Faculty readiness for online teaching at Imam Abdulrahman Bin Faisal University during the COVID-19 crisis: a cross-sectional study [version 3; peer review: 1 approved, 2 approved with reservations]

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Abstract

Background: The outbreak of the COVID-19 pandemic has affected the education sector around the world. In order to control the spread of the virus, eLearning practice has been introduced in Saudi higher education. Such online communication has become an important tool to narrow the teaching practice gap. This study assessed the characteristics of eLearning and distance learning and the inclination of Imam Abdulrahman Bin Faisal University (IAU) faculty members in terms of skills, and managing classes and tests using online learning tools.

Methods: A QuestionPro questionnaire with 22 questions on eLearning experience, training experience, and skills and knowledge in the educational process of IAU teaching faculty was conducted through the online university e-mail domain. The questionnaire was sent to the IAU’s teaching faculty. The questionnaire’s reliability was studied using Cronbach’s a coefficient. The criterion value was statistically studied using the KMO (Kaiser-Meyer-Olkin) and Bartlett’s test. The variables associated with
the present survey model were analysed using Structural Equation Modelling (SEM).

**Results:** The study showed positive responses and readiness (skills and abilities) and the effectiveness of IAU's faculty members to perform e-learning activities during COVID-19. IAU faculty received a strong positive response, and the respondents were also impressed with and agreed on trainer knowledge, session management, communication and expertise on training topics.

**Conclusions:** The positive response indicates the readiness of IAU to provide the necessary support (tools, information and updates) required for a successful online educational process.

**Keywords**
COVID-19, Education, Faculty readiness, Administration, Remote working.

This article is included in the Emerging Diseases and Outbreaks gateway.

This article is included in the Coronavirus collection.
Introduction
Coronavirus disease 2019 (COVID-19) initially started in Wuhan city, China and then spread severely, affecting Western countries. It has infected approximately 16 million people and caused the death of approximately 600,000 individuals worldwide. In the U.S., more than 4 million people have been infected; and especially, in the Kingdom of Saudi Arabia (KSA), the cases of infection and deaths are increasing steadily. The transmission rate from infected people was found to be higher than that of the influenza virus with reproductive numbers between 1.4 and 2.5. In the KSA, to date (08.04.21), the total number of cases is 394,952 with 6,719 deaths and 381,189 recoveries (https://www.worldometers.info/coronavirus/).

To contain the spread of this viral infection, strict social distancing, quarantine and rapid testing are suggested to control the COVID-19 crisis (Giordano et al., 2020). Inadvertently, the important role of information technology has been felt in higher education (Ayers, 2004; Carr-Chellman & Duchastel, 2000). In the Kingdom of Saudi Arabia (KSA), the government suspended all onsite activities of universities and initiated digital-based distance learning and remote working strategies to control the spread of COVID-19. Based on the World Health Organization and Ministry of Health guidance, certain orders were issued such as staying home, working from home, being safe, and maintaining good hygiene. In the case when going out is a necessity, social distancing (2 m) should be maintained. The sudden health crisis affected the educational sectors and inflicted a long-term financial revision state pertaining to online education. In response to the Saudi government instructions, Imam Abdulrahman Bin Faisal University (IAU) swiftly moved to online teaching (March, 2020). It is a leading university promoting academic and advanced scientific research in the Eastern Region. It has various graduate courses and branches. It started with the College of Medicine and College of Architecture and provides strong health care services through the establishment of King Fahd University Hospital. The IAU campus and its 21 colleges spread across various places of the Eastern Province with student enrolment is currently approximately 45,000 students.

Besides, web-based advanced learning tools for online teaching have long been considered a prime importance for student coaching (Beaudoin, 1990; Beaudoin, 1998; Cohn, 2002; Zhang et al., 2020). Fortunately, various technological updated measures have already been recommended based on the KSA's Vision 2030 (https://ndu.gov.sa/en/). Accordingly, several technological readiness measurements have been implemented by IAU. The advancement of the digital age with computer-based information technology was well realized, leading to the establishment of the Deanship of E-Learning and Distance Learning, IAU in 2010. The goal of IAU is to provide an e-learning platform to on-and off-campus students and expand the technology from universities to integrate regions and spread across the KSA. Currently, the digital platform that IAU uses is the Blackboard eLearning management system. The Deanship of E-Learning and Distant Learning lab at IAU is integrated with advanced high-performance IOS computers (Mac), Windows, platforms, visual viewers, studios, and soundproof capsules (to view and recording services). The presence of a digital lab enables interactive sessions, displays, video meetings, lectures, workshops, training sessions, uploading data in the Blackboard system and recording. IAU has advanced eLearning digital management facilities.

Concerning the faculty members, those were in place to suddenly move from traditional to online teaching without preparedness during COVID 19 pandemic. Such unexpected change made them puzzled and uncertain of managing the condition. It triggered them to highly concern about the teaching-learning outcomes (Daumiller et al., 2021; Valsaraj et al., 2021). Moreover, E-Learning has often been a challenging learning space that has exposed confrontation in acceptance from faculty members and students (Al-Hujran et al., 2013; Rosenberg & Foshay, 2002). Recognizing the desires and experiences of faculty members is essential to reveal their response towards online teaching and adaptation of techno-educational practices during the pandemic (Valsaraj et al., 2021). A recent study revealed the faculty members’ attitudes to the shift from traditional to online teaching and observed their associations with underlying drives and fatigue/engagement, and student learning. It is found that the faculty’s learning goals were associated to their perception of the shift as an optimistic encounter and useful for their competence development (Daumiller et al., 2021). A qualitative study has recently studied the experiences of faculty members over emergency remote teaching during COVID-19 pandemic. However, it has not included the faculty members of Saudi Arabia (Valsaraj et al., 2021). Therefore, the aim of this study was to analyze the significant role of the digital system and evaluate the readiness of IAU faculty members to transition to online teaching during COVID-19 using survey-based methods.

Methods
Study design
The exploratory study design was used to study the level of eLearning experience among the faculty members of IAU. Considering the abrupt changes in teaching mode during this pandemic situation, a questionnaire could effectively predict the characteristics and management of the advantages of e-learning by faculty members. The study was conducted from 8th March to 12th March 2020.

