Factors Affecting on Use of Learning Management Systems (LMS) During Covid 19 period in Tertiary Education Centers, Sri Lanka

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A B S T R A C T

During the Covid 19 period, there were no lectures, no workshops, no sports, no functions, and so on for the students in tertiary educational institutions in Sri Lanka. They began to detach from studying. Fortunately, technological advancements have enabled both lecturers and students to collaborate in a single virtual space where they can manage their teaching and learning activities. However, because of the various fields of education, it was not easy to adapt with the modern technology at first. As a result of the spread of the Covid 19 pandemic, all the human beings had to stay at home detaching each other. It affected all the industries around the world. Education is one of the most important sectors in Sri Lanka and here the researcher selected the tertiary education sector in Sri Lanka for the study. The objective was to identify factors affecting for use of LMS during the Covid 19 period. First, the researcher did a pilot study to determine the existing situation of those institutes and to determine the level of technological movement that was lacking due to a variety of factors. Later, the researcher identified the gap. Then researcher undertake the study by considering independent variables such as the lecturer's commitments, organizational support, student interest, and student experience with digitalized platforms for teaching and learning activities while considering the usage of LMS as the dependent variable. The primary data was gathered through standardized questionnaires distributed via email and WhatsApp. The gathered data were analyzed using SPSS, and frequencies, reliability analysis, correlation, and regression coefficient tests were performed to test the developed hypothesis of the study.
Keywords: Covid 19, Information Systems, Learning Management Systems, Online Education, Virtual Learning Platforms

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1. Introduction

Since the Corona pandemic, people have been debating lockdown, and it has become a popular topic from 2020 onwards. Indeed, starting in March 2020, competent authorities (in this case, the federal and state governments) announced a state of emergency to prevent people from leaving their homes, resulting in mass quarantines and the concept 'stay-at-home' around the world. People's unethical determination to take stringent safety precautions such as maintaining social distance, adhering to medically prescribed quarantine restrictions, and accepting hygiene and sanitation would go a long way toward limiting the COVID-19 epidemic. Around 264 million children and adolescents are out of school, according to the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the epidemic has aggravated the issue. As the COVID-19 pandemic spreads, an increasing tendency toward online education has emerged, and the only option was to close schools, colleges, and institutions indefinitely. Over "850 million children and youth — over half of the world's student population – were forced to stay away from schools and colleges" because of the COVID-19 pandemic. There are statewide limitations in 102 nations, with local closures in 11 more. This means that the number of students who are unable to attend school has more than doubled, with more increases expected (UNESCO, 2020).

Economic, social, and technological demands are putting a strain on tertiary-educational institutions, necessitating more adaptive and diverse plans to suit an ever-widening range of educational needs. By adopting a variety of bendable distribution options like "remote education, online learning, mixed-mode delivery, and self-paced or self-directed learning," springy tactics aim to provide students more choice in terms of when, where, and how they learn. Traditionally, tertiary colleges supplied good education programs to their students through printed course materials, practical experience, and insufficient "information technology" support, such as "email and internet discussion boards." (Jayarathna, 2021) Universities, on the other hand, are increasingly exploring the ways to use information and communication technology (ICT) to meet their flexible coaching requirements, thanks to recent breakthroughs in digital technologies. Tertiary institutes all over the world have been seeking to leverage the use of e-learning tools to support remote learning since the emergence of the internet and network capabilities. In comparison to other e-learning technologies, the "Learning Management System" (LMS) is a popular e-delivery mechanism.

1.1. Problem statement

By eliminating travel restrictions and saving time and money, Learning Management Systems enable students and lecturers to meet in a virtual learning environment. These platforms make it easier for both parties to manage their tasks, and during the Covid 19 period, the need for and use of virtual learning environments improved, with online lectures using Zoom, MS Teams, and Google Meet becoming more common. The virus had spread over the world by the beginning of 2020, and country lockdowns and physical human distances were imposed on society, as well as the shutdown of all organizations. As a result, many places became tense, and education institutions were influenced negatively (UNESCO, 2020). Even though the country has been imposed travel restrictions everywhere, due to the technology students can virtually visit their educational institutes. When considering the educational institutions in Sri Lanka, there are institutions controlled by the private sector and the institutions controlled by the public sector. Based on the pilot investigations done by the researcher, it was able to identify all the institutes which provide higher education has been continually engaged in online teaching, learning, and examination though the country was in a lockdown period. Then the local government university system also has its own LMS for all the undergraduates and

