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POSITIVE IMPACT OF SMART DEVICES AMONG HIGHER EDUCATION STUDENTS

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Abstract

Almost all have used smart devices despite geographical areas and countries. In detail, it is transparent that trendy smart devices rule the people, especially youngsters all around the world. Smart devices are being used in various domains despite the public of Sri Lanka; higher education is one of them. These smart devices are used for smart communication, sharing course material and knowledge, research purposes, group activities, e-learning, online tutorials, online assessments, and guest talks. This exploratory study approach was conducted to analyze the positive influence of smart devices in higher education among the undergraduates of the South Eastern University of Sri Lanka. This survey was carried out using a stratified sampling technique. The samples were collected from all the six faculties of the South Eastern University of Sri Lanka. Two hundred five responses have been collected out of 300 questionnaires. Descriptive statistics test and Chi-square test were applied for the statistical investigation purpose. As a result, most of the undergraduates (93.2%) use mobile phones like smart devices in academic activities. Though most of the undergraduates are using smart devices regularly, the awareness of the Learning Management System is low. The result shows that undergraduates strongly agree that smart devices are a convenient tool for academic purposes since smart devices make learning easy. The primary outcome of this study is that there is a significant relationship between the academic stream & faculty and the positive influence factors by using smart devices. In addition to this, there is a significant relationship between the stream & faculty and academic activities.

INTRODUCTION

Smart devices, As the names imply, a smart device is an electronic apparatus used to collect, share, and manage the appropriate information with other devices[1]. As a theoretical term, "A smart device is a context-aware electronic device capable of performing autonomous computing and connecting to other devices wire or wirelessly for data exchange". As we know, the number of smart device users are increasing over the last decade. Approximately 3.8

billion users currently have smart devices for day-to-day operations [2]. Very famous applications of smart devices are; smart homes[3], smart cities[4]–[7], smart education[8], smart healthcare[9], IoT agriculture[10]–[12], Connected cars[13], [14], and a lot more. It evident that smart devices govern the world by embedded with different applications.

There are many smart devices in the domain of trends for various purposes. Smartphones[15], smart TVs[16], [17], tablets[18], smart keys, smart cards[19], and smartboards [20]are few examples of this. Each of these devices is providing its best performance. The users of smart devices have many advantages and sometimes disadvantages too. As we know, All invented technologies have two faces. For example, we can cut the vegetables with a knife while we can even stab a person. Technologies also the same, getting pros and cons depending on the way we are using. Apart from those disadvantages, the contributions of smart devices are highly impactable to achieve several goals.

Smart devicesplaysignificant roles in the educational side these days[21], [22]. Massively smart devices are being used by people nowadays, especially youngsters. In the sense of University students, as they are very young users, they are using various smart devices.Such identified devices as; smartphones, PDA, MP3/MP4 players, e-book readers (e.g., Kindle), netbooks, tablets (e.g., iPad, Galaxy Tab), hybrid tablet/smartphone gadgets (e.g., Galaxy Note), and specialist portable technologies used in science laboratories, and smart wearable devices like a smartwatch, smart wrist band, and smart glasses. These trends are stimulating the undergraduate to use the necessary devices in education. The usage of smart devices providesenormous advantages simultaneously; it provides a few disadvantages too. On the education side, undergraduates are using these smart devices for different purposes.Communication, exchange of course materials and knowledge, academic projects, group discussion, e-learning (LMS), online tutorials, and expert knowledge acquisition are some of the examples.

On the other hand, the usage of these smart devices is decreasing the academic performance of the individual via stimulating the undergraduate to have entertainment such as social media usage (Facebook, WhatsApp, Viber, and YouTube)and online gaming (PUBG, Call of Duty, etc.). Also, addiction to smart device usage, creating different problems psychologically. Which occasionally leads to suicides and other social impacts. Unkown truth of most individuals that unlimited usage of smart devices, 71%, stimulates the suicide of a teenager [23].

Other beneficial applications of mobile technology in higher education include social, emotional, and educational improvement.Learners can learn anytime and anywhere through mobile learning, which has emerged as an innovative learning approach[24]. In this study, we have selected and analyzed students who are indifferent faculties of the South Eastern University of Sri Lanka. There is considerable interest in utilizing smart devices to increase higher education access, particularly in the South Eastern University of Sri Lanka. However, none provides a detailed analysis of smart device usage in learning in the South Eastern University of Sri Lanka context, which is the key focus of this study. Therefore, in an exploratory approach, this study reviews empirical evidence of the use of smart devices in learning in higher education from the perspective of the South Eastern University of Sri Lanka.

