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Article

E-learning Success Factors from the Perspective of Academic Staff at Nursing and Education Colleges During COVID-19 Pandemic: A Comparative Study

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Abstract

During the pandemic period of COVID-19, the use of electronic devices to enable teaching and learning, known as e-learning, was the most common format of education at all levels. Factors that interfered with academicians' ability to use e-learning successfully needed to be explored to enhance usefulness of teaching and learning and teaching outcomes. The present study aimed to evaluate E-learning critical success factors from the perspective of the academic staff at nursing and education faculty during the COVID-19 pandemic. A quantitative descriptive-correlational research design was used through a purposive sampling procedure to recruit 75 academicians from the Nursing and Education schools. Data was collected through an online questionnaire related to e-learning success factors (such as satisfaction level, knowledge acquisition, and knowledge transfer), from instructors' perspectives towards e-learning and their sociodemographic characteristics. Data was analyzed using the SPSS-25 to compare the analyses of both groups of the study. The results illustrated a highly statistically significant difference was observed between the academic staff of both the colleges related to net benefits and institutional factors, where (P =<0.0001). The study recommends that a useful future extension of this research may allow looking at how critical success factors in education can be enhanced through comparing the two formats of education: the traditional and online educational. This study would have useful implications for higher education institutions and academics as there is a need to for them to be well exposed to the importance of e-learning as one of the alternatives to learning in the modern times of crises.

Keywords

Academic staff, success learning factors, E-learning, COVID-19, pandemic, technology

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Educational technology has made a very positive impact on teaching and learning during the COVID -19 pandemic (Charband & Navimipour, 2018).Prior to the pandemic broke out, technology had been recognized as inevitable in online learning activities (Pangondian et al.).Technology works through the synchronization process which is a kind of exchange of information to ensure the users', teachers' and students' convenience of accessing the information. While the success of online learning enhances student's self-confidence and discipline of participating in online learning remotely, it also facilitates teachers as online learning supports them in teaching and evaluation and overcome all obstacles that students face during online learning. Robert Gagne postulated the "Information Processing Learning Theory" which described learning as the function of the human brain which helped in the processing of information. In other words, when learning occurs, it means that the human brain accepts the processed information and that produces it as learning outcome (Rahmadi & Hayati, 2020). Online learning assisted with technology is one such learning where information processing results in the formation of knowledge.

Online learning or electronic-based learning (e-learning) has been used synonymously to mean a type of learning that involves both students and teachers to communicate and interact with the help of information technology and communication methods (Rahman et al., 2015; Raspopovic et al., 2014). Online learning or E-learning in the current era is now recognized as a type of teaching or learning that allows teaching materials to be delivered to students using the Internet, in the form of audio and audio-visual (Rahman et al., 2015; Rehalat, 2014). This kind of learning also does not require any face to face or direct interaction between teachers and students. With the assistance of technology and internet networks, a learning process starts by using applications such as *google classroom, zoom meeting, google meeting, skype,* or *WhatsApp groups*. Studies have highlighted the effectiveness of online learning and factors that affect the success of online learning (Hayran, 2020; Pangondian et al.; Selim, 2007).

These studies reveal that the success of online learning is determined by several factors namely technology, which plays a big role in synchronization and asynchronization of the data which students can easily access in the process of online learning. Another characteristic of online learning is the instructional methodology, determined by teachers taken with a positive attitude towards online learning. The third characteristic is that students who do not possess basic learning skills can learn to be more disciplined, and develop self-confidence by using online methods. Selim (2007); Shahmoradi et al. (2018) pointed out a few success factors of online learning as teacher attitudes, student characteristics, technology, and support from educational institutions. A few other determining factors for the success of online learning were also proven by Cidral et al. (2018) such as quality of collaboration, quality of service, quality of information, and students' desire to learn computers and use the internet. Their attitude to online learning and perception also made a great impact on this kind of learning.