postgraduate students, but not 100% utilized in all the universities. With pandemics, they also shifted to online teaching and learning while conducting the examinations also. However, because of the social distance and country lockdowns brought on by Covid 19, institutions that provide practical education, i.e. tertiary level educational entities, have been fully shuttered. Although there are many platforms to develop LMS for any organization, still some are using personalized Google classrooms and conventional assignments. As the researcher could determine by the pilot study, the level of technological movement was lacking due to a variety of factors surrounding by the tertiary educational institutions in Sri Lanka. Thus, this study further aimed to investigate the affected factors and the impact of such kind of usage diminishes at that sector in Sri Lanka.

1.2. Research questions

Based on the findings of the previous studies and the pilot survey the researcher selected four independent variables and a dependent variable. Those variables were performed into the questions of the study.

RQ1: What is the lecturer's commitment to arranging standard digital platforms for the teaching and learning process?

RQ2: What is the role of organizational assistance in developing digitalized educational platforms?

RQ3: How often that students work using digitalized platform-related teaching and learning processors for learning?

RQ4: What are students' opinions on the use of LMS and related collaborative tools for learning?

1.3. Research objectives

1.3.1. Primary objective

RQ1: To identify the factors, affect for use of LMS during the Covid 19 period in tertiary level educational centers, Sri Lanka.

1.3.2. Secondary objectives

RQ2: To assess the lecturer's commitment to arrange standard digital platforms for the teaching and learning process.

RQ3: To recognize the level of organizational assistance toward developing digitalized platforms for the teaching and learning process.

RQ4: To identify students' interest in digitalized platform-related teaching and learning processors in tertiary-level educational bodies.

RQ5: To measure the students' experience, use of LMS and related collaborative tools for learning.

1.4. Hypothesis of the study

H1: There is a significant impact on the lecturer's commitment to arrange standard digital platforms for the teaching and learning process.

H2: There is a significant impact of organizational assistance toward developing digitalized platforms for the teaching and learning process.

H3: There is a significant impact of students' interest in the use of digitalized platform-related teaching and learning processors in tertiary level educational bodies.

H4: There is a significant impact of students' experience on the use of LMS and related collaborative tools for learning to have improvement of LMS in tertiary educational institutions.

2. Literature review

This topic critically discusses and elaborates about associate conversations, observations, and discoveries about learning management systems, as well as their impacts, causes, and effects on educational institutions' and the use of these systems. The researcher observed the research findings from national and international research journals published by national and international researchers all over the world throughout the Covid 19 period. This part expands on them from the perspective of Sri Lankan tertiary educational institutions.

2.1. Learning management systems

"A learning management system (LMS) is a computer program or web-based technology that uses to plan, implement, and assess a learning process." In most cases, a learning management system enables an instructor to design and deliver content online, track student involvement, and evaluate student performance." Through the LMS, students can employ collaborative topographies such as "threaded conversations, video conferencing, and discussion forums" (Cavus et al., 2021). LMS is sometimes known as a Course Management System or a Content Management System (CMS).

As stated by (Madushanka & Munasinghe, 2018) "Many learning procedures are automated by employing a Learning Management System,". It is a type of education management software that allows users supply "learning content, resources, and activities while simultaneously handling administrative tasks." LMS offers a distance education program that involves a considerable degree of online study. Managing a discussion board, a chat room, and e-mails is nearly always an element of running an online or e-learning course. Among these things, stimulate collaboration, which is a crucial part of online training, especially when there are few or no face-to-face meetings.

2.2. Why learning management systems for students

Thanks to the remarkable development of "knowledge, increased student diversity, new learning theories, and simple access to the internet," today's teachers have the chance to shift education in their classrooms from a traditional transmission paradigm to a student-centered approach. In the early twentieth century, students could effectively complete their education by recalling a collection of static facts and figures, and this information frequently provided enough foundation for them to live out their lives effectively (Senevirathne & Weerasena, 2018).

2.3. Independent variables

2.3.1. Lecturers' commitment

Lecturers or teachers possess a major role of any educational institution because without proper academic staff, the courses and students are not in such institutions. The academic staff should accept all the challenges by adopting every aspect of changes happening in the world in order to maintain the progress while matching the innovations. They are the party who guide the students on their way.

