in a response rate of 80.5%. Of these responses, 233 (92.8%) were deemed usable for analysis. The majority of respondents were male (90.1%), aged 35 years and above (82.4%), held a PhD degree (69.5%), were at least assistant professors (67.8%), had more than five years of teaching experience (82%), and had more than two years of experience using e-learning (63.9%). The detailed demographic values of the respondents are shown in Table 1.

4. Analysis and Findings

The analysis began with testing the reliability of the questionnaire by considering the Cronbach's alpha (α) coefficient (Cronbach, 1951). The results (Table 2) indicated that the Cronbach's alpha values for all readiness dimensions (ranging from 0.783 to 0.859) were greater than the recommended value of 0.70, thereby the questionnaire was reliable to carry out the study. Afterward, the analysis involved producing the statistical measures (e.g., means, t-values, and F-values) necessary to answer the research questions as outlined in the following subsections. The analysis was carried out using the Statistical Package for Social Sciences (SPSS).

Table 1. Demographic values of the respondents (n=233).

Attribute	Value	Frequency	Percentage
Gender	Male	210	90.10%
	Female	23	9.90%
Age	Under 25 years	2	0.90%
	25-34	39	16.70%
	35-44	89	38.20%
	45–54	80	34.30%
	55 years and above	23	9.90%
Education level	Bachelor	4	1.70%
	Master	66	28.30%
	PhD	162	69.50%
	Other	1	0.40%
Academic rank	Teaching assistant	6	2.60%
	Lecturer	69	29.60%
	Assistant professor	107	45.90%
	Associate professor	41	17.60%
	Professor	10	4.30%
Teaching experience (In years)	Under 1 year	7	3.00%
	1 – 5 years	35	15.00%
	6 – 10 years	63	27.00%
	11 – 15 years	71	30.50%
	More than 15 years	57	24.50%
E-learning usage experience (In years)	Under 1 year	5	2.10%
	1 – 2 years	79	33.90%
	3 – 5 years	101	43.30%
	More than 5 years	48	20.60%

Table 2. Reliability test.

Construct	Cronbach's alpha
Teaching staff readiness (TSR)	0.829
Technical readiness (TR)	0.790
Process readiness (PR)	0.783
Financial readiness (FR)	0.859
Administrative support (AS)	0.848

4.1. Teaching Staff's Perception about Their Institution's Readiness For E-Learning

To answer the first research question, the perception of teaching staff regarding each examined readiness dimension was assessed as follows. For teaching staff readiness, Table 3 depicts that the mean values of the items measuring this dimension were higher than the expected level of readiness (M_{TSR1}=4.03; M_{TSR2}=4.08; M_{TSR3}=3.88 > M_{elvr}=3.41). This indicates that the respondents agreed that their institution has a highly prepared teaching staff to utilize e-learning innovations.

Table 3. Descriptive statistics of the items measuring the teaching staff readiness dimension (n=233).

Code	Item	*Mean*	*SD*	*MIN*	*MAX*
TSR1	The teaching staff in our institution possesses the required technical skills and experience to effectively use e-learning innovations.	4.03	0.72	2	5
TSR2	The teaching staff in our institution has the desire to use e-learning innovations.	4.08	0.73	1	5
TSR3	The teaching staff in our institution is enthusiastic about being involved in projects related to e-learning innovations.	3.88	0.75	2	5

Respecting technical readiness, Table 4 presents that the mean values of the items assessing this dimension exceeded the expected level of readiness (M_{TR1}=4.12; M_{TR2}=4.18; M_{TR3}=3.85; M_{TR4}=3.95 > M_{elvr}=3.41). As such, the respondents perceived their institution as technically ready to implement e-learning in terms of having stable servers and networks, sufficient technical resources (hardware, software, and technical staff), and compatible IT systems with the e-learning innovation.

Table 4. Descriptive statistics of the items measuring the technical readiness dimension (n=233).

Code	Item	*Mean*	*SD*	*MIN*	*MAX*
TR1	Our institution's servers and networks are stable and have the capacity to support the needs of e-learning innovation, such as supporting increased data loads and heavy usage.	4.12	0.87	1	5
TR2	Our institution has the necessary hardware and software for effectively implementing e-learning innovations.	4.18	0.80	1	5
TR3	Our institution has a highly skilled technical staff capable of handling the increased demand resulting from the implementation of e-learning innovations.	3.85	0.81	2	5
TR4	The current IT systems in our institution are compatible with e-learning innovations.	3.95	0.76	2	5

For the process readiness dimension, the results (Table 5) indicated that the mean values of its associated items were higher the expected level of readiness (M_{PR1}=3.93; M_{PR2}=3.96; M_{PR3}=4.15 > M_{elvr}=3.41). This indicates that most respondents perceive their institution's academic processes as compatible with e-learning innovations, as well as capable of adapting educational procedures to changes introduced by such innovations.

