

IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON MANAGEMENT OF EXTENSION CENTRES OF NIGERIA INSTITUTE OF LEATHER AND SCIENCE TECHNOLOGY, KADUNA STATE

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Abstract

This study assessed the impact of information and communication technology on management of extension-centres of Nigeria institute of leather and science technology. Two objectives guided the study which were to: assess the impact of information and communication technology on improving learning efficiency at the extension centres of the NILEST, and assess the impact of information and communication technology on digital-literacy in the management of the extension centres'. Two research questions and hypotheses were formulated in line with the objectives. The study adopted descriptive survey research design. Population was 3,606, consisting 366 lecturers, 3,114 students, and 126 extension-centres managers. Sample was 357 respondents as recommended by research advisor 2006. Proportionate sampling was adopted to determine sample size. Structured questionnaire titled impact of information and communication technology on management of extension-centres was used for data collection. Experts from computer science and measurement and evaluation validated the instrument. Cronbach-alpha reliability was employed with a coefficient of 0.8. Frequency, percentage and mean were used to answer research questions. ANOVA was used to test hypotheses at 0.05. Findings revealed that ICT positively impacted learning efficiency at the extension-centres. Also, ICT training programs have improved management staff's digital competence and operational efficiency in administrative and decision-making. Integration of ICT has been recognized as positively enhancing learning-efficiency across Extension-Centres. The study recommended that NILEST should encourage workshops, seminars and continuous professional-development on ICT-based training.

Keywords: Information and Communication Technology, Management, Extension Centres.

Introduction

The Information and Communication Technology (ICT) is a very important aspect of running and controlling learning institutions. At Nigeria institute of leather and science technology Zaria, ICT adoption has significantly enhanced operations and management within the

Extension centres', which has boosted the delivery of learning and management efficiency. Attahakul (2024) opines that ICT has revolutionized traditional learning through the use of digital resources, interactive materials and platforms, it has cut time and location barriers and also enhanced flexible, engaging and collaborative learning through the internet. Also, ICT has enhanced the levels of digital literacy and administrative ability among the staff members via targeted training and has resulted in increased efficiency in data management, quicker decision-making process, improved communication and increased institutional transparency and accountability.

Moreover, Information and Communication Technology (ICT) entail the tools, systems and infrastructures which facilitate the processing and transfer of information such as computers, internet, mobile devices and digital networks. It is a convergence of computers, telecommunications, and networking technologies on which the information society today is based. ICTs are transformative in any sector they are applied to, whether they are higher in productivity and efficiency in the business sector (Aithal, 2023) or in providing interactive and accessible and innovative learning opportunities in the educational field (Adeshina, 2024). On the whole, ICT is an innovation driver, collaboration, and constant improvement catalyst in organizations and school. Management is a process that is dynamic and continuous that entails strategic alignment of human, financial and material resources in order to accomplish the organizational objectives. It has major functions that include planning, organizing, leading, and controlling functions that are intertwined to guarantee efficiency and productivity. Being a developing process, the management is flexible to external conditions as it adjusts the institutional goals. Gagné (2018) defines its essence by stating that it is aimed at leading, organizing, and inspiring people and teams to work towards the same objectives, encouraging teamwork and corporate prosperity.

Statement of the Problem

ICT has emerged as one of the major sources of innovation, efficiency and effectiveness in the management of education in the world in recent years. When institutions are well integrated in ICT in instructional systems, a good communication, data management, instruction and learning results are likely to be realized. Nevertheless, ICT still remains a potential that is not fully exploited in most of the learning institutions in developing nations such as Nigeria (Saif et al., 2022).

The extension center of the Nigerian Institute of Leather and Science Technology (NILEST) Zaria, is set up to bring the skill development, research dissemination and the mandate of the institute to the communities and industries. Although ICT integration in these centers has much potential in improving the management practices and delivery of instruction, there are questions of how far the ICT has gone in influencing their operations efficiency and learning. Thus, the research problem that this study aims to fill is to what degree information and communication technology has influenced the learning efficiency and digital literacy in the management of the extension center of NILEST in Zaria, Kaduna state.

Objectives of the study

The objectives of the study were to:

1: assess the impact of information and communication technology on improving learning efficiency at the extension centres of the Nigerian institute of leather and science technology, Zaria.

