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Original Article

Quality of Distance Learning during COVID-19 Pandemic in a Health Sciences University in Saudi Arabia

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ABSTRACT

Background: Distance learning adopted during COVID-19 pandemic as alternative of onsite learning for most students around the world. Students feedback to this alternative varied around the world, but this mean of education has pros and cons as most of things. Distance learning offer flexibility and convenience for both learners and tutors, in the other hand has limitation on assessment authenticity.

Aim: The study aim was to investigate the quality of distance learning in a health sciences university during COVID-19 pandemic.

Materials and Methods: Retrospective cross-sectional survey conducted by utilizing the results of four items about distance learning in predeveloped course survey. The relation of distance learning quality to gender, academic program, and campus were studied.

Results: 92.32% of students filled the survey (n=8370). The results' analysis showed 56.4% of students agreed with distance learning quality, but 37.25% could not decide or do not want to decide if they agree or disagree to distance learning quality. 6.35% of students disagree with the distance learning quality. Students' feedback affected by their gender, academic program, and campus. The postgraduate students and male students showed positive attitude toward distance learning and its quality more than other students.

Conclusion: Distance learning quality perceived well by health sciences students and can be a strategic mean of learning in the future with enhancement to assessment authenticity.

Keywords: Distance Learning; e-Learning; Education; Virtual Classroom, COVID-19

INTRODUCTION

Distance learning effectiveness for medical education is not well tested or understood despite the revolution in technology and the advancement of the internet that made distance learning feasible and widely available.^[1] It allows the learner to control more the learning process.^[2] It is a convenient mean of providing similar educational experience to learners at distant sites.^[3] A web-based virtual learning environment (VLE) and Interactive TV (ITV) are relatively new technologies that are used for distance learning at the universities for health sciences, and learners rated courses using both technologies as moderately interactive.^[4] Blackboard (Bb) better than ITV in bringing more interactive courses.^[5] Learners reported high satisfaction level and showed high completion rate for distance learning courses.^[6]

Assessment in distance learning courses to assess whether learning outcomes are being achieved done through the assignments and online exams that are set during and at the end of the course. Most learners use distance learning materials on their own, but they will need good course instructor and peer support to make the distance learning course more enjoyable and successful. The needed resources to complete the program should be known to learners from the beginning.^[7]

The distance learning is not any more alternative to traditional learning, but is a strategic and superior option in reaching many learners in a fast and effective way when rigorous pedagogical methods followed.^[8] The learners feedback will be important in distance learning to improve its quality. The quality of this feedback will depend on the course tutor, the education models, and the support provided.^[9] 55% of undergraduate students in United Arab Emirates liked distance learning.^[10] Most learners are in favor of distance learning due to flexibility and convenience.^[11] In other study, 44% of students reported their learning got worse with shift to e-learning.^[12] 49.2% of pharmacy students were in support to online learning during COVID-19 pandemic.^[13]

Dental students showed positive effect of distance learning as a key coping tool on their quality of life.^[14] Other dental students showed no difference between the in-class and distance learning by their impact on their stress level and quality of life during learning dentistry.^[15] Medical students showed association between the stress level reduction and distance learning without reducing education quality.^[16]

More research is needed to assess the efficacy of distance learning in improving the quality of medical education and to identify the circumstances and strategies that are most effective for specific individuals and learning organizations. Distance learning can be a powerful tool for developing medical education, which is an important factor in enhancing the quality of healthcare delivery.^[1] The aim of this study was to investigate the quality of distance learning in a health sciences university during COVID-19 pandemic.

MATERIALS AND METHODS

The study is a retrospective cross-sectional survey to investigate the quality of distance learning during COVID-19 pandemic. It was conducted across the three campuses of King Saud bin Abdulaziz University for Health Sciences (KSAU-HS), Saudi Arabia. The objectives of the study were to determine the learners' feedback about distance learning during COVID-19 pandemic, identify the areas for improvement, and suggest virtual learning quality improvement initiatives.