Ethical considerations
The study was approved by the Institutional Review Board (Standing Committee for Research Ethics on Living Creatures)
Participants
This study was conducted at Imam Abdulrahman Bin Faisal University (IAU), which is located in the Eastern Region of Saudi Arabia. A convenience sampling was used in this study. All faculty members (N=2227) of IAU who were involved in online teaching during the COVID-19 crisis in the 2019–2020 academic year were considered the population of this study, as only these faculty members used and experienced IAU e-learning facilities. Access to QuestionPro by external (non-IAU) persons was prohibited; therefore, only IAU teaching faculty were included. Nonteaching staff/faculty of IAU were excluded. In order to address potential sources of bias, the population of this study only included faculty members.

Data collection
A QuestionPro questionnaire with 22 questions on eLearning experience, training experience and skills and knowledge in the educational process of IAU faculty was implemented. Questionnaire was sent to participants using their university e-mail with a link to the questionnaire. The faculty members had to use their university email and password to log into the questionnaire via Blackboard dashboard. A specified time duration of 14 days to respond to the questionnaire was given to potential respondents. Two follow-up emails were sent that included reminders regarding answering the questionnaire.

The questionnaire was created through four brainstorming meetings with higher education experts and faculty members.

Three sections were included in the questionnaire, which aimed to evaluate: (section 1) the overall eLearning experience using Blackboard; (section 2) the skills and training provided to IAU faculty members to use eLearning; and (section 3) the management of classes and tests using the online learning tools. Section 1 had 8 items, section 2 had 9 items and section 3 had 4 items (total 21 items). The last item (22) was ‘How satisfied are you with our services’. Each item was a statement, and the answers respondents could choose from were as follows: strongly agree (marked as 1 in the data), agree (2), true sometimes (3), disagree (4), and strongly disagree (5).

Data analysis
Descriptive statistics were applied to reveal the level of eLearning experience among the faculty members of IAU. The internal consistency of the questionnaire was assessed using Cronbach’s alpha reliability test. Confirmatory factor analysis (CFA) with the principal component method was used to determine the construct validity of the questionnaire used. Furthermore, structural equation modelling (SEM) analysis was conducted using the AMOS (Analysis of Moment Structures) software 2020 to study the adequacy of the e-learning variables involved in the questionnaire. Pearson’s correlation was also used to examine the relationship between the e-learning variables and the faculty’s overall satisfaction. Besides, the effect of e-learning variables on the faculty’s overall satisfaction was evaluated using multiple regression analysis. All statistical analyses were conducted using SPSS version 22.0 at a 5% significance level. There were no missing data to address in this study.

Results
Out of the 2227 potential responses, 634 completed responses were received (response rate, 28.5%).

Reliability and validity of the instrument
Cronbach’s alpha was used as a benchmark to study the reliability of the questionnaire (Schakib-Ekbatan et al., 2019). The reliability value of Cronbach’s α coefficient ranges from 0.00–1.00. In the present study, the reliability of the statistics on the eLearning questionnaire using Cronbach’s α coefficient was found to be 0.940. This indicates that the questionnaire achieved a reliable standard of high consistency. Faculty’s perception of eLearning variables could be graded as “Good” (mean, 89.15; variance, 153.168; std. dev., 12.376). Cronbach’s alpha for each section was as follows: section 1 (evaluation of overall e-learning experience), 0.874; section 2 (training received), 0.940; and section 3 (applying skills and knowledge in the educational process through eLearning), 0.872.

Furthermore, the dimensionality of the instrument was analysed using CFA. KMO value (KMO=0.943) and Bartlett’s test of sphericity (value=10061.978, p<0.05) demonstrated that the raw data were suitable for the application of factor analysis. The common communalities of all the items had a value greater than 0.50, which indicated that the quality of the measurement was satisfactory. The factor analysis extracted four factors which jointly described 70.767% of the variance in e-Learning experience of IAU faculty members (Table 1).

Structural Equation Modelling for e-Learning scale
In this study, SEM analysis resulted in the model depicted in Figure 1, and the following characteristics: n=634, df=184, chi-squared=966.286, and p=0.000 (<0.05). Therefore, it is concluded that the proposed SEM model used in this study adequately fits the sample data representing IAU faculty members. The results of the relationship between each item and the proposed three dimensions show that the path coefficient between each item and the proposed 21-item questionnaire is positive and significant (p-value<0.05). The results show that there is a positive significant relationship between each item and the proposed three dimensions ranging from 0.290 to 1.339, which is given in Table 2. In this study, the values of Normed Fit Index (NFI), Relative Fit Index (RFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) were observed as 0.905, 0.892, 0.922, 0.911, and 0.922, respectively (Table 3). These findings met the recommended values for model fit indices i.e. CFI ≥ 0.90; NFI ≥ 0.90; relative fit index (RFI) close to 1; IFI ≥ 0.90 ; and TLI ≥ 0.90 (Byrne, 2001; Kline, 2011; Renganathan et al., 2012; Shadfar & Malekmohammad, 2013). In addition, the proposed model demonstrated the Root Mean Square Error of Approximation (RMSEA) is 0.08 (p<0.05) (Table 4), which is equal to the recommended value, i.e., ≤0.08 (Byrne, 2009; Kline, 2011). From these results, it observed that the
Table 1. Factor loadings on the e-learning scale among IAU faculty members.

