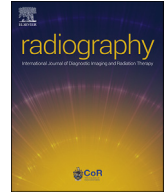




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Online learning during the COVID-19 pandemic: Perceptions of allied health sciences undergraduates



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ABSTRACT

Introduction: The purpose of this study was to determine the perceptions of Allied Health Sciences undergraduates towards online learning during the COVID 19 outbreak.

Methods: A cross-sectional study was conducted with undergraduates of the Faculty of Allied Health Sciences, University of Peradeniya, Sri Lanka. A self-administered online questionnaire consisted of four sections to evaluate demographic information; details of online learning; perspectives and challenges on online learning were used for data collection.

Results: A total of 518 responses were received from the five disciplines of radiography (32.8%), nursing (24.9%), medical laboratory sciences (18.2%), pharmacy (14.5%), and physiotherapy (9.7%), resulting in a 76.4% response rate. The majority preferred smartphones (73.2%) for online access, and Zoom is the most utilized online communicating platform (72.8%). The overall respondent's perception score ranged from 9 to 27 (Positive ≥ 18 , Neutral = 18, Negative ≤ 18) with a mean (SD) of 20.4 (4.0). Even though the majority (59.7%) agreed that online learning is more comfortable to communicate than conventional learning, most respondents (48.3%) have a negative perception towards offering practical and clinical-based subjects online. Poor internet connections (67.0%) and the lack of electronic devices (53.3%) were the most significant challenges encountered during online learning.

Conclusion: The majority of the students have a positive perception towards online learning. Online learning appears to be an efficient learning strategy when students have equal access to online facilities. **Implications for practice:** Although the allied health undergraduates faced several challenges, they demonstrated their versatility and acceptance of the online learning strategy during the COVID-19 pandemic. Therefore a well-structured online learning programme will be beneficial for students to continue their studies during a pandemic.

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Introduction

COVID-19 is a highly contagious respiratory disease that has invaded many countries exponentially, causing a higher number of deaths worldwide.^{1,2} The first case of COVID-19 disease in Sri Lanka was reported on January 27, 2020³ and later, this pandemic gradually developed across the country. As of July 2021, there were 283,512 confirmed COVID-19 cases in Sri Lanka and 3733 associated deaths were reported while 23,977 patients were under medical treatment.⁴

After the disease was identified in the country, the Sri Lankan government decided to temporarily close all the educational

institutions to prevent the spread of the virus among students.^{2,5,6}

This decision has abruptly transformed the traditional learning platforms that favour remote online mode, especially in the higher education sector of Sri Lanka.^{6,7} However, this rapid transformation is not an easy task for both students and teachers as they lack adequate facilities and equal access to online education.^{7–9} Online education is based on different digital platforms and tools, including massive open online courses, learning management systems, and various types of video communication software.⁷ Hence, this online education presents numerous challenges and obstacles for both students and teachers. These challenges include a lack of clinical placements and assessments, decreased student–teacher interaction, disruption of personal development activities, and insufficient evaluation of the teaching and learning gap.^{5,7,8}

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Conversely, online education has developed into an unexpected opportunity to achieve various benefits such as time-saving and enabling fast completion of the theoretical courses in the curriculum.^{8,10,11} It also makes it possible to ask questions freely and receive answers in real-time as well as to provide feedback on the courses enrolled. Additionally, online learning offers flexibility regardless of location and time, and it becomes a tool to avert the corona outbreak and ensure social segregation.¹²

