

Knowledge, attitudes and practices towards e-learning among Allied Health undergraduates in a Defence University, Sri Lanka: a cross-sectional study

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Abstract

Introduction: E-learning is a popular mode of learning among undergraduates and understanding the knowledge, attitudes and practices towards e-learning is important in planning effective teaching and learning activities.

Methodology: A descriptive cross-sectional study was conducted among 589 undergraduates of Nursing, Physiotherapy, Pharmacy, Medical Laboratory Sciences, Radiography and Radiotherapy at a Defence University in Sri Lanka. A pre-tested, self-administered online questionnaire was used to collect data. Data were analyzed using SPSS version 23.0 (Chi-square, independent t-test, one-way ANOVA).

Results: The response rate was 98%. More than half (58.4%, n= 344) of the participants had a good level of knowledge on e-learning, while 76.1% (n= 448) of the participants had neutral attitudes. Nearly 60% (n= 357) of the participants showed an average level of practice. The knowledge, attitudes and practices were not significantly different between the undergraduates of Allied Health degree programs ($p>0.05$). The attitudes towards e-learning were different between the academic years ($p=0.008$), where the 3rd year students had a significantly higher score for attitudes compared to 4th year students ($p=0.005$). Those who had previous knowledge (before university entry) of information technology (IT) showed significantly higher scores in knowledge ($p<0.001$), attitudes ($p=0.002$) and practices ($p<0.001$) towards e-learning compared to those who had no previous IT knowledge.

Conclusion: The undergraduates had a good level of knowledge on e-learning and it was further strengthened by their IT knowledge. Updating teaching methods with new techniques is recommended to improve the attitudes and practices towards e-learning among undergraduates in different degree programs.

Keywords: Knowledge, Attitudes, Practices, e-learning, Allied Health undergraduates

Introduction

Teaching and learning in many parts of the world are mainly based on traditional classroom methods where the teacher and students are in

face-to-face contact (Alzahrani, 2022). E-learning is an umbrella term that is used to describe the methods that incorporate electronic media for teaching and learning; web-based learning, online learning, distant learning and internet-based learning (Kumar & Om Prakash, 2015). With the evolution of information and communication technology, e-learning has been enhanced and more meaningful where the student could get access to learning at home (Timotheou *et al.*, 2023). E-

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learning has become the most popular method of learning with regards to this revolution of information and communication technology (Adewole-Odeshi, 2014) and it uses media such as audio clips, videos, texts, images, animations for the easy understanding of the learner (Vadlamani *et al.*, 2019). Recently, many e-learning online platforms have been established to access health-related programs, and courses to find new information and guidelines such as Learning Management Systems (LMS), Microsoft (MS) Teams, Zoom and Google Classrooms (Vadlamani *et al.*, 2019).

The known benefits of e-learning include flexibility of time and place, increased efficacy, and cost-effectiveness (Mohammad *et al.*, 2020). Cost-effectiveness is a significant advantage as e-learning results in the reduction of traveling, accommodation, and other costs compared to traditional learning (Mohammad *et al.*, 2020). Moreover, it gives the benefit that e-learning materials can be viewed many times anywhere based on the student's preference. The other advantage of e-learning is that it provides a productive environment for learning at the educational institutions for a truthful and quality process of learning while helping to upgrade the new knowledge with new technology (Samsudeen & Mohamed, 2019). Despite the considerable benefits of e-learning, current research indicates some disadvantages associated with e-learning including screen-related problems such as discomfort and dryness of eye, tearing, inability to focus and anxiety related to isolation (Oh & Lee, 2016). In addition, availability of computers or other devices, accessibility of the internet and economic factors remain challenges to e-learning in developing countries (Visalam *et al.*, 2015).