LITERATURE REVIEW

Rogers Kaliisa and Michelle Picard say that mobile devices' spread and popularity have led to their increased application in higher education. In the same research, they indicated that mobile learning within higher education institutions student and lecturer collaboration and provided distant communication, increased student participation and engagement, facilitated authentic learning and reflective practice, and fostered learning communities. The recent spread and subscription to mobile phones report incredible growth and mobile device penetration in developed and developing countries. For example, in countries such as China and the USA, 97% and 90% respectively of adults own a cell phone, with 64% being smartphones. In wealthier countries in the developing world, such as South Africa, 89% of people own a mobile device. In contrast, countries in the most impoverished region of Sub-Saharan Africa, such as Kenya and Uganda, stand at 83% and 65% mobile ownership, respectively, with an estimated increase of 130 million new mobile users each year in the developing world [24].

As stated by Christoph Pimmer et al., Digital smart devices such as smartphones, tablets, and PDAs have a higher impact on higher education these days [25]. As indicated by Arrigo et al. that, the students did most of the higher education projects without any social contact with teachers or tutors, and they have done by using mobile and smart devices [26].

Another novel study indicated that M-learning is defined as learning delivered across multiple contexts through social and content interactions, using handheld and mobile technologies such as personal digital assistants (PDAs), smartphones, or other mobile devices. M-learning increases learning flexibility by adapting learning to be more personalized and learner-centered [27]. As specified by Davis et al., PDA helps medical students to study a program of chest-tube insertion rather than working with a group of people [28]. This is a relatively massive application of smart devices in higher education and among higher education Students.

As said by Sung et al., smart devices are placing an important role in education sectors and assessment, research, and even learning activities done by using mobile and smart devices [29]. Mobile learning provides variety and a considerable number of advantages to educations, which provides support for the study, connects expertise for better understanding and provides communication and collaboration among teachers, students, and communities for learning and research activities [30].

As indicated by Jaradat, students can be learned at any time, any place, without any obstacle using smart devices and smart technologies. Also, using smart devices deliver and expand the range of learning from different areas; hence a student can be done his/her research activities in different areas and share and attain knowledge from expertise. It improves a good relationship among students and teachers [31].

Stavros A. Nikou, Anastasios A. Economides, et al. has done a study on Mobile-based assessment. They said that Mobile-Based Assessment (MBA) is a relatively new assessment mode delivered through wireless technologies and mobile devices. MBA, much like paper-based or computer-based assessment, gathers and reviews empirical data about student learning in order to evaluate students, the learning process itself, or both, aiming to improve learning. Furthermore, mobile technologies provide new and enhanced functionalities and opportunities to assess learning. Mobile learning and assessment spans from curriculum-led classroom instruction to informal, highly mobile learning on the move [32].

Many universities have begun to take benefit of the recent development in Information and Communication Technology (ICT) by embracing innovation in online learning. These higher educational institutions are aware that ICT is currently a significant component in reforming teaching and learning. The role of ICT is to formulate and to enhance mobile teaching and learning processes, and it drives student-centered learning. To be innovative in one's teaching, we need to consider the advancement of ICT like smartphones, social media, LMS, etc. Smart mobile devices are not limited to, making calls, but students can send text messages to anyone worldwide. Many Apps in smartphones make sending text messages and calling even more manageable and at a lower or no cost. Students can even make groups using one of the available apps on their smartphones and send messages instantly to everyone within the group. These functions are useful for students, as they can discuss their coursework[33].

As several researchers and writers have pointed out, emerging technologies in higher education inspire and enable students to address challenges[34]–[37].

Students from Open University, Nigeria, and the University of Makerere, Uganda, pointed out a study regarding mobile devices in higher education. This study proved that mobile devices in higher education are incredibly cheap, provide regulated learning and efficient access to teaching materials[38], [39]. It is also evident from Mayisela[40] and Mansour [41] that mobile learning in higher education establishes a bridge for communication among students and lecturers. Throughout the platform, they have higher quality service.

Rambe&Bere[42] reported that mobile technology enables teachers to develop their skills and encourages pupils to enroll in lectures more than usual conventional methods.

