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A Study on the Role of Digital Learning in Creating a Green Learning System in Educational Institutions

Tinta Baby,

Research Scholar,Mangalam College of Engineering Ettumanoor,APJ Abdul Kalam Technological University, Trivandrum

Dr Elgin Alexander,

Associate Professor, Saintgits college of Engineering

Dr.Anoop Tom Thomas,

St Dominics College Kanjirapally

Abstract

Technology has made revolutions in every aspects of life and in the field of education .The study investigate the role of digital learning in creating a green learning culture in educational system. This investigation looks at the connection between environmentally friendly innovation and the significance of green digital learning in Educational Institution. The adoption of digital learning by higher educational institutions [HEIs] demonstrates how to integrate green learning culture into the curriculum. Educational institutions have begun implementing different digital methods that foster an environmentally sustainable learning environment. The investigation's goal was to ascertain whether academicians would be open to incorporating green culture into the classroom through the use of digital teaching tools. Universities and educational institutions looking to investigate or take advantage of opportunities in green innovation and digitization may find this work's contributions to be beneficial. Technology Acceptance Model was used to identify the digital learning orientation of the respondents and a model was developed on green learning system.206 authentic questionnaires from higher education sector teachers were acquired for the study. Data was analyzed with SPSS and the results reveal digital learning has influence on the development of green learning culture in educational institutions.

Key Words—Digital Learning, Green ICT, Green learning system

I. INTRODUCTION

Digital learning, which is extensively employed in educational institutions, is the use of digital technology for content access, consumption, and interaction. The purpose of the study was to find out whether higher education institutions in Kerala preferr to use digital learning, as well as whether or not doing so encouraged the use of green learning methods in HEIs. By lessening its negative effects on the environment, encouraging sustainability, and raising knowledge of environmental issues, digital learning contributes to green learning. An educational strategy known as "green learning" places an emphasis on social responsibility, ecological awareness, and environmental sustainability. It seeks to prepare students to take on the complex environmental concerns that face our world and become engaged, global citizens. This investigation looks at the connection between environmentally friendly innovation and the significance of green digital learning in the realm of Education. A questionnaire was used to collect data from 206 teachers at Kerala's higher education institutions for the study, and SPSS was used to analyse the results. According to the paper, higher education institutions in Kerala favour digital learning, and advancements in digital learning encourage a culture of green learning in these settings.

2. Review of literature

There are a number of benefits to Digital Learning, also known as online education, in terms of resource optimization and environmental effect. There has been a significant trend in the last several years towards the use of digital learning platforms for education and learning. Numerous information technology tools used to help pupils become more knowledgeable because they are the nation's future. In order to improve present systems, green information technology tools are crucial, as demonstrated by the introduction of green education.[1]There have been numerous warnings regarding sustainability due to environmental concerns over resource scarcity, climate change, and other threats to the environment worldwide. [2]. It is expected of teachers to offer direction, strategic support, and aid to enable students with varying needs to take on more responsibility for their own education. The typical hierarchical connection between instructor and student can be replaced with a more collaborative one with the use of technology. The teacher is no longer

solely in charge of imparting knowledge to the class because of the abundance of material available on the Internet and from other sources. Rather, the teacher's job is to help pupils navigate the abundance of information by directing them as they move between resources. [3] In addition to using a variety of technology and creating cutting-edge pedagogies, teachers in paperless schools build a strong case for teaching and learning in a paperless setting. [4] The following hypothesis, which examines higher education teachers' preferences for digital learning, draws on the literature review mentioned above.

