Full Paper

Contribution of IT to Implementation of Digital Learning in State Universities of Sri Lanka during the Covid-19 Pandemic

Pirunthavi Sivakumar[a,*] and Kularasasingam Wijikumar[b]

[a]Department of Information & Communication Technology, Rajarata University of Sri Lanka, Mihintale 50300, Sri Lanka

[b]Faculty of Engineering Technology, Open University of Sri Lanka, Nawala 11222, Sri Lanka

Email Correspondence: psivakum@tec.rjt.ac.lk (P. Sivakumar)

Abstract

This study aims to identify the impact of digital learning in Sri Lankan state universities and the contribution of ICT to the implementation of digital learning during the Covid-19 pandemic. This study also aims to investigate the impact of digital learning conducted in academic activities while the Covid-19 pandemic; its implementation in state universities in Sri Lanka and the challenges encountered by the academic staff members and students. The purpose of this study is to identify the positive and negative effects of virtual mode studies and their adaptations. In addition, this study will help to identify future digital learning opportunities at Sri Lankan state universities. Data collection was conducted through an interview guide and implemented with some research-related open-ended questions and thematically analyzed the data, and interviews were conducted to carry out research work at eight Sri Lankan state universities. The methodology of this study was qualitative, and the sample of this study was purposive. The findings of this study developed three main themes; implementation of virtual learning; blended learning and distance evaluation; and adaption to rapid changes. Based on the results, academic recommendations are considered when making recommendations for future studies.

Introduction

Information Technology (IT) is spread in every area even before the Covid-19 situation. Learn, VLE, and Moodle were there in the university systems even before the pandemic. However, participants through these platforms were less from the student side and the lecturers' side. In the present and future, IT-related education is going to affect academic efficiency and effectiveness. The contribution of IT is looked at in two aspects. One is considered to be the discipline in academics and the second is to assist in other disciplines. The fundamental idea here is to integrate IT into all aspects of academics and many industries. Even before the pandemic in all the degree programs, IT had a role, for example, lecturers conducted the class by using PowerPoint presentations using a multimedia projector; lecture notes are shared in google groups and google classroom via the LMS. No matter the platform used for academic learning, the application of IT is there. From every university's perspective, different digital systems are developed, being developed, and will be developed in the future. The present generation is smart in

using IT. When it comes to academics, students seem more active and advanced in IT-relevant fields than highly experienced lecturers. The reason is the current generation appeared to live with IT in almost all things. Conventional study methods evolved little by little and now study methods are changed to electronic presentations, online discussions, and online study materials. The evolving teaching methods are becoming convenient to both lecturers and students. Even though the physical existence is more interactive, online teaching brings the existence of the lecturers rather than having no lecturers. This is because of the advanced IT that we have nowadays. The main advantage of this teaching method with the support of Information Communication Technology helps the students to get the recorded video or audios so they can listen to the lecturers whenever they need it. This helps them to listen to the lecturers and learn whatever they miss during the lectures. This is possible because of IT and is a huge advantage for the students. However, there is some additional work pressure on the lecturer's side. Overall, IT is a huge advantage to uplift the academic educational system. This helps both students and lecturers to maximize their utilization of IT to enhance their education. Every university and academic staff member is finding new methods or advancing their existing methods or implementing their planned methods to full fill the academic requirements in the given time frame.

Objectives

This study aims to identify the effectiveness of the implementation of digital learning where the possibility was made through advanced Information Technology in the state academic industry during the Covid-19. The purpose is to see the challenges encountered by the academic staff and students due to the peak use of IT in state universities of Sri Lanka. Below mentioned objectives are to fulfill the purpose of this study.

- Recognize the positive and negative impacts of virtual studies and their adaptation in the Sri Lankan state universities.
- Identify the opportunities for future digital learning in the academic educational system in the Sri Lankan state universities.