The authors utilized the available student experience survey data in ADAA[®] system through Development and Quality Management Affairs, King Saud bin Abdulaziz University for Health Sciences. The student experience survey is compulsory for all students, and recently four questions about distance learning were added.

The 9,066 undergraduate and postgraduate KSAU-HS students in the three campuses (Jeddah, Riyadh, Al Ahsa) were included, but all interns, residents, and fellows were excluded. A non-probability consecutive sampling technique was chosen by including the whole target population.

Student Experience Survey composed of 40 items covering 6 categories, these categories are Advise and Support (4 items), Learning Resources (7 items), Digital Library (5 Items), Facilities and Equipment (8 items), Learning and Teaching (13 items), and Open-End Items (3 items). The students asked to rate each item on five-point scale. The scale includes five options; strongly agree, agree, true sometimes, disagree, and strongly disagree. Student Experience Survey Results will be utilized from ADAA[®] system by analyzing the responses to the following items about distance learning;

1. It was easy to access the virtual classrooms;
2. It was effective to learn in the virtual classrooms.;
3. I was able to participate actively in the virtual classrooms.;
4. I would like to attend more virtual classrooms in the future.

Data was entered and analyzed using the statistical software IBM SPSS statistics version 20. Categorical data presented as count and percent while numerical data as Mean±SD. Chi-square used to assess the relation between distance learning feedback and other categorical data. Test results were declared significant when the p-value was less than 0.05.

RESULTS

The student experience survey including four items about distance learning was delivered to 9,066 students electronically at the end of the academic year 2019-2020. 8,370 undergraduate and postgraduate KSAU-HS students in the three campuses (Jeddah, Riyadh, Al Ahsa) filled the student experience questionnaire as part of course evaluation with 92.32% response rate; 4,395 female students, 3,975 male students. 8,278 undergraduate students, and 92 postgraduate students (Table 1).

Table 1: Students filled the questionnaire

Campus	Undergraduate		Postgraduate		Total
	Female	Male	Female	Male	
Riyadh	2,256	2,538	56	18	4,868
N	2,402	2,676	81	34	5,193
Jeddah	1,332	1,097	12	1	2,442
N	1,536	1,154	15	3	2,708
Al Ahsa	734	321	5	0	1,060
N	870	324	5	0	1,199
Total	4,322	3,956	73	19	8,370

P-Value not reported since was not significant (<0.001) due to large sample size

N=Number of Participants

Table 2: Students' response to the four items of distance learning

	I was able to participate actively in the virtual classrooms		I would like to attend more virtual classrooms in the future		It was easy to access the virtual classrooms		It was effective to learn in the virtual classrooms	
	N	%	N	%	N	%	N	%
Strongly disagree	569	6.8%	728	8.7%	536	6.4%	611	7.3%
Disagree	435	5.2%	527	6.3%	377	4.5%	469	5.6%
True sometimes	3180	38.0%	3080	36.8%	3072	36.7%	3139	37.5%
Agree	1732	20.7%	1607	19.2%	1833	21.9%	1699	20.3%
Strongly agree	2454	29.3%	2428	29.0%	2552	30.5%	2452	29.3%
Mean	3.61		3.53		3.66		3.59	
Standard Deviation	1.16		1.22		1.14		1.17	

