

Perception of E-Learning among medical students of the Maldives National University, Republic of Maldives, during COVID-19 pandemic

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ABSTRACT *Introduction: The outbreak of COVID-19 has led to the closure of medical schools all over the world. Maldives National University (MNU), School of Medicine adopted Electronic learning (e-learning) to prevent educational disruption. Adopting e-learning needs a clear understanding of the student's characteristics, perception and local culture. This study aims to find out medical students' perception of e-learning mode, effectiveness and their readiness to its adoption in a blended environment along with face-to-face learning.*

KEYWORDS *Medical students, E-learning, Perception, Effectiveness.*

The worldwide outbreak of COVID-19 has brought the world to a standstill, and medical education is one of the seriously affected sectors. MNU, School of Medicine immediately started Electronic Learning (e-learning) to meaningfully continue the teaching-learning activities and maintaining the safety of medical students, lecturers and staff. E-learning has a well-established role in medical education and it has been found to be effective in enhancing learning and is well accepted by students (Gormley et al., 2009). E-learning is defined as learning facilitated and supported through the utilization of information and communication technologies (ICT), e-learning concept is the use of ICTs (e.g. the Internet, computers, tablets, smart phones, videos, and other devices) to support teaching and learning activities (Ibrahim et al., 2018, pp.871). Global academic resources can be assessed through ICT tools, which can help students to transcend geographical boundaries and time zones. It can help students take an active role interacting with available learning materials, their colleagues and instructors from any location.

The School of Medicine, MNU, follows the undergraduate MD (Doctor of Medicine) curriculum which is latest and updated, student-centered, information-oriented, uniform, systematic, community-oriented and completely hospital-based.

Students are assessed continuously throughout the course on their knowledge, attitude, behavior and overall performance both in written and practical forms using small group discussions, seminars, projects and assignments. Implementation of e-learning can be a serious challenge to the administrators, students and lecturers in such an integrated and updated curriculum which focuses on personal and professional development.

The effective use of ICTs in delivering e-learning based components of a course is of critical importance to the success and student acceptance of e-learning (Ibrahim et al., 2018). Lack of appropriate IT skills, inadequate technology provisions can be potential barriers to e-learning (Childs et al., 2005). E-learning can be used both as a stand-alone teaching tool and in a blended learning environment where it is linked to face-to-face teaching (Cook, 2007). In order to create effective e-learning experiences for learners, understanding their perceptions regarding e-learning is crucial. The aim of the study is to find out medical students' perception of e-learning mode, effectiveness and their readiness to its adoption in a blended environment along with face-to-face learning.

Methods

The cross-sectional study was administered among the population of 80 undergraduate medical students enrolled at MNU, at the time of e-learning classes offered due to the COVID-19 outbreak. Students were informed about the research and their consent was obtained. Their classes were offered on e-learning modes during the COVID-19 outbreak, out of 80, 63 students responded in 24 hours and were included in the study and those who responded after 24 hours were excluded from study due to the time limitation.

Students and lecturers were given access to the software package 'Moodle' to post teaching learning materials and assessments. Discussion forums were created and regular online classes were conducted. The duration of online lecture classes was approximately one hour. A questionnaire was designed to survey students' usage patterns, e-readiness and their perception with regards to e-learning effectiveness, usefulness and implementation. The self-reported questionnaire was adapted after reviewing a large number of literature reviews conducted on given issues. The adapted questionnaire was used after running a pre-test among 20 students from the faculty of Health Science to obtain its reliability and validity.

Section one consists of Sociodemographic characteristics of participants such as batch number, current age, gender, permanent address, resident atoll during lockdown period, family type, availability of internet at home and kind of internet access.

Section two consists of 2 Likert's scale, point-based 5 on 7 items each, where 'strongly agree - 1, agree - 2, I do not know - 3, disagree -4, strongly disagree- 5, the total score -35. To identify the effectiveness and ineffectiveness of e-learning among medical students, the score is interpreted as favorable attitude: 25-36, neutral attitude: 13-24 and unfavorable attitude: 1-12.

Section three consists of additional questions to obtain various specific objectives which included E-learning as a tool to overcome problems in medical education, its implementation to improve the quality of medical education, possibility of e-learning as an active form of learning and whether the medical graduates will be

acknowledged and accredited as traditional learning students from professional bodies and employers.

The collected data was checked for its completeness, missed values, unlikely responses, accuracy, clarity and validity. The data was analyzed using the statistical package for social science (SPSS) version 21.0. Descriptive statistics was done for each variables or items using mean, median, mode, frequency and percentages

In addition, inferential statistical tests were done to identify the differences between variables using chi-square test, logistic regression was performed to examine the association between effectiveness of learning and the variables.