Literature Review

The outbreak of Covid-19 has had a major impact on all processes around the world. More than two years have passed since the pandemic, and it is still expanding rapidly. The functioning of the global education system was severely affected by the outbreak. This is a pandemic that has caused massive institutional and behavioral effects in various areas, including education. The impact on learners is unprecedented. According to UNESCO, there are more than 1.5 billion elementary and junior high school students around the world who cannot go to school because of this pandemic situation. Countries and communities affected by large and unexpected closures are forced to look to multiple digital learning platforms for a rapid fix. These rapid changes from face-to-face to online classes have pushed the deeper problems surrounding the country's education policy and theoretical foundations and assumptions. The need for implementation of various measures in the education sector is essential for better development to address the outbreak of covid-19. Therefore, many countries practice digital methods in learning and e-learning practices in school and university buildings. Digital learning and e-learning actions are highly applicable in all countries and even in Sri Lanka to provide education for students. The pandemic

continued for a long time, and according to the requirements of mobility avoidance, the best learning method was determined as digital learning [4].

The action epidemic shows educational institutions and teachers in the global education system moving from classrooms and lecture rooms to digital platforms almost overnight. This immediate transition created gaps and shortcomings in the adaptation of online learning [6]. There are pros and cons to using digital learning. Perhaps more importantly, alternative market opportunities have been created for commercial digital learning platform providers. Some emergency online learning programs have been criticized for not complying with educational principles, best practices, and previous research [3].

During the Covid-19 pandemic, educational institutions have strived to seek out to make sure the students can continue their studies despite the crisis and social distancing [6]. In many cases, to make sure the continuation of studies, educational institutions have proceeded to seek out quick fixes with ed-tech [6]. This has created a sellers' market, where ed-tech companies have eagerly jumped on the chance to supply their services. Some are willing to supply their services and platforms for free of charge during the instant of crisis. At the same time, the students' satisfaction levels and attitudes toward e-learning and virtual classes are high and positive during the pandemic [5]. This demonstrates proper procedures and provision of all necessary education and e-learning taken at the university. With this, the study recommends supporting the efforts taken by the university and the continuous work to supply all the needs of education via e-learning and virtual classes with suitable infrastructures and technical support. Further, it recommends the continuous update on the teaching and learning platforms with the developments and training for faculty members, instructors, and students for future updates regarding this online teaching and learning. The long-term impact of e-learning on education still needs further proper investigation. It's possible that long-term e-learning could hurt learners and educators. Future studies should tackle this issue maybe through future monitoring of graduates and alumni or employers' surveys [5].

Limited mobility is available for the functionality of the Covid-19 pandemic. Therefore, the education system faces great disadvantages in each country. While setting the virtual classes, a surprising result was found before the pandemic. It was explained by some factors [5]; these factors are a powerful infrastructure that supports e-learning with a robust bandwidth, and a stable reliable blackboard platform. Another important factor is that instructors and students with many features and tools have long experience in front of the pandemic [5].

Many schools and universities are switching to e-learning practices to avoid the effects of COVID-19. One study found that moving to complete online learning practices would put pressure on finding some new tools, but the universities are offering online training and workshops for all teachers and students [5]. Some educational and technical issues related to new features were explained through a series of recorded videos published on YouTube. Also, several faculty members and students were familiar with online practice even before the pandemic [5]. Indeed, during the lockdown, students were pressured to rely more on themselves during the learning process, but they gained better stamina and independence which lead to a positive attitude towards new experiences. Another point they pointed out was that during the virtual classes, female and male students could be integrated into the same class and create a more competitive environment that would increase the experience of scholars [5].

Methodology

Here, the primary data collection method was used to collect the data. This was conducted through an open-ended questionnaire through which the researchers were able to collect the data under the qualitative study to identify the contribution of Information Technology (IT) in the implementation of digital learning and its impact in state universities in the Sri Lankan context. The questions are included to identify the contribution of IT in the university system specifically on the academic side; changes happening in the government universities, due to this Covid-19 situation with IT; issues faced by lecturers in this situation; issues faced by the student side; challenges in conducting the practical sessions virtually; different modes of assignment submission; availability of infrastructure for students and lecturers; the desire of conducting blended learning mode in future due to pandemic; quality and challenges in virtual training; future IT changes and expectation for state universities from government.

