

UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) AND ADMINISTRATIVE EFFECTIVENESS IN TERTIARY INSTITUTIONS.

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Abstract

The study investigates utilization of information and communication technology (ICT) and administrative effectiveness in Tertiary Institutions. A study of Cross River University of Technology (CRUTECH). The specific objectives were to: examine the effect of ICT (computer, flash drive, zip disk, hard disk, electronic class roll etc.) on administrative effectiveness in terms of record keeping in tertiary institutions; determine the effect of ICT (scanner, printer, photocopying machine, spreadsheet) on administrative effectiveness in terms of result production in tertiary institutions; ascertain the effect of ICT (cell phone, email, radio, television, internet etc.) on administrative effectiveness in terms of communication in tertiary institutions. The survey research design was used for this study. The population of the study comprised of all administrative staff in Cross River University of Technology. The sampling technique adopted for this study was census sampling technique. The sample was made up of 168 administrators drawn from CRUTECH. The study employed primary sources of data and Analysis of Variance. The results of the analysis revealed that: Utilization of ICT (computer, flash drive, zip disk, hard disk, electronic class roll etc.) significantly influence administrative effectiveness in terms of record keeping in tertiary Institutions. There is no significant influence of the utilization of ICT (scanner, printer, photocopying machine, spreadsheet, scoring machine etc.) on administrative effectiveness in terms of result production in Tertiary Institutions. Utilization of ICT (cell phone, email, radio, television, internet, etc.) significantly influence administrative effectiveness in terms of communication in tertiary Institutions. The study recommended that administrators should try as much as possible to utilize ICT in keeping records in the institutions. This will make them to be more effective in the administration as they could provide any document within limited amount of time when demanded

Keywords: Information and communication technology, administrative effectiveness.

Introduction

The integration of Information and Communication Technology (ICT) which encompasses a wide range of technologies such as computers, mobile telephones, internet, video, satellite, World Wide Web among others in collection, storage, retrieval and transfer of information in various forms for human use has become an essential part of our everyday life and a vital means to facilitate task in tertiary institutions. The adoption of ICT does not only reinforce the teaching-learning process, but it also facilitates administrative process.

Administration and management of ICT applications are currently popular in tertiary institutions due to their capabilities in facilitating administration activities from data storage to management and decision-making. It ensures proper and timely result production, records keeping, school supervision and scheduling. It also aimed at assisting management and operating personnel to produce timely and accurate information not only to decide on present and future operations, but also to pinpoint potential problems that need to be rectified (Obi, 2023). Despite this, most tertiary institutions are still deprived of the benefits of ICT.

According to Federal Republic of Nigeria (FRN) (2023), the objectives of ICT infrastructures in the Tertiary Institutions are; to ensure that information is accurate and timely and also to organize information for planning, budgeting and decision-making. Based on ICT objectives, it is expected that ICT may assist the administrators of Tertiary Institutions in making decisions on various issues affecting them. An institution with a well-organized ICT will ensure that records are properly kept and produced when needed.

The deployment of ICT in tertiary institutions has caused a major paradigm shift on how issues are approached in the context of gathering, storage retrieval and analysis of information. However, the slow access to and provision of basic ICT equipment, low internet connectivity, epileptic power supply, lack of enough computers, lack of ICT competencies, and absence of trained staff are barriers to effective functioning of any administration. These constitute a setback to the administration of schools. According to Akuegwu, Udida and Nwue (2017), the effort in utilization of ICT in the administration of school is likely to continue to lag behind given the prevailing ICT status in schools.

Experience has also shown that most administrators do not carry out their communication processes effectively. Information hardly flows to the various parts of the organization in time (Acha, 2016). This is seriously blamed on lack of ICT infrastructure or the inability of the school administrators to use ICT properly. Frequently, students and non-academic staff in tertiary institutions agitate and at times go on strike because of certain doubts that need clarification by the school administrators. This doubt could have been better clarified if the principals were able to communicate properly with their subjects (Adebayo & Fashiku, 2020). It is in recognition of the importance of utilization of information and communication technology (ICT) in enhancing administrative effectiveness in schools that the researcher decided to investigate whether utilization of ICT by administrators will enhance effective and efficient administration in tertiary institutions

Objectives of the study

The main purpose of this study is to investigate the utilization of information and communication technology (ICT) and administrative effectiveness in tertiary institutions. Specifically, the study were to determine the influence of the utilization of:

1. ICT (computer, flash drive, zip disk, hard disk, electronic class roll etc.) on administrative effectiveness in terms of record keeping in Tertiary Institutions.
2. ICT (scanner, printer, photocopying machine, spreadsheet) on administrative effectiveness in terms of result production in Tertiary Institutions
3. ICT (cell phone, email, radio, television, internet etc.) on administrative effectiveness in terms of communication in Tertiary Institutions.