2: assess the impact of information and communication technology on digital literacy in the management of the extension centres of the Nigerian institute of leather and science technology, Zaria.

Research Questions

1: What is the impact of information and communication technology on improving learning efficiency at the extension centres of the Nigerian institute of leather and science technology, Zaria?

2: What is the impact of information and communication technology on digital literacy in the management of the extension centres of the Nigerian institute of leather and science technology, Zaria.

Hypotheses

H01: There is no significant difference in the perceptions of students, lecturers and centre managers regarding the impact of information and communication technology on improving learning efficiency at the extension centres of the Nigerian institute of leather and science technology, Zaria.

H02: There is no significant difference in the perceptions of respondents regarding the impact of information and communication technology on digital literacy in the management of the extension centres of the Nigerian institute of leather and science technology, Zaria.

Methodology

A descriptive survey research design was adopted for the study. According to Nchunge, Sakwa, and Mwangi (2013), the descriptive survey design enables researchers to obtain data from a selected sample that represents a larger population. The descriptive survey design was considered most appropriate for achieving the research objectives. The population of the study was 3,606, consisting of 366 lecturers, 3,114 students, and 126 Extension Centre's Managers. (NILEST, Samaru Zaria, Kaduna State (2024). Using simple random sampling, 4 Extension Centre's (57% of the 7 Extension Centre's) were selected: Kano, Plateau, Ondo, and Abuja. This selection aligns with the recommended sampling range of 50%, which was considered adequate for studies in education and the social sciences (Lakens, 2022). The sample size used for the study was 357 respondents. The selection was based on the recommendation of Research Advisor 2006. Proportionate sampling technique were used to select respondents: 51 lecturers, 24 students, and 52 Centre Managers. A self-designed questionnaire of 20 items, tagged "impact of information and communication technology on management of extension Centre's of Nigeria institute of leather and science technology (IICTOMECE) by the researcher was used to collect data for the study. The instrument was structured on a 5-points Likert's scale options of Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD) with the numerical values of 5, 4, 3, 2 and 1 respectively. Two research experts from the field of measurement and evaluation and computer science validated the instrument.

Descriptive statistics of mean and standard deviation were used to answer the research questions while One-Way Analysis of Variance (ANOVA) was used to test the null hypotheses at 0.05 level of significance. A mean score greater than 3.00 was considered “Agreed,” while a mean score less than 3.00 was considered “Disagreed.” This decision rule aligns with the interpretation scale suggested by Boone and Boone (2012), who noted that in Likert-type scales, a mean value above the midpoint (3.00 on a 5-point scale) indicates general agreement, whereas values below the midpoint indicate disagreement. A total of 357 copies of the questionnaire were distributed but only 348 copies were returned. The analysis of the study was therefore, based on the data gathered from the above-mentioned number of returned copies of questionnaire.

Results

Research Question One: What is the impact of information and communication technology on improving learning efficiency at the extension centres of the Nigerian institute of leather and science technology, Zaria?

Table 1: Opinions of Respondents on the impact of ICT on improving learning efficiency at the Extension Centre’s of NILEST, Zaria

Item	Statements	Respt.	SA		A		U		D		SD		M
			F	%	F	%	F	%	F	%	F	%	
1	ICT has enhanced learning efficiency by enabling students and staff at the Extension Centres to easily access and utilize learning materials	Lecturers	24	40.7	15	25.4	2	3.4	10	16.9	8	13.6	3.63
		Students	99	39.6	69	27.6	3	1.2	43	17.2	36	14.4	3.61
		Ext.	15	38.5	10	25.6	2	5.1	10	25.6	2	5.1	3.67
		Managers											
2	ICT usage improved the efficiency of teaching and learning processes.	Lecturers	15	25.4	18	30.5	1	1.7	8	13.6	17	28.8	3.11
		Students	51	20.4	11	44.4	3	1.2	47	18.8	38	15.2	3.36
		Ext.	5	12.8	17	43.6	3	7.7	11	28.2	3	7.7	3.27
		Managers											
3	ICT integration has enhanced students’ understanding of lessons through multimedia and interactive learning platforms	Lecturers	6	10.2	28	47.5	2	3.4	12	20.3	11	18.6	3.1
		Students	51	20.4	11	46.4	4	1.6	47	18.8	32	12.8	3.43
		Ext.	9	23.1	12	30.8	3	7.7	8	20.5	7	17.9	3.21
		Managers											
4	Online resources and digital libraries have	Lecturers	7	11.9	33	55.9	3	5.1	11	18.6	5	8.5	3.44
		Students	80	32	82	32.8	3	1.2	40	16	45	18	3.45