The sample of this study was taken from eight state universities in Sri Lanka. This sample included Heads of Departments, Senior Lecturers, Lecturers, and Professors, from the Faculty of Science, Department of Computer Science and Engineering, Department of Computing, Department of Computer Science, Department of Physical Sciences, Department of Computing and Information Systems, and Department of Computer Science and Informatics. This was taken as a purposive sample. The sample had academic experience from 3 years to 28 years.

The researchers transcribed the interviews from voice recordings to textual and then to the transcripts, data was carefully analyzed to code and researchers developed themes based on the codes.

Results and Discussion

The researchers developed three main themes based on the codes: Implementation of Virtual Learning, Blended Learning and Distance Evaluation, and Adaption to the Rapid Changes. These three themes have been analyzed and discussed carefully based on the findings.

Implementation of Virtual Learning

This is a tremendous improvement in the IT sector these days. Before Covid-19, IT was not effectively used in learning, however, after the pandemic, the main teaching method was online learning. The findings of this study show that there was uncertainty to conduct academic sessions online. However, the initiation began to conduct online lectures and other educational-related activities in state universities. The conventional teaching methods were teacher-centered but now it changed to student-centered teaching and learning. The lectures are conducted through Learn, Zoom, Google Meet, Microsoft Teams, and other different video conferencing applications. Teaching methodologies have drastically changed from offline to online. Not only the studies, but department, and faculty meetings are also conducted through digital platforms. One of the interviewees said that "*Some online teaching platforms have been used by some people like Google Classroom. Work from Home is becoming trendier these days. People are getting set up their personal computers with an adequate internet connection, software, and hardware. People are using a shared platform for practical sessions. Recording videos, uploading laboratory practical sessions to YouTube which are done by the staffs and YouTube materials are becoming popular these days*". Therefore, according to the interviewees, the government has provided free facilities, so data-free Zoom links have been provided for most of the

lecturers, so students do not have to worry too much, they only needed an internet connection to participate only in lectures. Participants of this study revealed that the students who have the IT infrastructure are privileged to have better connectivity. On the other hand, students who have not had any infrastructure or connectivity in the long term will be affected due to this virtual implementation. Similarly, students who have good connectivity but don't have infrastructure are challenging. Students who use their smartphones sometimes live in fewer coverage areas, and their bandwidth is not sufficient. Even if the students have all these facilities, they need to purchase data for learning. Those who are having facilities are getting benefits, others cannot get whatever they deserve to get.

The interviews further show that the assignments are collected, evaluated, and the marks of assignments are sent through Moodle. This study finds that the continuous assessment marks are provided through Moodle which is implemented to teach and evaluate smartly. This electronic mode of studying reduces paper consumption. UGC circular allows the universities to find ways of conducting the final assessments through online platforms. It is still under discussion to find a method to have final exams online. Regardless of the consequences, everyone was forced to use IT for learning, business, and other activities due to Covid-19. All around the world due to the peak usage of IT, many IT professionals lost their jobs or were half paid for their jobs. Based on the collected data, it is evident that the state universities stood up to the challenges and everyone is working online now.

Blended Learning and Distance Evaluation

The next finding of this study was stated that *".....Earlier we had those conventional thoughts that CA is this much and End semester is that much, and also all the examiners supervised examinations. Now everything is changing and we are seeking new methods of assessment, new methods of teaching."* Lectures and discussions are conducted through Zoom and other Video Conferencing platforms. But still, several problems are encountered in conducting exams as well as practical sessions. Especially in the field of Engineering courses, it is very hard to conduct practical sessions online. There were opinions to start the blended courses after Covid-19, so this will provide opportunities for students to take part in practical sessions at laboratories and study online. UGC and the authorities like to do this change, to have a better chance in future implementations. A participant stated that *"......at least the computing-based faculties and departments can go for the blended learning model. There are so many opportunities, and even though the semester is not over, now our students are in the industry, and they are working from home. The 4th-year students are following lectures, do the research, and also, they are working for organizations. Earlier we didn't have that flexibility. We can apply the same thing at least for our 4th-year students"*. This flexibility was validated by other participants.