Table 5. Descriptive statistics of the items measuring the process readiness dimension (n=233).

Code	Item	*Mean*	*SD*	*MIN*	*MAX*
PR1	The e-learning innovation is compatible with the existing learning and evaluation processes conducted in our institution.	3.93	0.71	2	5
PR2	The e-learning innovation is compatible with preferred educational practices.	3.96	0.72	2	5
PR3	Our institution has the ability and willingness to change educational procedures to accommodate any new changes introduced by e-learning innovations.	4.15	0.75	2	5

In regard to the items measuring the financial readiness dimension, Table 6 demonstrates that their mean values were larger than the expected level of readiness (M_{FR1}=4.10; M_{FR2}=4.15 > M_{elvr}=3.41) as well as they were very close to the lower limit of the highest readiness level range (i.e., 4.2 to 5). The average of these means (4.13), as shown in Table 8, indicates that the financial readiness dimension has the highest mean value among the other dimensions. This suggests that respondents perceive having the financial capability to implement e-learning innovations as the most significant contributor to the institution's overall readiness for such implementation.

Table 6. Descriptive statistics of the items measuring the financial readiness dimension (n=233).

Code	Item	*Mean*	*SD*	*MIN*	*MAX*
FR1	Our institution has the capability to provide the necessary financial support to adopt e-learning innovations.	4.1	0.83	2	5
FR2	Our institution has the capability to acquire sufficient resources, such as up-to-date technologies, for implementing and maintaining e-learning innovations.	4.15	0.82	2	5

With regard to administrative support, Table 7 depicts that the mean values of the items assessing this dimension exceeded the expected level of readiness (M_{AS1}=4.20; M_{AS2}=3.99; M_{AS3}=3.82; M_{AS4}=3.91 > M_{elvr}=3.41). However, the mean values of the last three items (i.e., AS2, AS3, and AS4) indicate that this dimension had the lowest mean value (i.e., M=3.98) among the other dimensions, making it the least contributor to the overall institution readiness for e-learning.

Table 7. Descriptive statistics of the items measuring the administrative support dimension (n=233).

Code	Item	*Mean*	*SD*	*MIN*	*MAX*
AS1	Top leaders support and encourage the use of e-learning innovations.	4.2	0.78	1	5
AS2	Top leaders establish the necessary policies and procedures to ensure the successful implementation of e-learning innovations.	3.99	0.77	1	5
AS3	A senior manager in our institution is responsible for managing the implementation of e-learning innovations.	3.82	0.77	2	5
AS4	Adopting e-learning innovations is included in the strategic plan of our institution.	3.91	0.79	1	5

According to these results for the individual dimensions, the overall mean value (Table 8) is greater than the expected level of readiness ($M_{overall}$=4.028 > M_{chr}=3.41). This finding indicates that the considered institution is generally prepared to implement e-learning innovations across the examined dimensions. However, improvements are necessary in certain areas, particularly in teaching staff readiness and administrative support, as their mean values were lower than those of other dimensions. The need for these improvements has been identified based on the mean values of the items measuring each dimension. In this regard, the results demonstrated that the mean values of some items (i.e., M_{TSR3}=3.88, M_{TR5}=3.85, M_{TR4}=3.95, M_{PR1}=3.93, M_{PR2}=3.96, M_{AS2}=3.99, M_{AS3}=3.82, and M_{AS4}=3.91) were significantly less than lower limit of the highest readiness level range (i.e., 4.2 to 5). Accordingly, improvement actions related to these items have been identified in the discussion section.

Table 8. Descriptive statistics of the examined readiness dimensions (n=233).