	increased the quality and depth of learning experiences.	Ext. Managers	15	38.5	13	33.3	2	5.1	0	0	9	23.1	3.64
5	ICT has enhanced effective and timely communication between lecturers and students	Lecturers	17	28.8	18	30.5	2	3.4	14	23.7	8	13.6	3.37
		Students	47	18.8	10	40	5	2	50	20	48	19.2	3.19
		Ext. Managers	4	10.3	23	59	1	2.6	9	23.1	2	5.1	3.46
6	ICT usage has reduced delays in assignment submission and feedback.	Lecturers	13	22	18	30.5	2	3.4	9	15.3	17	28.8	3.02
		Students	37	14.8	12	49.2	4	1.6	46	18.4	40	16	3.28
		Ext. Managers	8	20.5	16	41	1	2.6	7	17.9	7	17.9	3.28
7	ICT has enabled more flexible learning schedules that accommodate students' and staff availability	Lecturers	6	10.2	28	47.5	2	3.4	12	20.3	11	18.6	3.1
		Students	90	36	79	31.6	7	2.8	45	18	29	11.6	3.62
		Ext. Managers	17	43.6	10	25.6	2	5.1	4	10.3	6	15.4	3.72
8	Adoption of ICT has improved collaboration and knowledge sharing among students and lecturer	Lecturers	10	16.9	32	54.2	2	3.4	11	18.6	4	6.8	3.56
		Students	46	18.4	10	43.2	1	4	38	15.2	48	19.2	3.26
		Ext. Managers	5	12.8	15	38.5	3	7.7	14	35.9	2	5.1	3.18
9	ICT-based learning has increased students' motivation and engagement in academic activities	Lecturers	16	27.1	17	28.8	2	3.4	17	28.8	7	11.9	3.31
		Students	59	23.6	10	43.2	8	3.2	43	17.2	32	12.8	3.48
		Ext. Managers	14	35.9	13	33.3	2	5.1	5	12.8	5	12.8	3.67
10	ICT improved the efficiency and effectiveness of learning at the Extension Centre's.	Lecturers	14	23.7	14	23.7	2	3.4	8	13.6	21	35.6	2.86
		Students	82	32.8	81	32.4	8	3.2	37	14.8	42	16.8	3.5
		Ext. Managers	10	25.6	22	56.4	4	10.	0	0	3	7.7	3.92
								3					
Grand Mean												3.39	

The analysis in table 1 generally revealed that respondents agreed Information and Communication Technology (ICT) has improved learning efficiency at the Extension Centres of the Nigerian Institute of Leather and Science Technology, Zaria, as most mean scores were above the 3.00 benchmark. However, item 10 recorded a mean score below 3.00 (2.86) among lecturers, indicating disagreement with the statement that ICT has improved the efficiency and

effectiveness of learning at the centres. In contrast, students and Centre managers agreed on that item, with mean scores of 3.50 and 3.92 respectively. This exception suggests that lecturers were less convinced about ICT’s effectiveness in enhancing overall learning efficiency compared to other respondent groups. Despite this variation, the grand mean of 3.39 confirmed a general consensus that ICT positively impacts learning efficiency at the extension centres.

Research Question Two: What is the impact of information and communication technology on digital literacy in the management of the extension centres of the Nigerian institute of leather and science technology, Zaria?

Table 2: Opinions of Respondents on the impact of ICT on digital literacy in the management of the Extension Centre’s of the NILEST, Zaria.

