Attitudes and Practices of Educators Towards e-Learning During the COVID-19 Pandemic

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Abstract: Background The novel coronavirus outbreak is now shifting the way educational institutions operate around the world. This study aims to assess the online learning experience during the pandemic and recognize its perceived barriers according to university professors in Jordan. Methods This is a questionnaire-based, cross-sectional, and descriptive study. A web-based survey was distributed to all university professors and lecturers in public universities across Jordan. Results A total of 508 educators responded to this study. Males (67.5%, n=343) dominated the study population compared to females (32.5%, n=165). Educators spent an average of 20.2 ± 15.9 hours/week using the internet for educational purposes during the pandemic. Positive attitudes towards online teaching were seen, as 65.7% reported being prepared for online teaching, while 40.8% were comfortable communicating with students via online platforms. Institutional support for online learning also appears to have increased following the coronavirus outbreak. An overwhelming majority (81.9%, n=416) stated that their universities supported online education during the pandemic, compared to 56.5% (n=287) before. The main recognized barriers for online teaching were poor internet connection (78.3%, n=398), disadvantages in old learning tools (e.g., uploading capacity) (70.9%, n=360), and family atmosphere (69.3%, n=352). Participants also recognized technical (74.0%, n=376) and computer skills (49.2%, n=250) as areas requiring development. Conclusion Despite the positive attitudes of educators towards online teaching, many barriers need to be overcome before the shift from traditional learning is implemented. Faculty training and inter-departmental communication are warranted for the success of online teaching during the COVID-19 pandemic.

Keywords; coronavirus, COVID-19, e-learning, online teaching, pandemic, distance learning

1. Introduction

Online learning is a form of distance learning that harnesses electronic technology and internet platforms for conducting teaching and learning processes (Howlett *et al.*, 2009). Distance learning has been conducted since as early as 1996, with the use of methods such as TV broadcasting, lesson recording, and online content (Weiner *et al.*, 2019). The last decade has seen a shift, albeit hesitant, into online and other forms of distant learning (Shachar and Neumann, 2003; Weiner *et al.*, 2019). Recently, due to the novel coronavirus (COVID-19) outbreak many countries have implemented containment measures ranging from partial to complete lockdowns (Lau *et al.*, 2020). Thus, several educational institutions were required to operate under exceptional circumstances and transfer their activities to online and remote methods (Sahu, 2020). Such transition, normally taking months of deliberation and training, is now happening overnight. Concerns over the preparedness of institutions and faculty members for the delivery of high-quality remote education may therefore re-emerge.

Many countries since the declaration of COVID-19 as a global pandemic by the World Health Organisation (WHO) have implemented precautionary efforts directed towards containing the viral outbreak, forcing multiple institutions, most noticeably schools and universities to work and operate remotely (Azamfirei, 2020; Cohen and Kupferschmidt, 2020).

Online learning incorporates Information and Communication Technologies (ICT), such as websites, video conferences, CDs, television, online platforms, and mobile technologies in the learning and teaching process (Sife, Lwoga and Sanga, 2007). This has been suggested to enhance education quality, increase motivation, evade place limitations, provide time flexibility, and endow both students and educators with innovative technological skills (Van Braak, 2001; Al-Zaidiyeen, Mei and Fook, 2010). However, the shift towards online education has been slow due to multiple barriers recognized from earlier experiences. These barriers to online learning may fall into 4 main categories including skills, resources, institutional strategies, and attitudes (O'Doherty *et al.*, 2018).

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2. Literature Review

Barriers to efficient online learning during COVID-19 included the lack of technological equipment and stable internet connection, socioeconomics, household distractions, and digital incompetence among students and educators. Moreover, the lack of structured teaching plans with digestible material were found to risk overloading students and faculty and hinder effective learning (Adedoyin and Soykan, 2020).