P-Value not reported since was not significant (<0.001) due to large sample size

N=Number of Participants; %=Percentage

Table 3: Female and male students' response about distance learning items

Item	Response	Female		Male	
		N	%	N	%
I was able to participate actively in the virtual classrooms	Strongly disagree	312	7.1%	254	6.4%
	Disagree	237	5.4%	203	5.1%
	True sometimes	1631	37.1%	1542	38.8%
	Agree	993	22.6%	744	18.7%
	Strongly agree	1222	27.8%	1232	31.0%
	Mean	3.59		3.63	
	Standard Deviation	1.16		1.16	
I would like to attend more virtual classrooms in the future	Strongly disagree	413	9.4%	314	7.9%
	Disagree	303	6.9%	227	5.7%
	True sometimes	1569	35.7%	1515	38.1%
	Agree	923	21.0%	679	17.1%
	Strongly agree	1187	27.0%	1240	31.2%
	Mean	3.49		3.58	
	Standard Deviation	1.22		1.21	
It was easy to access the virtual classrooms	Strongly disagree	299	6.8%	234	5.9%
	Disagree	199	4.5%	179	4.5%
	True sometimes	1579	35.9%	1495	37.6%
	Agree	1051	23.9%	783	19.7%
	Strongly agree	1267	28.8%	1284	32.3%
	Mean	3.63		3.68	
	Standard Deviation	1.14		1.14	
It was effective to learn in the virtual classrooms	Strongly disagree	339	7.7%	270	6.8%
	Disagree	259	5.9%	214	5.4%
	True sometimes	1604	36.5%	1534	38.6%
	Agree	980	22.3%	716	18.0%
	Strongly agree	1213	27.6%	1241	31.2%
	Mean	3.56		3.61	
	Standard Deviation	1.17		1.17	

P-Value not reported since was not significant (<0.001) due to large sample size

N=Number of Participants; %=Percentage

The satisfaction of the students was categorized into five categories; strongly agree (4.1-5.0), agree (3.1-4.0), true sometimes (2.1-3.0), disagree (1.1-2.0), and strongly disagree (0.0-1.0). The experience of all students in the three campuses toward quality of distance learning studied by Chi-square test (Mean 3.6±1.2) with P-value <0.05. 37.25% of students selected true sometimes as a response to the distance learning items –could not or do not want to decide if they are satisfied or dissatisfied- while 6.35% of students selected disagree and strongly disagree -dissatisfied- as a response to distance learning items and 56.40% of students selected agree and strongly agree -satisfied- as a response to distance learning items. The detailed students' experience toward the four items about distance learning in the questionnaire shown in Table 2. The students' experience about distance learning quality studied based

on the gender, the male students scored higher (Mean 3.63 ± 1.17) than female students (Mean 3.57 ± 1.18). The detailed response toward the four items of distance learning based on the gender shown in table 3.

Table 4: Students' response about distance learning in each campus

Item	Response	Al Ahsa		Jeddah		Riyadh	
		N	%	N	%	N	%
I was able to participate actively in the virtual classrooms.	Strongly disagree	96	9.1%	156	6.4%	317	6.5%
	Disagree	88	8.3%	112	4.6%	239	4.9%
	True sometimes	362	34.3%	875	35.9%	1936	39.7%
	Agree	236	22.4%	493	20.2%	1010	20.7%
	Strongly agree	273	25.9%	802	32.9%	1375	28.2%
	Mean	3.48	3.68	3.59			
	Standard Deviation	1.22	1.16	1.14			
I would like to attend more virtual classrooms in the future.	Strongly disagree	132	12.5%	215	8.8%	385	7.9%
	Disagree	94	8.9%	161	6.6%	278	5.7%
	True sometimes	337	31.9%	841	34.5%	1897	38.9%
	Agree	219	20.8%	453	18.6%	932	19.1%
	Strongly agree	273	25.9%	768	31.5%	1385	28.4%
	Mean	3.39	3.58	3.54			
	Standard Deviation	1.3	1.24	1.18			
It was easy to access the virtual classrooms.	Strongly disagree	93	8.8%	144	5.9%	292	6.0%
	Disagree	85	8.1%	88	3.6%	210	4.3%
	True sometimes	345	32.7%	831	34.1%	1897	38.9%
	Agree	246	23.3%	551	22.6%	1039	21.3%
	Strongly agree	286	27.1%	824	33.8%	1439	29.5%
	Mean	3.52	3.74	3.64			
	Standard Deviation	1.22	1.14	1.13			
It was effective to learn in the virtual classrooms.	Strongly disagree	110	10.4%	168	6.9%	332	6.8%
	Disagree	92	8.7%	129	5.3%	254	5.2%
	True sometimes	354	33.6%	858	35.2%	1926	39.5%
	Agree	224	21.2%	500	20.5%	970	19.9%
	Strongly agree	275	26.1%	783	32.1%	1395	28.6%
	Mean	3.44	3.66	3.58			
	Standard Deviation	1.25	1.18	1.15			