The allied healthcare category includes diverse professionals such as radiographers, physiotherapists, medical laboratory scientists, nurses, and pharmacists. These allied health sciences undergraduates receive theoretical education and clinical training at a specific academic institute, which is later recognised by a license to practice.¹³ In the usual learning environment, the mode of the study of these students is face-to-face, and a virtual learning environment is only used for the distribution of notes. Hence, online learning is having a dramatic impact on these students as they cannot conduct their interactive in-class education and clinical training. The existing literature demonstrates that allied health undergraduates developed some stressful conditions due to this pandemic.^{14,15} This can also be triggered by financial difficulties, family issues and unequal access to online learning opportunities. Thus, it is significant to assess student perceptions of online education of undergraduates in the allied health sciences stream. Further, given the remote online learning opportunities, it is necessary to empirically assess the feasibility, the achievement of the objectives of the university curriculum and the appropriateness of continuing online education.¹⁶ Therefore, the objectives of this study were to explore the perceptions of allied health sciences undergraduates towards online learning during the COVID 19 pandemic and to identify the challenges associated with it. The information obtained here will be important in the future for the design and delivery of effective online education systems for allied health undergraduates.

Methods

A descriptive cross-sectional study was conducted between May and June 2021 at the Faculty of Allied Health Sciences, University of Peradeniya, Sri Lanka. This is the largest faculty dedicated to allied health education in Sri Lanka. Ethical clearance was obtained from the Ethics Review Committee of the Faculty of Allied Health Sciences, University of Peradeniya. This study enrolled all undergraduates (678) in the faculty, and they were affiliated to five allied health disciplines of radiography, physiotherapy, medical laboratory sciences, pharmacy, and nursing.

After reviewing the literature, a self-administered online questionnaire was developed using Google form survey management software (Google LLC, Mountain View, CA). The questionnaire consisted of four sub-sections with a total of 25 questions. At the beginning of the questionnaire, an introductory paragraph explained the objectives, the confidentiality of the responses, voluntary participation, and the right of withdrawal. All questions in the questionnaire were multiple-choice, except for the third and fourth sections, which used a three-point Likert scale (disagree = 1, neutral = 2, agree = 3). The first section included four questions about the participants' demographic information. The second section focused on the specific tools and devices used by undergraduates for online learning. The third section assessed perception toward online learning, with an overall score ranging from 0 to 27. A higher score reflected a positive perception. The last section was designed to identify the challenges in online education. Before administering the questionnaire, it was reviewed for content validity by two experts in the faculty and any necessary adjustments were made based on their feedback. The experts were

chosen based on two criteria: they had been senior lecturers or higher in the faculty for at least five years and had taught online for at least one year during the pandemic. The predictive validation was determined by administering an initial questionnaire to two randomly selected undergraduates in each discipline, who were then excluded from the final study.

The questionnaire with an open invitation was sent out via email to all undergraduates in the faculty. The declaration of consent was obtained from each participant at the time of enrollment. In order to ensure the highest possible response rate, a reminder was sent to all the students after the questionnaire had proceeded for two weeks. The statistical package for social science (SPSS) was used for data analysis and the questionnaires with incomplete information were excluded. The descriptive analysis was presented in the form of frequency tables. The t-test and the analysis of variances (ANOVA) were used to assess significant differences ($p < 0.05$) between the different groups.

Results

Demographic information

A total of 518 completed questionnaires were returned (57 incomplete questionnaires and 103 non-respondents), representing a response rate of 76.4%. As shown in Table 1, more than two-thirds (69.3%) of the respondents were female and more than half (60.4%) belonged to the age group 19–24 years. A large number of respondents (32.8%) were from radiography. Comparatively, there was a higher response rate (36.5%) from the first-year undergraduates.

Details of online learning activities

Table 2 shows the details of the online learning activities. According to the table, the majority (73.2%) attended online learning sessions using smartphones. Moreover, Zoom is the most frequently used online communication platform (70.9%), followed by Moodle (26.3%). Further, the majority of respondents (72.4%) stated that they had only attended theoretical lessons. When considering the type of online learning strategies used by respondents, fairly symmetrical responses were received for both live online classes (47.3%) and offline uploaded lectures (46.9%).

Perception towards online learning

Table 3 shows the overall respondents' perception of online learning. The total respondent's scores ranged from 9 to 27, with a mean (SD) of 20.4 (4.0). The majority (71.0%) perceive online

Table 1
Demographic information of the respondents.