Education, nowadays, can take place in or out of the classrooms' settings; therefore, the use of computers and internet methods are now considered the key element for E-learning whether in classroom or outside. For students at undergraduate and graduate levels, the need for and use of e-learning is also becoming essential for their classroom's education and for assignments and theses. This has eventually evoked attention towards exploring and enhancing the role of academicians at universities and college levels. This study therefore aimed to describe the success of online learning and to determine the percentage of factors determining the success of online learning in nursing schools, particularly during the COVID-19 Pandemic which has greatly challenged and tested the perspectives of both students and teachers. A need was felt to investigate the critical successful factors and a few factors like instructors' characteristics, e-learning environment, educational policy of institution, service quality, infrastructure and system quality, course and information quality, satisfaction, knowledge acquisition, knowledge transfer from academic staff perspective and so on were identified for the current study.

Literature review

E-learning, also known as a network-assisted learning, allows transferring knowledge and skills to many people who receive education at the same time or at different periods and settings (Chu et al., 2021; Raspopovic et al., 2014; Reyes et al., 2021). E-learning can be described as the use of electronic devices to support teaching and learning. E-learning can be done in a variety of ways. These formats and techniques include stand-alone computers, the internet, and satellites with learning materials supplied by an instructor, an active intelligent instrument, or through media such as text, images, sounds, and video (Kumar Basak et al., 2018). In higher education institutions, e-learning has become increasingly important due to number of factors such as information technology revolution and lately due to COVID-19 outbreak that has influenced the psychological stability of students and performance of academicians (AlAzzam et al., 2021; Alqahtani & Rajkhan, 2020; Chang et al., 2020; Hamaideh et al., 2021; McGill et al., 2014; Salavrakos).

The development and use of a variety of E-learning tools ranging from using email to creating a digital portfolio and a virtual learning environment has resulted in several challenges in higher education institutions, particularly with respect to their educational provision and support methods. E-learning can take place at both institutional and local levels. For example, at the institutional systems, e-learning can be used primarily to manage course materials, enrollment of students and to support the intensive course requirements such as assignments and presentations depending on particular platform (Fawaz & Hamdan-Mansour, 2016; Fawaz et al., 2018; McGill et al., 2014).On the other hand, and at local level, e-learning can be advised for single course induction, training, and certain learning activities (Raspopovic et al., 2014).At both levels, the instructors will be challenged to maintain high level of performance and capabilities to achieve the intended learning outcomes (Halasa et al., 2020; Hamaideh et al., 2021). Such situation has been worsened by the outbreak of COVID-19 and caused more harmful psychological disturbances to both students and educational staff that negatively affected the successful implementation of e-learning and achieving learning outcomes (Conradie et al., 2020; Hamaideh et al., 2021).

In general, people with sufficient supplies and some understanding of technology can join in e-learning by one means or another. During COVID-19 pandemics, universities have been forced to switch to e-learning using many accessible educational platforms. Educational staff were confronted with this sudden alteration and assembly use of information and communication technologies (ICTs) to offer their undergraduates a way to progress and reaching learning outcomes. On the other hand, educational staff were also required to take benefit of flexibility of time and space and increase retention of information among students. This has added to efforts that need to be done by both students and their instructors. Vershitskaya et al. (2020) observed that university students did not recognize the initiative of e-learning which contributed to poor achievement of e-learning objectives and outcomes. Not only students were affected by the obstacles and poor achievement, but the instructors were also involved in it and faced such challenges as well. It has been recommended that both students and instructors need to be familiarized to the development and use of e-learning materials (Shahmoradi et al., 2018)

Students found to have experienced anxiety due to their required academic materials (Shahmoradi et al., 2018),however, academic staff might not be aware of such inflecting factors especially with increased demands due to online and other requirement related to online use such as preparedness and availability of resources (Shahmoradi et al., 2018). Duke and Osim ; Fawaz et al. (2018); Freund (1988) noted that nurse educators should adapt to the rapidly advanced technology and need to acquire skills that should enable them to manage such demands and make them feasible for their students to reach the intended learning objectives. This shed the light on the experience of academic staff regarding the factors that might contribute to successful e-learning experience.

The term critical success factor was first introduced in 1980 to compare academic institutions (Dawar et al., 2021). Critical success factors referred to all factors that contributed to achieving the intended learning outcomes in a firm way (Ahmad et al., 2018; Alqahtani & Rajkhan, 2020).Such factors need to be well addressed to educational staff and have to be measurable and objective to enable better evaluation and enhancement. Such factors included and were not limited for intellectual property, suitability of the course for e-learning environment, e-learning course content, building the e-learning course, e-learning course maintenance, e-learning platform, and measuring the success of an e-learning course, satisfaction, knowledge acquisitions, and knowledge transfer (Ahmad et al., 2018; Alqahtani & Rajkhan, 2020).The acetated technology and the high levels of educational demand and communication processing also added to the burden of educational staff. Technical problems, infrastructure, personal capabilities, use of technology, and personal satisfaction of e-learning outcomes were also proposed as factors that might influence the achievement of learning outcomes (Ahmad et al., 2018; Berdiyev & Can, 2020).