P-Value not reported since was not significant (<0.001) due to large sample size
N=Number of Participants; %=Percentage

Students' experience about distance learning in each campus studied and Jeddah campus scored the highest satisfaction (Mean 3.67 ± 1.18), and the lowest satisfaction recorded in Al Ahsa campus (Mean 3.46 ± 1.25). The detailed response of students toward the four distance learning items in each campus shown in table 4. The students' response about distance learning quality in each college studied and recorded in ascending order starting with the lowest satisfaction among students in College of Pharmacy (COP) (Mean 3.39 ± 1.02). Students' satisfaction in College of Nursing (CON) (Mean 3.48 ± 1.12), College of

Medicine (COM) (Mean 3.50±1.04), College of Applied Medical Sciences (CAMS) (Mean 3.61±1.13), College of Science of Health Professions (COSHP) (Mean 3.61±1.23), College of Dentistry (COD) (Mean 3.80±1.08), and the students in College of Public Health and Health Informatics (CPHHI) are the most satisfied about distance learning (Mean 4.14±1.0). The detailed students' response toward the four distance learning items in each college shown in table 5.

Table 5: Students' response toward distance learning in each college

College		Items			
		I was able to participate actively in the virtual classrooms	I would like to attend more virtual classrooms in the future	It was easy to access the virtual classrooms	It was effective to learn in the virtual classrooms
CAMS	Strongly disagree	6.2%	7.7%	5.5%	6.5%
	Disagree	5.1%	5.9%	4.3%	5.4%
	True sometimes	37.7%	36.6%	37.1%	37.5%
	Agree	23.4%	22.5%	24.0%	23.0%
	Strongly agree	27.7%	27.3%	29.1%	27.5%
	Mean	3.61	3.56	3.67	3.60
	Standard Deviation	1.12	1.17	1.10	1.14
COD	Strongly disagree	3.3%	3.4%	3.1%	3.8%
	Disagree	4.4%	5.5%	4.6%	4.7%
	True sometimes	36.7%	35.5%	35.3%	36.0%
	Agree	21.3%	19.2%	21.6%	20.4%
	Strongly agree	34.3%	36.4%	35.3%	35.1%
	Mean	3.79	3.80	3.81	3.78
	Standard Deviation	1.07	1.10	1.07	1.09
COM	Strongly disagree	5.0%	5.2%	4.5%	4.8%
	Disagree	4.6%	4.5%	3.6%	3.6%
	True sometimes	51.1%	50.1%	50.0%	51.5%
	Agree	17.7%	16.5%	18.3%	17.0%
	Strongly agree	21.7%	23.7%	23.6%	23.0%
	Mean	3.46	3.49	3.53	3.50
	Standard Deviation	1.04	1.06	1.03	1.04
CON	Strongly disagree	8.5%	9.1%	8.2%	8.5%
	Disagree	4.8%	6.2%	5.2%	5.5%
	True sometimes	38.9%	38.1%	37.0%	38.7%
	Agree	24.8%	23.9%	26.3%	24.2%
	Strongly agree	23.0%	22.8%	23.2%	23.0%
	Mean	3.49	3.45	3.51	3.48
	Standard Deviation	1.15	1.17	1.15	1.15
COP	Strongly disagree	5.2%	6.2%	4.7%	5.0%
	Disagree	5.7%	6.3%	5.0%	5.5%
	True sometimes	52.8%	52.2%	51.6%	53.2%
	Agree	17.9%	17.4%	20.4%	17.5%
	Strongly agree	18.3%	18.0%	18.3%	18.8%
	Mean	3.38	3.35	3.43	3.40
	Standard Deviation	1.02	1.04	1.00	1.01
COSHP	Strongly disagree	7.8%	10.8%	7.4%	8.6%
	Disagree	5.6%	7.0%	4.7%	6.4%
	True sometimes	34.3%	33.0%	32.9%	33.4%
	Agree	20.2%	18.2%	21.6%	19.8%
	Strongly agree	32.2%	31.0%	33.4%	31.8%
	Mean	3.64	3.51	3.69	3.60
	Standard Deviation	1.21	1.29	1.19	1.23
CPHHI	Strongly disagree	2.5%	5.1%	2.5%	3.4%
	Disagree	3.4%	4.2%	0.0%	0.8%
	True sometimes	16.9%	16.9%	16.9%	16.1%
	Agree	32.2%	30.5%	33.9%	32.2%