Variables	Levels	Frequency (%)
Gender	Female	359 (69.3%)
	Male	159 (30.7%)
Age	19–24	313 (60.4%)
	25–30	199 (38.4%)
	>31	6 (1.2%)
Discipline	Radiography	170 (32.8%)
	Nursing	129 (24.9%)
	Medical Laboratory Sciences	94 (18.2%)
	Pharmacy	75 (14.5%)
	Physiotherapy	50 (9.7%)
Academic year	1st year	189 (36.5%)
	2nd year	118 (22.8%)
	3rd year	107 (20.7%)
	4th year	104 (20.0%)

Table 2
Details of learning activities.

Variables	Levels	Frequency (%)
ICT device used by students	Smartphones	379 (73.2%)
	Laptop	122 (23.6%)
	Tablet	12 (2.3%)
	PC	02 (0.4%)
	More than one method	03 (0.6%)
Type of online platforms used for online learning	Zoom	367 (70.9%)
	Moodle	136 (26.3%)
	WhatsApp	4 (0.8%)
	More than one method	11 (2.1%)
Type of the lessons	Theoretical lessons only	375 (72.4%)
	Practical lessons only	–
	Both	143 (27.6%)
Type of online teaching strategy	Live online classes	245 (47.3%)
	Offline uploaded lectures	243 (46.9%)
	Other methods (self-directed learning through references or group work)	16 (3.1%)
	More than one method	14 (2.7%)

Table 3
Overall perception of undergraduates towards online learning.

Perception	Frequency (%)	Mean (SD)	Range
Positive (>18)	368 (71.0%)	20.4 (4.0)	9–27
Neutral (=18)	39 (7.53%)		
Negative (<18)	111 (21.43%)		

learning as positive. According to [Table 4](#), most respondents agreed that online learning is more comfortable to communicate than traditional learning (59.7%), enabling them to improve their knowledge and skills related to information and communications technology (66.4%). Further, more than half of the undergraduates (61.8%) agreed that online learning is more flexible and could save time than traditional learning. Moreover, the majority (62.6%) believed that online learning was convenient and allowed students to learn at their own pace. But only 21.2% agreed that the motivation of students to study is higher when learning online. 48.3% of respondents disagreed with the statement that practical and clinical-based subjects could be offered online. However, the majority agreed that the online method is useful for completing assignments and tutorials easily (59.7%), and enables fast completion of courses in the curriculum (64.1%). Further, most undergraduates (65.1%) believed that online education could be an effective way to control the spread of the COVID-19 pandemic among university students while allowing them to continue their academic activities. Compared to the other four disciplines, students in radiography had the lowest mean value for the overall perception of online learning ([Table 5](#)). Further, the results indicated a significant difference in overall perception based on the age (19–24 with 25–30 age groups), discipline (radiography with pharmacy) and academic year (1st year with 4th year) of the participants.

Challenges encountered during online learning

[Table 6](#) indicates the frequent challenges undergraduates face while learning online. According to the responses, it could be identified that poor internet connection (67.0%) was the main reason for limited online access. Further, issues related to the lack of electronic devices (53.3%) and difficulties in learning practical and clinical-based subjects (52.3%) were also mentioned by the majority of the undergraduates.

Table 4
Perception of undergraduates towards online learning.

Variables	Frequency (%)			Mean (SD)
	Disagree	Neutral	Agree	
It is comfortable to communicate online than conventional learning	133 (25.7)	76 (14.7)	309 (59.7)	2.34 (0.9)
It enables to enhance the knowledge and skills of information and communications technology (ICT)	86 (16.6)	88 (17.0)	344 (66.4)	2.50 (0.8)
It is more flexible and saving time than conventional learning	120 (23.2)	78 (15.1)	320 (61.8)	2.39 (0.8)
It is convenient and allows students to study at their own pace	112 (21.6)	82 (15.8)	324 (62.6)	2.41 (0.8)
Students' motivation for studies is higher in online learning	306 (59.1)	102 (19.7)	110 (21.2)	1.62 (0.8)
Practical and clinical based subjects could be offered online	250 (48.3)	98 (18.9)	170 (32.8)	1.85 (0.9)
Assignments and tutorials can be completed easily	106 (20.5)	103 (19.9)	309 (59.7)	2.39 (0.8)
It is helpful for the fast completion of courses in the curriculum	101 (19.5)	85 (16.4)	332 (64.1)	2.45 (0.8)
It is one type of method to control COVID-19 pandemic among undergraduates	86 (16.6)	95 (18.3)	337 (65.1)	2.48 (0.8)