Recently, many studies attempted to assess the online learning experience mandated by COVID-19 from teachers' and students' perspectives. One study from India has highlighted the key areas that determined the success of online teaching from the perspective of 70 teachers and 407 college students. These included efficient interaction, a defined structure for modules, the availability of technical support, and the ability to conduct practical lessons remotely (Nambiar, 2020). Another study outlined the online learning challenges faced by elementary school teachers during the COVID-19 pandemic. These were the availability of infrastructure, including internet connection and facilities, in addition to teacher-parent collaboration and carrying out teaching activities, including planning, teaching, and assessment (Fauzi and Khusuma, 2020).

Several studies have examined the online learning process during the time of the pandemic from students', parents, or school teachers' perspectives (Agung, Surtikanti and Quinones, 2020; Dong, Cao and Li, 2020; Khalil *et al.*, 2020; König, Jäger-Biela and Glutsch, 2020; Mailizar *et al.*, 2020; Verma *et al.*, 2020). However, few studies provided an insight into online teaching practices and attitudes of university educators during the early stages of the COIVD-19 pandemic. Furthermore, this study examines factors influencing educators' perceptions of institution preparedness and barriers towards the implementation of effective e-learning in a developing country providing better understanding necessary to future adaptation of online education in the region. Moreover, as the adaptation of online education was conducted overnight in the early stages of COVID-19, educators' readiness to adopt new technologies was assessed in this study. Therefore, educators were classified based on their adaptation styles providing better understanding to achieve better accommodation of online teaching tools necessary for effective online teaching particularly in developing countries.

3. Methods

3.1 Study design

This is a descriptive, questionnaire-based, cross-sectional study design. The questionnaire was implemented on a web-based platform to facilitate completion and collection of data during the quarantine period. Invitations were emailed nationwide to all educators of all academic degrees at private and public universities in Jordan. E-mail addresses were obtained from universities' websites. The link to the survey questionnaire was included in the sent invitations with a brief description about the study purpose. The average completion time of the survey was 10 minutes.

3.2 Questionnaire development

A set of main ideas and primary items directly relevant to our topic were based on current scientific literature. The primary items were reviewed by seven experts from different disciplines and universities who were required to provide feedback and suggest necessary changes in order to establish both face and content validity of the survey. The reliability of the questionnaire was established using a pilot test by collecting data from 20 academics not included in the study sample. They were asked to fill in the questionnaire individually and were encouraged to think loudly and to speak what they meant by each answer and how they understood each question.

Responses were voice recorded and questions were adjusted accordingly. The final survey contained five sections. Those included (1) demographics, (2) innovation adoption, (3) attitudes and opinions towards online learning, (4) perceived areas of development and barriers, and (5) usage and rating of online teaching tools.

Questions included in the questionnaire were tested for content validity. Section 2 was adopted from Roger's classification of innovation adoption where people are categorized as Innovators (the first to adopt a new innovation); Early Adopters (second in responding to novelties); Early Majority (those who accept a technology after a considerable period of time); Late Majority (those who adopt a technology after the average society member); and Laggards (those who are last to accept an innovation) according to their acceptance of new technologies (Rogers, 1983). A three-point Likert scale was used and scored to evaluate statements related to electronic teaching practices and perceived barriers and to identify associated factors. Usage of online teaching

tools were assessed using "Yes", "No" options. Furthermore, educators were asked to rate the currently used online teaching tools from 1=less preferred to 3= more preferred, with the option "not using it" was available for each online tool.

3.3 Ethics

Ethical approval was obtained from the Institutional Review Board (IRB). Participants were informed prior to starting the survey that it is completely anonymous, voluntary, and that all data would be treated as confidential.

3.4 Statistical Analysis

Data was analyzed using SPSS software version 24. Descriptive data was expressed as frequencies and percentages. T-test and the One-Way ANOVA Model were used at a significant level of Alpha <0.05 to identify factors associated with educators' attitudes and perceived barriers to on-line learning.

