STUDENT ATTITUDE TOWARDS APPLICATION OF TECHNOLOGY ENABLED TOOLS IN AGRICULTURE EDUCATION: A CASE STUDY IN SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION DURING COVID PANDEMIC

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ABSTRACT: *Higher Education and Education sector were one of the most impacted sectors with COVID -19 epidemic worldwide. For this circumstance, widely applied contingency plan was to replace the classroom education by distance teaching and learning. In such situation, student readiness and availability of technical infrastructure are paramount elements to concern; especially in a country like Sri Lanka where the technologically driven education system has not properly established yet. Therefore, present study attempted to investigate the student attitude towards technology enabled education of randomly selected 50 Agriculture students who follow higher national diploma programme in Sri Lanka Institute of Advanced Technological Education. A pre-tested survey questionnaire was employed to assess student attitude towards technology enabled education using Technology Acceptance Model (TAM) which has three main components of perceived usefulness, perceived ease of use, and perceived hedonic component. The study used Watcharawalee Lertlum and Borworn Papasratorn construct with minor modifications. Inferential and descriptive statistics were employed to analyze the data. The sample consisted with 62% (31) of female and 38% (19) of male students and, most of respondents were in average monthly income category of LKR 20000-40000. Most of them qualified with prior ICT education. The study focused the availability of technological infrastructure and found that 84% owned at least one technological device while the most popular device was 'Smartphone'. In contrast, the least popular device was 'Tablet or Notebook'. Considering the student attitude, results indicated that 82% of respondents had a high-level while, 10% and 8% had moderate and low level of attitude respectively. Further, all three components of TAM model have significant impact on willingness to apply the technology enabled tools in Agriculture education. The study implicated that providing some grants such as easy payment-based purchases, instalment purchases, work and pay basis to obtain own ICT resources are mandatory with the ICT skill development programs. And these findings could be utilized into national and institutional policy development in the arena of enabling ICT facilities into higher education sector.*

Keywords: Distance Education, ICT, Technology enabled tools, Students' attitude

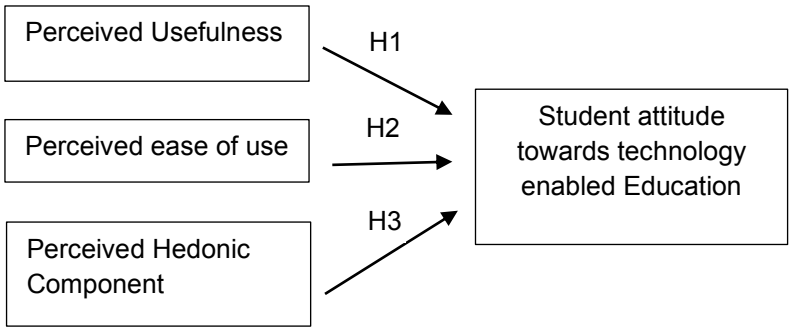
1. INTRODUCTION

During past few decades rapid developments in information technology (IT), communication technology and computer networks have provided sophisticated sources to promote the dramatic change of the world economy from a product based

to a knowledge-based one. This has resulted in an increased demand for Internet based scientific and technological tools in many areas including Education, and integration of computer technology and communication reformed the traditional setting of teaching and learning (Van et al., 2011). This digitally enabled education environment is not novel in the field of distance education throughout the world (Fu, 2013). Also, many developed countries are capable of applying these modifications into their day-to-day educational activities In contrast, past literature provide evidence for digital divide in developing countries with some challenges in practicing ICT based education such as limited electrical or Internet infrastructure in rural areas, limited availability of technically skilled support staff, issues with student readiness for applying these tools, the predominance of minority languages, and under-qualified teaching staff (Doyumgaç, 2021).

In Sri Lanka, ICT application in Education sector is not satisfactorily established yet. However, with the outbreak of COVID-19 throughout the world, Education, particularly Higher Education is one of the most impacted sectors as the closure of institutes. According to the IAU Global Survey Report on the impact of COVID-19 on higher education around the world (2020), the mostly applied contingency plan for the circumstance was replacement of the classroom teaching by distance teaching and learning. Although many institutions in the country are able to facilitate technical infrastructures which adequately enable online teaching facilities for the academic and academic support staff, the availability of technical infrastructures in student hand is an extra issue. In case of Agriculture Education, as a subject, is bound with access to laboratories and field activities that respondents' practice cannot be replaced by distance teaching and learning. Therefore, the teaching staff often limited to the theoretical dimension of the curriculum which impacts on quality of the output.