Dimension	*Mean*	*SD*
Teaching staff readiness	3.997	0.63
Technical readiness	4.024	0.64
Process readiness	4.011	0.61
Financial readiness	4.127	0.77
Administrative support	3.980	0.64
Overall mean	4.028	0.66

4.2. The Influence of Demographics on the Perception of the Institution's Readiness

The second research question assesses whether the demographic attributes of the respondents (gender, age, education level, academic rank, teaching experience, e-learning usage experience) influence their perception of their institution's readiness for e-learning. To assess the influence of gender, an independent-samples t-test analysis was conducted. The results (Table 9) indicated that there was a statistically significant difference between male and female perceptions of their institution's readiness for e-learning (t=2.490, p < 0.05). Males had a higher mean value (M_m=4.05) than females (M_f=3.78), indicating that such readiness was perceived better by male respondents than by female respondents.

Table 9. Independent samples t-test results for gender.

Gender	n	Mean	SD	df	t	p
Male	210	4.05	0.48	231	2.49	0.013*
Female	23	3.78	0.58			

Note: * p < 0.05.

To inspect the influences of the remaining demographic attributes (i.e., age, education level, academic rank, teaching experience, and e-learning usage experience), analyses of variance (ANOVA) were conducted. The findings (Table 10) revealed that there was no significant influence of age (F(4, 228) = 0.084, p > 0.05), education level (F(3, 229) = 1.266, p > 0.05), academic rank (F(4, 228) = 0.490, p > 0.05), teaching experience (F(4, 228) = 0.565, p > 0.05), and e-learning usage experience (F(3, 229) = 2.024, p > 0.05) on the perception of the institution's readiness for e-learning. Accordingly, among the considered demographic attributes, only gender had a significant influence on such perceptions.

4.3. The Influence of Demographics on the Teaching Staff's Readiness

The third research question assesses whether the demographic attributes of the respondents (gender, age, education level, academic rank, teaching experience, e-learning usage experience) influence their readiness for e-learning. To assess the influence of gender, an independent-samples t-test analysis was applied. The results (Table 11) indicated that there was no significant influence of gender on the teaching staff's readiness for e-learning (t=1.134, p > 0.05).

Respecting the influences of other demographic attributes (i.e., age, education level, academic rank, teaching experience, and e-learning usage experience) on teaching staff readiness, analyses of variance (ANOVA) were applied. The results (Table 12) showed that the influences of age (F(4, 228) = 1.467, p > 0.05), education level (F(3, 229) = 0.853, p > 0.05), academic rank (F(4, 228) = 0.424, p > 0.05), and teaching experience (F(4, 228) = 1.293, p > 0.05) on such readiness were not statistically significant.

Table 10. Analysis of variance results for the influences of demographic attributes on the perception of the institution's readiness for e-learning.

Attribute	Group	*n*	Mean	SD	*F*	*p*
Age	< 25 years	2	3.97	0.02	0.084	0.987
	25-34	39	4.00	0.44		
	35-44	89	4.03	0.50		
	45–54	80	4.05	0.51		
	≥ 55 years	23	4.00	0.59		
Education level	Bachelor	4	3.55	0.26	1.266	0.287

Attribute	Group	*n*	Mean	SD	*F*	*p*
	Master	66	4.04	0.47		
	PhD	162	4.03	0.51		
	Other	1	3.95	*		
Academic rank	Teaching assistant	6	3.79	0.43	0.49	0.743
	Lecturer	69	4.05	0.46		
	Assistant Professor	107	4.03	0.56		
	Associate Professor	41	4.01	0.41		
	Professor	10	4.13	0.48		
Teaching experience	< 1 year	7	3.83	0.37	0.565	0.688
	1 – 5 years	35	4.00	0.39		
	6 – 10 years	63	4.00	0.54		
	11 – 15 years	71	4.08	0.48		
	> 15 years	57	4.03	0.55		
E-learning usage experience	< 1 year	5	3.69	0.33	2.024	0.111
	1 – 2 years	79	4.05	0.53		
	3 – 5 years	101	3.98	0.47		
	> 5 years	48	4.14	0.50		

Note: * No value was produced by the used software.

Table 11. Independent samples t-test results for the influence of gender on the teaching staff readiness for e-learning.

Gender	*n*	*Mean*	*SD*	*df*	*t*	*p*
Male	210	4.01	0.63	231	1.134	0.258
Female	23	3.86	0.7			

For e-learning usage experience, the analysis of variance results (Table 12) indicated that there was a significant influence of this attribute ($F(3,229) = 3.500$, $p < 0.05$) on the teaching staff's readiness for e-learning. To determine the groups leading to this significant influence, the Tukey HSD test, as a widely used technique for post-hoc comparisons, was applied. The results demonstrated that the e-learning readiness mean value of the respondents with 1–2 years e-learning usage experience ($M_{1\text{-}2\ years}$= 3.89, SD=0.69) was significantly less than that of those with experience more than 5 years ($M_{>5\ years}$= 4.24, SD=0.63). The other differences in the e-learning readiness mean values according to the usage experience were not significant at $p < 0.05$.