4. Results

A total of 508 educators participated in the study. Table 1 shows participants' characteristics. The mean (±SD) age among participants was 44.8 ± 10.4 years. Males (67.5%, n=343) were predominant in the sample. Almost 41.5% (n=211) of educators belonged to medical faculties, 37.5% to engineering faculties, 17.7% to science and literature faculties, and 3.3%. to other faculties. The mean years of experience was 9.7 ± 9 years. Almost two thirds (66.9%, n= 340) of educators reported having a prior experience with online learning, including attending or receiving workshops, webinars, and courses. The educators reported that they used the internet for 12.8 ± 13.6 hours/week prior to the coronavirus crisis for non-educational purposes (e.g., Facebook, YouTube, games). During the pandemic, the use of internet for educational purposes averaged at 20.2 ± 15.9 hours per week.

Table 1: Demographic characteristics of study participants. (N=508)

Variable	Frequency (%)
Gender	
Male	343 (67.5)
Female	165 (32.5)
Age mean ± SD	44.8 ± 10.4
Academic degree	
Professor	103 (20.2)
Associate Professor	108 (21.3)
Assistant Professor	223 (43.9)
Lecturer	37 (7.3)
Teacher	37 (7.3)
Department	
Medical	211 (41.5%)
Engineering	190 (37.5)
Science and Literature	90 (17.7)
Other	17 (3.3)
City	
Northern	305 (60.0)
central	176 (34.6)
southern	27 (5.4)
Living Area	
City	453 (89.2)
Village	55(10.8)
Prior experience with online education	
Yes	340 (66.9)
No	168 (33.1)
Years of experience mean ± SD	9.7 ± 9.0
Number of hours you generally spent per week online for non-educational purposes	12.8 ± 13.6
Number of hours spent online per week for educational purposes during the current corona crisis	20.2 ± 15.9

Participants were asked to categorize themselves into Innovators, early adopters, early majority, late majority, or laggards according to their adoption of online teaching technologies (Table 2). Most reported being

innovators (37.8%, n=192) or early adopters (32.7%, n=166). Meanwhile, only 5.3% (n=27) were self-classified as late majority and 6.7% (n=34) as laggards.

Table 2: Self-reported categories of teaching technologies adoption

Style	Frequency (%)
Innovators	192(37.8)
Early Adopters	166 (32.7)
Early Majority	89 (17.5)
Late Majority	27 (5.3)
Laggards	34 (6.7)

Most educators believed they were well-prepared for electronic education (65.7%, n= 334) (Table 3). More than half participants also reported having the required computer skills to conduct online teaching activities (77.4%, n=393). Less than half (40.8%, n= 207) said they were comfortable communicating with students by online methods. However, only 36.2% (n=184) reported being easily able to give group assignments online. Moreover, only 23.2% (n=118) stated that they would prefer electronic learning to become the new norm. The greater percent did not trust online systems to be robust and fair (32.5%, n= 165). Around 55% of participants also disagreed that all courses offered by their departments can be given electronically without difficulties. University support for online education appeared to have increased following the COVID-19 pandemic. An overwhelming majority (81.9%, n=416) stated that their universities supported online education after the pandemic, compared to 56.5% (n=287) before. Around 44.7% (n=227) educators perceived the online education provided by their universities to be of high quality. A similar percent (40.9%, n=208) stated that their universities provide tools and technical support for online education. More than half participants also stated they can easily access the internet to conduct online teaching activities (63.8%, n= 324). Around half educators disagreed that students feel more comfortable sharing their ideas through online platforms compared to classes (50.2%, n=255). Moreover, around 47.2% (n=240) agreed that online education risks overloading students with schoolwork.

Table 3: Attitudes and practices of educators towards online teaching during the COVID-19 pandemic