During the outbreak of COVID-19, in addition to management of the e-learning requirements and responding to psychological and educational needs of students, educational staff were also challenged with the type of courses that were not proposed and prepared to be in electronic format (Alqahtani & Rajkhan, 2020).Variation in specialties also added to the burden. For example, practicum courses in nursing schools were responsible for higher level of academic stress for students and instructors compared to those specialties where practicum courses were not there.

Owing to these challenges and e-learning variations, a need was felt to address and examine the critical success factors from perspectives of academic staff for better course and learning management at personal and institutional levels. This study aimed at addressing this issue and developing a better understanding how E-learning can be more successful and feasible. The aim of this study was therefore to evaluate the e-learning critical success factors from the perspectives of academic staff at nursing and education colleges during the COVID-19 pandemic.

Methods

Research Design

A descriptive-correlational research design was utilized to achieve the objectives and research questions of the current study. Data was collected using online format of data collection from academic staff at school of Nursing and Education Colleges of a large education institution.

Sample and sampling

A purposive sampling technique was used to recruit the sample of the study. A total of 95 instructors were approached out of which 75 instructors (25 from College of Nursing and 50 from College of Education) agreed to participate in the study (response rate of 79%) and who filled out the online learning survey. The inclusion criteria for sample selection included: 1) a faculty staff who should be involved in teaching of one or more e-learning courses, and 2) who should agree to participate in the study. No exclusion criteria were used for the purpose of maximization of participation.

Research Settings

The study was conducted at the Hafr Al Batin University, Saudi Arabia. Two schools were targeted in this study to represent the variation in curricula: one health school (School of Nursing) and one humanity school (Education College). The setting was selected because the faculty in these colleges had a large experience in undergraduate online learning courses and varied in their curricula and type of education requirements for both students and instructors.

Instruments

Data was collected using the online format in the Arabic language from the sampled instructors. The tools were formulated using the WHO translation and tool adaptation guidelines which included using the standard protocol of forward and backward translation. The translation technique included four steps: forward translation; expert panel back-translation; pretesting and cognitive reviewing; and final version. A forward translation of the instrument from the original language (source language) to the target language was conducted by a bilingual translator, a health professional, familiar with the terminology of the topic embraced by the instruments and the content area of the construct of the instruments in the desired target language. The translator was also knowledgeable of the English-speaking culture and had experience in instrument development and translations. The instruments were translated back to English by an independent translator, whose mother tongue was English and who had no knowledge of the questionnaire and reviewed it as equivalent to the original. The back-translation was based on conceptual and cultural equivalence and not linguistic equivalence. Later, the back-translation version was sent to the original author for approval.

The questionnaire tool was tested for face validity, for which three subject experts: one each from IT, nursing, and education discipline were consulted. These experts reviewed the validity of the instrument about cultural and education system-related issues. After the review, minimal issues related to language were attended. In addition, the survey was pilot tested on six respondents who were academicians (three each from nursing and education disciplines) to check for appropriateness, clarity, and understandability. The responses of these six academics were also included in the analysis and their notes and comments were given serious attention. The reliability of the scale was measured 0.79, which was in the acceptable range of 0.75 to 0.83 for both satisfaction level and knowledge acquisition.

The questionnaire was divided into two main parts. The first part dealt with socio-demographic data such as age group, staff educational level, years of experience, specialty, language used in teaching, level of using computer and whether the staff had received online courses, and like. The second part dealt with critical success factors that were measured using the ICT variables scale (Selim, 2007; Vershitskaya et al., 2020) The scale was formed with three major rubrics that were related to outcomes of e-learning from academic staff perspectives such as satisfaction, knowledge acquisition, and knowledge transfer The scale included 36 items and the respondents were required to mark their answers on a four-point Likert-scale with 1 as strongly disagree, 2 as Disagree, 3 as Agree and 4 as Strongly agree. Respondents were given the option of N/A only if an item was not applicable. The scale was measured with good internal reliability with Cronbach's alpha of 0.79 in this study.