Table 12. Analysis of variance results for the influences of demographic attributes on the teaching staff readiness for e-learning.

Attribute	Group	*n*	*Mean*	*SD*	*F*	*p*
Age	< 25 years	2	3.83	0.24	1.467	0.213
	25-34	39	3.81	0.53		
	35-44	89	3.98	0.63		
	45–54	80	4.10	0.63		
	≥ 55 years	23	4.01	0.79		
Education level	Bachelor	4	3.5	0.58	0.853	0.466
	Master	66	3.99	0.57		
	PhD	162	4.01	0.66		
	Other	1	4.00	*		
Academic rank	Teaching assistant	6	3.72	0.57	0.424	0.791
	Lecturer	69	4.00	0.57		
	Assistant professor	107	4.01	0.64		
	Associate professor	41	4.03	0.67		
	Professor	10	3.87	0.89		
Teaching experience	< 1 year	7	3.76	0.42	1.293	0.273
	1 – 5 years	35	3.82	0.53		
	6 – 10 years	63	4.02	0.58		
	11 – 15 years	71	4.08	0.59		
	> 15 years	57	4.01	0.80		
E-learning usage experience	< 1 year	5	3.73	0.60	3.5	0.016**
	1 – 2 years	79	3.89	0.69		
	3 – 5 years	101	3.98	0.56		
	> 5 years	48	4.24	0.63		

Note: * No value was produced by the used software.
** $p < 0.05$.

4.4. The Influence of the Other Examined Readiness Dimensions on Teaching Staff Readiness

To answer the fourth research question, a multiple regression analysis was performed. The results (Table 13) demonstrated that the value of F statistic was statistically significant at $P < 0.001$, signifying the presence of significant associations between teaching staff readiness and the other examined readiness dimensions. To identify these associations, the standardized regression coefficients (i.e., β values) and the significance of their t-values were inspected. This inspection indicated that each of the process readiness (β=0.244, t=2.674, p<0.05) and administrative support (β=0.270, t=3.344, p<0.05) had a positive impact on teaching staff readiness. Conversely, the impacts of technical readiness (β=0.012, t=0.136, p>0.05) and financial readiness (β=-0.106, t=-1.377, p>0.05) on teaching staff readiness were insignificant.

Table 13. Multiple regression analysis results for the influences of the other examined readiness dimensions on teaching staff readiness.

Hypothesized effect	Standardized coefficient *(β)*	t-Statistic	F-Statistic
H1: TR "TSR"	0.012	0.136	11.890*
H2: PR "TSR"	0.244	2.674**	
H3: FR "TSR"	-0.106	-1.377	
H4: AS "TSR"	0.27	3.344**	

Note: * Significant at p<0.001, ** Significant at p<0.05.
_ TSR: Teaching staff readiness, TR: Technical readiness, PR: Process readiness, FR: Financial readiness, AS: Administrative support.

5. Discussion

This study examined teaching staff's perceptions of key dimensions of readiness for e-learning in the Saudi higher education context. These dimensions include teaching staff readiness, technical readiness, process readiness, financial readiness, and administrative support. Although the findings demonstrated higher readiness levels for these dimensions than the expected level of readiness (i.e., 3.41), improvements are needed in some aspects of these dimensions. None of these dimensions achieved the highest readiness level (i.e., ranging from 4.2 to 5).

For teaching staff readiness, the findings (Table 3) showed that most respondents agreed that the teaching staff at their institution possess the traits of desire, technical skills, and experience to use e-learning innovations. Such human traits have been identified in multiple studies as critical indicators of human resources' readiness to implement innovations (Cheon et al., 2012; Levkoff, 2006; Snyder-Halpern, 2001). Thus, these three traits constituted the teaching staff's readiness at the chosen institution. However, an area for improvement related to measurement item TSR3, which had the lowest readiness level (3.88), should be identified. This item assessed the extent to which teaching staff were enthusiastic about participating in projects related to e-learning innovations. Enhancing such enthusiasm requires increasing motivation to ensure broad participation of teaching staff in key activities of projects and initiatives involving the implementation of innovative e-learning tools. These activities include planning and designing online courses and assessments, coordinating learning activities, and facilitating courses (i.e., helping learners and fostering interactions with them) (Dennen & Jones, 2022; Hung & Chou, 2015). Several potential factors that contribute to increased motivation to engage in such activities were indicated in prior research, including adequate encouragement and support from administrators (Gautreau, 2011; Stumbrienė, Jevsikova, & Kontvainė, 2024) reduced teaching load (Gautreau, 2011) monetary incentives (Mascher, 2016) and creating the appropriate conditions in the educational environments (Gorozidis & Papaioannou, 2014). Strengthening this motivation also requires raising awareness of the importance of these projects and initiatives in developing teaching staff and improving academic processes in higher education institutions.