Preparedness and Attitudes Statements	Frequency (n%)		
	Disagree	Neutral	Agree
▪ You are well-prepared to join online learning	56 (11.1)	118 (23.2)	334 (65.7)
▪ Before the emerging of COVID-19, the university used to support online education.	82(16.1)	139(27.4)	287 (56.5)
▪ After the emerging of COVID-19, the university started supporting online education.	82(16.1)	59 (11.4)	416 (81.9)
▪ Would you prefer to have online learning to become the new normal?	232 (45.7)	158(31.1)	118 (23.2)
▪ I am able to easily access the Internet for my online courses.	85 (16.7)	99 (19.5)	324 (63.8)
▪ I feel comfortable to actively communicate with my students online.	152 (29.9)	149 (29.3)	207(40.8)
▪ I am able to grade assignments on time for online courses (usability).	124 (24.4)	168 (33.1)	216 (42.5)
▪ My university provide high-quality online education.	84(16.5)	197 (38.8)	227(44.7)
▪ I prefer in-class approach as it provides a lot of interaction with my students.	46 (9.1)	88(17.3)	374 (73.6)
▪ I have satisfactory computer skills for dealing with online course/assignments.	25(4.9)	90 (17.7)	393 (77.4)
▪ Students feel more comfortable sharing their thoughts in an online learning environment than in-class.	255 (50.2)	185 (36.4)	68 (13.4)
▪ I can easily assign group activities online.	149 (29.3)	175 (34.4)	184 (36.2)
▪ I believe most courses offered in my department can be given online without difficulty.	279 (54.9)	113 (22.2)	116 (22.8)
▪ You trust the online systems to be fair, rigorous and reliable.	165 (32.5)	220 (43.3)	123 (24.2)
▪ My school provide adequate hardware and technical support for online learning	114 (22.4)	186 (36.6)	208 (40.9)
▪ Online education is associated with a significant risk of information overload.	110 (21.7)	158 (31.1)	240 (47.2)

Perceived barriers for online education were also assessed (Table 4). The most recognized barriers were weak internet connection (78.3%, n=398), disadvantages in old learning tools (e.g., uploading capacity) (70.9%, n=360), and family atmosphere (69.3%, n=352). Time constraints, lack of instructions, demotivation, equipment costs, internet subscription fees, and number of students were all identified as barriers by over than half of educators (61%, 59.8%, 56.1%, 52.2%, 58.7%, and 53.5%, respectively). The majority of participants recognized training for use of online learning platforms as an area needing development (74%, n=376).

Table 4: Perceived barriers and necessary areas of development for online education

	Frequency n (%)		
Barriers	**Agree**	**Neutral**	**Disagree**
Lack of motivation	285 (56.1)	128 (25.2)	95 (18.7)
Lack of instructions	304 (59.8)	118 (23.2)	86 (16.9)
Too challenging eLearning tools	221 (43.5)	134 (26.4)	153 (30.1)
Cost of hardware	265 (52.2)	117 (23.0)	126 (24.8)
Cost of Internet	298 (58.7)	102 (20.1)	108 (21.3)
Family atmosphere	352 (69.3)	104 (20.5)	52 (10.2)
Poor Internet connection	398 (78.3)	76 (15.0)	34 (6.7)
Time consuming	310 (61.0)	120 (23.6)	78 (15.4)
School using complex online software programs	131 (25.8)	184 (36.2)	193 (38.0)
Lack of trust in online systems	154 (30.3)	203 (40.0)	151 (29.7)
Number of students	272 (53.5)	98 (19.3)	138 (27.2)
Disadvantages in old learning tools (e.g., uploading capacity)	360 (70.9)	92 (18.1)	56 (11.0)
Needed skills			
Basic computer literacy	250(49.2)	145(28.5)	113(22.2)
Skills training in using the online tools	376(74.0)	101(19.9)	31(6.1)
Training in browsing online resources	291(57.3)	131(25.8)	86(16.9)

Factors associated with attitudes and perceived barriers to distance learning were assessed (Table 5). Notably, females appeared to have significantly more perceived barriers than their male counterparts (p= 0.00). Moreover, there were significant differences in the reported barriers across departments, with pharmacy and nursing departments having the highest average of perceived barriers 2.67 (0.46). Preparedness to join online teaching was associated with less perceived barriers and more positive attitudes. Prior experience with online education and innovativeness were also both associated with more positive perceived attitudes towards online learning.