Discussion

The COVID-19 pandemic has resulted in a formidable academic disaster around the world, particularly in low and middle-income countries.^{17,18} The majority of the countries appreciate online education as it is the only option for continuing education. In this situation, teachers and students are forced to modify their teaching and learning strategies and thereby adapt to the online teaching and learning environment.^{7,10,18} The allied health science degree programmes are designed to provide graduates with the competency required to deliver high-quality health care. But this pandemic has disrupted their usual learning environment and placed them in difficulty acquiring and completing the clinical knowledge and skills. This study was designed to identify the key basic information relevant to the online learning of allied health sciences undergraduates that may be used in the future in developing an effective online learning environment.

As indicated in the results, positive insights into the implementation of online learning were received. Although most of the undergraduates in this study believed that online learning was convenient, time-saving and less time-consuming to deliver courses, many undergraduates agreed that traditional education is better suited to offering practical and clinical-based subjects than online learning. Further, many undergraduates indicated that student motivation is higher in traditional face-to-face learning than in online learning. Online learning is an individual act and it can make students feel like they are learning all alone.¹⁹ In addition, students who have limited or no access to online resources may face discrimination, but all students have equal access to face-to-face education. However, according to the previously published studies, undergraduates' perceptions of online learning differed across disciplines around the world.^{20–22} According to this study, radiography students had the lowest mean value for overall perception, but they still demonstrated positive perception.

Table 5
Relationship between the overall perception of undergraduates towards online learning with their gender, age group, discipline and academic year.

Variables	Levels	Mean (SD)	p-value	Post Hoc Test (p) of significantly different groups	
Gender	Female	20.3 (3.7)	0.2		
	Male	20.8 (4.4)			
Variables	Levels	Mean (SD)	p-value	Comparison groups	p-value
Age	19–24	20.1 (4.1)	0.03	19–24 vs. 25–30	0.04
	25–30	21.0 (3.7)			
	>31	18.8 (5.3)			
Discipline	Radiography	19.9 (4.3)	0.01	Radiography vs. Pharmacy	0.01
	Nursing	20.5 (4.1)			
	Medical Laboratory Sciences	20.2 (3.7)			
	Pharmacy	21.6 (3.3)			
	Physiotherapy	21.0 (3.4)			
Academic year	1st year	19.9 (4.3)	0.01	1st year vs. 4th year	0.01
	2nd year	20.1 (3.8)			
	3rd year	20.8 (3.4)			
	4th year	21.4 (3.8)			

Table 6
Challenges encountered during online learning.

Variables	Frequency (%)			Mean (SD)
	Disagree	Neutral	Agree	
Poor internet connection	74 (14.3)	97 (18.7)	347 (67.0)	2.53 (0.7)
Lack of electronic devices such as smartphones, tablets, laptops and PC	151 (29.2)	91 (17.6)	276 (53.3)	2.24 (0.9)
Higher cost for the internet connection	180 (34.8)	137 (26.5)	201 (38.8)	2.04 (0.9)
Less motivation due to loneliness	179 (34.6)	97 (18.7)	242 (46.7)	2.12 (0.9)
Less interaction with lecturers	167 (32.2)	97 (18.7)	254 (49.0)	2.17 (0.9)
Less motivation due to long hour lectures	156 (30.1)	106 (20.5)	256 (49.4)	2.19 (0.9)
Difficulties in learning practical and clinical based subjects	135 (26.1)	112 (21.6)	271 (52.3)	2.26 (0.9)

According to literature,^{20,21} most undergraduates have fairly positive perceptions towards online learning, including this study.