Julie Mueller et al. [43] examined the bond between mobile technology and higher education. This study focused on a mobile device called “BlackBerry”. Students enthusiastically used this tool for communication purposes. As a result of this study, we can understand that mobile device in higher education provides the best environment for learning activities. Also, these devices sort out many problems with students and lecturers.

Zeynep Turan et al.[44] inspected how mobile Augmented Reality (AR) in higher education. The study centered on the achievement of the student and cognitive load levels. This approach was applied to the geography subject of 95 students. The results of the study showed that mobile AR enhances the student's achievement. In contrast, the number of cognitive loads of students decreased. This study concluded that mobile AR tools in higher education are very beneficial.

Iris Shuk Han Wai et al. [45] have accomplished a study to identify the mobile apps pattern in higher education. This research was employed to 150 students at Honk Kong University. The outcome of this study indicated that students are using various applications in higher education for various purposes. Accessing the study resource, dictation, and connectivity are significant factors for using these various apps. In conclusion, mobile devices affect higher education in many ways, including smart device applications.

As several studies have pointed out, Mobile learning offers high support for enhancing e-learning experiences [46], [47]. Besides, the support of m-learning is a significant pillar in higher education sectors these days [48]–[50].

Mobile devices make high contributions to student education and achievement in several ways. Helen Cromptona and Diane Burkeb[51] studied the nature of

mobile devices in higher education. Smart devices allow students to learn more than other mediums. From the result of this study, we could be identified that more than 70% of students using mobile devices for their educational purposes. Hence, we can strenuously express that mobile devices influence higher education in a realistic context.

Kallissa et al. [24] stated that mobile phones are mostly using devices in higher education. Correspondingly, Chen et al. [52] claimed that Mobile devices are frequently used in higher education. At the same time, audio players are the very least used devices.

METHODOLOGY

This survey was carried out using a stratified random sampling technique by chosen up samples from the respective students of the corresponding faculties of the South Eastern University of Sri Lanka (SEUSL). A total of 300 questionnaires were distributed among the students of six faculties of SEUSL via an online questionnaire, and in these, received completed questionnaires were 205. Therefore, the sample size was concluded to 205. This study has been carried out to analyze the positive influence of Smart Devices in higher education among the undergraduates of SEUSL. Further, the Descriptive Statistics test and Chi-square test were applied for the statistical investigation purpose. Also, the required statistical analysis was performed using SPSS software; also used Google formsto create a questionnaire, and used Google sheet to extract data from Google form. Also, 5% of the significant level was used in this study.

RESULTS AND DISCUSSION

The undergraduate students' demographic summaries are shown in Table 1. The majority of male students had participated in this study (51.2%) from the non-science stream (53.2%). Mostly they were from the Faculty of Islamic Studies and Arabic Language (FIA) (24.4%) and Faculty of Arts and Culture (FAC) (23.9%) inthe second academic year. They were asked to select which smart devices they use for their academic purpose. For this question, 93.2% of them said that they use smartphones as a smart device.

Table 1. Demographic variable

Variables	Frequency	%
Gender		
Male	105	51.2
Female	100	48.8
Stream		
Science	70	34.1
Non-Science	109	53.2
Technology	26	12.7
Faculty		
FAS	33	16.1
FE	31	15.1
FT	23	11.2
FIA	50	24.4

Variables	Frequency	%
FAC	49	23.9
FMC	19	9.3
Year of Study		
1 st	37	18.0
2 nd	63	30.7
3 rd	52	25.4
4 th	53	25.9
Smart device***		
Smartphone	191	93.2
Tablet/iPad	55	26.8
Other	81	39.5

Note: ***Multiple choice questions

60.5% of students use mobile devices for learning regularly, and mostly their smart devices are connected to the internet anytime (40.5%). However, only 35.1% of undergraduates use the Learning Management System (LMS) through smart devices. From this, it seems that they are unaware of the LMS. These results are shown in Table 2.

Table 2. The usage pattern of Smart Devices

Variables	Yes		No		Maybe	
	Freq.	%	Freq.	%	Freq.	%
Regularly use for learning purpose	124	60.5	18	8.8	63	30.7
Connected to internet anytime	83	40.5	49	23.9	73	35.6
LMS use via smart devices	72	35.1	49	23.9	84	41

Further, students were asked how long they use the internet per day for their academic purpose and which place they frequently use the internet via smart devices. Figures 1 & 2 show mostly they spent 1-3 hours on the internet (36%), at home/hostel (57%).