Lecturers have a variety of qualities and characteristics, some of which appear to be particularly significant when considering technology integration in the classroom. The uses of technology in lectures, as well as the teacher's social awareness, were both key factors. These features did not exist in a vacuum. They interacted with each other as well as with aspects of the innovation. The findings of significant factors linked with the second domain, the innovations, and the projects that teachers attempted to carry out (Weaver et al., 2008).

2.3.2. Organizational assistance

Teachers, who are socially aware of the potential for problems, can frequently negotiate compromises among the many parties, paving the path for successful classroom technology facilities and experiences. In today's institutions, technology also means money and attention. In an egalitarian setting with limited resources, such as a school, the additional resources received or required by technology projects can quickly disrupt social peace among peers (Kamel et al., 2021). For successful technology integration initiatives in classrooms, understanding technical resource availability and sensitivity to the requirements and priorities of colleagues are beneficial. Furthermore, from the specified significant resources observed in e-learning systems by post-secondary foundations, it seems practically that those are making the investment decision would want to know if students intend to use such systems for accompanying learning , remoteness in tutoring courses, as well as the factors that predict such intent (Jayarathna, 2021).

2.3.3. Students' experience

Students are the main part of an educational institution because everything is there because of them. Based on the studies done after the Covid 19, several findings have been revealed by many researchers. A study has mentioned that after two weeks of the lockdown, 75% of students said their lives had become more stressful, and 50% thought learning outcomes would be more difficult to accomplish as a consequence of the sudden move to online schooling. The equivalent numbers were 57 percent and 71 percent, respectively, after 12 weeks of the lockdown (Muthuprasad et al., 2021). Students' familiarity with written home examinations influenced their choice of online varieties of earlier on-campus tests. In comparison to previous years, the dropout rate remained steady (Alturki, 2021).

2.3.4. Students' interest

"COVID-19 pandemic has forced educational institutions around the world, to close, putting academic calendars in jeopardy". In order to keep academic activities alive, most educational institutes have switched to online learning platforms. However, problems about e-learning readiness, design, and efficacy remain unanswered, particularly in developing countries like India, where technical constraints such as device appropriateness and bandwidth availability represent a severe barrier (Camilleri & Camilleri, 2021).

Many studies have looked into students' preferences for various aspects of online classrooms, which might assist designers to design a more effective online learning environment than offline learning environment. Some have discovered through content analysis that students prefer recorded classes with a quiz at the end of each class to boost learning effectiveness. Students believe that online programs are appealing because of their flexibility and convenience but the internet connectivity concerns in remote locations make it difficult for students to participate in online learning efforts (Muthuprasad et al., 2021).

2.4. Dependent variable

2.4.1. Use of LMS in tertiary level educational institutions in Sri Lanka

Shift the concept of utilization from subjective to objective in terms of perceived utility. The number of logins, time spent logging in, and requests made to the technical support are used as indicators of utilization. Then, in terms of barriers, both manipulative (e.g., desire, abilities, or knowledge) and non-manipulative elements, identify attitudes toward the conduct (e.g., lack of Internet access). Preventing kids from fully utilizing the ICT system, the level of student ability in various information communication technologies, such as email, the Internet, PowerPoint, and other utilities, is characterized as knowledge. Furthermore, abilities in the

usage of LMS components such as uploading, downloading, chats, and discussion boards are included in the knowledge (Jayarathna, 2021).

3. Methods

This is a crucial part of the study since methodology explains how the researcher conducts the research and the research methodologies and strategies that are used. This part provides an introduction later on the concepts, and the methodologies that will discuss up to the level of presenting, and acceptance of the research hypotheses mentioned under the introduction part of the paper.

3.1. Conceptualization of the variables

3.1.1. Conceptual framework

The theoretical background serves as the foundation for the entire study task. It is a rationally created, defined, and explained network of associations between the factors referred important to the problem stated and determined through "interviews, observations, and a literature survey". University practical difficulties and intuitional difficulties also shape the creation of theoretical frameworks.

The literature survey and the theoretical framework are connected in the way which the former is served as a strong basis for the latter's expansion. Thus, based on prior study findings, the literature survey indicates the variables that are important for the continuation of the study.