Respecting technical readiness, the respondents agreed on the stability and availability of technological resources needed to implement e-learning innovations in their institutions. Nonetheless, the readiness levels related to items TR3 (3.85) and TR4 (3.95) (Table 4) were significantly lower than the highest readiness level (i.e., ranging from 4.2 to 5), suggesting the need for improvement actions linked to these items. The first action pertains to item TR3 and involves enhancing the capabilities and skills of the IT staff to address the specific challenges arising from the implementation of e-learning innovations. These challenges include troubleshooting technical issues that hinder access for teaching staff and students, managing the technological infrastructure (e.g., servers and network connectivity) required to operate these innovations, applying robust security measures to protect sensitive data (Crudu & MoldStud Research Team, 2024), and managing the increased workload associated with these tasks. Improving the skills and capabilities of existing IT staff necessitates providing targeted training programs focused on managing and resolving technical issues related to e-learning implementation. Additionally, hiring new technicians with high skills and experience in e-learning is essential to effectively address these challenges and reduce the workload. The second action relates to item TR4 and requires careful planning to ensure that the components of the institution's IT infrastructure (e.g., operating systems, software services, and hardware) support the effective operation of the adopted e-learning innovations. This planning should be followed by immediate upgrades of components that do not meet the operational requirements of these innovations, as well as the acquisition of the latest technologies to keep the IT infrastructure current.

For process readiness, the findings (Table 5) showed that it was adequately perceived by the respondents. However, an improvement effort related to items PR1 and PR2, whose readiness levels (i.e., 3.93 and 3.96, respectively) were significantly less than the lower limit of the highest readiness level range (i.e., ranging from 4.2 to 5), should be conducted to increase the contribution of this dimension to the overall institution readiness. This effort revolves around redesigning the current academic processes and practices that are not fully supported by the e-learning innovations, such as carrying out discussions involving full and active engagement of all students, as well as monitoring student activities (Mershad & Said, 2022) and attention during class sessions. Conducting these processes in an e-learning environment is more challenging in cases such as having a large number of students in one session, and some of these students experiencing technical problems with cameras or audio. Several aspects of process redesign can be identified to address such limitations of e-learning innovations, including extending the session time to ensure the full participation of all students (Dwivedi et al., 2020) and considering sections with a small number of students for each course. However, implementing these aspects in the e-learning environment requires that the process redesign plan address critical issues, including the additional cost, time, and effort associated with such implementation.

In regard to financial readiness, it had the highest level (4.13) (Table 6) among the examined dimensions, signifying that it was perceived by the respondents as the greatest contributor to the institution's overall readiness for e-learning implementation. This is in line with Nwagwu (2020), who found a greater effect on financial readiness than other factors regarding readiness for e-learning adoption in a Nigerian university? Therefore, aspects that support this financial readiness must be included in the institution's IT strategic plan, such as ensuring the budget consistently covers the evolving costs of acquiring e-learning tools.

In contrast, the results showed that administrative support had the lowest readiness level (3.98) (Table 7) compared to the other examined dimensions. To increase the contribution of this dimension to the institution's readiness for e-learning, it is necessary to conduct enhancement activities related to the items with readiness levels

below the highest level (i.e., ranging from 4.2 to 5), namely AS2, AS3, and AS4. The first activity is linked to item AS2 (3.99) and involves more active participation of top leaders in setting policies and procedures that contribute to the successful implementation of e-learning innovations. Consequently, this activity highlights the need for these leaders to prioritize their active involvement in planning for such implementation. This is because they have the authority to establish the rules and procedures governing the change associated with the adoption of IT innovations, and they also possess the ability to positively influence the post-implementation success of complex IT systems (Zhu, Li, Wang, & Chen, 2010). Furthermore, their actions when participating actively in shaping policies and strategies represent powerful signals to the rest of the stakeholders (Chatterjee, Grewal, & Sambamurthy, 2002). Such participation in establishing policies and procedures is among those suggested by the practitioner literature to be actively done by the top leaders in their planning for the technology use (Chatterjee et al., 2002). The performance of this activity should be followed by another responsibility for these leaders, which is to ensure that staff are aware of and comply with the established policies and procedures.