Strongly agree	44.9%	43.2%	46.6%	47.5%
Mean	4.14	4.03	4.22	4.19
Standard Deviation	0.99	1.11	0.91	0.97

P-Value not reported since was not significant (<0.001) due to large sample size

CAMS= College of Applied Medical Sciences; COD= College of Dentistry; COM= College of Medicine; CON= College of Nursing; COP= College of Pharmacy; COSHP= College of Science and Health Professions; CPHHI= College of Public Health in Health Informatics

Table 6: Response of students in each program about the four items of distance learning

Program	I was able to participate actively in the virtual classrooms		I would like to attend more virtual classrooms in the future		It was easy to access the virtual classrooms		It was effective to learn in the virtual classrooms		Total	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
MPHHS	4.5	0.71	4.5	0.71	4.5	0.71	4.5	0.71	4.5	0.53
MPHHI	4.19	0.94	4.22	0.86	4.27	0.83	4.28	0.85	4.24	0.87
MSN	3.9	0.98	3.92	0.95	3.89	0.98	3.9	0.99	3.9	0.97
BCT(US)	3.78	1.27	3.83	1.26	3.81	1.28	3.86	1.26	3.82	1.26
DMD	3.79	1.07	3.8	1.1	3.81	1.07	3.78	1.09	3.8	1.08
BSEMS	3.82	1.13	3.76	1.2	3.86	1.15	3.73	1.2	3.79	1.17
MPHEB	3.86	1.17	3.14	1.61	4	1.2	3.82	1.37	3.7	1.37
BSOT	3.67	1.14	3.62	1.17	3.76	1.07	3.68	1.13	3.68	1.13
BCT(CC)	3.65	1	3.62	0.97	3.76	0.9	3.63	0.96	3.66	0.96
ANETY	3.63	0.95	3.65	0.93	3.67	0.94	3.6	0.99	3.64	0.95
UPPP	3.62	1.21	3.5	1.28	3.67	1.19	3.59	1.23	3.6	1.23
BSRT	3.56	1.19	3.52	1.24	3.61	1.19	3.57	1.2	3.57	1.2
BSCN	3.55	1.04	3.47	1.1	3.58	1.06	3.48	1.09	3.52	1.07
BSRS	3.54	1.12	3.45	1.16	3.57	1.11	3.52	1.12	3.52	1.13
MBBS	3.48	1.04	3.5	1.07	3.55	1.03	3.51	1.04	3.51	1.05
BSN	3.52	1.15	3.48	1.18	3.54	1.15	3.51	1.16	3.51	1.16
BSCLS	3.47	0.98	3.3	1.16	3.65	0.95	3.41	1.03	3.46	1.04
PharmD	3.38	1.02	3.35	1.04	3.43	1	3.4	1.01	3.39	1.02