| Questions                                                                 | 1    | 2    | 3    | 4    |
|---------------------------------------------------------------------------|------|------|------|------|
| Blackboard is easy to use                                                 | 0.816|      |      |      |
| Broadcasting and recording lectures via Zoom is easy                       | 0.566|      |      |      |
| Using Blackboard to collaborate is easy                                   | 0.693|      |      |      |
| I am not experiencing difficulties when giving tests on Blackboard        | 0.739|      |      |      |
| Level of satisfaction with provided technical support                      |      |      | 0.770|      |
| It is easy to contact technical support for help                           |      |      | 0.86 |      |
| The services provided by the technical support team are sufficient        |      |      | 0.859|      |
| Technical support team quickly responds to my requests                    |      |      | 0.872|      |
| How do you rate the training topics?                                      |      |      |      | 0.709|
| How would you rate the trainer in terms of level of their knowledge on the training topics? |      |      |      | 0.825|
| How would you rate the trainer’s management of the session?               |      |      |      | 0.846|
| How the trainer handles participants’ questions                           |      |      | 0.824|      |
| The trainer’s ability to communicate and communicate with the trainees    |      |      | 0.846|      |
| How do you rate the level of discussion                                   |      |      | 0.799|      |
| How would you rate your training experience using Zoom?                   |      |      | 0.704|      |
| How do you evaluate the adequacy of the training time?                    |      |      | 0.627|      |
| How do you rate the training materials?                                   |      |      |      | 0.696|
| The extent to which the training is consistent with my job goals          |      |      |      | 0.683|
| My ability to apply what I learned in the educational process             |      |      |      | 0.755|
| What I learned contributed to developing specific skills that can affect my success in my workplace |      |      |      | 0.788|
| I recommend this training course to my colleague.                          |      |      |      | 0.675|
| Eigenvalue                                                                | 9.945| 2.461| 1.338| 1.117|
| Variance explained (%)                                                     | 47.358| 11.718| 6.373| 5.318|
| Total variance explained (%)                                               | 70.767|      |      |      |

The proposed model is a good fit since it met the recommended values of model fit indices.

Table 5 shows the percentage of responses for each statement. The faculty’s perception of the quality of eLearning experience at IAU was found to be high (Table 6). A positive correlation existed between the eLearning variables that indicate an overall satisfaction with the provided services (Table 7).

Influence of e-Learning variables on overall satisfaction of IAU faculty members with e-Learning process

This study observed a significant regression model (p<0.05), and three e-Learning variables described 18% % of the total variation in overall satisfaction among IAU faculty members. The value of R (0.424) indicated a weak positive relationship between e-Learning variables and overall faculty’s satisfaction (Table 8). Table 9 shows that three e-Learning variables such as e-Learning experience, training received, and knowledge and skills are significant predictors of overall satisfaction among IAU faculty members (p<0.05).

Discussion

IAU promotes leadership qualities, encourages and supports high-end basic and applied research activities (medicine, arts and sciences, and computing), and enhances researcher skills with state-of-the-art facilities. IAU has students and faculty members from different cities and regions. During onsite/traditional classes, the chance for infection and spread is high among students due to mingling. The online management and workload assessment of faculty are critical for strategic balance (Conceição & Lehman, 2011; Davies et al., 2005). This study was conducted to evaluate eLearning variables from the
Figure 1. Structural equation modelling (SEM) for the eLearning evaluation of IAU faculty members following Kirkpatrick.

perspective of IAU faculty members using a questionnaire. The questionnaire’s reliability was studied using Cronbach’s α coefficient. The criterion value was statistically studied with KMO (Kaiser-Meyer-Olkin) and Bartlett’s test. The results indicated that all the items had a value greater than 0.50, which indicated that the quality of the measurement was satisfactory. Besides, SEM was used to evaluate the experience of eLearning at IAU. This model has been effectively used to analyse the structural variables in educational-based research (Jansson et al., 2019). Based on the survey study, a model was constructed using SEM analysis (Figure 1). The SEM study showed that items studied under the proposed three dimensions are acceptable for measuring the eLearning experience of IAU faculty members during the COVID-19 pandemic. Overall, the modules were found to be effective in the present situation and able to continue the practice of teaching and learning in the online mode of action. The expressed eLearning satisfaction level by faculty and online trainings adopted by IAU can be an effective strategy to combat online teaching challenges.

In the first section of the questionnaire, the eLearning experience of faculty was evaluated. The faculty members were asked about their experience using Blackboard, training, and applying their learned skills and knowledge through eLearning. Bower (2001) stated that online distance education requires effective training sessions and a change in the pedagogical approach. In addition, such a web-based teaching approach requires certain preassessment measures to ensure the validity and results (Buchanan, 1999; Carnevale, 2004; Schifter, 2000a; Schifter, 2000b). Our results show a unanimous level of satisfaction of faculty members using the Blackboard eLearning tool. In the first instance, the ease of using Blackboard received mostly positive responses of ‘strongly agree’ (50.3%) and ‘agree’ (38.7%), indicating a higher proportion of faculty members with a strong commitment to the online working mode of action. Broadcasting and recording lectures via Zoom using Blackboard received mostly ‘strongly agree’ (59.3%) and ‘agree’ (33.4%) responses. Very few responded ‘true sometimes’ (6.2%), ‘disagree’ (1.1%) and ‘totally disagree’ (0.0%). The positive responses of respondents indicate the ease of using the Blackboard platform to provide course lessons using menu items and conducting Zoom classes with students through built content options. In the case of Blackboard collaboration (virtual classroom), the ‘true sometimes’ (32.5%) responses increased, similar to the ‘strongly agree’ (33.1%) and ‘agree’ (30.8%) responses. Impressively, the disagreement response still has a lower proportion (<4%). An increase in ‘true sometimes’ indicates that respondents have some reluctance or reservation of using Blackboard as a video tutoring platform. Conducting online tests using this software was found to be easier as most respondents positively agreed (58.5%). In total, 26.8% of respondents answered ‘true sometimes’ while few disagreed (11.2%) and strongly disagreed (3.5%). Faculty members expressed positive agreement and strong satisfaction with the provided technical support (strongly agree, 49.8%; agree, 34.5%). Less than 4% expressed disagreement, while 12% responded ‘true sometimes’. Furthermore, stronger agreement was given by faculty members for the easy contact, responses and services provided by technical support assistance.