Item	Statements	Respt.	SA		A		U		D		SD		M
			F	%	F	%	F	%	F	%	F	%	
11	ICT training programs have strengthened the digital literacy and operational efficiency of management staff at the Extension Centre’s	Lecturers	16	27.1	25	42.4	4	6.8	3	5.1	11	18.6	3.54
		Students	50	20	108	43.2	6	2.4	56	22.4	30	12	3.37
		Ext.	11	28.2	18	46.2	1	2.6	9	23.1	0	0	3.79
		Managers											
12	Management staff now effectively utilize computers and digital tools to perform administrative tasks efficiently	Lecturers	13	22	26	44.1	2	3.4	4	6.8	14	23.7	3.34
		Students	88	35.2	81	32.4	5	2	41	16.4	35	14	3.58
		Ext.	9	23.1	20	51.3	1	2.6	9	23.1	0	0	3.74
		Managers											
13	The use of ICT has improved management personnel’s efficiency in storing and retrieving digital records	Lecturers	4	6.8	31	52.5	3	5.1	7	11.9	14	23.7	3.07
		Students	62	24.8	87	34.8	8	3.2	55	22	38	15.2	3.32
		Ext.	10	25.6	17	43.6	1	2.6	6	15.4	5	12.8	3.54
		Managers											
14	ICT tools have enhanced communication and collaboration among management, staff,	Lecturers	4	6.8	34	57.6	4	6.8	7	11.9	10	16.9	3.25
		Students	51	20.4	116	46.4	6	2.4	47	18.8	30	12	3.44
		Ext.	14	35.9	21	53.8	1	2.6	0	0	3	7.7	4.1
		Managers											

	and other stakeholders.													
15	Management staff use software applications to manage data and generate accurate reports with confidence.	Lecturers	6	10.2	31	52.5	4	6.8	5	8.5	13	22	3.20	
		Students	86	34.4	88	35.2	8	3.2	47	18.8	21	8.4	3.68	
		Ext.	10	25.6	22	56.4	0	0	5	12.8	2	5.1	3.85	
		Managers												
16	The integration of ICT has strengthened managers' capacity to analyze and interpret data for informed decision-making	Lecturers	6	10.2	31	52.5	3	5.1	6	10.2	13	22	3.19	
		Students	61	24.4	103	41.2	1	4.4	39	15.6	36	14.4	3.47	
		Ext.	11	28.2	20	51.3	0	0	3	7.7	5	12.8	3.74	
		Managers												
17	Regular use of ICT tools has fostered continuous learning and enhanced digital competence among management staff	Lecturers	5	8.5	32	54.2	3	5.1	7	11.9	12	20.3	3.19	
		Students	67	26.8	106	42.4	8	3.2	44	17.6	25	10	3.58	
		Ext.	15	38.5	18	46.2	1	2.6	3	7.7	2	5.1	4.05	
		Managers												
18	ICT has modernized the monitoring and evaluation of activities at the Extension Centre's	Lecturers	5	8.5	33	55.9	3	5.1	8	13.6	10	16.9	3.18	
		Students	81	32.4	88	35.2	8	3.2	39	15.6	34	13.6	3.57	
		Ext.	10	25.6	21	53.8	1	2.6	7	17.9	0	0	3.87	
		Managers												
19	Digital literacy among management staff has promoted greater transparency and accountability in administrative operations.	Lecturers	5	8.5	28	47.5	2	3.4	11	18.6	13	22	3.25	
		Students	58	23.2	113	45.2	5	2	45	18	29	11.6	3.5	
		Ext.	14	35.9	19	48.7	1	2.6	2	5.1	3	7.7	4	
		Managers												
20	ICT adoption has enhanced digital literacy and enabled management staff to perform tasks more efficiently at the Extension Centre's	Lecturers	12	20.3	29	49.2	4	6.8	4	6.8	10	16.9	3.02	
		Students	87	34.8	92	36.8	7	2.8	45	18	19	7.6	3.73	
		Ext.	13	33.3	24	61.5	1	2.6	0	0	1	2.6	4.23	
		Managers												

The analysis of data in table 2 indicated that respondents generally agreed that Information and Communication Technology (ICT) has significantly enhanced digital literacy in the management of the Extension Centres at the Nigerian Institute of Leather and Science Technology, Zaria. All the items recorded mean scores equal to or greater than 3.00, signifying agreement among lecturers, students, and Centre Managers. Respondents affirmed that ICT training programs have improved management staff’s digital competence and operational efficiency, and that staff now effectively use computers, software applications, and digital tools for administrative and decision-making tasks. ICT was also found to enhance communication, collaboration, transparency, and accountability in management operations. Moreover, regular use of ICT tools has fostered continuous learning, improved monitoring and evaluation, and strengthened managers’ capacity for data analysis and reporting. With a grand mean score of 3.69, the findings conclusively indicate a strong positive impact of ICT on digital literacy and managerial effectiveness at the Extension Centres.