E-learning made a remarkable changeover in the education system with the COVID-19 pandemic and e-learning platforms have been more popularized for academic activities comparatively to the last decade (Hayashi *et al.*, 2020). Although, e-learning was not a popular method in the Sri Lankan university system, most universities in Sri Lanka expanded e-learning as a mode for the

continuation of academic activities to a certain extent and remain with challenges in certain aspects (Ekanayake & Weerasinghe, 2020). A previous study revealed that 90% of the participants in all faculties in state and non-state universities in Sri Lanka have tried online learning during the pandemic (Hayashi *et al.*, 2020). However, certain factors such as age, student's physical and mental health, intelligence, attitudes, level of motivation, willingness to learn and attention of the student were reported to be affecting the learning process during e-learning (Mishra & Study, 2021).

Assessing the knowledge, attitudes and practices towards e-learning among undergraduates will help to create awareness about the needs to be considered in planning e-learning activities effectively, to enhance the quality of academic activities (Houpis *et al.*, 2016). Delivery of medical education via e-learning is challenging as learners need more exposure at the real clinical setting to improve hands-on-skills. Moreover, many countries in the world have no specific guidelines developed in delivering e-learning to Medical and Allied Health undergraduates (Farooq *et al.*, 2020). Though, knowledge, attitudes and practices towards e-learning have been extensively studied globally (Timotheou *et al.*, 2023), there is a paucity of studies conducted among Sri Lankan undergraduates in the published literature. The lack of popularity of online learning systems in Sri Lankan context could be the possible reason for that. As e-learning is a global trend in higher education (Chan *et al.*, 2021), it is vital to explore the positive and negative aspects of e-learning experience among undergraduates. Hence, the current study aimed to assess the knowledge, attitudes and practices towards e-learning among Allied Health undergraduates of a Defence University to fill this gap in the literature.

Methodology

Study Design, Study Setting and Study Population

A descriptive, cross-sectional study was conducted among 589 Allied Health Sciences

undergraduates at General Sir John Kotelawala Defence University (KDU) Sri Lanka. All undergraduates studying at the faculty and consenting to participate in the study were included as the study sample without sample size calculation.

Data Collection Tool

A pre-tested, structured, self-administered questionnaire was used for data collection. It was developed based on an extensive literature search and finalized after discussion among the research team. The questionnaire was pre-tested among a sample of Allied Health Undergraduates (n=10) of a different university and necessary modifications were made before applying to the target study sample.

The questionnaire comprised of four sections; Section 1 included socio-demographic details of participants. Five- point Likert type questions were used in section 2, 3 and 4 with responses ranging from 0-4 for each statement. Section 2 included 15 questions related to knowledge and responses were scored as 0= Poor, 1 = fair, 2= average, 3= good, 4 = excellent. Section 3 consisted of 15 questions with the responses as 0= Strongly Disagree, 1= Disagree, 2= Neutral, 3 = Agree, 4 = Strongly Agree and section 4 consisted of 15 questions related to practices towards e-learning with responses as 0= Never, 1 = Occasionally, 2 = Sometimes, 3 = Most of the times, 4 =Always. Total scores were measured to acquire the knowledge, attitudes and practices scores. The total possible score for knowledge, attitudes and practices sections ranged from 0-60.

Data Collection

Ethics approval was obtained from the Ethics Review Committee of the Faculty of Medicine, KDU and approval for data collection was

obtained from respective Department Heads through the Dean of the Faculty. The questionnaire was shared among each undergraduate as a Google Form with inclusion of the information sheet and consent form, and the link was shared through WhatsApp among the participants. Informed consent was obtained prior to data collection. Privacy and confidentiality were maintained throughout the research process. No participant identities have been noted on the questionnaires. The participants were informed that their participation is voluntary and that they could withdraw from the study at any time and without prior notification. They were also informed that their academic activities would not be affected by their withdrawal from the study. Only the investigators had access to the entire database. No information or data was shared with a third party.

Data Analysis

The data entry and analysis were done using SPSS version 23.0. Data were analyzed using both descriptive and inferential statistics. The mean ($\pm$ SD) score was calculated for knowledge, attitudes and practices related to e-learning. The mean ($\pm$ SD) scores for individual statements in each section were also calculated. The overall scores of participants for knowledge, attitudes and practices were categorized in to 3 groups as shown in Table 1. Chi-square was used to identify the associations between categorical variables. Independent sample t-test was used to compare the mean score of knowledge, attitudes, practices with independent groups (gender, previous IT knowledge, etc.). One-way ANOVA followed by Tucky post-hoc test was used to compare the means score of knowledge, attitudes and practices with the academic year/degree program.