On the other hand, the university doesn't have academics only, students will be missing their extra-curricular activities, team interactions, and other personality development. Yet the pattern was identified that all the participants said learning from home would be much more relaxing for the students. Similar to the advantages, the researchers identified disadvantages as well. When it comes to blended learning, distance learning has some backlogs which cannot be controlled by the students, such as frequent power failures, strengths of networks, and additional costs for data packages. The researchers further noticed that there are students who cannot afford to buy laptops, desktops, and smartphones to continue this distance blended learning.

The researchers recognized some relaxation in certain rules through virtual learning which also can be adapted to blended learning. A participant confirmed that *"we too relax in many of our styles, I'm very much strict on attendance, I expect 100% attendance. But in online lectures, I don't expect attendance. So, I think, slowly and slowly I am also adjusting to that technique. Nowadays I'm not looking for 100% attendance. So, from a different point of view, we relax some certain concepts of teaching and certain styles. We have given up some certain aspects and also students used to do so with virtual lectures."* In blended learning regardless of the environmental challenges, the student can learn from wherever they are. If this is a physical classroom, there may be some distractions depending on the weather. Students can have recordings of online sessions during the blended learning, therefore they can repeat the sessions and take notes if they miss any area. This will reduce the time of lecturing. Further, this new culture brought difficulties into the students' life, and this was deeply mentioned during the interview. The researchers noted that participants were concerned with cost-effective methods, which can be implemented to reduce the university overheads. *"……in the private sectors, you don't have to invest a lot in buildings, air conditioning, power, and internet. You can be given laptops and some increments for internet and infrastructure facilities and working from home is very easy from the company point of view. Some of these things have to work well from online mode will be a good thing to learn during the online lectures."* The researchers further identified that participants desired to move to the blended learning mode due to an increased number of university intakes which can be exhausting for lecturers and faculties. Therefore, blended learning will be prioritized in the future to reduce overheads, decrease exhaustive teaching, and improve effective learning.

Adaption to the Rapid Changes

One of the main problems identified here was the state universities were not ready for the drastic change which was happened during the Covid-19. *"….one main concern is "We were not ready" … especially government universities/ government set-up. We are a kind of behind in the industry or the private sector. Our infrastructure was not ready. In university times, our networks were not enough, and our Wi-Fi set-up is not adequate."* The researchers identified the attitude of reluctance to change to the new environment and the methods were not implemented effectively to face these challenges and to change the attitude toward learning. Commitment from the students is also lacking, the researchers identified that the responsibility of the students is far less than in previous days. Commitment to education and finding solutions to problems are far behind. The soft skills of the students yet need to be developed apart from academic learning. Evident to this finding, a participant stated *"……If you are going to study 4-year engineering program, the government is going to spend a lot on you. Whatever program you are going to follow, after 3- or 4-years' time students are done, because of that student's whole life will change, and the student will be stable. In 10 years, the students will be having a good job. So, a student is given a lot of things. So, I would prefer, the students should find possibilities, there are enough ways for a student to earn money nowadays. There are enough payment schemes, you may need around 100,000 to buy a fair-enough laptop, and even cheaper than that you can find a second-hand PC. So, in my opinion, when they are 18 to 19 years old, and if they don't know how to make 50,000LKR to 100,000LKR for something that is going to change their life, how the student is going to live in the company later? how they are going to live in an institute later? how they are going to work for a company?"*