The second section of the questionnaire was related to the experience of the training received. Cho & Berge (2002) reported that a major barrier in distance training is administrative, technical experts and the infrastructure system. However, in the present study, a strong positive response was given to training experience. Respondents were also impressed and agreed on the trainer’s knowledge expertise on training topics. Strong affirmative statements were recorded for the trainer’s session
Table 2. Regression weights for distance working among IAU faculty.

| Variables                                                                 | Path     | Construct                      | Estimate | Standard Error | Critical Ratio | p value  |
|---------------------------------------------------------------------------|----------|--------------------------------|----------|----------------|----------------|----------|
| Technical support team quickly responds to my requests                   | <--      | E-learning experience          | 1.000    |                |                |          |
| The services provided by the technical support team are sufficient        | <--      | E-learning experience          | 0.974    | 0.025          | 39.493         | 0.0001   |
| It is easy to contact technical support for help                          | <--      | E-learning experience          | 1.023    | 0.027          | 38.169         | 0.0001   |
| Level of satisfaction with provided technical support                     | <--      | E-learning experience          | 0.802    | 0.027          | 29.878         | 0.0001   |
| I am not experiencing difficulties when giving tests on Blackboard        | <--      | E-learning experience          | 0.644    | 0.049          | 13.160         | 0.0001   |
| Using Blackboard to collaborate is easy                                  | <--      | E-learning experience          | 0.382    | 0.040          | 9.460          | 0.0001   |
| Broadcasting and recording lectures via Zoom is easy                       | <--      | E-learning experience          | 0.290    | 0.030          | 9.729          | 0.0001   |
| Blackboard is easy to use                                                 | <--      | E-learning experience          | 0.373    | 0.033          | 11.275         | 0.0001   |
| How do you rate the training topics?                                      | <--      | Training                      | 1.000    |                |                |          |
| How would you rate the trainer in terms of their level of knowledge on the training topics? | <--      | Training                      | 1.087    | 0.048          | 22.739         | 0.0001   |
| How would you rate the trainer’s management of the session?               | <--      | Training                      | 1.299    | 0.054          | 23.947         | 0.0001   |
| How the trainer handles participants’ questions                            | <--      | Training                      | 1.249    | 0.053          | 23.394         | 0.0001   |
| The trainer’s ability to communicate and communicate with the trainees   | <--      | Training                      | 1.279    | 0.053          | 24.188         | 0.0001   |
| How do you rate the level of discussion                                   | <--      | Training                      | 1.339    | 0.060          | 22.332         | 0.0001   |
| How would you rate your training experience using Zoom?                   | <--      | Training                      | 1.066    | 0.057          | 18.617         | 0.0001   |
| How do you evaluate the adequacy of the training time?                    | <--      | Training                      | 1.015    | 0.064          | 15.746         | 0.0001   |
| How do you rate the training materials?                                   | <--      | Training                      | 1.067    | 0.054          | 19.834         | 0.0001   |
| I recommend this training course to my colleague.                          | <--      | Knowledge                     | 1.000    |                |                |          |
| What I learned contributed to developing specific skills that can affect my success in my workplace | <--      | Knowledge                     | 1.054    | 0.051          | 20.531         | 0.0001   |
| My ability to apply what I learned in the educational process             | <--      | Knowledge                     | 1.043    | 0.053          | 19.852         | 0.0001   |
| The extent to which the training is consistent with my job goals          | <--      | Knowledge                     | 0.993    | 0.049          | 20.279         | 0.0001   |

Table 3. Baseline comparisons.

| Model                  | NFI Delta1 | RFI rho1 | IFI Delta2 | TLI rho2 | CFI   |
|------------------------|------------|----------|------------|----------|-------|
| Default model          | **0.905**  | **0.892**| **0.922**  | **0.911**| **0.922**|
| Saturated model        | 1.000      | 1.000    | 1.000      |          |       |
| Independent model      | 0.000      | 0.000    | 0.000      | 0.000    | 0.000 |

Table 4. Root mean square error of approximation (RMSEA).

| Model                  | RMSEA | LO 90 | HI 90 | PCLOSE |
|------------------------|-------|-------|-------|--------|
| Default model          | **0.080** | **0.077** | **0.087** | **0.00** |
| Independent model      | 0.274  | 0.269 | 0.279 | 0.000  |
Table 5. Percentage of faculty responses to e-learning variables.

| S.No | Questionnaire (N=634)                                                                 | Strongly disagree (%) | Disagree (%) | True sometimes (%) | Agree (%) | Strongly agree (%) |
|------|-------------------------------------------------------------------------------------|-----------------------|--------------|-------------------|-----------|-------------------|
| 1    | Blackboard is easy                                                                  | 2 (0.3%)              | 16 (2.5%)    | 45 (7.1%)         | 252 (38.7%) | 319 (50.3%)       |
| 2    | Broadcasting and recording lectures via Zoom is easy                                 | 0 (0.0%)              | 7 (1.1%)     | 39 (6.2%)         | 212 (33.4%) | 376 (59.3%)       |
| 3    | Using Blackboard to collaborate is easy                                             | 1 (0.2%)              | 22 (3.5%)    | 206 (32.5)        | 195 (30.8%) | 210 (33.1%)       |
| 4    | I am not experiencing difficulties when giving tests on Blackboard                 | 22 (3.5%)             | 71 (11.2%)   | 170 (26.8%)       | 158 (24.9%) | 213 (33.6%)       |
| 5    | Level of satisfaction with provided technical support                               | 3 (0.5%)              | 20 (3.2%)    | 76 (12.0%)        | 219 (34.5%) | 316 (49.8%)       |
| 6    | It is easy to contact technical support for help                                    | 7 (1.1%)              | 33 (5.2%)    | 123 (19.4%)       | 191 (30.1%) | 280 (44.2%)       |
| 7    | The services provided by the technical support team are sufficient                  | 4 (0.6)               | 27 (4.3%)    | 115 (18.1%)       | 210 (33.1%) | 278 (43.8%)       |
| 8    | Technical support team quickly responds to my requests                              | 5 (0.8%)              | 22 (3.5%)    | 135 (21.3%)       | 182 (28.7%) | 290 (45.7%)       |