Results

The study sample consists of 52 female and 11 male, age ranging from 18 to 26 year, 22% live in joint family, 94% of the study sample has the internet connection at their place, only 20.6% of the students agreed that e-learning could be effective in medical education, rest 79.4% students disagreed. The study was carried out with three batches of the medical school students as shown in the table 1.

Table 1
Effectiveness of e-learning in medical education

	Students			Total
	<i>Batch 1</i>	<i>Batch 2</i>	<i>Batch 3</i>	
Yes	11.1%	7.9%	1.6%	20.6%
No	23.8%	20.6%	34.9%	79.4%
Total	34.9%	28.6%	36.5%	100%

Of the 63 students 49.2% thought that e-learning could be helpful in overcoming the problems in medical education. Among them 20.6% were the students who believed e-learning as an effective way of learning in medical school and 28.6% were the one who did not believe e-learning as an effective way of learning as seen in table 2.

Table 2
Overcoming the problems in medical education

E-learning is an effective way of learning in medical education	E-learning can help in overcoming the problems in medical education in Maldives		Total
	<i>Yes</i>	<i>No</i>	
Yes	20.6%	0%	20.6%
No	28.6%	50.8%	79.4%
Total	49.2%	50.8%	100%

In the answer to implementation of e-learning in medical school, 73.0% of the sample wrote that students may face difficulties, among whom only 3.2% were the students who answered e-learning as an effective way of learning whereas 73.0% did not have the same view about e-learning as can be seen in table 3.

Table 3
Implementing e-learning in medical education

<i>E-learning is an effective way of learning in medical education</i>	<i>Implementing e-learning will be difficult in medical education</i>		<i>Total</i>
	<i>Yes</i>	<i>No</i>	
Yes	3.2%	17.5%	20.6%
No	69.8%	9.5%	79.4%
Total	73.0%	27.0%	100%

Table 4 shows 44.4% of the students agreed that e-learning could help in improving the quality of medical education, only 14.3% were the ones who thought that e-learning was an effective way of learning in medical education.

Table 4
Improving the Quality of medical education

<i>E-learning is an effective way of learning</i>	<i>E-learning can help in improving the quality of medical education</i>		<i>Total</i>
	<i>Yes</i>	<i>No</i>	
Yes	14.3%	6.3%	20.6%
No	30.2%	79.4%	79.4%
Total	44.4%	55.6%	100%

Only 28.6% subjects agreed that e-learning could be an active form of learning, of which only 14.3% had believed that e-learning was an effective way of learning as can be seen in table 5.

Table 5
Active form of learning

<i>E-learning is an effective form of learning</i>	<i>E-learning can be an active form of learning</i>		<i>Total</i>
	<i>Yes</i>	<i>No</i>	
Yes	14.3%	6.3%	20.6%
No	14.3%	65.1%	79.4%
Total	28.6%	71.4%	100%

Table 6
Acknowledgement and accreditation

<i>E-learning is an effective way of learning</i>	<i>E-learning medical graduates will be acknowledged and accredited as traditional learning students from professional bodies and employers</i>		<i>Total</i>
	<i>Yes</i>	<i>No</i>	
<i>Yes</i>	<i>7.9%</i>	<i>12.7%</i>	<i>20.6%</i>
<i>No</i>	<i>17.5%</i>	<i>61.9%</i>	<i>79.4%</i>
<i>Total</i>	<i>25.4%</i>	<i>74.6%</i>	<i>100%</i>

In the studied sample, 25.4% answered that e-learning medical graduates would be acknowledged and accredited as traditional learning students from professional bodies and employers among them only 7.9% had acknowledged that e-learning is an effective way of learning as depicted in table 6.

Table 7:
Chi square test

<i>Hypothesis</i>	<i>Chi-square</i>	<i>df</i>	<i>Sig</i>
<i>E-learning will help in overcoming the problem in medical education in the Republic of Maldives</i>	<i>16.908a</i>	<i>1</i>	<i>0.000</i>
<i>Implementing E-learning will be difficult in medical education in the Republic of Maldives.</i>	<i>27.612a</i>	<i>1</i>	<i>0.000</i>
<i>E-learning can be an active form of learning.</i>	<i>13.269a</i>	<i>1</i>	<i>0.000</i>
<i>E-learning can help in improving quality of medical education</i>	<i>4.076a</i>	<i>1</i>	<i>0.044</i>
<i>E-learning medical graduates will be acknowledged and accredited as tradition learning students from professional bodies and employers</i>	<i>1.476a</i>	<i>1</i>	<i>0.286</i>

Chi square test is done and results depicted in table 7 which compares the expectations to actual observed data.