Table 1: Cut-off marks for knowledge, attitudes and practices related to e-learning

	0-20	21-39	40-60
Knowledge	Poor	Average	Good
Attitudes	Negative	Neutral	Positive
Practices	Poor	Average	Good

Results

Socio-Demographic Characteristics of the Participants

The response rate was 98.0% (n=589). The socio-demographic and other details of the sample are summarized in Table 2 and Table 3. The majority (75.7%, n=446) were females.

Mean ($\pm$ SD) age of the participants was 21.3 ($\pm$ 1.4) years. Of the participants, 88.5% (n=521) reported knowledge on Information Technology prior to the university entry. Only 39.7% (n=234) had experienced a good and stable network connection. The most reported limitation for e-learning was the network connection issues (57.5%, n=347). The majority (56.4%, n=332) preferred blended learning.

Table 2: Socio-demographic characteristics of the participants (n=589)

Characteristics	Number of students (n)	Percentage (%)
Age in years (Mean $\pm$ SD)*		21.3 $\pm$ 1.4
Gender		
– Male	143	24.3
– Female	446	75.7
Accommodation		
– Hostel	13	2.2
– Boarding place	346	58.7
– Own home	213	6.2
– Other	17	2.9
Locality		
– Urban	448	76.0
– Rural	141	24.0
Ethnicity		
– Sinhalese	552	92.9
– Tamil	19	3.2
– Muslims	15	2.5
– Other	3	0.5
Degree program		
- Nursing	171	29.0
- Physiotherapy	124	21.0
- Medical Laboratory Sciences	82	14.0
- Pharmacy	100	17.0
- Radiotherapy & Radiography	112	19.0
Academic Year		
- 1 st year	88	14.9
- 2 nd year	177	30.1
- 3 rd year	172	29.2
- 4 th year	152	25.8
(Mean $\pm$ SD)*		

Table 3: Students' experiences related to e-learning (n=589)

Characteristics	Number (n)	Percentage (%)
Previous knowledge on information technology (IT)		
– Obtained	521	87.7
– Not Obtained	68	11.4

Device used for e-learning		
- Laptop/desktop	402	65.3
- Mobile phone	181	30.5
- Other	6	1.0
Type of internet connection		
- Wi-Fi	117	19.7
- Mobile data	130	21.9
- Both	342	57.6
Quality of current network		
- Good & Stable	234	39.4
- Good but unstable	308	51.9
- Poor	44	7.4
- No Network	2	0.3
Limitations of e-learning		
- Lack of computer skills	54	9.1
- Lack of resources	38	6.4
- Distraction	147	24.7
- Connection issues	347	58.5
Hours spent on online resources per day		
- 1 – 2	64	10.8
- 2 – 4	194	32.7
- 4 – 6	261	43.9
- More than 6	66	11.1
Preferred learning type		
- Classroom learning (face to face) only	225	37.9
- Online learning only	32	5.43
- Blended learning (face to face & online learning)	332	55.9
Reasons for choosing online learning		
- Save time	160	27
- Maintain good interaction with lecturer	31	5.2
- Easy to use	35	6
- Enhance memory	16	3
- Comfortable (no need formal dress up, no travel cost)	101	17
Satisfaction towards e-learning		
- Very satisfied	49	8.2
- Satisfied	387	65.2
- Not satisfied	127	21.4
- Very dissatisfied	26	4.4

Knowledge on e-learning

Analysis with one-way ANOVA revealed that knowledge ($p=0.612$), attitudes ($p=0.454$) and practices ($p=0.237$) were not significantly different between the degree programs (Figure 1). The mean ($\pm$ SD) knowledge score was 38.57 ($\pm$ 15.04). The highest mean ($\pm$ SD); 3.90 ($\pm$ 1.17) was scored for 'logging in to learning platforms' while the lowest mean ($\pm$ SD); 2.95 ($\pm$ 1.24) was scored for 'ability to do data

analysis using statistical software'. The distribution of level of knowledge among the participants is shown in Figure 2, with nearly 60% ($n=344$) having good knowledge. When exploring the association between level of knowledge (i.e., poor, average, good) and socio-demographic variables, the academic year was significantly associated ($p=0.01$) with the knowledge on e-learning. However, knowledge on e-learning was not significantly different between degree programs ($p=0.612$).