According to the results, the majority of online learning is accessed via smartphones. This result was consistent with global findings among undergraduates in various disciplines.^{20,23} Smartphones are devices that can disseminate knowledge inexpensively and they can be used anytime and anywhere. This may be the reason for the higher accessibility of online learning activities through smartphones. However, allied health curriculums were more focused on clinical-based education. Hence these curricula have consisted of less mobile-friendly courses. Further, there are also limited features in a smartphone to facilitate a good learning process. At this point, it is essential to mention that many of the undergraduates have unequal access to sophisticated equipment or facilities because of their diverse economic backgrounds. As such, it can be a significant issue that can affect the effectiveness and usefulness of online learning.

Because of the pandemic condition, the University Grant Commission of Sri Lanka and the Telecommunication Regulatory Commission of Sri Lanka have reached an agreement with all internet providers to enable free access to university web services via the Lanka Education and Research Network (LEARN).⁷ This made Zoom and Moodle free digital platforms for all undergraduates in Sri Lanka. This study reveals that undergraduates are currently getting the greatest possible benefit from this service as Zoom and Moodle are the most frequently used communication platform of the study

sample. Another possible explanation for this result is that these platforms offer educators and learners greater flexibility (easier information sharing) and more comprehensive features (chats, forums, public and private messages).²⁴ Therefore there is a higher tendency for selecting these two platforms by the educators to offer the classes online. This finding is supportive with available results indicated in the previous studies^{25,26} conducted in Sri Lanka with undergraduates in different disciplines.

The unexpected rapid transformation of traditional education into the online environment has presented teachers and students with numerous challenges. As found in this study, signal availability was one of the main reasons for limited online access for many undergraduates. Further, a significant proportion of the undergraduates had financial difficulties. Additionally, the results also highlight the need of providing interactive online learning activities. The curriculum of the allied health disciplines consisted of theoretical, practical and clinical lessons. However, the results show that few practical lessons have been conducted through online communication platforms. This reflects the importance of navigation of practical lessons through online modes. Further, according to the results, it was found that no virtual reality or simulation methods were incorporated into the online teaching practice. These observations indicated the importance of developing and designing simulation laboratories, improving the infrastructure facilities in the simulation laboratories, and the availability of virtual learning and teaching facilities to promote skills-based online education.¹⁸ These results also highlight the requirement of implementing interactive online learning sessions that can also be delivered through smartphones. Further, implementation of online education requires a change in content delivery, communication, and assessments.²⁷ Therefore, it is vital to raise teacher-student awareness and conduct training on the application and availability of technology in order to improve their preparedness and maximize the benefits of online education.

This study has several limitations. Although there are few other allied health faculties in Sri Lanka, this study only focused on one faculty. Furthermore, this study does not consider students who need additional attention during the transition to the online learning process. Therefore, the generalizability of this study may be limited. Additionally, since the statements in the perception assessment section of the questionnaire were written very positively, they may mislead the respondents. Besides that, to the best of our knowledge, no study has focused exclusively on the perception of allied health sciences undergraduates toward online learning during the COVID-19 pandemic in the world. Many studies have only focused on one

professional group of undergraduates. As such, this was the very first study to assess the perceptions of undergraduates' towards online learning among different allied health science professions.

Conclusion

Online learning appears to be an efficient learning strategy that can save time, enable courses to be completed quickly, and, in particular, control the COVID-19 pandemic among students during continuing education. However, this appears to be less productive because of the numerous challenges involved. The most intriguing challenges identified in this study are unequal access and the less availability of online learning facilities, less interactive sessions between students and teachers, and the inability to complete clinical training. Therefore, it is essential to take remedial actions to identify and address the challenges involved in online learning in order to maximize its benefits in various disciplines that practice skill-based education.

Conflict of interest statement

The authors declare that they have no competing interests.

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