Discussions

The results show that medical students of MNU understand the importance of e-learning and value the use of e-learning in medical education but doubt the effectiveness of e-learning. Accessibility of necessary technologies and IT skills are important factors for learners to engage with e-learning. Lack of relevant skills, inadequate technology and integrated curriculum may be few causes for medical students to doubt the effectiveness of e-learning in medical education. Lack of technologies and skills have been identified as potential barriers to e-learning both for lecturers and students. (Childs et al., 2005; Cook, 2007)

To analyze the data collected the following null hypotheses were tested and interpreted as shown below:

H01: E-learning will help in overcoming the problem in medical education in the Republic of Maldives.

Medical education being an integrated course, e-learning can help to address few problems associated with traditional methods for example students can practice dissection from anywhere if anatomage table is installed in their laptops or tablets. They can practice different skills using e-learning software but to test whether, in reality, students believe that it will improve the medical education in the Maldives or not, (Q12) chi-square tests were used and the results obtained were: chi-square = 16.908a (df= 1, sig = 0.000), with these values, we can reject the null hypothesis. The interpretation is that medical students of MNU are aware of e-learning educational modes and its advantages. And they agree that E-learning will help to overcome the problem in medical education in the Republic of Maldives.

H02: Implementing E-learning will be difficult in medical education in the Republic of Maldives.

Implementing e-learning will be difficult in medical school in the Maldives because most of the students and staff are experienced and familiar with traditional on-campus education and it may face resistance to change, fear of uncertainty, and low expectation of e-learning programs. To see whether their preferences are different from our expectations, a chi-square test was used and the results obtained as follows: (Q13) Do you think implementing e-learning will be difficult in medical education? The findings were chi-square = 27.612a (df = 1, Sig = 0.000), with these values, we can reject the null hypothesis which indicates implementing E-learning will be difficult in medical education in the Republic of Maldives. Implementing e-learning has to be a well monitored and gradual process because interactions are comparatively lesser and it misses synchronous feedback to questions and assignments (National Work Force, 2006).

H03: E-learning can be an active form of learning.

E-learning has allowed students for active and deep learning to occur and therefore act as a useful complement to face-to-face teaching (Spencer & Jordan, 1999). A recent meta-analysis looking at Internet-based learning in health professionals found Internet-based learning to be favourable across a range of learning styles,

contexts, topics, and learning outcomes (Cook et al., 2008). To see medical student's opinions regarding this we used the chi-square test. Results were obtained as follows: (Q15), "Do you think e-learning can be a more active form of learning?" The analysis chi-square = 13.269a (df =1, sig 0.000), indicating we can reject the null hypothesis and the interpretation is E-learning can be an active form of learning; this result indicates e-learning awareness in the survey population.

HO4: E-learning can help in improving quality of medical education

Blended learning strategy enhances the acquisition of important skills and utilises valuable face-to-face teaching time. This study reported a perceived increase in knowledge as a result of using the e-learning package (Warnecke, 2011). We used the chi-square test to see the results in our study population (Q 14) 'Do you think e-learning can help in improving the quality of medical education?' chi-square = 4.076a (df = 1, sig 0.044), we can reject the null hypothesis, the interpretation is medical students agree that e-learning can help in improving the quality of medical education. Factors such as addressing differences in learning styles and studying according to learner's convenience may be the causes of such results.

HO5: E-learning medical graduates will be acknowledged and accredited as tradition learning students from professional bodies and employers

We are aware of changes in the field of medical education, we have been using tools and technologies for effective teaching-learning activities in medical schools and hence e-learning can have very significant advantages. We expect its application should not be of less value than any traditional on school learning mode. To test this hypothesis chi-square test was again used and the results obtained as follows: (Q 16) 'Do you think E-learning medical graduates will be acknowledged and accredited as traditional learning students from professional bodies and employers?' The results were: chi-square = 1.476a (df = 1, Sig = 0.286), with these values we fail to reject the null hypothesis, the interpretation is students seem to lack the confidence that a medical graduates from such teaching-learning mode will be acknowledged and accredited as tradition learning students by professional bodies and employers. This may again be due to the resistance to change and students are familiar with the traditional on school activities and hence it has to be implemented slowly in a blended form which will eventually train both the students and facilitators to use different tools of e-learning effectively and efficiently to convince the decision-makers and professional bodies. The main success factors to system success are behavioral more than technical (Lorenzi & Riley, 2000).

Conclusions

This study represents research in examining the perception of e-learning effectiveness among medical students of MNU. Several implications can be drawn from the findings of the study. The students seem to be aware of the advantages of e-learning, trust the technology but still doubt the effectiveness. A variety of reasons such as lack of normal school environment, asynchronous interactions, technological infrastructure problems like the Internet speed and bandwidth might

have led to student's confusion regarding effectiveness of e-learning in medical education.

Conflicts Of Study: None

Acknowledgements

I would like to thank Dean of school of medicine Dr. Sheeza Ali for the necessary guidance and support, medical students, Maldives National University for their cooperation on the study.

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