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Undergraduate Students' Readiness for Blended Learning during COVID – 19 Pandemic in Sri Lanka

Investigating the availability of resources, characteristics of learners, technological skills and their belief on this method with compared to other learning methods

K.W.S.N. Kumari & G.J.M.S.R. Jayasinghe
Department of Science and Technology, Faculty of Applied Sciences, UvaWellassa University, Badulla, Srilanka.

Correspondence: K.W.S.N. Kumari, Department of Science and Technology, Faculty of Applied Sciences, UvaWellassa University, Badulla, Srilanka. Tel: +94-711244919 E-mail: sandya@uwu.ac.lk

Abstract

Recently, a major education crisis occurred around the world due to the COVID-19 pandemic. Consequently, Sri Lanka too, resorted to shutting down its universities. This created a need to find alternative learning methods to carry out educational activities during a challenging period. Therefore, this study was conducted to investigate the readiness of undergraduates for blended learning. The structured questionnaire was shared online to collect the necessary data. The sample of 549 undergraduates representing all universities was selected for the study by applying the convenient sampling method. The student's readiness was assessed using 28 questions. All of them had at least a smartphone to connect to the internet, but 48% of them had moderate speed internet connections. Exploratory factor analysis indicated that four factors are significant for readiness in learners' characteristics such as communication, interaction and study habits, technological skills, availability of resources, and their belief, in the blended learning method. Undergraduates' overall readiness percentage scores in four indicators were above 50% indicating a moderate amount of readiness in each area. According to the two-sample proportions test, among four areas, only readiness in resources and infrastructure was significantly different across gender. The majority of undergraduates preferred blended learning during the COVID-19. Although the government offers free internet service for educational websites, they should facilitate internet services to all areas in the country. Further, authorities in higher education would enhance students' awareness and skills on web-based learning.Additionally, undergraduates should be encouragedto adapt to blended learning during this type of challenging periods.

Keywords: COVID-19, Blended Learning, Education, Readiness, and Sri Lanka.

1. Introduction

The COVID-19, which originated in Wuhan, China during December 2019, spread rapidly around the world. Hence,the World Health Organization (WHO) stated it as a

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pandemic on March 11, 2020. However, in April 2020, 43% of the world population in 80 countries was shut down while adapting social distancing and implementing quarantine measures recommended by the WHO (Marinoni, van't Land & Jensen, 2020). Consequently, it caused a massive impact on higher education. Furthermore, the UNESCO stated that schools and higher education institutions were closed in 185 countries and 89.4% of total learners were affected. This critical nature can generate long-term effects on education such as loss of motivation, increased dropout rates, inflated unemployment rates, and reduction in students' contribution to the future development of the country. Sri Lanka is also experiencing this harsh reality which is one of the largest educational crises ever occurred. Since the Sri Lankan government also decided to shut down universities on March 12, 2020, the relevant authorities informed the universities to create alternative platforms that would allow the continuation of higher education delivery.

In face-to-face learning method, students physically interact with the lecturer. However, both parties are fully virtually connected in online learning method which directs towards learning in a digital world (Radha, Mahalakshmi, Kumar, &Saravanakumar, 2020). Blended learning is a combination of both face-to-face and online learning methods where 30–79% of the content is delivered online (Ibrahim & Nat, 2019). Numerous scholars elaborate on their explanations of blended learning.Garrison and Kanuka (2004) describe it as a method of integrating classroom teaching with online involvements. Live chats, instant messaging, social networking, forums, applications, and webinars are some tools which can be utilizedwhen incorporating online platforms in blended learning (Okaz, 2015). Singh (2003) defines that blended learning merges diverse delivery media to endorse meaningful and inspiring learning. Hence, when online aspects or technology is integrated as the main delivery method, the instructor should enhance not only the student's achievement but also their motivation to learn by applying interactive activities. To achieve these, the teacher should design innovative instructional and evaluation strategies based on the student's learning style.

Previously, the majority of the degree programs were followed under traditional face-to-face learning method for Sri Lankan undergraduates. Most of the students in the world used to get motivated by face-to-face interactions (Wright, 2017). Sri Lankan students are no exception to this. Hence, shifting fully to online learning would be challenging for them. However, the WHO has already declared to maintain social distancing and confinement measures during this virus outbreak. Thus, before implementing fully online learning in Sri Lankan universities, it would be better to practice the blended learning method (Liyanagunawardena, Adams, Rassool, &Williams, 2014). Before starting the online sessions, exploring the availability of infrastructure, student's confidence about technical skills, belief in blended learning method, and their characteristics such as communication, interaction, and study habits would lead to constructing a strong platform of learning.