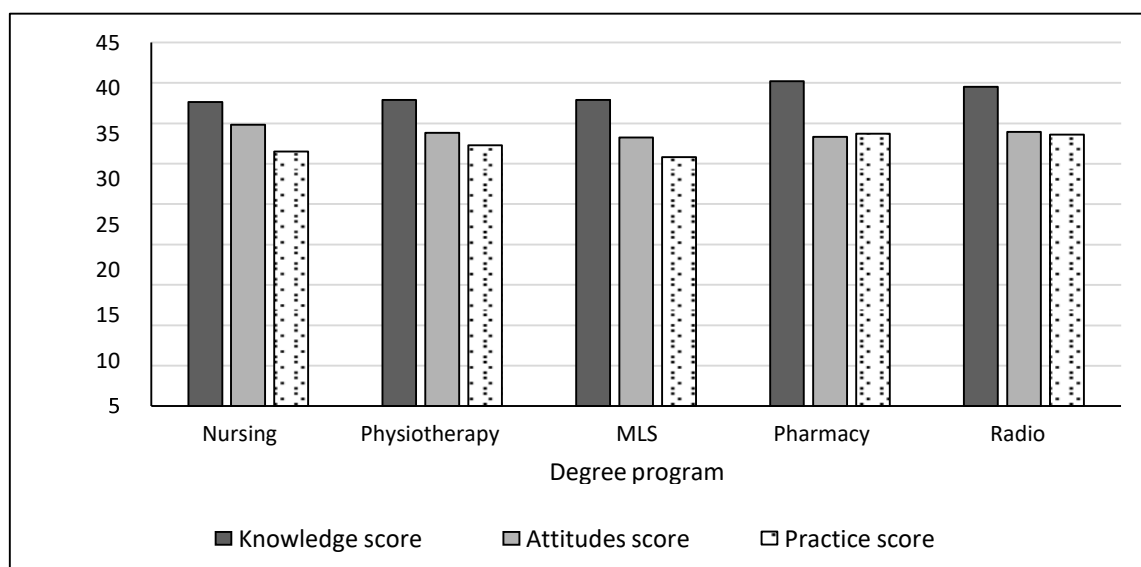


Figure 1: Mean score of knowledge, attitudes and practices in different streams (n=589)

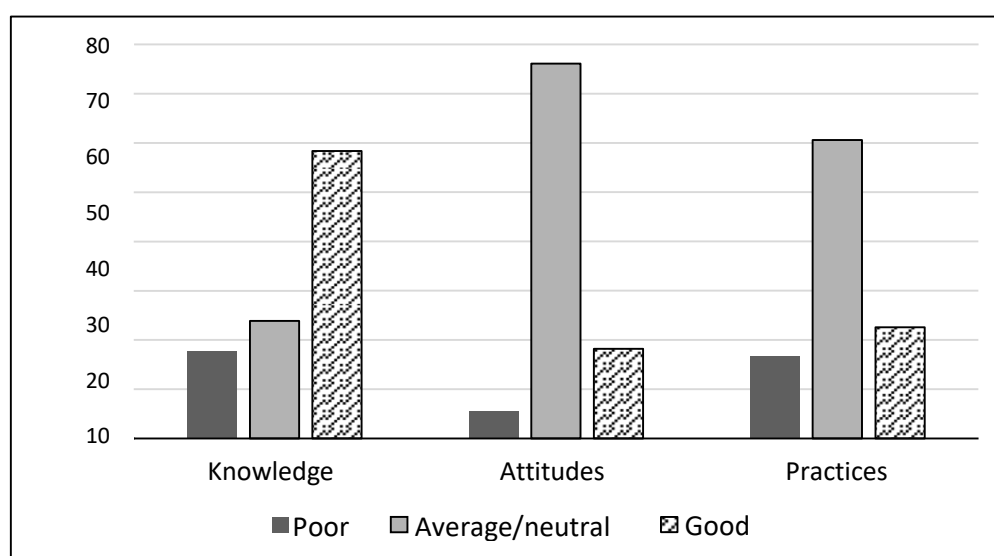


Figure 2: Participants' overall level of knowledge, attitudes and practices towards e-learning (n=589)