Data collection procedure

Data collection procedure started immediately after obtaining ethical approval from Hafr Al Batin University. Data was collected using structured online survey, for which school administrators were approached and informed about the study. The administrators agreed to send the invitation letter through the email list. The invitation included information about the purpose of the study and its significance and an email contact to send their interest to the principal investigators. Those participants who showed their interest were sent a link through the email (or any preferred method). Each participant was sent the information about the study, purpose, significance, voluntary participation, and confidentiality issue. The communication included a statement to show their consent. Once electronically the consent was signed, a link was sent to each participant to respond to the survey. The survey took about 10 minutes to fill it out. All data was kept in a password-secured computer.

Ethical Consideration

The ethical approval was obtained from the Scientific Research Committee Hafr Al Batin University. Participant's anonymity and confidentiality was guaranteed by using numeric codes instead of participants' names on all documents during data collection and analysis. Each participant received an informed consent form via email, explaining the aim and merit of the study, and stating that participation in the study was voluntary and risk-free. Each participant was required to sign the informed consent form.

Data analysis

Data was analyzed using SPSS package, version 25. The descriptive statistics of mean and standard deviation were used to describe the sample characteristics and critical success factors. Preliminary analyses were carried out to assure no violations of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. The *t*-test and ANOVA were used to test differences between the two groups. Pearson r was used to test the correlation magnitude and significance. A p-value less than 0.05 was considered statistically significant.

Results

Table 1 analyzes the mean age of staff, which was measured 40.6 ± 5.31 years at the education faculty, and 41.33 ±4.95 years at the faculty of nursing. Most participants in both groups were between the age of 30 to 50 years (> 70%), while more than 50% were assistant professor and lecturers. The data revealed that 42% staff in the education faculty and 88% staff in the nursing faculty had received training to use online learning methods.

Table 1: *Distribution of studied academic staff according to their characteristics*

Items	*Education n=50*		*Nursing n=25*		*t- /F test (p- value*
	n	%	n	%	
Age:					
<30	3	6	2	8	
30 - <40	17	34	8	32	
40-50	22	44	10	40	1.625 (>0.05)
50+	8	16	5	20	
Mean SD	40.6±5.31		41.33±4.95		
Teacher educational level:					
Demonstrator	3	6	2	8	
Teaching assistant	10	20	5	20	2.014
Lecturer	18	36	10	40	>0.05
Assist professor	12	24	5	20	
Professor	7	14	3	12	
Years of experience					
<10	10	20	4	16	1.766
10 - <20	21	42	12	48	>0.05
20 or more	19	38	9	36	
Language of course					
Arabic	50	100	0	0	16.487
English	0	0	25	100	<0.01**
Online course specialty					
Theory	50	100	15	60	5.077
Practice / applied	0	0	10	40	<0.01**
Level for using common computer application					
Beginner	4	8	1	4	
Intermediate	29	58	9	36	2.318
Advanced	17	34	15	60	>0.05
Training courses attended related to online courses:					
Yes	21	42	22	88	1.968
No	29	58	3	12	>0.05
Years of using the internet:					
< 5-10	15	30	6	24	1.308
10 or more	35	70	19	76	>0.05

The data revealed that there was no significant difference between both groups related to academic level, experience, using common computer application, training courses and years of using the internet with p value > 0.05. There was a high significant difference between the language of course and online course specialty used by both groups of participants (p value < 0.001).

The t-test and ANOVA (Table 2) shows very opposing results. For instance, while 46% and 40% of the Education staff showed a low value for the variable of using tools of platform and outcome factors respectively, the staff (56% and 52%) at nursing faculty showed a high level for the same variables respectively.