Training received

| S.No | Questionnaire (N=634)                                                                 | Strongly disagree (%) | Disagree (%) | True sometimes (%) | Agree (%) | Strongly agree (%) |
|------|-------------------------------------------------------------------------------------|-----------------------|--------------|-------------------|-----------|-------------------|
| 9    | How do you rate the training topics?                                               | 1 (0.2%)              | 18 (2.8%)    | 74 (11.7%)        | 209 (33.0%) | 332 (52.4%)       |
| 10   | How would you rate the trainer in terms of level of their knowledge on the training topics? | 2 (0.3%)              | 11 (1.7%)    | 71 (11.2%)        | 210 (33.1%) | 340 (53.6%)       |
| 11   | How would you rate the trainer’s management of the session?                        | 6 (0.9%)              | 24 (3.8%)    | 81 (12.8%)        | 213 (33.6%) | 310 (48.9%)       |
| 12   | How the trainer handles participants’ questions                                     | 6 (0.9%)              | 23 (3.6%)    | 64 (10.1%)        | 199 (31.4%) | 342 (53.9%)       |
| 13   | The trainer’s ability to communicate and communicate with the trainees             | 5 (0.8%)              | 20 (3.2%)    | 76 (12.0%)        | 182 (28.7%) | 351 (55.4%)       |
| 14   | How do you rate the level of discussion                                            | 11 (1.7%)             | 37 (5.8%)    | 89 (14.0%)        | 228 (36.0%) | 269 (42.4%)       |
| 15   | How would you rate your training experience using Zoom?                            | 7 (1.1%)              | 22 (3.5%)    | 85 (13.4%)        | 181 (28.5%) | 339 (53.5%)       |
| 16   | How do you evaluate the adequacy of the training time?                             | 11 (1.7%)             | 42 (6.6%)    | 96 (15.1%)        | 206 (32.5%) | 279 (44.0%)       |
| 17   | How do you rate the training materials?                                            | 3 (0.5%)              | 26 (4.1%)    | 72 (11.4%)        | 221 (34.9%) | 312 (49.2%)       |

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| S.No | Questionnaire (N=634)                                                                 | Strongly disagree (%) | Disagree (%) | True sometimes (%) | Agree (%) | Strongly agree (%) |
|------|-------------------------------------------------------------------------------------|-----------------------|--------------|-------------------|-----------|-------------------|
| 18   | The extent to which the training is consistent with my job goals                     | 4 (0.6%)              | 13 (2.1%)    | 46 (7.3%)         | 271 (42.7%) | 300 (47.3%)       |
| 19   | My ability to apply what I learned in the educational process                        | 6 (0.9%)              | 18 (2.8%)    | 55 (8.7%)         | 277 (43.7%) | 278 (43.8%)       |
| 20   | What I learned contributed to developing specific skills that can affect my success in my workplace | 6 (0.9%)              | 10 (1.6%)    | 58 (9.1%)         | 227 (35.8%) | 333 (52.5%)       |
| 21   | I recommend this training course to my colleagues.                                   | 8 (1.3%)              | 13 (2.1%)    | 51 (8.0%)         | 186 (29.3) | 376 (59.3%)       |

Overall satisfaction

| S.No | Questionnaire (N=634)                                                                 | Strongly disagree (%) | Disagree (%) | True sometimes (%) | Agree (%) | Strongly agree (%) |
|------|-------------------------------------------------------------------------------------|-----------------------|--------------|-------------------|-----------|-------------------|
| 22   | How satisfied are you with our services                                            | 0 (0.0%)              | 9 (1.4%)     | 79 (12.5%)        | 307 (48.4%) | 239 (37.7%)       |
### Table 6. Level of e-learning experience among faculty members at IAU.

| S.No. | Questionnaire (N=634)                                                                 | Mean  | SD    | Level   |
|-------|-------------------------------------------------------------------------------------|-------|-------|---------|
|       | How do you evaluate your e learning experience (as a faculty member)?                |       |       |         |
| 1     | Blackboard is easy to use                                                           | 4.37  | 0.752 | High    |
| 2     | Broadcasting and recording lectures via Zoom is easy                                 | 4.51  | 0.663 | High    |
| 3     | Using Blackboard to collaborate is easy                                             | 3.93  | 0.898 | High    |
| 4     | I am not experiencing difficulties when giving tests on Blackboard                   | 3.74  | 1.140 | High    |
| 5     | Level of satisfaction with provided technical support                                | 4.30  | 0.033 | High    |
| 6     | It is easy to contact technical support for help                                     | 4.11  | 0.966 | High    |
| 7     | The services provided by the technical support team are sufficient                    | 4.15  | 0.908 | High    |
| 8     | Technical support team quickly responds to my requests                               | 4.15  | 0.927 | High    |
|       | Training                                                                            |       |       |         |
| 9     | How do you rate the training topics?                                                | 4.35  | 0.806 | High    |
| 10    | How would you rate the trainer in terms of their level of knowledge on the training topics? | 4.38  | 0.776 | High    |
| 11    | How would you rate the trainer's management of the session?                          | 4.26  | 0.888 | High    |
| 12    | How the trainer handle participants’ questions                                       | 4.34  | 0.871 | High    |
| 13    | The trainer's ability to communicate and communicate with the trainees               | 4.35  | 0.867 | High    |
| 14    | How do you rate the level of discussion                                              | 4.12  | 0.971 | High    |
| 15    | How would you rate your training experience using Zoom?                              | 4.30  | 0.905 | High    |
| 16    | How do you evaluate the adequacy of the training time?                               | 4.10  | 1.002 | High    |
| 17    | How do you rate the training materials?                                              | 4.28  | 0.857 | High    |
|       | Applying skills and knowledge in the educational process through eLearning at Imam Abdurrahman Bin Faisal University |       |       |         |
| 18    | The extent to which the training is consistent with my job goals                     | 4.34  | 0.755 | High    |
| 19    | My ability to apply what I learned in the educational process                        | 4.27  | 0.809 | High    |
| 20    | What I learned contributed to developing specific skills that can affect my success in my workplace | 4.37  | 0.791 | High    |
| 21    | I recommend this training course to my colleague.                                     | 4.43  | 0.826 | High    |
|       | Overall satisfaction with the e-learning process at IAU                               |       |       |         |
| 22    | How satisfied are you with our services                                              | 4.22  | 0.713 | High    |