The present study focused to discover the availability of technological infrastructure in student hand and their attitude towards technology enabled learning in Agriculture education which was crucial to recognize the applicability of technology enabled education in Agriculture. Although there are many empirical researches throughout the world related to the e-learning and related factors, a very few of them in Sri Lankan context; especially using the Technology Acceptance Model (TAM) by Davis (1989) which is an extensively accepted tool to measure technology acceptance by students. Therefore, this study adds new literature for the topic and it hypothesized that perceived usefulness, ease of use and hedonic component has a significant impact on students' attitude towards technology enabled learning in Agriculture Education.



Theoretical Framework (TAM Model)

H1: Perceived usefulness has a significant impact on Student attitude towards technology enabled Education in Agriculture
H2: Perceived ease of use has a significant impact on Student attitude towards technology enabled Education in Agriculture
H3: Perceived hedonic component has a significant impact on Student attitude towards technology enabled Education in Agriculture

2. METHODOLOGY

The study was conducted in Sri Lanka Institute of Advanced Technological Education (SLIATE). The Higher National Diploma Program in Technology Agriculture (HNDT-Agri) was selected for the study. In the stream of Agriculture, only three ATIs develop HNDT diplomats which located in Gampaha, Galle and Ampara. This study focused students in Galle and Ampara Institutions. Among the students in tertiary education level, study population was all the registered students for the HNDT Agriculture Diploma programme in SLIATE with 190 students. And the study focused 50 respondents who follow HNDT Agriculture Diploma programme. The sample was randomly selected from a list of names in both Galle and Ampara Institutes. Both primary and secondary data were gathered for the study. Primary data was gathered by in-depth structured interviews using a pre-tested survey questionnaire.

The questionnaire consisted with three main parts. First part of the questionnaire covered the socio-demographic factors of the respondents including Sex, hometown, highest educational qualification, monthly family income, following of other professional courses etc. The second part of the questionnaire consisted with closed ended questions to explore the present of technology enabled tools. A list of technology enabled tools with digital devices which are commonly applied in present Agriculture Higher Education sector were stated based on past literature and these tools were validated by focus group discussions with respondents. Third part of the questionnaire was focused to investigate the students' attitude towards technology enabled tools in Agriculture Education. Technology Acceptance Model (TAM) was employed to achieve the objective. Fourteen positive statements of Watcharawalee Lertlum and Borworn Papasratorns' construct (2014) with modifications was used. Statements were adjusted based on existing online learning methodology of the institute that used to deliver lectures. These statements were sated in five-point Likert scale where '1' represents 'Strongly Disagree' to '3' represents 'Neutral' to '5'-represents 'Strongly Agree'.

Gathered data were recorded in a excel workbook and summarized into bar charts and several descriptive statistical methods such as mean, SD, percentages to present data. Next, to measure the availability and usage of ICT tools the study calculated the percentages. To measure the student attitude towards ICT tools in Agriculture Education, first, the construct reliability was calculated using Cronbach's alpha value. As a rule of thumb, study required each construct in the model to demonstrate a Cronbach's alpha coefficient value of 0.7 or above (Nunnally and Bernstein 1994). Next, the level of attitude was measured using a categorization by considering the highest and the lowest scores of the respondents obtained for each main item of perceived usefulness (PU), Perceived Ease of use (PE) and Perceived Hedonic component (PH) .As the Likert scale consisted with five points, the highest mark was 70 while lowest was 0. According to the scale, it was generated three categories named; "high (47-70)", "medium (23-46)" and "low (0-23)". Further, linear regression model was employed to investigate how these three items impact on respondents' willingness to apply the technology enabled tools in Agriculture education using SPSS version 16.0.

3. RESULTS AND DISCUSSION

3.1 Demographic Characters

First the study focused on demographic variables of the respondents. The sample consisted with 62% (31) of female and 38% (19) of male students. According to the Department of Census and Statistics (2019), there were approximately 1.38 females for every one male enrolled in tertiary education in Sri Lanka which explicates that in tertiary education, the enrolment of female is higher than male students. Moreover, the study focused average monthly income level of the respondents and, results revealed that the most of respondents are in average monthly income of LKR 20000-40000 category while lowest in the highest income (more than LKR 60000) category (Table 1).