The majority of the students in the world engage with teacher-centred traditional learning methods in their primary and secondary education. However, when they drastically shift to higher education with e-learning mode, they deeply recognize the challenges and differences in changing their study behavior (Popovici,& Mironov, 2014). Several studies were conducted to examine the impact of ICT on the implementation of online learning in distance educational systems (Liyanagunawardena, Adams, Rassool, &Williams, 2014). Further, it was found lack of infrastructure, low levels of computer literacy and local language content, and the lack of formal student support services as major obstacles to executing essential online activities at University.

When assessing the student's readiness before implementing online learning, not only the technical skills but also the characteristics of learner such as communication, interaction, and beliefs on the learning method, etc. should be considered (Bernard,Brauer,Abrami, &Surkes, 2004; Yu & Richardson, 2015). Based on the study done by Thaufeega (2016) it can be identified that e-learning is popular as an

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innovative idea among the majority of students whereas Eldeeb (2014) revealed that students favoured mixed-mode courses rather than fully online courses. However, concerning the demographic variations, it was found that male students, students who enrich with prior computer knowledge, and students who have the confidence to adapt to innovative technologies had a pessimistic attitude to e-learning on campus than other students (Keller &Cernerud, 2002). As major gains of e-learning, students emphasized that they can advance their understanding, independence, self-discipline, motivation to learn, and interactions with peers and with the lecturer. (Mislinawati&Nurmasyitah, 2018).

Recently some studies have been conducted on the attitudes of students towards e-learning, based on which it is the most appropriate method of learning during the pandemic crisis of COVID-19.The majority of learners revealed that online learning is very supportive in the middle of a pandemic (Allo, 2020). Further, it was found that e-learning improves the students' self-study skills and students' interest in using online resources. It has become prevalent among the students all over the world during the lockdown period due to COVID-19 outbreak (Radha, Mahalakshmi, Kumar, &Saravanakumar, 2020).Additionally, educational networks projected that 80-90% of higher education courses would become blended in the future (Ibrahim & Nat, 2019).

Subsequently, considering all previous studies, this study intends to explore the opinion of Sri Lankan undergraduates about the learning method used during COVID-19 pandemic, their readiness on the blended learning method before starting online sessions and conduct a comparative assessment of the readiness across demographic characteristics.

2. Methodology

All undergraduate students in Sri Lankan universities were considered as the population for this study. The structured questionnaire was prepared to collect the data based on prior studies (Bernard,Brauer,Abrami, &Surkes, 2004; Yu & Richardson, 2015) and it was shared online during March 2020. The convenient sampling technique was adopted to select 549 undergraduates for the sample. The first section of the questionnaire consisted of information on demographic factors while the second section contained 28 questions and collected information on student's readiness on blended learningon a five-point Likert scale.

Data were analysed using SPSS 22 software and R studio. The reliability of the questionnaire was tested using Cronbach's alpha which indicates the consistency of the items, if the test value is at least 0.7. Frequency tables were used to obtain the descriptive statistics. Then, factor analysis was done to identify the factor structure of the question set. First, the Kaiser-Meyer-Olkin (KMO) test was performed to validate the sampling adequacy for the analysis with an expected test value of above 0.6. Bartlett's test was used to assess whether correlations among questions were sufficiently large for factor analysis with an expected statistical significance of less than 0.05. Consequently, the factor arrangement was determined based on the number of eigenvalues that were greater than one. The principal component method and "varimax" method were applied to construct rotated factor loadings.The questions which were loaded on the wrong factors or cross-loaded on multiple factors were deleted from the structure. Then Cronbach's alpha for each set of items was calculated to check the reliability of each factor. Original factor scores were interval scale values which were calculated by applying the regression method. However, original responses were five-point Likert-scale values. Therefore, factor scores should be rescaled to extract meaningful indicators of readiness which will reflect the original semantic meaning of the primary data. Subsequently, factor loadings, weighted mean, and weighted standard deviation of original data were used to rescale them as five-point Likert-scale data (Starkweather, 2012). Then, the percentages of readiness for each factor were calculated using rescaled scores. Based on those percentages, students' overall readiness for the blended learning method was assessed. Then, a

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comparative analysis of undergraduates' readiness on each factor across gender was conducted by applying two-sample proportions test. "Strongly Agree" and "Agree" responses were combined as "Agree" and "Neither Agree nor Disagree", "Disagree" and" Strongly Disagree" responses were combined as "Disagree". If the response was "Agree", then it was considered as a respondent is ready to grab the new method. Based on those responses, proportions of readiness for each factor were calculated. Then, the two-sample proportions test was performed to investigate the difference of readiness on each factor across male and female undergraduates. Finally, the opinion of undergraduates about the learning method during this COVID-19 outbreak was identified by analyzing their comments given in the questionnaire.