### Table 7. Correlation between e-learning variables and overall satisfaction with our services.

|                        | How do you evaluate your e-learning experience | Training | Skills and knowledge | Overall satisfaction with e-learning |
|------------------------|-----------------------------------------------|----------|----------------------|-------------------------------------|
| How do you evaluate your e-learning experience | 1                               |          |                      |                                     |
| Training               | 0.333**                                       | 1        |                      |                                     |
| Skills and knowledge   | 0.357**                                       | 0.447**  | 1                    |                                     |
| Overall satisfaction with e-learning      | 0.354**                                       | 0.465**  | 0.622**              | 1                                   |

**Correlation is significant at the 0.01 level (2-tailed)**
management and the way they handled participants’ questions. Similarly, the trainer’s ability to communicate with trainees and the level of discussion received strong positive responses. Training experience using the Zoom platform, training time and training materials received positive responses. For the overall training sessions, approximately 7–15% of respondents expressed the statement of ‘true sometimes’ while very few provided negative responses.

The third section of the questionnaire was related to the application of skills and knowledge in the educational process through eLearning at IAU. Substantial positive responses with 47.3% of respondents answering ‘strongly agree’ and 42.7% answering ‘agree’ indicated that the organized training was consistent with faculty’s job goals. Similarly, the faculty revealed that they were able to apply the learned experience during their educational process (agreement of 43.7% and 43.8%, respectively). A high percentage of respondents agreed that training also contributed to developing specific skills that can boost their success in the workplace and accepted that they would also promote this training course to their colleagues. Overall, the faculty members expressed satisfaction with the provided Blackboard service.

The level of perception of faculty members with respect to eLearning experience at IAU was found to be impressively high with a mean score higher than 4 (Table 4). A positive correlation exists between eLearning variables that indicates an overall satisfaction with the provided services (Table 5). The results of the factor loadings on the eLearning scale showed that all items had values greater than 0.5, which indicated that the survey’s result quality was satisfactory (Table 6). The observed positive results of eLearning experience can be correlated to several IAU training initiatives offered to faculty members through the Deanship of Academic Development (DAD). Key training program approaches to online classes are classified into short training programmes, intensive training programmes and material resource support. The professional development training programme involves improving competency in teaching/learning, lecture preparations and mentorship training programmes. Training topics are based on assessment, surveys, reports to the Deanship of Quality and Accreditation (DQAA), student course evaluations, faculty, academic program evaluations, benchmarking teaching and learning practices, trainer questionnaires, and DAD forum recommendations. In addition, the training content materials were updated in the training portal on Blackboard and IAU website (DAD, 2020).

Mainly, the key strategy points focus on faculty online communication skills, leadership skills, conceptual thinking, learning as a team, teaching in a creative way, interpersonal student communication skills, deep learning, lecture planning, an artistic teaching approach and class management.

A faculty professional development series was conducted by IAU. The topics was related on utilizing educational technology and teaching methods. The framework includes theoretical backed interactive sessions, using technological tools to improve student engagement, motivating the students by improving the learning environment and intellectual concept activities, improving competency and fluency in English, microteaching (teaching through practice), metacognition (higher-order thinking), effective questioning strategies, avoiding common teaching mistakes, flipped classrooms (instructional strategy), knowing students’ learning styles and welcoming students on the first day of class.

The professional training for faculty also includes improving effective assessment and evaluation skills. The module covers the different types of concepts, methods, types and concepts
Ayers EL, Almahasheer MB, Al-Rubaish AM, Alkadi A, Al-Hujran O, Aloudat A, Al-Hennawi H. Online teaching during the COVID-19 crisis at IAU. The survey in higher education. This study explored faculty readiness for the COVID-19 pandemic situation; and how to publish in journals related to education. The module comprises observation of classroom behaviours and interactions and the promotion of learning through activities. Faculty members were taught strategies for formulating key principles of critical thinking and student engagement. The adult learning concept and principles were taught to be applied in knowledge transfer from classroom to actual work settings, as seen in the current pandemic situation. The concept of self-efficacy from the perspective of faculty and department was the focus. Similarly, preventing faculty burnout during adverse situations such as COVID-19 and different strategies to overcome faculty burnout are taught.

Conclusion
The COVID-19 pandemic presents an unprecedented challenge in higher education. This study explored faculty readiness for online teaching during the COVID-19 crisis at IAU. The survey responses by the faculty indicate their high satisfaction using eLearning tools. The Blackboard online teaching software tool, recording lectures using the Zoom platform, virtual classrooms and online tests received strong positive responses. Faculty responded positively to the technical and training support rendered by IAU. Overall, the study found that the eLearning training and modules provided by IAU were effective in the present pandemic situation.

Limitations and Recommendations
This study is restricted to the faculty members of a single public university, and future work can be conducted with the enclosure of all Saudi universities. In further research, the demographic data of faculty members can be included. Further, the relationship between demographic variables of faculty members (such as age, gender, nationality, highest educational qualification, current designation, and work experience) and their e-learning experience, training, and applying skills and knowledge in the educational process through e-learning can be revealed in future studies. Besides, the difference in overall satisfaction among faculty members concerning their demographic variables can also be studied. It is suggested to study the influence of demographic variables on overall faculty satisfaction with the e-learning process at their respective universities. A qualitative or quantitative research can be further carried out with Saudi faculty members to reveal the challenges or barriers facing faculty members while using Blackboard. This study also recommends that higher education administrators frame and execute uniform regulations to improve teaching faculty’s satisfaction with Blackboard.

Data availability
Underlying data
Figshare: E-learning datasheet of Faculty readiness for online teaching at Imam Abdulrahman Bin Faisal University during the COVID-19 crisis: a cross-sectional study. https://doi.org/10.6084/m9.figshare.14406434 (Almahasheer et al., 2021).

Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).