Theoretical framework

The following theories are used to support the study, they include:

Administrative Management Theory (Fayol, 1923)

Henri Fayol was a Frenchman and an industrialist who is associated with the administrative management theory. The basic assumption of the theory is that administration is a universal

process consisting of functions which include planning, organizing, coordinating, commanding and controlling and that these functions promote greater efficiency. Administration according to him involves studying the future and arranging both human and material resources, command the staff to do their work, unite and correlate the activities of the organization and see that everything is done in line with laid down rules and regulations.

In addition to the five elements, Fayol developed fourteen principles of management and was of the opinion that, all business organizations are the same all over the world i.e., they are universal. The principles are: division of labour, authority, discipline, unity of command, unity of direction, and subordination of individual interest to common goals, remuneration, centralization, order, equity, stability of personnel, initiative, and esprit de corps. This theory recognizes division of labour and delegation as a basis for job effectiveness. Its application in the school system entails that the principals should place much emphasis on assigning responsibilities to teachers and other members of the community based on their potentials, co-coordinating the work, handling special problems that arise, planning improvements, taking personal interests in staff, while the teachers and other staff concentrate in accomplishing the tasks using ICT facilities that will lead to the achievement of school goals.

Literature Review

Utilization of ICT and record keeping

Record keeping is very pertinent for administrative effectiveness in any organization or institution. It is not enough to just keep records, but it should be noted that how records are kept and used should be seen as essential for administrative effectiveness. Acha (2016) opined that records are information or data on a particular subject or activity collected and preserved for future use. The essence of record keeping is to enable the management or educators make effective decision. It is the records of the past events or activities which were preserved that are used by administrators for planning and control of the present programmes or activities. Some records are mandatory, example, register of admission, register of attendance and fees, progress and withdrawal of student. This is because the law demands that such records are kept and must be produced at the request of the inspection officer to the schools.

According to Ngugi (2022) record keeping enhances administrative effectiveness in Tertiary Institutions. Administrative functions of planning, controlling, organizing, staffing, coordinating and directing is not effectively carried out without proper documentation, for example, every plan and decision undertaken by the teacher and by the school administrators must be properly documented for reference purposes. Proper and accurate documentation would enable the school management recall and implement what were discussed. It is interesting to note that the next decision could be arrived at from the last reports documented.

According to Acha (2016), manual record keeping is prone to errors and mistakes especially in processing accounting data. It leads to dirt's on document production and greasy thumb print. It becomes vital for the administrator to note that computerized record management is essential for future planning. Documents are effectively controlled, retrieved and shared. Asiabaka (2020) maintained that what gives the administrator the power and control to manage the resources is the availability of information. It is interesting to note that proper storage and security of information or data in the administration could bring about the effectiveness of the administration of any organization.

ICT and result production

Over the years, the administrative work of principals is print based. Various documents are kept in the form of records. These records provide information on the past, present and anticipated future activities of the school including relevant information from the external environment which aid decision making. Obi (2023) emphasized that ICT serves as a tool for increase productivity and effective decision making. Incorporating it in the management of school in the meaningful and productive way can improve or enhance the administrative duties of a principal officer and provide better management of results.

The use of ICT is making major difference in the learning of students and teaching approaches. A survey by Tayo and Abass (2024) on the management use of computers in the United States, Britain, Mexico and Netherlands reported that ICT has enabled effective management of tasks related to students' assessment, timetabling, administrative records and financial accounting. Olayemi and Omotayo (2022) conducted a study on ICT adoption and effective secondary school administration in Ekiti State in which 180 principals were randomly selected from three senatorial districts. Data collected were analyzed using frequency counts, percentage score, t-test and Pearson Product Moment Correlation statistics, the result of the study indicated that there is a relationship between adoption of ICT and efficient management of students' results in Tertiary Institutions. They maintained that the effective management of students' academic records is one important aspect of school administration that school principals should show diligence.

In a similar study Asiabaka (2020) investigated the access and use of information and communication technology for administrative purposes by principals of government Tertiary Institutions in Imo State, Nigeria. Survey method was adopted and data was collected using questionnaire. The population of study was 621 and sample was made up 130 principals. The data analyzed with percentages and mean scores revealed that principals use ICT in individual student management, marking and analyzing tests, grading, diagnosis and monitoring of learners progress.

Tayo and Abass (2024) in a study on the "perception, availability and levels of use of ICT on school administration in public tertiary institutions in Osun state, Nigeria, using a 25 item questionnaire and 100 principals and descriptive statistics found that administrators are aware of the importance of ICT in school administration. They use it to record grade assign to students in a fashion that the records can be easily and readily accessible to appropriate individuals. They also use it to process the examination data, announce results in the quickest possible time.