3. Results

The overall Cronbach's alpha of the test which measures the internal reliability of the dataset was 0.852, which is greater than 0.7, indicated the consistency of the question set.

The sample consisted of 549 undergraduates in Sri Lanka, out of which 325 (59%) were female students and 224 (41%) were male students. According to descriptive statistics, approximately equal number of students were using laptops (261, 47%) and smartphones (285, 52%) as a device to connect to the internet and a less number of them were using a desktop (3, 1%). Further, 77% (423) of all respondentshad a home connection while 21% (120) of them were using internet service on a smartphone as the connection mode of the internet at home. Although they have devices to be connected, 48% (267) of the respondents stated that they have a moderately speedy connection whereas only about 22 % (121) of them stated that they have a speedy connection.

KMO test value was 0.946 which verified the sampling adequacy for the analysis. The p-value of Bartlett's Test was 0.00 which indicated that the correlations between questions were sufficiently large for the factor analysis. Since all the requirements were satisfied, factor analysis was performed. As shown in Table 1, the final structure of factors comprised four factors with eigenvalues greater than 1. This four-factor structure accounted for 62.80% of the overall variance in the pattern of relationship among the questionnaire items.

Table 1: Eigenvalues and variance percentages explained for the four-factor structure

	Factor 1	Factor 2	Factor 3	Factor 4
Eigenvalue	12.25	2.31	1.79	1.23
Variance (%)	18.40	18.30	14.80	11.30

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As stated in Table 2,the first six items were loaded into thefourth factor, which represented "availability of resources and infrastructure" to join with blended learning. The next six questions in the questionnaire were highly loaded into the second factor which expressed the "technological skills" of undergraduates. Then, ten items were exceedingly related to the first factorand it described the "learner's characteristics" such as study habits, communication skills, and interaction with the lecturer and peers. Finally, the last six questions in the instrument were loaded into the third factorwhich represented the "beliefs" of students on blended learning.The Cronbach's alpha for factor 1, factor 2, factor 3, and factor 4 were 0.8497, 0.9430, 0.9036, and 0.8793, respectively, which indicated that all four factors on this scale had a highly reliable set of sub measures.

Table 2: The questionnaire items and final four-factor structure of undergraduates' readiness on blended learning with factor loadings

Questions	Factor1	Factor2	Factor3	Factor4
I can easily access a laptop/desktop/smartphone at home				0.703
I have convenient access to a reliable internet connection				0.757
I can access internet multiple times a week				0.692
I have a university email account				0.470
I have access to the University VLE portal				0.589
I have a quiet and personal space for studying that is free from distractions				0.554
I know the basic functions of computer hardware and its peripherals like the printer, speaker, keyboard, mouse, etc.		0.771		
I know how to log on to an Internet Service Provider (connect to the internet?)		0.790		
I know how to navigate web pages		0.773		
I know how to open/send an email with file attachments		0.831		
I know how to upload and download documents through browsers		0.819		
I have confidence that I can join online discussions/forums		0.590		
I prefer to work alone	0.550			
When I have important assignments, I can meet tough deadlines	0.656			

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I can understand instructions for assignments/tutorials/quizzes by myself	0.721	
I prefer to figure out instructions for assignments by myself	0.739	
I do not need direct lectures to understand study materials	0.685	
When asked to learn new technologies, I do not put it off or avoid it	0.669	
I am determined to stick to studies despite challenging situations	0.650	
I can communicate effectively with the lecturer and my classmates using online technology and get difficult things in the course clarified	0.645	
Online discussions with other participants would help me to develop a sense of collaboration.	0.632	
I can take responsibility for my learning	0.404	
Learning through online platform makes me responsible for the course		0.695
Attending the class with online preparation helps me learn a lot		0.790
Learning through an online platform is much more interesting than the materials used in class		0.726
I can refer to study materials anytime		0.726
I can learn by myself in a quiet and comfortable environment		0.767
I can easily discuss things with the lecturer and students outside of class		0.666

Based on the found four-factor structure, undergraduates' readiness on blended learning was investigated. According to Table 3, the highest percentage scores of readiness was shown in technological skills (66.29%) and availability of resources and infrastructure (61.87%). However, the learners' characteristics and beliefs on blended learning scored percentages around 50% expressing necessity of further improvement in these areas. Consequently, undergraduates' overall readiness percentage scores in all four indicators were above 50% indicating a moderate amount of readiness in each area. Based on these facts, they should put a huge effort into transforming their attitudes, study habits, and skills while relevant authorities should provide required infrastructure facilities to help them shift drastically from face-to-face learning to blended learning during this pandemic.