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Reviewer Report 28 February 2024

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Rewanee Chaichaowarat
Udon Thani Rajabhat University, Udon Thani, Thailand

Thank you for affording me the opportunity to review your research article. I posit that your findings hold potential significance for faculty members worldwide, offering insights into the challenges faced by educators and university students amidst the Covid-19 pandemic. However, I observe that your article requires further refinement.

In the Introduction section, it is advisable for the author to incorporate more recent scholarly resources pertaining to remote learning, online learning (both synchronous and asynchronous), blended learning, and offline modalities. Over the past 2-3 years, particularly due to widespread school closures and the consequent transition to online pedagogy prompted by the Covid-19 crisis, a plethora of studies exploring this domain have emerged. The author should prioritize recent literature in selecting and referencing sources for the article.

Regarding the Methods section, while the authors mention employing an exploratory study design with a questionnaire developed through four brainstorming sessions with higher education experts and faculty members, there is a lack of clarity regarding the methodology employed in this process, the number of experts involved, and the process of finalizing the questionnaire's validity. Additionally, the inclusion of a separate literature review section and a structured discussion on relevant sources pertaining to the questionnaire's structure is warranted.

Furthermore, the information provided in the Results section necessitates better integration with the data collection process. Specifically, the reliability and validity of the instrument should be elucidated within the context of questionnaire creation.

The purpose statement of the article remains somewhat obscure. While the introduction alludes to the aim of analyzing the significant role of digital systems and evaluating the readiness of IAU faculty members to transition to online teaching during Covid-19 through survey-based methods, the Methods section indicates the utilization of an exploratory study design to predict the characteristics and management of e-learning advantages by faculty members. Clarification of the article's overarching purpose, especially if it represents only a segment of a broader study, would
I am of the opinion that your article holds substantial practical relevance. It stands to aid faculty members in gaining a deeper understanding of digital systems and assessing the preparedness required for transitioning to online teaching amid the challenges posed by COVID-19. Nevertheless, there are certain aspects of the Results section that warrant reconsideration in alignment with the study’s objectives. It would be beneficial for readers if the significance of digital systems and the readiness of IAU faculty members for online teaching during the pandemic were more thoroughly explained and illustrated within the context of the study’s aims.

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Is the work clearly and accurately presented and does it cite the current literature?
Partly

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
Partly

Are all the source data underlying the results available to ensure full reproducibility?
Partly

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Teacher Education, Teaching and Learning, Curriculum Development, Design Thinking for education, Professional Learning Community (PLC)

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.
Martin Daumiller
Department of Psychology, University of Augsburg, Augsburg, Germany

Overall, I have found that this manuscript makes a relevant contribution to the literature and is well written. However, there are still issues that warrant attention:

1. The introduction on COVID-19 is very lengthy, yet in the theoretical background only little is written about how COVID-19 affected faculty (e.g., Daumiller et al. (2021), Delivering High-Quality Instruction Online in Response to COVID-19: Faculty Playbook, Valsaraj et al. (2021), and related works). Yet, such information would be highly relevant for the outset of the article.

2. A contemporary understanding of "validity" should be used. See AERA, APA, NCME recommendations, according to which a questionnaire itself cannot have "construct validity".

3. In the method section, the authors state they used a CFA, but later findings of an EFA are described. This is inconsistent. What are the fit indices of the CFA and its results? A CFA would appear more appropriate given that an established scale is used, and in order to prepare the SEM.

4. Which cut off values are used to determine adequate model fit? The fit indices fall short of many commonly used criteria (e.g., CFI, TLI > .95), and partly even more lax recommendations (e.g. CFI, TLI > .90).

5. What do you mean that CFI and RMSEA are equal? This seems impossible, given that high CFI values and low RMSEA represent good model fit. Why would it be necessary to test them for equivalence?

6. The information presented in the tables and figures is partly redundant. I suggest to only present them either in the figure or in the respective table.

7. It would be good to illustrate the SEM as a figure so that it becomes clear how this model looked like. Similar to the results of the CFA in Figure 1.

8. The authors should also add their analytical script to the dataset so that researchers can reproduce their results.

References
1. Daumiller M, Rinas R, Hein J, Janke S, et al.: Shifting from face-to-face to online teaching during COVID-19: The role of university faculty achievement goals for attitudes towards this sudden change, and their relevance for burnout/engagement and student evaluations of teaching quality.
Is the work clearly and accurately presented and does it cite the current literature?
Partly

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
No

If applicable, is the statistical analysis and its interpretation appropriate?
Partly

Are all the source data underlying the results available to ensure full reproducibility?
No

Are the conclusions drawn adequately supported by the results?
Partly

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Faculty motivation, experiences, and only teaching; structural equation modelling

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 25 January 2022

https://doi.org/10.5256/f1000research.80828.r120632

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Shahul Hameed Pakkir Mohamed

Department of Physical Therapy, Faculty of Applied Medical Sciences, University of Tabuk, Tabuk, Saudi Arabia

Thank you very much for your responses. All the comments were addressed in the manuscript.
Is the work clearly and accurately presented and does it cite the current literature?  
Partly

Is the study design appropriate and is the work technically sound?  
Partly

Are sufficient details of methods and analysis provided to allow replication by others?  
Partly

If applicable, is the statistical analysis and its interpretation appropriate?  
Partly

Are all the source data underlying the results available to ensure full reproducibility?  
Partly

Are the conclusions drawn adequately supported by the results?  
Partly

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Musculoskeletal physical therapy

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

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**Version 1**

Reviewer Report 04 October 2021

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**Shahul Hameed Pakkir Mohamed**

Department of Physical Therapy, Faculty of Applied Medical Sciences, University of Tabuk, Tabuk, Saudi Arabia

**Comments on: Faculty readiness for online teaching at IAU during the COVID-19 crisis.**

1. The demographic details are missing in the table and in the interpretation of the results?

2. It is better to add a table relationship between demographic data (such as academic rank, age, years of teaching experience, attendance of training courses, etc...) of faculty members and their e-learning experience, received training information, and applied skills and
knowledge?