ICT and scheduling of responsibilities

According to Ezziane (2017), involvement of ICT in general administration has brought increased efficiency and optimal resource utilization. Oguta, Egessa and Musiega (2024) asserted that ICT enhances day-to-day management of institutions and enables schools to improve in efficiency and cope with rapidly changing world in executing management tasks. In support of this contention, Ngugi (2022) in a study on the extent of use of ICT in education management in public Tertiary Institutions in Naivasha District, Kenya noted that cost-effective application of ICT related technology combined with flexibility in learning and administrative activities is essential in enhancing efficiency in Tertiary Institutions.

Asiabaka (2020) pointed out that ICT enhances personnel duty schedule. Duty records are usually reduced into duty sheets which are an overview of the workloads of the individual staff members, specifying the type of work (teaching or administration) and the hours of work in line with the employment condition of service. He held that the summary of duties or detailed description of tasks to be performed helps the administrator to make informed

decisions regarding the workload of staff. Alexander (2022) asserted that ICT has enabled allocation of work, attendance, and leave management and performance appraisal, raising efficiency in task distribution, data collection and management.

Utilization of ICT and communication

Over the past decade computer and other communication equipment have come to play such a dominant role in the processing of information that is enormous to imagine any enterprise to function efficiently without them. They are therefore useful tools for data/information input, storage, organization, processing and retrieval. The use of ICT for communicative purpose continues to evolve in an institutional set up. In business, one of the major changes in work associated with ICT is the shift from more traditional networking within organizations. Likewise, in schools, one of the most important ways that ICT changes student and teacher work is by creating new networking possibilities directly with other schools or, indirectly, to informational data bases on the World Wide Web. In business, ICT has transformed radically work that requires communication with others, processing information, or creating information. Similarly, ICT can change student and teacher work around teaching and learning.

ICT and information sourcing

The increased significance of “information” as a prime resource in management contexts and its importance for the support of decision-making processes has brought about various approaches to information management. Managers at all levels act on information to communicate with one another in order to know about developments, plans, forecasts, inherent changes etc. in the organization. The availability of relevant information is a necessary condition for decisions. Asiabaka (2020) suggested three phases of decision-making: intelligence (reviews the environment, analyze goals, collect data, identify problem, categorize problem, assess ownership and responsibility), design (develop alternative courses of action, analyze potential solutions, create model, test for feasibility, and validate results) and choice (acceptability of solution, building normative models). In all three phases information has to be provided and/or searched for in different forms and levels of aggregation. Essentially, management decisions can be understood as information processing where information takes on a strategically important significance for the organization’s development. The use of ICT in tertiary institutions provides an opportunity to administrators to transform their practices by providing improved educational content through the provision of more interactive educational materials that increase learners motivation and facilitate the easily acquisition of basic skills. Effective use of ICT can contribute to the timely transmission of information and knowledge, thereby helping tertiary institutions improve the quality of administrative activities and processes (Chigona, Chigona, Kayongo, & Kausa, 2020; InforDev, 2020).

Research Methodology

The survey research design was used for this study. The population of the study comprised of all administrative staff in Cross River University of Technology in Calabar. Census sampling technique was adopted in this study. The sample was made up of 168 administrators drawn from CRUTECH. The study employed primary sources of data using analysis of Variance. All the hypotheses were stated in the null form and are tested at 0.5 level of significance.

Presentation of results

Hypothesis one

There is no significant influence of the utilization of ICT (computer, flash drive, zip disk, hard disk, and electronic class roll) on administrative effectiveness in terms of record keeping in Tertiary Institutions.

The dependent variable in this hypothesis is administrative effectiveness in terms of record keeping while the independent was utilization of ICT (computer, flash drive, zip disk, hard drive and electronic class roll). The utilization of ICT was categorized into low, moderate and high based on respondents mean score on utilization of ICT (computer, flash drive, zip disk, hard drive and electronic class roll) sub scale. Respondents who scored below the mean regions were categorized as low, those who scored within the mean region were categorized as moderate and those who scored above the mean region were categorized as high. Based on this the influence of utilization of ICT(computer, flash drive, zip disk, hard drive and electronic class roll) on administrative effectiveness in terms of record keeping was computed using One way analysis of variance (ANOVA).

Table 1: One way analysis of variance (ANOVA) of the influence of the utilization of ICT (computer, flash drive, zip disk, hard disk, and electronic class roll) on administrative effectiveness in terms of record keeping in Tertiary Institutions.