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Table 3: Undergraduates' overall readiness percentage on four factors

Factors	1(%)	2(%)	3(%)	4(%)	5(%)	Overall (%)
Learners' characteristics	2.22	6.43	37.92	46.56	6.87	53.43
Technological skills	1.33	6.43	25.94	55.43	10.86	66.29
Beliefs	0.89	7.76	40.80	44.35	6.21	50.56
Availability of resources and infrastructure	1.11	11.31	25.72	54.77	7.10	61.87

1 = "Strongly Disagree"2 = "Disagree", 3 = "Neither Agree nor Disagree", 4 = "Agree", and 5 = "Strongly Agree". Overall readiness percentages were calculated by taking total percentages of "Agree" and "Strongly Agree" responses.

According to the comparative analysis done on students' readiness acrossgender in every four areas, readiness in learners' characteristics, technological skills and beliefs do not vary significantly across the gendersince all three p-values of two-sample proportions tests (Table 4) were greater than 5% significance level. Conversely, the p-value of the test related to the readiness in the area of availability of resources and infrastructure was less than 5% significance level indicating a significant difference of readiness among female and male undergraduates.

Table 4: Two-sample proportion test results for testing the students' readiness difference of readiness on four factors across gender

Factors	Proportion (Female)	Proportion (Male)	The difference between the two proportions	P-value
Learners' characteristics	0.5326	0.5371	-0.0045	0.925
Technological skills	0.6377	0.7029	-0.0652	0.148
Beliefs	0.5036	0.5086	-0.0050	0.918
Availability of resources and infrastructure	0.6558	0.5600	0.0958	0.042

Finally, the students' opinion about the learning method during the COVID-19 pandemic was analyzed based on their comments given in the questionnaire. Their suggestions and ideas aboutface-to-face learning, online learning, and blended learning were obtained asking an open-ended question in the questionnaire. The majority of them indicated that they prefer blended learning since it comprises some face-to-face activities while online sessions are conducted and it facilitates convenient time and comfortable place at home, easy access to study materials anytime, and self-study opportunity. However, most of them highlighted issues in resources and facilities such as poor internet connection, difficulties in affording internet service, frequent power outages, and no proper internet connection in some areas in Sri Lanka. Even though face-to-face learning facilitates them to understand the lessons clearly and motivate them in the class through physical interaction than other methods, the majority of them expressed their interest in adapting to blended learning by participating in online sessions during this crisis.

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4. Discussion and Conclusions

According to the results,majority of the respondents were female undergraduates. All the students had at least a smartphone as a device to be online. However, most of them had moderate speed connections which tend to be an issue. Based on the factor analysis, a four-factor structure was identified that indicated the readiness in the learners' characteristics such as communication, interaction and study habits, technological skills, availability of resources, and their belief in the blended learning method.However, undergraduates' overall readiness percentage scores in all four indicators were between 50% and 67%. Hence, they were in a moderate level of readiness in each indicator. Readiness in the areas of the learners' characteristics and their beliefs were shown to have the lowest percentage scores around 50%. Therefore, relevant authorities in higher education should address this matter. At the university level, the academic members can provide a guide regarding blended learning. Further, they can conduct introductory sessions to make them aware of utilizing online platforms in higher education and communicating aids with the lecturers and peers before starting the online lectures. Then, they can carry out activity-based workshops on enhancing their skills and confidence in blended learning.

Moreover, the government also should provide resources and facilities for students to continue their activities during this pandemic. They have already provided the free internet connection facilities to join the educational websites. However, the majority of students commented about not having connection services. Therefore, if the government or the service providers can facilitate proper internet connection to all areas in the country, it will be a motivation for all the university studentslearning all over the country.

According to the comparative analysis done using a two-sample proportions test, only the readiness in resources and infrastructure was significantly different across gender. The majority of students stated that they prefer blended learning than face-to-face learning and fully online learning during this kind of a challenging situation. Moreover, in their comments, they expressed their interest in changing their attitudes, habits, and skills and getting ready to utilize blended learning during the COVID-19. Hence, based on the undergraduates' view, it can be identified that the most appropriate learning method for Sri Lankan universities will be the blended learning method with an online platform during the COVID-19pandemic. However, Sri Lankan undergraduates have to put more effort into changing their characteristics, skills, and attitudes related to blended learning methods. Additionally, the Sri Lankan government, service providers, and authorities in higher education should fulfill their responsibilities to help undergraduates achieve their higher educational goals in a timely manner during COVID-19.

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