The Role of E-Education in Preserving Educational Outcomes During Covid-19 Pandemic

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Abstract

This study aims to examine the role of e-education in preserving educational outcomes during the Covid-19 pandemic and to explore factors that were associated with these outcomes. A descriptive cross-sectional study was conducted between August and September 2020. A sample of Saudi Electronic University (SEU) students was asked to participate in this study. The study questionnaire is composed of seven main domains; demographics domain, attitudes towards e-education, others influence on e-education perception, contents of education and participation in the online discussion, challenges of e-education, effects of e-education, and finally a comparison between e-education and traditional education. One hundred and thirty eight students participated in this survey. The students reported that e-education is appropriate and they indicated positive views towards using e-education tools in their daily study. The majority of study participants reported low participation in an online discussion. In addition, the participants reported limited ability to overcome e-education challenges. The participants stated that e-education improves their overall performance. The majority of the students reported that e-education is superior to the traditional educational methods and half of the participants reported that they would recommend e-education to others. Based on study results, it is recommended to find motivation and monitoring tools to encourage the students to participate more in the online discussion, which could eventually enhance the achievement of students enrolled in the e-education. In addition, more support is needed to eliminate challenges associated with the Covid-19 pandemic and maintain students' positive view towards the e-education process.

1. Introduction

In December 2019, a new viral infection appeared in the Wuhan providence in China and it quickly spread all over the world (Sapkota & Narayangarh, 2020). The World Health Organization (WHO) announce a global pandemic status in March 2020 (Khalil et al., 2020). The official name of this new virus is '2019 novel coronavirus' or Covid-19. It has disrupted normal life activities for millions of people worldwide, including educational activities (Alqahtani & Rajkhan, 2020; Martins et al., 2020). Lockdowns were announced in several countries and regions. Universities and schools were forced to shut down and switch to distance education or e-education (Kaur et al., 2020; Rajhans et al., 2020). Although e-education has become a well-known phenomenon in the modern era, this unplanned and sudden switch to e-education was an excellent opportunity to examine the large-scale effects of e-education on educational outcomes (Alqahtani & Rajkhan, 2020; Khalil et al., 2020).

In Saudi Arabia, the first Covid-19 case was reported in March 2020 and the lockdown measures were implemented in the same month (KSA, 2020; Network, 2020; WorldAware, 2020). The Saudi government closed all traditional face-to-face educational institutes. The only available option to continue the educational process was e-education (Almaghaslah & Alsayari, 2020; "Coronavirus Outbreak Forces Arab Countries to Consider Long-Ignored Online Education," 2020). Meanwhile, the Saudi Electronic University (SEU) is a well know long-term reputable e-education institution, established back in 2012 (Alsadoon, 2020; Bugis, 2020). Since the SEU was already providing an e-education blinded curriculum, the Covid-19 pandemic has not led to significant disruption in its activity. On the contrary, it started a new opportunity to expand the e-educational activities to a broader targeted population (W. Saudi Electronic University, n.d.). However, the effects of Covid-19 on educational outcomes were not explored on SEU students.

Nowadays, the benefits and advantages of e-education reached a point that is not a matter of argument and debate anymore (Boateng, 2015). However, the vast majority of studies that examined the benefits of e-education were conducted in a period when this method was optional, unlike the situation with Covid-19 when it becomes the only option for educational activities. Therefore, it is crucial to explore the effects of e-education on education outcomes in Covid-19 affected areas.

Although there is no consensus on a definition for e-education, the following definition is widely used in the literature: E-education is referred to as the use of electronic tools, applications and telecommunication to provide, maintain, and improve the educational process and involves discussions between students and teachers using electronic and web materials and teaching, and involves communication between learners and teachers utilizing online content (Alfawaz & Yamin, 2020; Baticulon et al., 2020; ESRI et al., 2020, p. 19).

This study aims to examine the role of e-education in preserving educational outcomes during the Covid-19

pandemic and to explore factors that were associated with these outcomes.

2. Methodology

This descriptive cross-sectional study was conducted between August and September 2020. A convenient sample of Saudi Electronic University (SEU) students was asked to participate in this study. Inclusion criteria were any student who was enrolled at any of the undergraduate or postgraduate programs at the time of data collection. Exclusion criteria were those who refused to give informed consent on participation in this study.

The study questionnaire was based on a modified version of Devisakti & Ramayah and Diab & Elgahsh questionnaires (Table I). The study questionnaire is composed of seven main domains; demographics domain, attitudes towards e-education, others influence on e-education perception, contents of education and participation in the online discussion, challenges of e-education, effects of e-education, and finally a comparison between e-education and traditional education (Devisakti & Ramayah, 2019; Diab & Elgahsh, 2020).