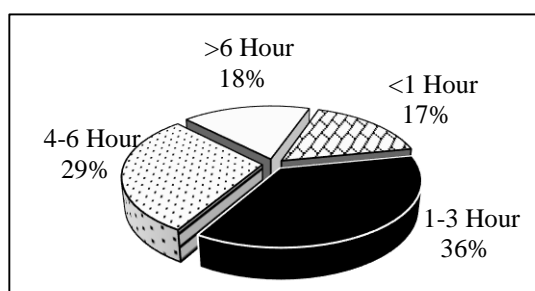


Figure 1. Internet usage per day

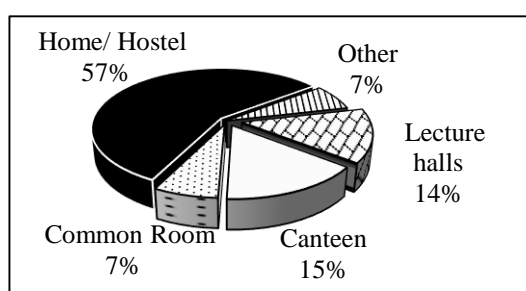


Figure 2. Frequent use place

They strongly agreed that Smart devices are a convenient tool for the academic purpose; these devices make learning easy, they can be used to take notes at lectures, to support studies and researches, to share learning materials and information, to practice online materials / follow online courses, to communicate with fellow students and to read more books/research articles by using E-Library. Also, they agreed with the quality of smart devices that motivate their studies at the university level, and smart devices increase the academic relationship between Teachers and Students. These results are shown in Table 3. It seems that there are more positive influences by using smart devices in undergraduate students' academic activities.

Table 3. Influence of smart devices in academic activities

Variables	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Convenient tool	67	32.7	43	21	30	14.6	23	11.2	39	19
Motivate education	56	27.3	61	29.8	25	12.2	23	11.2	39	19
Easy Learning	73	35.6	50	24.4	14	6.8	24	11.7	44	21.5
For Lecture Notes	71	34.6	54	26.3	24	11.7	27	13.2	29	14.1
For Studies & Researches	88	42.9	43	21	19	9.3	18	8.8	37	18
Share learning material	99	48.3	40	19.5	10	4.9	20	9.8	36	17.6
Practice online course Materials	62	30.2	57	27.8	22	10.7	27	13.2	37	18

Communication	81	39.5	52	25.4	22	10.7	24	11.7	26	12.7
Motivate read books & Research	60	29.3	51	24.9	39	19	23	11.2	32	15.6
Increase Students-Teachers Relationship	60	29.3	61	29.8	30	14.6	28	13.7	26	12.7

Table 4 shows the relationship between the academic stream & faculty and the positive influence factors by using smart devices. There was a significant relationship between the stream & faculty and the LMS usage, make learning easy, to take lecture notes, for studies & research activities, to share learning materials and information, to practice online materials / follow online courses, to communicate with fellow students, for E-Library usage and to increase the relationship between teachers and students.

Table 4. Relationship with Smart device usage

Variables	Stream		Faculty	
	χ^2	(P-value)	χ^2	(P-value)
Using LMS through smart devices	30.740	(0.000)*	50.704	(0.000)*
Smart devices make learning easy	47.996	(0.000)*	77.796	(0.000)*
Smart devices are used to take notes at lectures	29.627	(0.000)*	58.543	(0.000)*
Support for studies and researches	67.530	(0.000)*	107.359	(0.000)*
Share learning materials and information	59.352	(0.000)*	105.118	(0.000)*
Practice online materials / follow online courses	35.604	(0.000)*	68.123	(0.000)*
Communicating with fellow students	34.151	(0.000)*	48.178	(0.000)*
To read more books / research articles by using E-Library	33.639	(0.000)*	66.661	(0.000)*
Increase Students-Teachers Relationship	17.863	(0.022)*	38.248	(0.008)*

* Fail to accept the null hypothesis of there is no relationship at 5% level

Conclusion

Most of the undergraduates (93.2%) use a mobile phone as a smart device in academic activities. Even though most of the undergraduates are using smart devices regularly, the awareness of LMS is low. Our result shows that the undergraduates strongly agree that Smart devices are a convenient tool for academic purposes; smart devices make learning easy. Our study's main result is that there is a significant relationship between the academic stream & faculty and the positive influence factors by using smart devices. There was a significant relationship between the stream & faculty and academic activities.

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