Table 1: Average monthly Income level of the respondents

Income category (LKR)	Percentage of Respondents (%)
<20000	32
20000-40000	38
40000-60000	20
>60000	10

Next, the study considered the students' prior ICT knowledge which is a key to determine their attitude towards ICT tools. At present, ICT is a crucial component in school and higher education streams. In 2017, Sri Lanka Export Development Board explained that 90% of the local schools have been empowered by providing ICT facilities and a computer network connecting schools and centralized network operation named 'Schoolnet'. Also, most of the school teachers have been trained through Intel Teach Program conducted with the assistance of the University of Moratuwa. Moreover, there are many government and privet ICT courses in Sri Lanka in certificate level, Advanced certificate level, diploma level, Higher Diploma level and graduate and post graduate levels. Further, Survey of ICTs for Education in India and South Asia, Country Studies (2010) reported some of the government projects provide roots for ICT education for the students such as Nenasala project, Shilpa Sayura Project, Secondary Education Modernization Project etc.

GCE Ordinary level (O/L) and Advanced level (A/L) ICT education syllabus is intended to introduce ICT as a main subject and students need to pass with the standard O/L or A/L examinations. Many students have completed General Information Technology syllabus (GIT) which is offered for AL Grade 12 students in any stream. Moreover, many Certificate level and Advanced certificate level ICT courses are offered by both privet and government educational institutes such as Sri Lanka Institute of Information Technology (SLIIT), Esoft, Vocational Training Authority (VTA) and SLIATE. Most of the diploma level and degree level ICT programs offered by the NIBM, ICBT campus, Open University of Sri Lanka, Moratuwa University and many of other government and privet Universities.

In this background, among the respondents, majority qualified with GCE Ordinary level ICT Examination (42%) while, 22%, 12%, 6% and 4% qualified with GCE Advanced level, Certificate level, Diploma level and Advanced certificate level ICT courses respectively where 14 percent of the respondents did not have any previous ICT qualification and none of the respondents have degree level ICT qualification.

Then, the study measured whether students follow "other courses" professional courses, such as Human Resource Management, Marketing, accounting etc., because other professional courses, Short-term courses and workshops found to be positively impacted on ICT literacy (Mahmud and Ismail, 2010). However, results obtained that only 36% of the respondents were following other professional courses.

3.2 Accessibility and Usage of Technology enabled tools

The study revealed the accessibility of ICT tools among the respondents. Respondents were asked to mention whether they owned or not any kind of technological device such as desktop computer, laptop computer, smart phone, Notebook etc. Among the sample, 84% owned at least one technological device while 16% do not owned any type of technological device. Jo Shan Fu (2013) has stated that technology availability and accessible to ICT equipment are positively associated with technology integration in Education. He further explained these factors as a main external factor in progression or effectiveness of technology integration among students. Smith, Salaway, and Caruso (2009) stated that undergraduates' ICT experience and ICT skills depend on technology ownership and experience in ICT courses. They further explained, there is a great deal about how student use certain types of technology including hand-held devices both in and out of the classroom and technology enabled education.

Next, the study discovered the usage of technology enabled tools among respondents. Among the respondents, majority (98%) use ICT tools in day to day activities. Moreover, study found that 6% of students do not have their own device, but use a public (institute) device and 8% of students do not have their own device, but use a family members' device for activities. The study further focused the types of technology enabled devices available with students. Results revealed that the most popular device for the respondents is 'Smart-phone' (80%) meanwhile the least popular device is 'Tablet or Notebook' (8%). Moreover, 64% of the respondents had at least two devices. Furthermore, it was found that 30% of the respondents own the combination of Laptop with Smart-phone while 10% own the combination of Desktop with Smart-phone. Smith, Salaway, and Caruso (2009) found the majority of undergraduates use laptops and internet capable hand-held devices as popular technology equipment in USA. Further they noticed that ownership for desktop has increasingly declined in last few years. In contrast, the ownership for full sized laptops and small-lightweight netbooks has significantly increased.

3.3 Student Attitude towards Technology enabled tools

Student attitude towards technology enabled tools was invented through TAM model which is introduced by Davis 1989. Three main items of perceived usefulness (PU), perceived ease of use (PE) and perceived hedonic component (PH) were considered as determinants of attitude according to the Watcharawalee Lertlum and Borworn Papasratorn construct (2014). First, the reliability of the construct was measured using Cronbach's' alpha value. Results obtained the construct was valid for the respondents (Table 2) as it demonstrated a Cronbach's alpha coefficient value of 0.7 or above which is ruled by Nunnally and Bernstein in 1994.