Table 5: Factors Associated with Attitudes and Perceived Barriers to Distance Learning

Variables	**Attitudes** Mean (SD)	**p value** (sig.)	**Perceived Barriers** Mean (SD)	**p value** (sig.)
Gender				
Male	2.02 (0.42)	0.329	2.49 (0.47)	*0.000*
Female	1.98 (0.39)		2.65 (0.44)	
Age				
25-35	1.99 (0.43)	0.816	2.59 (0.47)	0.275
36-45	2.02 (0.39)		2.56 (0.46)	
Above 45	2.01 (0.42)		2.51 (0.47)	
Academic degree				
Professor	1.96 (0.41)	0.395	2.57 (0.53)	0.108
Associate Professor	2.04 (0.41)		2.58 (0.44)	
Assistant Professor	1.98 (0.38)		2.56 (0.44)	
Lecturer	2.01 (0.44)		2.45 (0.49)	
Department				
Medical (MDs and Dentists)	2.05 (0.41)	0.227	2.48 (0.45)	*0.007*
Medical (Pharmacists and Nurses)	2.05 (0.42)		2.67 (0.46)	
Engineering	2 (0.42)		2.51 (0.46)	
Science and Literature	1.95 (0.40)		2.51 (0.48)	
Teaching Experience (Years)				
Up to 5	2.03 (0.41)	0.398	2.57 (0.47)	0.678
6-10	2.04 (0.42)		2.53 (0.49)	

Variables	Attitudes Mean (SD)	p value (sig.)	Perceived Barriers Mean (SD)	p value (sig.)
11-15	1.96 (0.39)		2.55 (0.45)	
More than 15	1.97 (0.42)		2.51 (0.45)	
Living Area				
Urban	2.01 (0.41)	0.527	2.49 (0.50)	0.340
Rural	1.98 (0.42)		2.55 (0.47)	
Preparedness to Join Online Teaching				
No	1.6 (0.31)	*0.000*	2.73 (0.45)	*0.000*
Not Sure	1.8 (0.32)		2.65 (0.39)	
Yes	2.15 (0.38)		2.48 (0.48)	
Prior experience with online education				
Yes	2.06 (0.41)	*0.000*	2.54 (0.47)	0.701
No	1.9 (0.39)		2.56 (0.45)	
Number of Online Platforms used				
≤ 3 platforms	2.12 (0.41)	*0.000*	2.52 (0.46)	0.326
> 3 platforms	1.95 (0.40)		2.56 (0.47)	
Innovativeness (Rate of Adoption)				
Innovators	2.11 (0.41)	*0.000*	2.54 (0.44)	0.250
Early Adopters	1.97 (0.37)		2.56 (0.46)	
Early Majority	1.83 (0.37)		2.58 (0.46)	
Late Majority	1.99 (0.44)		2.59 (0.50)	
Laggards	2.1 (0.50)		2.38 (0.61)	

T-test and the One-Way ANOVA Model were used at a significant level of Alpha <0.05

Educators reported their most and least preferred platforms for conducting online teaching activities (Figure 1). E-mail, university e-learning, and Moodle were the most used platforms among educators for online teaching during the COVID-19 pandemic (figure 1). YouTube (56.5%, n=287), Facebook (54.5%, n=277), and Zoom (51.4%, n=261) were also used by over than half of the participants. WhatsApp and google classroom were the least preferred platforms among educators.