Hypothesis One: There is no significant difference in the perceptions of students, lecturers, and Centre managers regarding the impact of information and communication technology on improving learning efficiency at the extension centres of the Nigerian institute of leather and science technology, Zaria.

Tables 3: Summary of One-Way ANOVA on the impact of ICT on improving learning efficiency at the Extension Centre’s of the NILEST, Zaria.

Status	Sum of Square	df	Mean Square	F	Sig
Between Groups	2.181	2	1.090	.835	.435
Within Groups	450.497	345	1.306		
Total	452.678	347			

The result presented in table 3 revealed that there was no significant difference in the perceptions of students, lecturers, and Centre managers regarding the impact of ICT on improving learning efficiency. This means that all respondents agreed that ICT has positively impacted learning efficiency at the Extension Centre’s. With a p-value of 0.435, which is greater than the 0.05 level of significance, the finding confirms that the perceived impact of ICT does not differ significantly among the respondent groups. This outcome indicates an agreement among stakeholders on the positive role of ICT in enhancing learning at the Institute’s Extension Centre’s.

Hypothesis Two: There is no significant difference in the perceptions of respondents regarding the impact of information and communication technology on digital literacy in the management of the extension centres of the Nigerian institute of leather and science technology, Zaria.

Tables 4 Summary of One-Way ANOVA on impact of ICT on digital literacy in the management of the Extension Centre’s of the NILEST, Zaria.

Status	Sum of Square	df	Mean Square	F	Sig
Between Groups	9.579	2	4.789	3.924	

				.021
Within Groups	421.060	345	1.220	
Total	430.639	347		

The research determined that there was a considerable difference in the perception of the respondents on the impact of ICT in addressing digital literacy in the management of the Extension Centres of NILEST, Zaria. The .021 (less than the 0.05 level of significance) indicates that there is a difference in the perception of students, lecturers, and Centre managers regarding the role of ICT in digital literacy in management.

Discussion of Findings

The analysis did not reveal any significant difference in the ways students, lecturers, and Centre managers view the impact of ICT on the learning efficiency in the NILEST Extension Centre's, which means that they have a common positive perception. This agreement demonstrates that ICT tools have been successfully implemented into teaching, learning, and administration whereby they have improved the engagement levels, access to materials, and efficiency. The observation compliments Zhao et al. (2024), who emphasized the role of ICT as a convergent factor in educational innovation and found that educational innovation designed by NILEST to foster the adoption of ICT had produced both consistent and positive results with all respondents involved.

This research indicated that there were differences among the respondents in their perceptions towards the impact of ICT in digital literacy in the management of the Extension Centre's. The results show that the administrative role of ICT is not viewed uniformly by the stakeholders as the p-value of 0.021 is lower than 0.05. This difference could be due to uneven exposure, access or training. The implication of this finding is that there is a need for targeted specific capacity-building initiatives and the equal access to the digital resources to facilitate the active digital competence development among all groups, in line with Fichman et al. (2014), who have noted that ICT proficiency plays a central role in the successful organizational change in technology-driven era.

Conclusion

The researchers discovered that ICT integration had a positive impact on the learning efficiency of the Extension Centres of the Nigerian Institute of Leather and Science Technology, Zaria. There is a general agreement between the students, lecturers, and Centre Managers that ICT has enhanced teaching, learning, and communication. Nevertheless, they have conflicting opinions about its influence on digital literacy in management, which implies imbalanced agreement of administrative functions. The findings therefore imply that enhancing digital literacy training, ensuring equitable access to ICT resources, and strengthening capacity development among all stakeholders are essential for achieving balanced digital competence and sustainable ICT integration in both learning and management processes.

Recommendations

1: The Nigerian Institute of Leather and Science Technology (NILEST), Zaria, should promote the process of lifelong learning in relation to innovative ICT-based teaching methods among lecturers and Centre Managers.

2: To improve digital literacy, the (NILEST), Zaria, management should consider the frequent and role-specific digital literacy training of students, lecturers, and Centre Managers. Such trainings must target different levels of ICT competencies, and aim at increasing the capacity of the participants to efficiently apply digital tools in the administrative management, communication and decision-making process.

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