This is a kind of study which is conduct to find what kind of factors affect what level of adaption of Learning Management Systems in tertiary level educational bodies in Sri Lanka, therefore, this is an explanatory type of research. The study will be extended in terms of Lecturers' commitment, Organizational assistance, Students' Experience, and Students' interest in the use of learning management systems or digital platforms during the period of the Covid 19 pandemic.
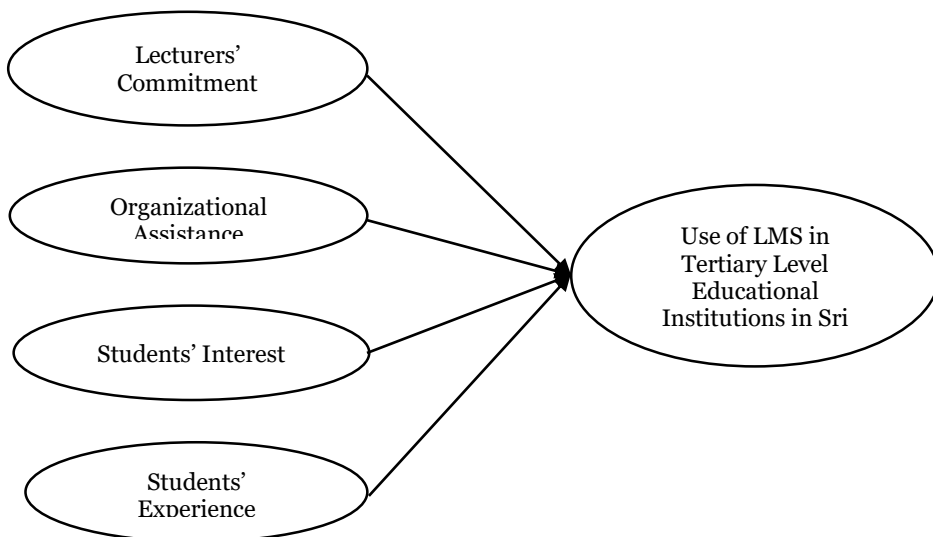

Figure 1: Conceptual Framework of the Study

The purpose of the study is to quantify the degree of LMS usage and its explanatory variables, as well as, to statistically assess the explanatory power of independent variables, to meet the basic criteria of a quantitative study. Therefore, the study will be quantitative. Field experiments were used as a research approach in this study. This technique refers to the study of cause-and-effect linkages with some researcher influence, yet in a natural context where work is carried out as usual. The level of aggregation of the data obtained during the subsequent data analysis step is referred to as the unit of analysis. Students from Tertiary Educational Institutions in Sri Lanka were polled in the field. As a result, a unit of analysis is a single student.

3.1.2. *Population and sample*

Here the researcher considered 2018 intakes students who are in the final year in below mentioned tertiary level educational institutions as the population of this study. "A sample is a subset of data that a researcher selects from a broader population using a pre-determined procedure. "Sample points, sampling units, and observations" are all terms used to describe these aspects. Creating a sample is a time-effective way to conduct research". By considering the available contacts and *support, the researcher selected the below institutions to collect the data*.

Table 1: Sample Consideration of the Study

No	Name of the Institute	Population of 2018 Intake	Selected pool for sample	Response Rate	Sample
01	University College of Matara	253	100	70%	70
02	University College of Rathmalana	282	100	60%	60
03	University College of Kuliyapitiya	217	100	58%	58
04	Vocational Training Authority – Maharagama	212	100	64%	64
05	Vocational Training Authority – Kurunegala	118	100	56%	56
06	National Youth Services Council - Kolonnawa	89	89	47%	42
07	Tertiary and Vocational Education Commission	92	92	32%	30
	Total		681	56.4%	384

Table 02: Operationalization

Independent Variable	Dimension	Indicator	Q. No
Lecturer Commitment	Participation	Lecture notes have been uploaded to LMS	6
		LMS allows students to interact with lecturers	7

	Motivation	Lecturer provide web links to refer	8
		Lecturer arrange Online activities	9
		Lecturer explains how to use LMS	10
		Lecturer encourage students	11
	Online Socialization	Lecturer provide e-assignments and quizzes	12
	Information exchange	Video conferencing & chat rooms	13
Organizational Assistance	Facilitation	Arrange facilities for online lectures	14
		Availability of LMS	15
		Availability of Information on the web	16
	Interaction	E-learning alignment	17
		Introduced LMS at the orientation	18
	Motivation	Provide administrative information in a central web location	19
	Practice	Collect exam admissions via LMS	20
		Conduct Examinations via LMS	21
Student's Interaction	Usability	Submissions	22
		Improvements of results	23
	Practice	Operations of web-based learning	24
	Interest	Students' Preference	25
		Feelings	26
	Interaction	Interconnection	27
	Anxiety	Nervous	28
Student's Experience	Efficiency	Enhance user efficiency	29
	Capability	Enhance working capability	30
	Quality	Enhance quality of studies	31
		Improve the quality of degree program	32
	Perception	Use for distance learning	33
Usage of LMS	Arrangement	LMS username & password	34
	Visibility	Moodle homepage	35
	Support	Online discussions	36
	Accessibility	Access LMS by smart phone	37