The study invitation was sent by WhatsApp and Facebook groups to potential participants. The data was collected electronically on Google Forms, then exported as an Excel sheet.

The questionnaire included a short briefing about the nature of the study and the procedures of filling out the questionnaire. An online written, voluntary informed consent was obtained from all study participants. No identifying data were collected in the questionnaire and this study was according to SEU ethical regulations for studies involving human participants. It was conducted according to the Declaration of Helsinki (Williams, 2008).

The anonymous survey data were numerically coded in an Excel sheet (Microsoft Corp., Redmond, WA, USA). The data was imported into an SPSS statistical spreadsheet (Statistical Data Analysis Software, SPSS version 23.0) and analyzed. Descriptive statistics analysis of the demographic characteristics of the study participants was prepared. The five-point Likert scale data were expressed as means ± standard deviation (SD). The students' response was recorded on from 1 'strongly disagree' to 5 'strongly agree'. The overall mean score was calculated by the summation of all scores and converting the number into a percentage. If the overall score was more than 50% then it was considered as a positive perception towards e-education. Data were interpreted as statistically significant when p-value < 0.05.

The internal consistency coefficients (reliability test) were adequate for the questionnaire. The internal consistency (Cronbach's alpha) of the questionnaire was .714. This Cronbach's alpha value is considered adequate because they exceed the threshold of 0.6 (Zhong, 2020).

3. Results

One hundred and thirty eight students participated in this survey. Almost 60% of the study participants were male students and around half of the participants were between 18 and 20 years old. The characteristics of the study participants are described in Table 2.

Both male and female students reported that e-education is appropriate with a mean score of 2.9±1.2 and 2.7±1.2, respectively. Male students were more confident in using e-education tools (2.5±1.4) compared to female students (2.2±1.5), but the difference between the two genders was not statistically significant (p-value 0.181). Similarly, male and female participants reported positive views towards using e-education tools in their daily study with a mean score of 2.7±1.1 and 2.6±1.3, respectively. On the other hand, encouragement and support from others vary greatly; the encouragement and support ranged from 2.5±1.4 scores for support received by male students from university employees to 1.9±1.4 score for encouragement of female students by family members.

Meanwhile, female students reported that the e-education contents are informative with a mean score of 2.7±1.3 compared with a mean score of 2.3±1.4 for male students; however, the mean difference between the two genders was not statistically significant. Nonetheless, both genders reported low participation in an online discussion. Also, the participants reported limited ability to overcome e-education challenges yet female students reported a score of 2.6±1.5 for finishing registered courses and male students reported a 2.3±1.4 score with no statistical significant difference between the two genders.

Undoubtedly, male and female participants reported that e-education improves their overall performance, with a mean score of 3.0±1.2 and 3.1±1.1, respectively, while the reported encouragement of e-education for the exploration of additional information in the area of study had a mean score of only 1.8±1.5 between female students. The reported encouragement of e-education for time management was limited for both genders. Almost half of the students from both genders agreed that the e-education decreases students' educational expenses.

The majority of the students reported that e-education is superior to the traditional educational methods and half of the participants reported that they would recommend e-education to others. Table 3 and Figure 1 demonstrate the details of students' mean scores towards e-education.

Four out of each ten participants reported a positive perception towards e-education. Around one-third of participants between 18 and 20 years old had positive perception compared with half of the participants 23+ years old. Both genders were almost equally divided between positive and negative perceptions towards e-education and the difference was not statistically significant. While the positive perception ranged between 35.1% between

students, using e-education for less than an hour per week to 51.4% between students who use e-education 1 to 7 hours per week. Table 4 describes the overall perception of the students towards e-education.

4. Discussion

This study provides an essential insight into the e-education outcomes during the Covid-19 pandemic. One of the most prominent highlights of this study is that it showed that despite all the challenges that were associated with the pandemic and the lockdown measures, the majority of the students still believe that e-education is superior to traditional educational methods. This finding is in line with Baticulon et al. and Dodiya et al., reporting that the participants perceive e-education as a better alternative for classical or traditional educational methods (Baticulon et al., 2020; Dodiya et al., 2019).

Although the current study failed to identify any gender difference in the perceptions towards e-education, this was, surprisingly, in contrast to findings of a previous study in Saudi Arabia that reported female students to have more favorable views towards e-education and remote learning in general (Alfawaz & Yamin, 2020). These differences in gender perception between the two studies could be related by the underrepresentation of female students in the current research and to lockdown measures that could have some impact on gender roles and gender dynamics (Betron et al., 2020).