H1 Digital learning is preferred in higher education sector

Green ICT is a cutting-edge approach to using ICT that focuses on environmental sustainability through policies and practices that reduce carbon footprint, ICT waste, optimize energy consumption, and conserve natural resources for ICT upkeep, cost effectiveness, and planet preservation.[5] The topic of green innovation is becoming more and more prominent in both practice and academics. It involves the creation or enhancement of goods and procedures for reducing pollution, conserving energy, recycling materials, and putting environmental management into practice.[6] Measuring the carbon footprint of an activity is one technique to assess the environmental impact it has on the area around it. The carbon footprint can be defined as: ‘a measure of the exclusive total amount of carbon dioxide (CO2) emissions that is directly or indirectly caused by an activity or is accumulated over the life stages of a product. [7] For a UK institution, the study took into account indirect emissions from staff and student commutes, business travel, student excursions home, and tourist travel. They report 300 kg of CO2 emissions per student during the 2008–2009 academic years. 750 kg of CO2 emissions for each employee who commutes. This particular UK university's travel-related emissions amount about 15,000 tonnes of CO2e, or almost 30% of the university's total emissions.[8] Within a course, researchers identified five emission sources: student transport, ICT, paper and print, residential energy (i.e., energy used for studying at home residence), paper and print. Residence and campus site management. They then determined the carbon emissions per student for each of these sources over a 100 study hours in HE courses with varying degrees of ICT intensity.They then determined the carbon emissions per student for each of these sources over a 100 study hours in HE courses with varying degrees of ICT intensity. According to their research, face-to-face campus-based courses—whether or not they use ICT enhancements—consume significantly more energy and produce more carbon emissions than distance-based courses, which can be either online or distance. Comparing these to in-person classes, an 84 percent decrease in carbon emissions is achieved.[9] Digital learning is a great way to lower costs, optimise resource usage, promote sustainability, and broaden the audience and influence for educators and learners. Because it saves time and facilitates convenient study, it also benefits the environment by using less paper for books and handouts. [10, 11]. In general, transport accounted for 40% of carbon emissions, institutional site operations for 31%, and residences account for 16% of carbon emissions across all HE teaching types.[12]**.**In all, the use of paper and printed materials accounted for only 7% of the emissions from HE courses. Not surprisingly, a larger percentage of emissions in the distance-based system were caused by the usage of paper products, including the models of online teaching (12%), ICT-enhanced distance teaching (15%), and distant teaching (27%). Paper and print consumption accounted for just 5 and 4% of carbon emissions, respectively, with campus-based face-to-face teaching and ICT-enhanced face-to-face teaching models. The majority of these emissions were caused by book purchases, accounting for 83 and 76% of the emissions, respectively. Across all teaching approaches, there were variations in the patterns of paper and print use, including book purchases, paper use, and instructional material use.[12]A hypothesis is developed to ascertain whether digital learning advances green learning systems based on the research mentioned above.

H2 Digital learning contributes to the advancement of green learning system

Objective
To identify the preference of Digital Learning in Higher Education Sector
To determine whether digital learning contributes to the advancement of green learning systems

Implementing digital learning as a tool for preserving the environment:
Digital learning can be seen as a tool for protecting the environment. Particularly, it enables students to access courses and educational materials from anywhere without having to physically visit a learning location. This lessens travel-related greenhouse gas emissions, which lowers air pollution and carbon footprint. E-learning conserves natural resources by employing digital learning materials instead of tangible ones like paper, books, and school supplies. When less paper is utilised, fewer trees are cut down and less energy is needed in the manufacturing and delivery of tangible instructional resources.[13]

Measures
Other researchers gave their approval for the measuring items employed in this investigation and based on the body of current literature. The procedures recommended by Baron & Kenny's (1986) were used to investigate the combination

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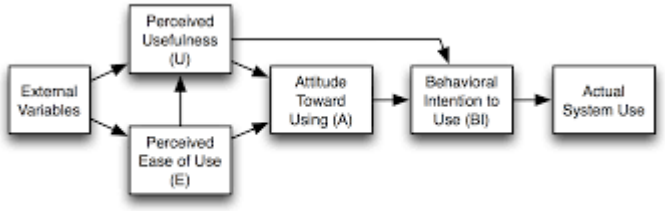
role of green knowledge acquisition and the influencing mechanism of green learning orientation on ambidextrous green innovation.[14] Four items that were developed from Sheng & Chien (2016)[15] and Fong & Chang (2012)[16] are used to measure green learning orientation.

TAM

The adoption of technology by users has often been explained by the technological acceptance paradigm .The causal relationship between the users' internal beliefs, attitudes, and intentions has been explained by this paradigm as well as computer usage habits. Historically, individuals have used the technological acceptance model to try to figure out why they accept or reject a given technology (Davis 1989). To ascertain why educators accept or reject digital learning resources, the technological acceptance model has been modified for this study.[17,18]



Technology Acceptance Model .Davis(1989)

Data Analysis & Interpretation

Digital Learning

Reliability Statistics

Cronbach's Alpha	N of Items
.922	16

Green Learning System

Reliability Statistics

Cronbach's Alpha	N of Items
.837	11

As Cronbach’s Alpha value is greater than 0.7 a relationship is established between Digital learning and Green learning System.