Table 2: *Distribution of studied academic staff regarding their satisfaction related online education at education and nursing faculty (N = 75)*

Variable	*Education*			*Nursing*			*t-test*	*p-value*
	High	Moderate	Low	High	Moderate	Low		
	n (%)	n (%)	n (%))	n (%)	n (%)	n (%)		
Using tools of platform	9 (18)	18 (36)	23 (46)	14 (56)	7 (28)	4 (16)	13.9	<0.01
Net Benefits	13 (26)	19 (38)	18 (36)	12 (48)	8 (32)	5 (20)	7.2	<0.05
Institutional Factors	11 (22)	23 (46)	16 (32)	10 (40)	9 (36)	6 (24)	7.0	<0.05
Outcome Factors	9 (18)	21 (42)	20 (40)	13 (52)	8 (32)	4 (16)	15.9	<0.01

Table 2 also illustrates a significant difference between education and nursing staff ($t = 13.9$, $p < .01$; $t = 7.2$, $p < .05$; respectively. In addition, 38% and 46% of academic staff at education faculty had moderate level related to net benefits and institutional factors, while 48% and 40% of nursing faculty had high level. The analysis also showed a significant difference between education and nursing staff ($t = 7.0$, $p < .05$; $t = 15.9$, $p < .01$; respectively).

The total satisfaction related to online education at education and nursing faculty showed that 42%, 38%, and 20% of academic staff at education faculty had low, moderate, and high level of satisfaction respectively while, nursing faculties had 20%, 28%, and 52% low, moderate and high level of satisfaction. These results revealed that faculty members at faculty of nursing had higher level of satisfaction (50% high level of satisfaction) than those at faculty of education (20% high level of satisfaction). The analysis also showed a significant difference between education and nursing staff ($t = 6.8$, $p < 0.001$).

Regarding knowledge acquisition and transfer, it was found that 40% and 38% of academic staff at education faculty had low and moderate level related to knowledge acquisition, while 44% and 36% at nursing faculty had high and moderate level (see Table 3). The analysis also showed a significant difference between education and nursing staff ($t = 7.01$, $p < .05$) . In addition, 42% and 26% of academic staff at education faculty had low- and high-level related to knowledge transfer, while 40% and 44% at nursing faculty had high and moderate level.

Table 3: *Distribution of faculty staff regarding knowledge acquisition and transfer related online education ((N = 75)*

	Education			*Nursing*				
	High n (%)	Moderate n (%)	Low n (%)	High n (%)	Moderate n (%)	Low n (%)	*t- test*	*P value*
Knowledge Acquisition	11 (22)	19 (38)	20 (40)	11 (44)	9 (36)	5 (20)	7.011	<0.05
Knowledge Transfer	13 (26)	16 (32)	21 (42)	10 (40)	11 (44)	4 (16)	8.034	<0.05

Table 3 also presents a significant difference between education and nursing staff ($t = 8.03$, $p < .05$). In addition, the analysis showed that there was a high positive correlation between staff satisfaction and knowledge acquisition ($r = .63$, $p < .001$), and with knowledge transfer ($r = .55$, $p < .001$) among academic staff at education faculty (p value <0.01).

The bivariate analysis of the data also revealed information related to staff satisfaction, knowledge acquisition and transfer at faculty of nursing. It was found that the academic staff at faculty of education showed a high positive correlation between staff satisfaction and knowledge acquisition ($r = .66$, $p < .001$), and knowledge transfer and satisfaction ($r = .71$, $p < .001$). the analyses of the academic staff at faculty of nursing showed a high positive correlation between staff satisfaction and knowledge acquisition ($r = .63$, $p < .001$), and moderate correlation knowledge transfer and satisfaction ($r = .55$, $p < .001$). On the other hand, knowledge transfers and knowledge acquisition were also significantly correlated among academic staff at education and nursing faculties ($r = .60$, $p < 0.001$; $r = .70$, $p < .001$; respectively).

Discussion

During the COVID-19 pandemic, education had been one of the most affected sectors. A massive impact was seen on educational institutions and teachers, who were obliged to move their courses online in a short period of time. Both academicians and students were required to adapt to online learning methods and manage their learning and teaching needs Chu et al. (2021) This study found significant differences between nursing and educational academics in relation to using common computer applications and usability of internet in their academic works. For instance, the analyses of data related to staff satisfaction for online education, this comparative study revealed a high level of satisfaction among the nursing staff as compared to the staff at education faculty. The satisfaction variables included using the platform tool or application, net benefits, institutional factors, and outcome factors.