The pattern of lecturers is not easily adapted to these kinds of changes and that was also notified by the researchers. "*…..there are a lot of courses like IELTS, Toffle, CCNA, Microsoft exams, etc, are even doing lots of practical sessions online and even exams were conducted online. We should not think too much, there are difficult technologies delivered online nowadays, even though, we are still reluctant to change some small changes. In my opinion, one of the difficulties we face is attitude.*" A positive pattern also seen in virtual learning is that student interacts quite high via chatting where they don't raise questions or answer questions in the physical classrooms. So, this provides kind of feedback to the lectures to understand the student's level of understanding of the lectures. However virtual environment has challenges to adapt to because it was revealed that "*it's not like sitting and looking at the lectures and lecturer. While working from home the disturbance might be there, they will put their microphones in mute and switch off their videos, and go here and there, so that reduce the concentration on the lecture.*" Ultimately gained knowledge at the end of the semester or during the academic year virtually will be far less than the physical lecturers. Long-time lectures have consequences and exhausting for both lecturers and students. "*……Conducting lectures online is time-consuming compared to physical lectures. We need to ask every student whether they are online and whether they can hear the lecturer. So, time is taken to sort out these kinds of things. It's very time-consuming compared to the physical lectures. And also, face-to-face communication is lacking, there is some kind of cognitive factors that decide the relationships between students and lecturers; the emotional attachments between students and lecturers are lacking; organizing quizzes and examinations is very hard; previously materials and everything didn't allow the students to copy.*" This virtual teaching culture may result in the new approach of inducing students to copy at a higher rate. The researchers further recognized that when the students don't have speedy typing skills, it causes additional stress to the students. The researchers further noticed that even if the staff is not experienced, the staff may have enough capacity to learn and adapt to the upcoming technologies.

Another important point was stated that adapting to virtual learning is also not possible. As evident, a participant said, "*………In my point of view if we are conducting practical sessions using ICT, ………., It is difficult but possible. I'm saying that just consider the chemistry practical, and if a lecturer carries out whatever the experiment in the laboratory while someone is recording it for creating a video, then uploading the video for students to view and learn. That is what I said "Not Possible". But it's possible, on the other hand, it is less effective. Because students just watch the video and learning experiment is not highly recommended. But it is only a possible solution. In the case of industrial training, now the only possibility is work-from-home. Then what happens is, we lost the objective of this industrial training. The main objective of industrial training is to give our students industrial exposure. They have to work within the industrial environment, they have to observe how this management, the intermediate level officers, and the lower-level officers, how to work, how they interact with each other, and all these things. But those are not achievable with these work-from-home or train-from-home situations. Those are the factors we cannot address under this situation, even we have fewer ICT technologies.*"

Conclusion

The results of this study identify the contribution of Information Technology (IT) in the implementation of digital learning and its impact on state universities in the Sri Lankan context during the covid-19 pandemic. It shows some interesting findings that the researchers attempted to investigate the effectiveness of digital learning which was implemented in academic activities in the state universities of

Sri Lanka during the Covid-19 pandemic and the challenges encountered by the academic staff and students. The finding of this study discussed implementing virtual learning; blended learning and distance evaluation; and adaptation to the rapid changes. Based on the findings, the researchers considered the recommendation made by academics when providing recommendations for further future studies. Due to the time and financial restrictions, researchers restricted the study only to the lecturers. This study further provides an understanding of the gap in implementing the planned activities in the state universities of Sri Lanka. That is why when there is a drastic change in the study platforms, they face many challenges in conducting virtual lessons and organizing practical.

Conflicts of Interest

The authors declare that there is no conflict of interest.

References

[1] L. Czerniewicz, What we learnt from "going online" during university shutdowns in South Africa. *Phil on EdTech.* **2020**.

[2] Y. K. Dwivedi, D. L. Hughes, C. Coombs, I. Constantinou, Y. Duan, J. S. Edwards, B. Gupta, B. La, S. Misrah, P. Prashant, R. Raman, N. P. Rana, S. K. Sharma, N. Upadhyay, Impact of COVID-19 pandemic on information management research and practice: Transforming education, work and life. *ScienceDirect*. **2020**.

[3] C. Hodges, S. Moore, B. Lockee, T. Trust, A. Bond, The Difference Between Emergency Remote Teaching and Online Learning. *EDUCAUSE*. **2020**.

[4] D. Jansen, K. Warren, What (Exactly) Is Research Methodology?. *GRADCOACH*. **2020**.

[5] E. Malkawi, A. Bawaneh, M. Bawa'aneh, Campus Off, Education On: UAEU Students' Satisfaction and Attitudes Towards E-Learning and Virtual Classes During COVID-19 Pandemic. *CONTEMPORARY EDUCATIONAL TECHNOLOGY*. **2020**.

[6] M. Teräs, J. Suoranta, H. Teräs, Post-Covid-19 Education and Education Technology 'Solutionism': a Seller's Market. *SpringerLink*. **2020**, 863-878.