P-Value not reported since was not significant (<0.001) due to large sample size

MPHHS=Master of Public Health in Health Systems; MPHHI=Master of Public Health in Health Informatics; MSN=Master of Science in Nursing; BCT (US)=Bachelor of Cardiovascular Technology (Ultrasound); DMD=Dental Medicine Doctor; BSEMS=Bachelor of Sciences in Emergency Medical Services; MPHEB=Master of Public Health in Epidemiology and Biostatistics; BSOT=Bachelor of Science in Occupational Therapy; BCT (CC)=Bachelor of Cardiovascular Technology (Cardiac Catheter); ANETY=Bachelor of Anesthesia; UPPP=Unified Pre-Professional Program; BSRT=Bachelor of Sciences Respiratory Therapy; BSCN=Bachelor of Science in Clinical Nutrition; BSRS=Bachelor of Science in Radiological Sciences; MBBS=Bachelor of Medicine and Bachelor of Surgery; BSN=Bachelor of Science in Nursing; BSCLS=Bachelor of Science in Clinical Laboratory Sciences; PharmD=Doctor of Pharmacy

The students in the academic program titled Master of Public Health in Health Systems (MPHS) were the most satisfied (Mean 4.50±0.53), and the students in the academic program titled Doctor of Pharmacy (PharmD) were the least satisfied about distance learning (Mean 3.39±1.02). The detailed students' response means with standard deviation in each program toward each item of distance learning recorded

in table 6. The reliability of the four items related to distance learning were studied by Cronbach's Alpha (0.982). The P-Value was not significant in all calculations (<0.001) due to large sample size but there is significant difference in responses.

DISCUSSION

The study's aim was to investigate the quality of distance learning in King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) during the COVID-19 pandemic by exploring the student experience through an electronic course evaluation. KSAU-HS has three campuses, which makes quality control of education delivery across the programs and campuses a difficult endeavor, despite the unification of the programs' curricula across campuses. Evaluating the students' experiences at the end of each course is one of the tools implemented to measure the quality of education across both the programs and the campuses. The announcement of COVID-19 pandemic lockdowns on March 2020 disturbed the educational delivery, and KSAU-HS advised students immediately to attend virtual classrooms from home by using Blackboard® and Microsoft Teams®. All faculty members and students were offered an orientation on how to use virtual classrooms by the department of Educational Technology. The Saudi government acted positively and advised internet providers to increase bandwidth. The availability of smartphones and digital devices with students and faculty members supported remote learning and minimized the need to purchase new laptops or personal computers for distance learning.

6.35% students were dissatisfied, but 56.40% of students were satisfied with their distance learning experience. The remaining students, 37.25%, were not able to decide and marked responses that were neutral. Electing to be neutral could also be the result of respondent mistrust in the questionnaire's confidentiality or a lack of motivation to read the questionnaire items to decide satisfaction.

Male students, students of health informatics, and senior -postgraduate- students were more satisfied with distance learning. Programs that were related to computer sciences were associated with higher students' satisfaction. These programs have a major impact on students' satisfaction toward distance learning since the students are more familiar with computers and have advanced computer skills. Gender and maturity also play a contributing role in satisfaction about distance learning. The students agreed the most (52.4%) about accessibility to virtual classrooms, while they disagreed the most (48.2%) about attending more virtual classrooms in the future.

The study has limitations in that it included students from only one university. More studies are needed to confirm the results to make the results more generalizable to the target university student population. The second limitation is a lack of students' motivation willingness to decide where they agreed or disagreed to distance learning quality aspects.

CONCLUSION

Distance learning was adopted during the COVID-19 pandemic as an alternative to onsite learning for most students around the world. Students' feedback about this alternative learning experience was varied around the world, but this means of education has pros and cons that warrant further study. Distance learning offers flexibility and convenience both learners and instructors. On the other hand, it has limitations on assessment authenticity.

56.4% of the polled students agreed with the statements about distance learning quality, but 37.25% could not decide or do not want to decide if they agreed or disagreed with the statements about distance learning quality. 6.35% of students disagreed or were not satisfied with the distance learning quality. There were differences in students' feedback based on their gender, academic program, and campus. The

postgraduate students and male students showed more positive attitudes toward distance learning and its quality than other students.

Overall, the quality of their distance learning experience was perceived positively by health sciences students and can be embraced as strategic means of learning in the future with enhancements to assessment authenticity.

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Conflict of Interest

The author declares that there are no conflicts of interest relevant to this article.

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