Descriptive statistics

Descriptive Statistics

	N	Mean	Std. Deviation
PU	206	4.4757	.45173
PEU	206	4.3447	.38367
AT	206	4.3107	.47931
BI	206	4.2063	.50175
RPW	206	4.0752	.45755
RT	206	4.0121	.54388
EP	206	4.0939	.55703
Valid N (listwise)			

PU	Perceived usefulness of Digital Learning
PEU	Perceived ease of use of Digital Learning
AT	Attitude towards using Digital Learning
BI	Behavioural Intention to use Digital Learning
RPW	Reduced Paper work

RT	Reduce Travelling
EP	Environment Protection

		Loadings	Mean	SD
	PU			
	PU1	.846	4.55	.537
	PU2	.783	4.43	.571
	PU3	.739	4.50	.575
	PU4	.843	4.42	.569
	PEU			
	PEU1	.781	4.26	.577
	PEU2	.788	4.44	.498
	PEU3	.719	4.49	.540
	PEU4	.784	4.19	.672
	AT			
	AT1	.839	4.38	.507
	AT2	.805	4.30	.502
	AT3	.802	4.23	.730
	AT4	.827	4.33	.600
	BI			
	BI1	.760	4.13	.621
	BI2	.708	4.24	.720
	BI3	.852	4.24	.551
	BI4	.846	4.21	.652
	RPW			
	RPW1	.675	4.08	.637
	RPW2	.690	4.20	.746
	RPW3	.739	4.09	.702

	RPW4	.480	3.93	.731
	RT			
	RT1	.801	4.08	.652
	RT2	.695	3.87	.825
	RT3	.775	4.22	.685
	RT4	.630	3.87	.848
	EP			
	EP1	.751	3.91	.768
	EP2	.841	4.05	.719
	EP3	.680	4.32	.717

All items are adequately loaded and mean value is high which shows digital learning creates green learning systems in the higher education system.

H1: One sample t-test

H0: Digital learning is not preferred in higher education sector (Rejected)

HI: Digital learning is preferred in higher education sector

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
DigitalLearning	103	4.3343	.40236	.03965

One-Sample Test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
DigitalLearning	109.326	102	.000	4.33434	4.2557	4.4130

As the level of significance is less than 0.05 null hypothesis is rejected and alternated hypothesis is accepted also the mean value is 4.3343 which shows digital learning is preferred in higher education sector in Kerala.

H2: Regression

H0: Digital learning has no influence on the advancement of green learning system (Rejected)

As the significance value is less than 0.05 we reject null hypothesis and come to the conclusion that digital learning has influence on the advancement of green leaning system .

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Descriptive Statistics

	Mean	Std. Deviation	N
GreenLearningSystem	4.0604	.45485	206
DigitalLearning	4.3343	.40236	206

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.725[a]	.525	.521	.31495	.525	111.742	1	101	.000

a. Predictors: (Constant), Digital Learning

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.509	.337		1.510	.134	-.160	1.179
	DigitalLearning	.819	.078	.725	10.571	.000	.666	.973

a. Dependent Variable: Green Learning System

Here the computed mean value of digital learning and green learning system is high. Model Summary provides r value .725 which shows there is high correlation between digital learning and green learning systems. As the r square value is .525 it is clear that change in digital learning systems creates significant change in the green learning system of the institutions.

Conclusion

The study shows the Higher education Institutions in Kerala prefer digital learning and digital learning advancement promotes green learning culture in the higher education institutions. The advent of digital learning makes it possible to drastically cut carbon emissions, which may assist HEIs in meeting their objectives for sustainability and creating green leaning culture. It is possible to carry out more research on the topic of green education for sustainability and the influence of technology in green education. Research can also be done on implementing green training adoption for organizations' employee training programmes. When purchasing digital learning tools and putting digital learning into practice, higher education institutions should consider the advantages of digital learning for safeguarding the environment.

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