The independent sample t-test revealed that the mean score of knowledge ($p=0.001$), attitudes ($p=0.002$) and practices ($p=0.001$) were significantly higher among students who reported previous IT knowledge compared to those who had no IT knowledge before university entry.

Attitudes towards e-learning

The overall findings of the entire sample are shown in Figure 2. Mean ($\pm$ SD) attitude score was 33.98 ($\pm$ 8.08). The mean ($\pm$ SD) score for each statement in the attitudes sections were assessed and the highest mean ($\pm$ SD); 4.00 ($\pm$ 1.11) was scored for the attitude stating that 'it was not easy to gain clinical experience with the

e- learning method' while the lowest mean ($\pm$ SD) was scored for the attitude statement which stated that the 'it was more comfortable for to stay focused on the lessons when teaching through MS teams or Zoom than class room teaching'; 2.88 ($\pm$ 1.06).

Majority of the students ($n= 448$, 76.1%) had neutral attitudes on e-learning while 107 (18.2%) students had positive attitudes. Furthermore, a significant association was shown between students' attitudes on e-learning and academic year ($p = 0.001$) although no association was shown with other socio demographic variables. The following attitudes of the students showed a significant association with their academic year, i.e.,

hindrance to gaining clinical experience with e-learning ($p=0.041$), ability to stay focused on online lessons than classroom lessons ($p=0.001$), increase grades in academic performances using e-learning ($p=0.001$) and improve the quality of academic work with e-learning ($p=0.003$).

Analysis with one-way ANOVA revealed that attitudes towards e-learning were significantly different between the academic years [$F(3, 585) = 4.01, p=0.008$]. Tucky post-hoc analysis further revealed that the 3rd year students had a higher score for attitudes toward e-learning compared to the 4th year students [mean score; 3rd year vs 4th year: 35.1 ± 9.5 vs 32.1 ± 6.4 = $p=0.005$]. However, the attitudes were not significantly different between the degree programs ($p=0.454$).

Practices related to e-learning

The overall mean ($\pm$ SD) Practice score of the participants was $32.38 (\pm 11.29)$. According to the mean ($\pm$ SD) scores of each practice statement, the highest mean ($\pm$ SD); $3.83 (\pm 1.11)$ was scored for the practice on attending online lectures on MS teams/ Zoom while the lowest mean ($\pm$ SD) was scored for the practice of playing online games; $1.96 (\pm 1.07)$ which was less common among undergraduates. The distribution of level of practice according to the categories is shown in Figure 2.

Majority of the students ($n=357, 60.6\%$) had average practices on e-learning while 99 (16.8%) had poor practices on e-learning. No association was observed between practices (poor, average, good) and socio demographic variables. Nevertheless, the following practices of the students showed significant association with their academic year, i.e., downloading documents, journals & articles from the internet ($p=0.025$), exploring therapeutic guidelines for health-related conditions ($p=0.004$), attending online lectures on MS teams/zoom ($p=0.001$) and utilizing Moodle to submit assignments ($p=0.002$). The practices were not significantly different between the degree programs ($p=0.237$).