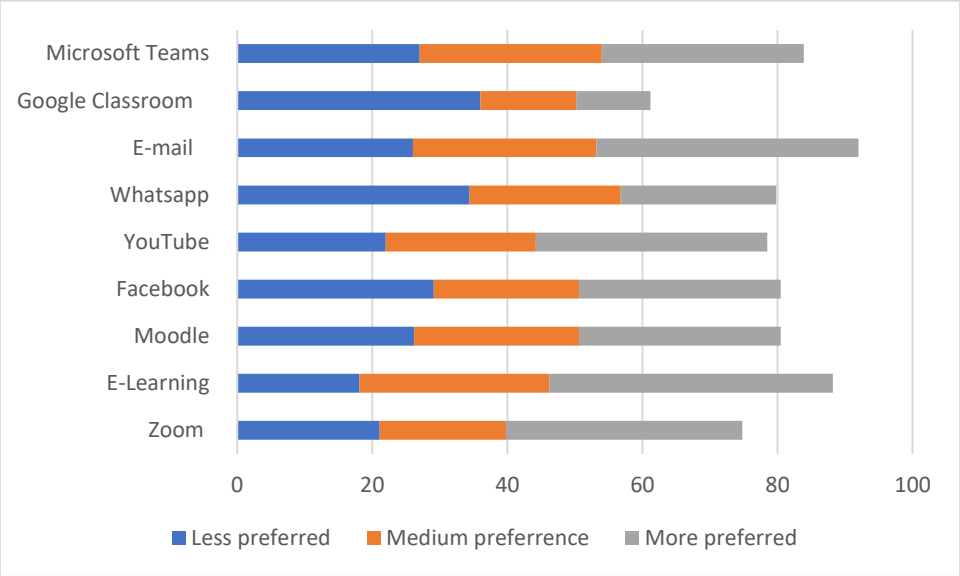

Figure 1: Preference ratings of commonly used online tools among users

5. Discussion

This study is a nationwide study that included educators from all public and private universities in Jordan. Our study finds that the main barriers for online education according to educators are poor internet connection, disadvantages in old learning tools (e.g., uploading capacity), and family atmosphere. These barriers were perceived more significantly among females. Such barriers have been previously reported by multiple studies, especially in developing countries where the infrastructure for information technology may be lacking (Attardi and Rogers, 2015; Lakbala, 2015; O'Doherty *et al.*, 2018). Lack of technology infrastructure and internet access

and poor internet connection also present challenges for online teaching, and were recognized as a main technical issues for live online classes in studies from Iran, Cameroon, and Canada (Bediang *et al.*, 2013; Attardi and Rogers, 2015; Lakbala, 2015).This particularly presents a challenge for the use of interactive teaching methods, such as video conferencing and prerecorded videos. In our study, use of the video conferencing tool "Zoom" and the video-sharing platform "YouTube" was popular among professors. Those also received high rankings among the commonly used platforms, as 35% and 34.3% gave a higher rating for Zoom and YouTube, respectively. The use of educational media downloadable from YouTube may offer a timesaving and relatively easy method to deliver certain concepts to students. However, real-time platforms such as Zoom offer a more interactive experience with an opportunity for in-class questions and answers. However, they are affected by poor internet connection and the lack of appropriate infrastructure (e.g. computers, webcams, internet routers, etc.). Rasmitadila *et al.(*2020) also noted that educators, particularly primary school teachers, may prefer methods that are commonly used among parents, such as WhatsApp. The cost of hardware infrastructure and internet subscription fees were also seen as challenges by over than half of our participants. However, Maloney *et al.* (2012) argue that investment in web-based education may later prove to be more cost-efficient than traditional learning, thus serving as a solution to a perceived barrier.

Responses to this study demonstrate a nationwide institutional support for online teaching following the COVID-19 pandemic. Compared to the 56.5% of educators agreeing that their universities supported online learning before coronavirus spread, around 81.9% stated such support is now present after the pandemic. A considerable percent of educators (40.9%) also endorsed the technical and hardware support offered by their universities for e-learning activities, while 44.7% stated that their universities offer high-quality online education. Sife, Lwoga and Sanga (2007) identify institutional support as a factor vital for successful integration of technologies in the learning and teaching processes. A recent study from Indonesia similarly identified collaboration and support from all of the involved parties, such as schools, authorities, and teachers as key factors in the success of online learning in the country amidst the pandemic (Rasmitadila *et al.*, 2020). Communication among departments and clear administrative directions can also contribute greatly to the success of e-learning strategies (Bury, Martin and Roberts, 2006). In this study, lack of directions was identified as a barrier to the success of online teaching by over than half of our participants (59.8%).