3. What type of sampling was used in this study?

4. What are the challenges or barriers the faculty members at the IAU have met while using Blackboard?

5. What are the limitations, suggestions, and recommendations in the study?

**Is the work clearly and accurately presented and does it cite the current literature?**
Partly

**Is the study design appropriate and is the work technically sound?**
Partly

**Are sufficient details of methods and analysis provided to allow replication by others?**
Partly

**If applicable, is the statistical analysis and its interpretation appropriate?**
Partly

**Are all the source data underlying the results available to ensure full reproducibility?**
Partly

**Are the conclusions drawn adequately supported by the results?**
Partly

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Musculoskeletal physical therapy

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

---

Author Response 10 Dec 2021

Nuhad Abdullah Alomair

- The demographic details are missing in the table and in the interpretation of the results?

**Response:**

The aim of the study is to analyse only the significant role of the digital system and evaluate the readiness of IAU faculty members to transition to online teaching during COVID-19 using survey-based methods. Hence, the authors have not collected the demographic data of the IAU faculty members. However, the authors stated that the demographic data of
This study is restricted to the faculty members of a single public university, and future work can be conducted with the enclosure of all Saudi universities. In further research, the demographic data of faculty members can be included. Further, the relationship between demographic variables of faculty members (such as age, gender, nationality, highest educational qualification, current designation, and work experience) and their e-learning experience, training, and applying skills and knowledge in the educational process through e-learning can be revealed in future studies. Besides, the difference in overall satisfaction among faculty members concerning their demographic variables can also be studied. It is suggested to study the influence of demographic variables on overall faculty satisfaction with the e-learning process at their respective universities. A qualitative or quantitative research can be further carried out with Saudi faculty members to reveal the challenges or barriers facing faculty members while using Blackboard. This study also recommends that higher education administrators frame and execute uniform regulations to improve teaching faculty's satisfaction with Blackboard.

- It is better to add a table relationship between demographic data (such as academic rank, age, years of teaching experience, attendance of training courses, etc...) of faculty members and their e-learning experience, received training information, and applied skills and knowledge?

Response:

The aim of the study is to analyse the significant role of the digital system and evaluate the readiness of IAU faculty members to transition to online teaching during COVID-19 using survey-based methods. Hence, the authors did not analyze the relationship between demographic data of faculty members and their e-learning experience, received training information, and applied skills and knowledge. However, the authors stated that the relationship between demographic data of faculty members and their e-learning experience, received training information, and applied skills and knowledge can be revealed in future studies in the Limitations and Recommendations Section.

The description is provided as follows:

Limitations and Recommendations

This study is restricted to the faculty members of a single public university, and future work can be conducted with the enclosure of all Saudi universities. In further research, the demographic data of faculty members can be included. Further, the relationship between demographic variables of faculty members (such as age, gender, nationality, highest educational qualification, current designation, and work experience) and their e-learning experience, training, and applying skills and knowledge in the educational process through e-learning can be revealed in future studies. Besides, the difference in overall satisfaction among faculty members concerning their demographic variables can also be studied. It is suggested to study the influence of demographic variables on overall faculty satisfaction with the e-learning process at their respective universities. A qualitative
or quantitative research can be further carried out with Saudi faculty members to reveal the challenges or barriers facing faculty members while using Blackboard. This study also recommends that higher education administrators frame and execute uniform regulations to improve teaching faculty's satisfaction with Blackboard.

- **What type of sampling was used in this study?**

**Response:**

In this study, convenience sampling technique was applied.

The description is provided in the Methods section as follows:

**Methods Participants**

This study was conducted at Imam Abdulrahman Bin Faisal University (IAU), which is located in the Eastern Region of Saudi Arabia. A convenience sampling was used in this study. All faculty members (N=2227) of IAU who were involved in online teaching during the COVID-19 crisis in the 2019–2020 academic year were considered the population of this study, as only these faculty members used and experienced IAU e-learning facilities.

- **What are the challenges or barriers the faculty members at the IAU have met while using Blackboard?**

**Response:**

The aim of the study is to analyse the significant role of the digital system and evaluate the readiness of IAU faculty members to transition to online teaching during COVID-19 using survey-based methods. Hence, the authors did not reveal the challenges or barriers the faculty members at the IAU have met while using Blackboard. This valuable point of the reviewer has been included in the Limitations and Recommendations Section for further research. The description is provided as follows:

**Limitations and Recommendations**

This study is restricted to the faculty members of a single public university, and future work can be conducted with the enclosure of all Saudi universities. In further research, the demographic data of faculty members can be included. Further, the relationship between demographic variables of faculty members (such as age, gender, nationality, highest educational qualification, current designation, and work experience) and their e-learning experience, training, and applying skills and knowledge in the educational process through e-learning can be revealed in future studies. Besides, the difference in overall satisfaction among faculty members concerning their demographic variables can also be studied. It is suggested to study the influence of demographic variables on overall faculty satisfaction with the e-learning process at their respective universities. A qualitative or quantitative research can be further carried out with Saudi faculty members to reveal the challenges or barriers facing faculty members while using Blackboard. This study also recommends that higher education administrators frame and execute uniform regulations to improve teaching faculty's satisfaction with Blackboard.

- **What are the limitations, suggestions, and recommendations in the study?**

**Response:**
As advised, the authors have included the Limitations and Recommendations Section in the manuscript. The description provided in the manuscript is given below:

**Limitations and Recommendations**

This study is restricted to the faculty members of a single public university, and future work can be conducted with the enclosure of all Saudi universities. In further research, the demographic data of faculty members can be included. Further, the relationship between demographic variables of faculty members (such as age, gender, nationality, highest educational qualification, current designation, and work experience) and their e-learning experience, training, and applying skills and knowledge in the educational process through e-learning can be revealed in future studies. Besides, the difference in overall satisfaction among faculty members concerning their demographic variables can also be studied. It is suggested to study the influence of demographic variables on overall faculty satisfaction with the e-learning process at their respective universities. A qualitative or quantitative research can be further carried out with Saudi faculty members to reveal the challenges or barriers facing faculty members while using Blackboard. This study also recommends that higher education administrators frame and execute uniform regulations to improve teaching faculty's satisfaction with Blackboard.

**Competing Interests:** No competing interests were disclosed.