As mentioned in most research articles, when high population while an inability to reach the total population, 384 sample units are acceptable. The researcher also undertakes that approach. Later the researcher applied the cluster sampling and then the convenience sampling technique to finalize the selection of responses. Data collection happened through the distribution of Google-formed structured questionnaires through email and WhatsApp. The response rate was 56.4% out of a selected pool of students for the sample. Further, Table 2 and 3 show the structure of the questionnaire and the operationalization. Then the collected data were analyzed using the SPSS software tool. Descriptive statistics and inferential statistics tests were performed using the techniques availed in the software package.

Table3: Structure of the Questionnaire

Part A	Demographic Characteristics of students	No of Questions: 05
Part B	Questions relating to independent and dependent variables	No of Questions: 32

4. Data analysis

When considering the sample profile, there are 29% (110) of students who do not have an awareness regarding what does it mean by the LMS? Moreover, the remaining 71% (270) have stated that they have awareness of LMS but their awareness level is contradicted since they do not use the facility. Further, when considering the awareness level, the female students are having minor awareness when compared to the male students.

Out of the total sample, 47% (178) are male respondents and the remaining 53% (202) are female students. It can be concluded that majority of the population consists of female students from different tertiary education institutions. Among them around 60% (226) are following a higher national diploma, NVQ 5/6 which the course duration is nearly 03 years and 11% (45) are following an education program which equals to a degree or NVQ 7.

When considering students' usage of cloud services, if some who do not use the cloud service, their level of engagement on the internet is high. The majority of students spent (50% - 192) 15-20 hours per week on the internet, but among those 50%, 27% (52/140*100) do not have any awareness of the LMS. When it comes to the total sample if they use the internet for their study purposes, 29% (110) of students do not have awareness of the LMS.

4.1. Reliability analysis

When considering the reliability analysis test, it explains the level of internal consistency of the independent and dependent variables and provides further assurance regarding the questions used to collect data on formulated factors to assess the impact. The below table shows the statistical data.

Table 2: Reliability Analysis Results

Variable	No of Items	Cronbach's Alpha
Lecturer Commitment	08	0.961
Organization Assistance	08	0.957
Students Interest	07	0.954
Students Experience	05	0.933
LMS Usage	04	0.918

According to Olaniyi, (2019) the accepted value of Cronbach's value is 0.70. Then the above table shows the Cronbach's values of the study and all fulfill the accepted value (>0.7), therefore, it can be concluded that all the variables are internally consistency.

According to the descriptive statistic test results, the mean values are in the range of 3.3. Then it can be concluded that all the respondents have the same level of opinion regarding executions and usage of LMS for the teaching and learning process in terms of Lecturer

Commitment, Organization Assistance, Students Interest and Students Experience. Standard deviation values of all variables are higher than 1.0, and all are in a range of 1.021 − 1.041. Therefore, it can conclude that not much deviation regarding the respondent's responses and skewness shows the unbalances of the distributions. According to the above table, all values are negatively skewed. It means favorable impact has made up teaching and learning process toward the use of information systems based learning during covid 19 period.

According to the independent sample t-test, there is a higher mean value of male regarding the usage requirement of LMS, but to exactly find out whether there are differences between the two groups, the independent sample t-test was performed. The sig. value of equality of variances is 0.007 and it is less than 0.05. Therefore, the researcher selected the second row of the table to conclude the findings. Thus, sig. (2-tailed) is 0.440 and it is higher than 0.05 and can exactly mention that there are no significant difference in the responses provided by the male and female students regarding the use of LMS by the tertiary educational institutions.

According to a model summary, the Adjusted R Square of the model is 0.875. The R square indicates the extent or percentage of variation that independent variables can explain the dependent variable. That means the explanatory power of independent variables to the dependent variables. It is around 87.7%. The remaining 12.3% represent the factors, like information quality, system use, user satisfaction, perceived usefulness and more, which have not been observed by this study. When it comes to the ANOVA results, the sig. value is less than 0.05. Therefore, it can be concluded that there is a significant relationship between independent and dependent variables.