The second activity relates to item AS3 (3.82) and involves augmenting the roles of top leaders in effectively managing and supporting the implementation of e-learning innovations. Playing these roles constitutes a major step toward the successful implementation of such innovations. This is in line with the broad recognition of top management support as the most significant driver for success in all organizational processes and practices (Jayeola et al., 2022) as well as the specific view of it as an important factor for information technology success (Liu, Huang, & Lin, 2012) including e-learning (Alhomod & Shafi, 2013). Within this specific view, Elumalai et al. (2021) included such support as a central factor in implementing e-learning innovations in the higher education sector. The last activity involves the full realization of the statement associated with item AS4 (3.91) by including actions and specifications that support e-learning adoption in the institution's strategic plan. Most of these actions and specifications should focus on facilitating the implementation of teaching and evaluation changes introduced by e-learning innovations. Examples of these actions include expanding the role of academic staff to become instructional designers and interaction facilitators rather than merely content deliverers. Consequently, these actions should clarify the procedural steps necessary to support such an extended role, as it may be challenging for some academics to perform it (Singh & Hardaker, 2014). The development of these actions in the strategic plan requires significant involvement from teaching staff, who are often expected to be the key drivers of successful teaching and assessment processes on e-learning platforms.

In summary, performing these three activities is essential to enhance the contributions of top leaders to their institution's readiness for the successful implementation of e-learning projects. This necessity arises not only from the low readiness levels observed for the three items but also from another related factor concerning the participation of these leaders in such projects. As evidenced by prior empirical studies, this factor is the common reluctance of top leaders to play a significant role during the project lifecycle because they view projects as operational rather than strategic concerns (Hermano & Martín-Cruz, 2016).

In addition, the present study examined whether demographic attributes (gender, age, education level, academic rank, teaching experience, and e-learning usage experience) influence the teaching staff's perception of the overall e-learning readiness of their institution. The results revealed that only the respondents' gender had a significant impact on their perception of such readiness. Comparing the mean values of males (M_m=4.05) and females (M_f=3.78) indicates that such readiness was better perceived by male than female respondents. This result aligns with research demonstrating that males have a greater perception of e-learning readiness than females (Çınar et al., 2021). The insignificant influences of age, education level, and usage experience are consistent with those found by Aydın and Tasci (2005).

Also, the effects of these attributes on the teaching staff's perception of their own readiness for e-learning were investigated in this study. The findings showed that e-learning usage experience was the only significant determinant of such readiness. The highest level of such readiness was perceived by respondents with more than 5 years of experience (M= 4.24, SD=0.63) compared to those with fewer years of experience (Table 12). This significant effect of e-learning usage experience is consistent with the one found by Çınar et al. (2021) in that those who had delivered more e-learning courses were significantly more prepared for e-learning, and thus increasing opportunities for extended e-learning experience has great potential to enhance teaching staff knowledge and capabilities related to such learning.

Furthermore, this study assessed whether teaching staff readiness is influenced by the other examined readiness dimensions. The results revealed process readiness and administrative support as significant positive antecedents of teaching staff readiness. This indicates the importance of the compatibility of existing academic processes with the e-learning innovation, as well as the encouragement and support provided by top leaders to promote the use of such innovation in enhancing teaching staff readiness. This promotion can be represented in terms of multiple facets, including increasing teaching staff's desire and willingness to participate actively in the implementation process of such innovation, as well as boosting their confidence in their capabilities to ensure the effectiveness of their participation. Based on the obtained β values, administrative support had the strongest effect on teaching staff readiness. This is matching with the critical role of administrative support, highlighted by numerous studies (e.g., (Kundu, Bej, & Dey, 2020; Moses, Bakar, Mahmud, & Wong, 2012)), in motivating and promoting instructors to implement technological innovations in their academic activities. Accordingly, adopting institutions of these innovations, as the most involved stakeholders, should devote significant focus to maintaining such a strong effect of administrative support on increasing staff preparedness. This requires developing action plans to ensure continued high levels of leadership commitment to providing policies, procedures, encouragement, and resources that often motivate and prepare teaching staff to effectively incorporate these innovations into their educational activities.