The majority of SEU students reported that the SEU academic employees were supportive of e-education. This was an expected result since the SEU is one of the pioneer public universities in Saudi Arabia and the Middle East Region in e-education, blending learning and innovation in the educational process (S. Saudi Electronic University, 2020). Alqahtani & Rajkhan's study in Saudi Arabia demonstrated that the support of the academic team and educational managers are crucial to reaching a positive educational outcome (Alqahtani & Rajkhan, 2020). Similarly, Bayeck and Lumadi emphasized the importance of teachers' support for the success of e-educational activities (Bayeck, 2016; Lumadi, 2013).

Less than half of the current study participants reported that they contribute to online discussions. This is a low level of involvement in online discussions could be considered as a lost opportunity since those discussions are an essential part of the educational process and exchange of ideas (Linjawi et al., 2012; Nguyen & Huynh, 2020). Perhaps this low usage level of online discussion forums could be due to the Covid-19 pandemic effect on the communication in general and its social isolation consequences (Taunton, 2020). Alawamleh et al. reported a similar communication challenge in a recently published study about the effect of Covid-19 on the online learning process (Alawamleh et al., 2020).

In addition, the majority of participants in the current study reported that it was not easy for them to overcome the challenges of e-education. Exploring the current difficulties of e-education during the Covid-19 pandemic is outside the scope of this study. However, it seems that the current pandemic added a new layer of challenges that needs to be carefully examined in future research (Bao, 2020; Rapanta et al., 2020; Rose, 2020, p. 19; Sahu, 2020).

On the other hand, it was clear that SEU students perceive e-education as a tool that enhances their overall performance. This positive effect of e-education on the overall performance is in line with Diab & Elgahsh's findings who reported that e-education has led to the enhancement of the overall students' performance during the Covid-19 pandemic (Diab & Elgahsh, 2020). Even before the pandemic, several studies have reported better performance using e-education methods compared to conventional methods (Akugizibwe & Ahn, 2020; Dodiya et al., 2019; Lumadi, 2013). However, a large meta-analysis study in 2019 found the effect of the flipped classroom to be moderate on students' performance and recommended further research to explore it (Strelan et al., 2020).

The current study has limitations. First, it only reflects the student's perspective regarding education and it does not include an academic staff point of view. In addition, the current study was based on self-perceived data. Results would be more precise if they were combined with other documented resources of data such as students' performance scores. Due to the cross-sectional nature of this study, the causality between e-education and the educational outcome could not be assessed. Also, the convenient sample methodology could be considered as one of the weak points of this study. However, the sample size could be considered as relatively large, which could increase the precision of study parameters. To the best of our knowledge, this was the very first study to examine the role of e-education in preserving educational outcomes during the Covid-19 pandemic on students enrolled in an electronic university in the Middle East Region.

5. Conclusion

In conclusion, the results of the current study revealed that the e-education method has a positive effect on educational outcomes during the Covid-19 pandemic. However, the challenges of e-education during the pandemic needs to be explored and addressed by the stakeholders of the e-education process. Also, there is a need for further longitudinal research to examine the long-term effects e-education of students' performance and their overall achievement.

One of the main recommendations of this study is to encourage finding motivation and monitoring tools to encourage the students to participate more in the online discussion, which could eventually enhance the

achievement of students enrolled in the e-education.

It was clear that the SEU students prefer e-education to the traditional educational methods; however, more support is needed to eliminate challenges associated with the Covid-19 pandemic and maintain students' positive view towards the e-education process.

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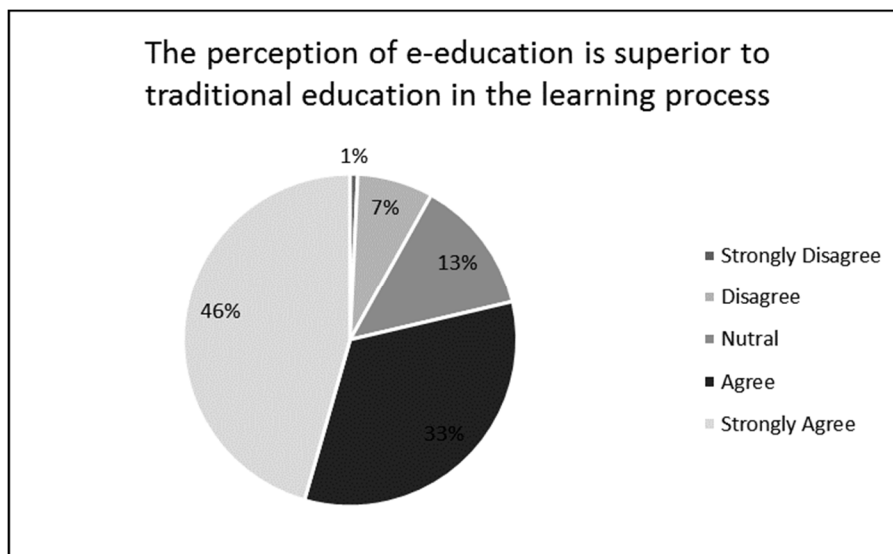
Figure 1. The perception of e-education is superior to traditional education in the learning process