4.2. Acceptance of the hypothesis

Hypothesis was accepted based on the sig. value of the regression coefficient results (Sig.<0.05 – shown at Table 05) and the summary of acceptance of the hypotheses shown in table 6.

Table 3: Regression Analysis Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.139	.065		2.126	.034
Lecturer Commitment	.300	.062	.302	4.804	.000
Organization Assistance	.216	.069	.212	3.127	.002
Students Interest	.345	.065	.345	5.334	.000
Students Experience	.100	.067	.099	1.493	.136

a. Dependent variable: LMS usage

Table 4: Summary of the Hypothesis Acceptance/Rejection

Hypothesis	Sig. value of Regression Coefficient	Accept / Reject
There is a significant impact of lecturer's commitment toward arranging standard digital platforms for teaching and learning process.	.000	Accepted
There is a significant impact of organizational assistance toward developing digitalized platforms for the teaching and learning process.	.002	Accepted
There is a significant impact of students' interest toward use of digitalized platform related teaching and learning processors in tertiary level educational bodies.	.000	Accepted
There is a significant impact of students experience on use of LMS and related collaborative tools for learning to have improvement of LMS in tertiary educational institutions.	.136	Rejected

5. Conclusion

The primary objective of the study was to identify the factors affecting for use of LMS during the Covid 19 period in tertiary level educational centers in Sri Lanka while recognizing whether they have adopted to use of information systems to continue the education during the Covid 19 pandemic period. According to the facts uncovered during the background inquiry, tertiary educational institutions do not use a typical LMS built on Moodle or Microsoft 365. But some of them have taken some initiations to develop such kinds of systems. They are still at the proposal level and they are facing some barriers to implementing those due to lack of financial support and delay in having approvals for the proposals. Mostly, they have adapted to use of Google classrooms and zoom to manage their virtual classrooms during and post pandemic period. Based on the conceptual framework formulated by the researcher were included different factors including the lecturer's commitment, level of organizational assistance, students' interest and students' experience tested toward initiation/ implementation or use of LMS in tertiary educational institutions.

To make that work easier, the researcher set up sub-objectives such as assessing the lecturer's commitment to setting up standard digital platforms for teaching and learning. Internal academic staff can have a significant impact on the introduction of such a learning platform because they are the most interactive party with students and can make recommendations to prospective parties to develop such facilities in their institutes. If a pandemic occurs, it will be critical to maintain their teaching and learning activities. However, at the moment, the level of lecturer commitment to implementing such systems is lower in tertiary educational institutions.

Because such types of tertiary educational organizations are governed by different government entities other than the ministry of education, obtaining organizational support for the implementation of standard information systems would be difficult. As a result, acquiring authorization and allocating financial resources has become a serious concern for these

educational institutions. Another issue is that maintaining enough IT infrastructures, particularly a server and server room, is a significant barrier they face. If cloud services are available, they must present predictive applications of such technologies to the institutes' major governing bodies. Many challenges have reduced support for such types of systems in tertiary educational institutions.

Even though having restrictions to physically open institutes during the Covid period, some students are not engaging with at least their emails. That has also become an issue, which needed to consider and significantly proved that it is not at a satisfactory level. Therefore, their interest to follow up interest-based learning is important.

Unlike students in 19 century, now students are savvy with technology and they can easily follow up and learn. To identify whether they are looking for systems that have former experience, the researcher formulated another objective to measure the students' experience use of LMS and related collaborative tools for learning would make an impact to have such systems in their institutes. Based on the mean value and significance value of the regression test results, it can make a positive impact but does not consider as significant. Therefore, according to the results found by the study researcher can be concluded that students do not need to have the former experience to move to such systems. Hence, they can adapt systems without former experience on it.

Unlike government universities and private universities, tertiary educational bodies encourage students to have vocational education and develop their skills. These institutes are very important for a country because they would become key sources that can make entrepreneurs. Therefore, the government should pay attention to develop these institutes with more facilities. Further, the researcher recommended that these institutes should be made more popular than the current state. Later on, in future, the institutes will function more effectively than at present.

Implementation of LMS for these kinds of institutes is crucial. Therefore, future researchers can develop proposals by gathering data on the LMS requirements of this kind of organization and provide sufficient evidence to the government by doing more research by highlighting the barriers faced by the tertiary educational institutions in Sri Lanka would be adventurous for the betterment of the tertiary education of Sri Lanka.

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