Conversely, the influences of technical readiness and financial readiness on teaching staff readiness were insignificant. This suggests that the technical and financial capabilities of the institution do not necessarily ensure that its teaching staff are well prepared to use e-learning innovations. Respecting technical readiness, the finding is consistent with that obtained from the multiple regression analysis applied by Nwagwu (2020) which indicated that ICT-equipment readiness is not a significant determinant of lecturers' readiness. On the other hand, the finding related to financial readiness is inconsistent with the result of Nwagwu (2020) which revealed a significant association between this dimension and lecturers' readiness. A possible interpretation of this contradiction is that financial

readiness was perceived in the context of the present study as the greatest contributor to the institution's overall readiness for e-learning implementation, as indicated in Table 8, and thus may not have the same contribution to promoting specific readiness dimensions, such as teaching staff readiness. In light of these insignificant effects, policymakers in adopting institutions need to establish procedural actions to leverage the technical and financial capabilities of the institution in enhancing the human traits that contribute to increasing the teaching staff's preparedness to utilize e-learning innovations. These traits include technological background and skill level, experience with innovations, and involvement in innovation implementations (Levkoff, 2006; Snyder-Halpern, 2001). The crucial procedural actions to improve such traits include allocating the budgets and technical resources needed for establishing effective staff development training programs on innovative e-learning tools and systems. In this vein, Junus, Santoso, Putra, Gandhi, and Siswantining (2021) included the necessity for training to enhance the preparedness of staff to implement e-learning and to assist students in being ready to learn through this learning method. In addition to ensuring effective training, procedural actions can also encompass leveraging the institution's financial and technical capabilities to foster teaching staff engagement in activities leading to the successful implementation of e-learning projects, such as designing high-quality and attractive content for online courses. Generally, such engagement was found by Meria, Yohana, and Purwohedi (2023) to be a positive determinant of instructors' readiness to change.

6. Conclusion

This study primarily aimed to assess the ongoing need to evaluate the readiness of higher education institutions for e-learning. Accordingly, a set of key dimensions of this readiness was assessed at a Saudi public higher education institution, considering the perceptions of teaching staff. These dimensions related to the readiness of critical components within the institutional setting, namely teaching staff, technology, business processes, finance, and leadership. Using a questionnaire-based survey approach and relevant statistical measures, the study revealed that each of these dimensions had a readiness level exceeding the expected threshold of 3.41. Among these dimensions, financial readiness was perceived by respondents as the most significant contributor to the institution's overall readiness for e-learning, while administrative support was viewed as the least contributory. However, improvements are necessary across all dimensions to enhance their contribution to overall readiness. The study suggested several areas for improvement, particularly for dimensions related to teaching staff and administrative support, which exhibited lower readiness levels than others. Additionally, the findings indicated that the perceptions of teaching staff regarding the institution's overall readiness for e-learning were not significantly influenced by most demographic attributes, such as age, education level, academic rank, teaching experience, and e-learning usage experience. The only demographic attribute with a significant impact was gender.

Accordingly, the distinction of this study is indicated by assessing the institution's overall readiness for e-learning in terms of these dimensions within the Saudi higher education context. This distinction is evident from the fact that only a few studies have been conducted to measure the e-learning readiness of educational institutions in Saudi Arabia, each using different sets of dimensions. Additionally, the study went beyond this assessment to suggest areas for improvement for each dimension whose readiness level was below the highest level. Such suggestions have not received attention in the studied context. Therefore, the study extends the existing e-learning literature by providing more insights into the factors influencing e-learning readiness and identifying areas that require enhancement initiatives in Saudi higher education. These insights are valuable for policymakers and e-learning administrative units in their efforts to implement effective e-learning innovations and promote sustainable learning development in Saudi universities.

The limitations of this study are evident in several aspects. Firstly, only one institution was evaluated for e-learning readiness, which may limit the generalizability of the findings to other institutions with similar conditions. Additionally, the results were obtained from the perspective of only one group of higher education stakeholders, specifically teaching staff, indicating that the views of other groups (e.g., administrators) should be included in future research. Furthermore, only five readiness dimensions were assessed for the selected institution; therefore, additional key dimensions (e.g., content readiness and cultural readiness) should be considered in subsequent studies.

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