Table 1. Study Questionnaire

Gender	• Male • Female
Age	• 18 – 20 • 21 – 23 • 23+ years
How many hours do you use e-education tools per week?	• Less than an hour • 1 – 7 hours • 7 – 14 hours • 14+ hours

Please select the answer that best fits your feeling (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree)
1.   I believe it is appropriate to use e-education for my university study
2.   I am confident in using e-education tools
3.   I am positive towards using e-education tools for my daily study
4.   The academic employees at SEU support the use of e-education for my study
5.   Other students' beliefs about e-education encourage me to continue using e-education
6.   My family encourages me to continue using e-education
7.   E-education contents are informative
8.   I participate in online discussions with professors and other students
9.   I can overcome challenges that occur when I use e-education
10. I tend to finish the courses I registered to
11. Using e-education improves my overall performances
12. E-education encourages me to explore additional information in my area of study
13. Using e-education improves my effectiveness in managing my time
14. E-education decreases students educational expenses
15. E-education is superior to traditional education in the learning process
16. I recommend using e-education for others

Table 2. Characteristics of study participants

		n	%	P-value of univariate analysis
Student gender	Male	80	58.8	0.049
	Female	56	41.2	(There is a statistically significant difference in the numbers of students according to their gender)
Student age	18 – 20	65	48.1	0.001
	21 – 23	40	29.6	(There is a statistically significant difference in the numbers of students according to their age)
	23+ years	30	22.2	
Number of hours using e-education tools per week	Less than an hour	37	26.8	0.724
	1 – 7 hours	35	25.4	(No significant difference in the percentage of the students according to the duration of using e-education tools per week)
	7 – 14 hours	37	26.8	
	14+ hours	29	21.0	

Table 3. Participants' perception of e-education

Variable	Male students			Female students			p-value
	N	Mean	SD	N	Mean	SD	
Using e-education for my university study is appropriate	80	2.9	1.2	56	2.7	1.3	0.510
Confidence in using e-education tools	79	2.5	1.4	55	2.2	1.5	0.181
Positive view towards using e-education tools for my daily study	80	2.7	1.1	56	2.6	1.3	0.839
The academic employees at SEU supportive to the use of e-education	80	2.5	1.4	55	2.3	1.4	0.242
Encourage other students to use e-education tools	79	2.4	1.4	54	2.0	1.5	0.099
Family members encourage the use of e-education	79	2.0	1.3	53	1.9	1.4	0.700
E-education contents are informative	80	2.3	1.4	54	2.7	1.3	0.093
Students participation in online discussions with professors and other students	80	2.1	1.5	55	2.2	1.5	0.637
Overcoming challenges that occur when using e-education	79	1.8	1.4	54	2.0	1.4	0.506
Finishing registered e-education courses	80	2.3	1.4	55	2.6	1.5	0.161
E-education improves the overall performance	80	3.0	1.2	55	3.1	1.1	0.787
E-education encourages the exploration of additional information in areas of study	80	2.1	1.4	54	1.8	1.5	0.385
Using e-education improves the effectiveness of time management	79	2.1	1.4	56	1.8	1.5	0.204
E-education decreases students educational expenses	78	2.4	1.3	56	2.4	1.4	0.956
E-education is superior to traditional education in the learning process	78	3.1	0.9	56	3.2	1.0	0.341
Recommendation of e-education to other	78	2.5	1.3	56	2.5	1.4	0.983

Table 4. The overall perception of education at SEU

		Positive perception		Negative perception		p-value
		n	%	N	%	
Overall		59	42.8	79	57.2	
Age (in years)	18 – 20	25	38.5	40	61.5	0.546
	21 – 23	18	45.0	22	55.0	
	23+ years	15	50.0	15	50.0	
Gender	Male	36	45.0	44	55.0	0.507
	Female	22	39.3	34	60.7	
Number of hours using e-education tools per week	Less than an hour	13	35.1	24	64.9	0.497
	1 – 7 hours	18	51.4	17	48.6	
	7 – 14 hours	17	45.9	20	54.1	
	14+ hours	11	37.9	18	62.1	