Table 2: Construct Reliability of TAM Model

Construct	Number of items	Cronbach's' Alpha
Perceived Usefulness (PU)	5	0.946*
Perceived Ease of Use (PE)	5	0.861*
Perceived Hedonic Component (PH)	4	0.842*

*If α>0.700

The level of attitude was measured using a categorization by considering the highest and the lowest scores of the respondents obtained for each key item. As the Likert scale consisted with five points, the highest mark was 70 while lowest was 0. According to the scale, it was generated three categories named; "high (47-70)", "medium (23-46)" and "low (0-23)". Percentages of respondents were calculated for each key attribute considering the marks they obtained though their responses. Results indicated that 82% of respondents had a high level of attitude towards application of technology enabled tools in Agriculture education while, 10% and 8% had moderate and low level of attitudes respectively.

Many researchers have investigated the student attitude towards ICT tools for education and found a positive attitude similar to the present study (Kennewell & Morgan, 2003, Chai, Hong, Huang-Yao, & Teo, 2008). Yusuf, and Balogun (2011) stated positive attitude is an important indicator of willingness and first step in effective ICT integration in curriculum of the colleges. Yunus, and Suliman, (2014) stated that attitude towards application of ICT tools can be enhanced by actual utilization of the ICT tools in classroom.

Further, linear regression model was employed to investigate how these three items impact on respondents' willingness to apply the technology enabled tools in Agriculture education. No multi-collinearity was observed among independent variables (VIF<5). A high level of model fit (71.9 %) was observed with R^2 value. Regression model was statistically significant at 5% level. It was confirmed that all three items of PU, PE and PH are significant for the willingness to apply technology enabled tools (Table 3). Therefore, the model was presented as:

Willingness to Apply ICT tools=0.94+0.2 PU+ 0.2 PE+ 0.2 PH+ 0.281

Table 3: Student attitude impact on willingness to apply ICT tools

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	.914	.172		5.318	.000*		
PU	.02	.015	.034	4.017	.000*	.810	2.067
PE	.02	.017	.026	3.688	.000*	.734	1.734
PH	.02	.017	.022	2.538	.000*	.643	2.655

* Significant at 0.05 level

Luan and Teo (2009) explained two main factors impact on technology acceptance as perceived usefulness which explained as "the degree to which a person believes that using a particular system would enhance his or her performance" and perceived ease of use which explained as the "degree to which a person believes that using a particular system would be free of effort". They further explained these two factors condition the attitude towards use, formed by the individual's beliefs that affect their

behaviour response. In contrast, the present study found all three components are equally important for the student attitude. If students accept the technology as it is useful, easy to use and can have an interaction of entertainment, social behaviour with learning, it will more likely to use the technology in such activities. Gómez et al. (2019) found perceived usefulness has a higher association with intention than does perceived ease of use in their study. Al-Hawari and Mouakket (2010) found that although perceived ease of use is a key determinant in student e- satisfaction, it is not important in e -retention where perceived usefulness is elementary in both. Their study also evaluated the Hedonic component which was found to be significant in technology acceptance.

4. CONCLUSION AND IMPLICATIONS

We concluded that the majority of the students have their digital devices and the most popular device was 'Smart-phone' while the least popular device is 'Tablet or Notebook'. In addition, most of the students have more than one device. Moreover, study revealed that the most of students have a higher level of student attitude towards using ICT tools into Higher Education. Also, their willingness to apply ICT tools into higher education was affected by all components in the TAM model: Perceived usefulness, perceived ease of use and perceived hedonic component.

Krumsvik (2014) mentioned that it is important to have at least one digital device with the students to continue their academic and other tasks without disruptions. Therefore, a relevant organization should intervene to overcome the situation of 'lack of digital devices among higher educational students' by providing some grants such as easy payment-based purchases, instalment purchases, work and pay basis, etc. Students have a positive attitude towards Technology enabled education and all key components of Technology Acceptance Model are significant for their attitude. The attitude can be improved by emphasizing usability and easiness of applying ICT tools in the education.

The findings of the study could be utilized into national and institutional policy development in the arena of enabling ICT facilities into higher education sector. Also, further researches are required to investigate the attitude towards ICT enabled education and ICT resource availability of other diploma programs, degree level, school level and also post graduate level to enhance the digital technology application in education sector.

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