Discussion

The knowledge, attitudes and practices towards e-learning among Allied Health undergraduates of a Sri Lankan Defence University were assessed in this study. In general, all undergraduates followed a four-year full-time degree comprised of both theory and clinical components. The outcomes of this study seem reliable as the study sample was nearly six hundred ($n=589$) which strengthens the findings. To our understanding, this is the first reported study conducted among a large group of Allied Health undergraduates to explore their perceptions on e-learning in the Sri Lankan context. Moreover, this study has strengthened what is currently known in the scientific community about e-learning among undergraduates. In the present study, the majority of the students reported good knowledge on e-learning attributed to the reason that the majority of them have obtained IT knowledge before university entry. A recent study conducted among Nursing undergraduates in India has found that the participants had inadequate knowledge related to e-learning and the previous experience of attending online classes positively correlate with knowledge (Alias *et al.*, 2021). Most of the students in the present study were confident in using Microsoft office (MS) software, MS Teams, Zoom and Electronic mail. Further this study proved a significantly higher mean score of all the components (knowledge, attitudes, practices) among those who had previous IT knowledge compared to those who had no prior knowledge, highlighting the importance of IT skills in improving the effectiveness of e-learning. This finding is in line with of a team of researchers in Philippines emphasizing that the Medical students who previously spent fewer hours studying online were less likely to cope with e-learning (Baticulon *et al.*, 2021).

As per the students' responses, the majority preferred blended learning. Furthermore, some students preferred to learn solely through classroom learning and very few students preferred to learn only from online learning. Classroom learning is more preferred than online learning perhaps due to greater opportunities to interact with their colleagues

during university life. To the best of our understanding, online learning was a new experience to the Allied Health undergraduates and it became more popular during the Covid pandemic due to the closure of universities and travel restrictions in Sri Lanka. In contrast, a study conducted in Sudan in 2014 showed that students preferred both online and traditional learning while it has been reported that students prefer online learning as they have found it interesting, not boring and making clear information for their learning (Alkanzi and Alshfee, 2014). Most of the students in the present study had neither negative nor positive attitudes towards e-learning and it showed a significant association with the academic year but not with the degree program. No significant association was shown with the demographic variables such as age, gender, locality, accommodation and family monthly income with their attitudes towards e-learning. However, attitudes were significantly different between academic years. Undergraduates who study in their 4th year showed lower scores for attitudes compared to the 3rd years, which may be attributed to the number of clinical placements they have to cover during their 4th year which is impossible to achieve via online platform. A recent systematic review suggested that, e-learning may not be suitable in disciplines in the health professions, as they need practical or demonstrative types of learning, and further e-learning may create some problems of communication, as well as a lack of group dynamics (Regmi et al., 2020).

With regards to the level of practice, the students had an average practice on e-learning. No significant association was found with the degree program and academic year of the students and demographic variables. However, a similar study in India, has shown a significant association between the practice of e-learning and demographic variables such as gender and total family monthly income (Alias et al., 2021).

In summary, the Sri Lankan education system predominantly relies on traditional face-to-face teaching environment, with a limited attention on e-learning. However, it is understood that many state and non-state educational institutes in Sri Lanka have practiced e-learning in

essential circumstances in the recent past. At present, it is evident that blended learning approaches are being adopted in higher education system in a significant way. Improving knowledge, attitudes and practices among undergraduates is challenging, especially in low-resource settings. Despite the challenges of e-learning, it is vital to consider the benefits of virtual reality and simulation-based technologies, to keep the clinical competency, education and assessment on each stream (Shima, 2020). In addition, overcoming teachers' disability in accessing technology should also be addressed (Lestyanawati, 2020). Thus, the findings of the present study would help future researchers to step forward with a new insight, especially with regards to e-learning among Allied Health undergraduates.

Conclusion

A good knowledge with neutral attitudes and average practices were observed among the undergraduates towards e-learning which was different between the academic year. Introducing standard guidelines and strategies in higher education on effective e-learning is needed to fill the gaps in Allied Health degree programs.

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Authors' Contributions: Author GPG, DV designed the study, MPL, KK, UW and LG wrote the protocol and involved in data collection, statistical analysis, MPL wrote the first draft of the manuscript. Author DV, GPG and TS reviewed & edited. All authors read and approved the final manuscript.

Ethics approval: All authors hereby declare that data was collected after obtaining the ethical approval from the Internal Ethical Review Committee, FAHS (NUR/006/IRSCMC21) and the Ethical Review Committee, FOM, KDU (RP/S/2021/24).

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