Training for technological and computer skills was the primary area needing development according to educators in this study. Dwyer, Ringstaff and Sandholtk (1992) further goes to highlight the importance of technological literacy and competency among administrators for the implementation of technology-based activities. Moreover, lack of technical skills is suggested to discourage the use of online-learning platforms (Dyrbye *et al.*, 2009). In a cross-sectional survey of 30 lecturers from nursing and midwifery faculties, the majority (66%) believed that lack of technical training is a barrier for e-learning implementation (Lakbala, 2015). This was previously highlighted in many studies, as the lack of required training is suggested to discourage faculty from conducting online teaching activities (Dyrbye *et al.*, 2009; Niebuhr *et al.*, 2014; Perlman *et al.*, 2014). In our study, educators who felt prepared to conduct online teaching activities had significantly less perceived barriers and more positive attitudes. Additionally, prior experience with online teaching was associated with more positive attitudes, highlighting the role of skills and digital competency in guiding a smooth and efficient transition to online learning.

Negative attitudes towards online learning may stem from a lack of comfort towards using unfamiliar technologies and having to handle technical errors. In addition, educators may find it overwhelming to navigate new tools and platforms while fulfilling teaching responsibilities (Merlin, Weston and Tooher, 2009; Skye *et al.*, 2011). The latter may be perpetuated by the need to cope with major life changes and elevated psychological stress associated with the novel coronavirus spread (Yanyu *et al.*. This further perpetuates the problem of time constraints already recognized by 61% of our participants, as both students and teachers might be overwhelmed with the extra burden of assigning time for technical skill attainment. A study of 27 faculty members engaging in the creation of online teaching content showed time management as an important limitation to the program, despite positive attitudes and increased confidence in new skills being reported (Niebuhr *et al.*, 2014). Perlman (2014) also cites time as a hindrance for faculty participation in an electronic portfolio (e-portfolio) experience, as they spent an average of 4-5 days of uncompensated time training for and using the tool. A suggested solution to this challenge is to reimburse and acknowledge educators for the additional time dedicated for training and creating online educational content (O'Doherty *et al.*, 2018). Once implemented, information and communication technology can be time-efficient and robust (Perlman *et al.*, 2014). This was shown in previous

studies in which a reluctance from lecturers to abandon the traditional teaching culture was observed and distance learning methods were adopted (Skye *et al.*, 2011; O'Doherty *et al.*, 2018).

On a natural distribution curve, Rogers (1983) proposed that people fall into five categories in terms of adopting new technologies. The degree of willingness to adopt new technologies in teaching has been suggested to predict the use of computer mediated communication (CMC) in school teaching (Van Braak, 2001). In a survey of 233 school teachers, most (90.2%) CMC users strongly agreed that adoption of technology innovations is beneficial to teaching (Van Braak, 2001). Furthermore, around 86.3% of CMC users believed the adoption of innovations in teaching is of high priority. In our study, an overwhelming majority (70.5%) of educators self-identified as either innovators or early adopters of online teaching technologies. In addition, around 40.8% were comfortable in communicating with their student via online platforms, and 65.7% reported being well-prepared for online teaching. This reflects positive attitudes among university professors towards taking the leap into a perhaps un-navigated experience. In contrast, a similar study reported the dissatisfaction of elementary school teachers (80%) with the online learning experience, with many perceiving it as ineffective (Fauzi and Khusuma, 2020). However, our study was conducted in an early period of the COVID-19 pandemic, and hence the timeframe was not large enough to assess long term outcomes. Interestingly, only 23.2% of our participants preferred online learning to become the new norm. This suggests that many barriers still need to be overcome before such strategies are successfully implemented.

5.1 Conclusion

Multiple barriers are identified that might hinder this shift, including poor infrastructure, costs, and time constraints. The study also identifies predictors of perceived barriers and attitudes of educators towards online teaching, including prior experience and readiness to adopt new technologies. Therefore, it is recommended that training programs and inter-departmental communication strategies are implemented and using fewer platforms for online education for an efficient online learning experience. Future studies assessing online tools used by educators are suggested to provide guidance of efficient tools in online education.

Conflicts of interest

Authors declare no conflicts of interest.

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Ethics approval

Ethical approval was obtained from the Institutional Review Board (IRB) (reference code 92/132/2020).

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