One reason that might explain such differences was the kind of preparedness that nursing, and education staff had been exposed to. In other words, nursing staff had been using the internet platform prior to COVID-19; they had also been trained in laboratory work; and therefore, they could prepare students well for the challenging situation. This reflected their high satisfaction level. On the other hand, the education staff have not been exposed to the use of blended learning with their students. This was also clear in terms of those who had received training on e-learning where almost all (88%) of nursing staff expressed that they were trained compared to less than half of education staff. Nevertheless, this may have allowed nursing staff to judge and make their perception more objective as they had the experience of using such advanced technology into their education training and practices.

These results partially agree with a few previous studies such as Dawar et al. (2021) who demonstrated that teachers were satisfied with online education. The results are also in line with Reyes et al. (2021); Yuliastuti and Sholihah (2021) who found that teachers and instructors had low level of e-learning satisfaction. The results of the current study revealed several factors that contributed to low level of satisfaction among academic staff such as preparation for online teaching, time devoted to online teaching compared to face-to-face instruction, and spending more time to improve course design to support different learning styles, such as PowerPoint slides, videos, and quizzes. These findings are also in line with McGill et al. (2014) who asserted that the characteristics of the technology and institutional support systems did influence successful endorsement of e-learning. However, a few instructors might find a few challenges and difficulties in customizing learning tools, as they were the cost- and time-effective way to deliver a better learning experience to colleagues in e-learning.

Regarding the variables such as knowledge acquisition and knowledge transfer, the present study detected a higher level of knowledge acquisition and transfer significantly reported among academic staff at nursing than at education faculty. These results may be attributed to the fact that nursing staff had advanced skill levels of using common computer applications compared to those of education staff. This supported the findings of Shahmoradi et al. (2018) who found that poor internet services, high cost, and lack of computers and laptops devices for teachers were among the main factors that affected skills and knowledge and made variation among instructors. Such factors were also emphasized by McGill et al. (2014) who found that financial support was one core element to successful e-learning application. Puri (2012) reported that students' perception of successful factors of e-learning also hinted at the requirements of infrastructure, technology, and financial issues as core components to e-learning implementation.

The current study findings significantly revealed that there was a high positive correlation between staff satisfaction, knowledge acquisition, and knowledge transfer among academic staff at both nursing and education faculty. The more the teachers are satisfied with their abilities, skills, and familiarity with learning management systems, and if the greater are the free online training resources for teachers, opportunity to reuse recorded educational material, the accessibility of platforms, the education process flexibility, and the institutional support available to them. the greater are the chances of the improvement of their ability and skill to acquire knowledge and transfer information. Although controversial reports were found in terms of factors that contributed to academicians' satisfaction, the current study supported the notion that knowledge sharing, nature of knowledge, working culture, staff attitudes, motivation to share and opportunities to share were the factors that interrelated and influence satisfaction and the successful e-learning (Cidral et al., 2018).

Conclusion

The current study emphasized a significant issue related to the use of e-learning platforms during the COVID-19 pandemic. The results of the study revealed a high positive correlation between the variables of the study which included staff satisfaction, knowledge acquisition and knowledge transfer among one group of the study, i.e., the academic staff at education faculty. A lot of variation was found in the level of satisfaction with the second group of academic staff at the nursing faculty. Differences were found in almost all critical success factors between both the staff groups at nursing and education faculty. One of the differences was having a low and moderate level of knowledge acquisition among the Academic staff at education faculty in comparison with the staff at the nursing faculty.

The study has several implications to educators and policy makers in various educational institutions. The findings of the study have reiterated that staff in education faculty and other humanities faculties should provide training opportunities for the staff to enhance their skills. The results have also emphasized that curricula should be reviewed to address e-learning issues and more advanced technology should be introduced in education, particularly e-learning and its platforms. The study also felt a need to improve the level of literacy of advanced technology in education including the blended learning and simulation as one novel means of education at undergraduate and graduate levels. Teachers and academic staff need to be well equipped with skills and knowledge about the efficient use of advanced technology in education and research. The policy makers would benefit from this study, and they would improve learning/teaching resources for both students and educators to enhance positive learning outcomes.

One limitation of this study was related to the naturally low number of faculties included in this study. A larger and more specific involvement in future studies would incur more informative results. More research is needed to compare the efficacy of various forms of e-learning platforms from students' and instructors' perspectives.

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Declaration of Competing Interest

The authors declare that they have no competing interests.

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