	N	\bar{X}	S D			
	↑	↑	↑			
Low utilization	37	12.4865	4.11381			
Moderate utilization	82	13.8049	3.92031			
High utilization	43	14.7209	3.67958			
Total	162	13.7469	3.95834			
	Sum of Squares	Df	Mean Square	F-ratio	p-level.	
Between Groups	99.851	2	49.926	3.276*	.040	
Within Groups	2422.772	159	15.238			
Total	2522.623	161				

* $p < 0.05$, d.f= (2, 159), critical F= 3.14

The result in Table 1 revealed that, the calculated F- value of 3.28 was found to be greater than the critical F-value of 3.14 needed for significance at 0.05 level of significance with 2 and 159 degrees of freedom. With this result, the null hypothesis was rejected, it therefore means that the utilization of ICT (computer, flash drive, zip disk, hard disk, and electronic class roll) on administrative effectiveness in terms of record keeping in Tertiary Institutions. Given the significant F- value, a post hoc test was conducted using Fishers least significance difference (LSD). The result, is presented in Table 2

Table 2: Fishers' least significant difference multiple comparison Influence of the utilization of ICT (computer, flash drive, zip disk, hard disk, and electronic class roll) on administrative effectiveness in terms of record keeping in Tertiary Institutions

(I) Utilization of ICT1	(J) Utilization ICT 1	Mean Difference (I-J)	Std. Error	p-level
Low utilization	Moderate utilization	-1.31839	.77308	.090
	High utilization	-2.23444*	.87532	.012
Moderate utilization	Low utilization	1.31839	.77308	.090
	High utilization	-.91605	.73497	.214
High utilization	Low utilization	2.23444*	.87532	.012
	Moderate utilization	.91605	.73497	.214

The result in Table 2 revealed that, there was a significant higher mean difference in record keeping between secondary school administrators who were categorized as high in the utilization of ICT (computer, flash drive, zip disk, hard disk, and electronic class roll) than those who were categorized as low (MD = -2.24, $p < 0.01$). No significant mean difference exist in record keeping between secondary school administrators who were as low in the utilization of ICT (computer, flash drive, zip disk, hard disk, and electronic class roll) and those categorize as moderate (MD = 1.31, $p = 0.09$). Also, no significant mean difference exist in record keeping between school administrators who were classified as being high in utilization of ICT (computer, flash drive, zip disk, hard disk, and electronic class roll) and those classified as moderate (MD = 0.92, $p = 0.21$)

Hypothesis two

There is no significant influence of the utilization of ICT (scanner, printer, photocopying machine, spreadsheet, scoring machine) on administrative effectiveness in terms of result production in Tertiary Institutions.

The dependent variable in this hypothesis is administrative effectiveness in terms of result production while the independent was utilization of ICT (scanner, printer, photocopying machine, spreadsheet, scoring machine). The utilization of ICT was categorized into low, moderate and high based on respondents mean score on utilization of ICT (scanner, printer, photocopying machine, spreadsheet, and scoring machine) sub scale. Respondents who scored below the mean regions were categorized as low, those who scored within the mean region were categorized as moderate and those who scored above the mean region were categorized as high. Based on this the influence of utilization of ICT (scanner, printer, photocopying machine, spreadsheet, scoring machine) on administrative effectiveness in terms of result production was computed using One way analysis of variance (ANOVA). The result is as presented in Table 3

Table 3: One way analysis of variance (ANOVA) of the influence of the utilization of ICT (scanner, printer, photocopying machine, spreadsheet, scoring machine) on administrative effectiveness in terms of result production in Tertiary Institutions

	N ↑	\bar{X} ↑	S D ↑		
Low utilization	50	11.9800	5.05678		
Moderate utilization	85	13.2824	5.29063		
High utilization	27	14.7407	5.67445		
Total	162	13.1235	5.33332		
	Sum of Squares	Df	Mean Square	F-ratio	p-level
Between Groups	138.142	2	69.071	2.473	.088
Within Groups	4441.389	159	27.933		
Total	4579.531	161			

* $p > 0.05$, d.f= (2, 159), critical F= 3.14

The result in Table 3 revealed that, the calculated F- value of 2.47 was found to be smaller than the critical F-value of 3.14 needed for significance at 0.05 level of significance with 2 and 159 degrees of freedom. With this result, the null hypothesis was retained, it therefore means that the utilization of ICT (scanner, printer, photocopying machine, spreadsheet, scoring machine) on administrative effectiveness in terms of result production.

Hypothesis three

There is no significant influence of the utilization of ICT (cell phone, email, radio, television, and internet) on administrative effectiveness in terms of communication in Tertiary Institutions.

The dependent variable in this hypothesis is administrative effectiveness in terms of communication while the independent was utilization of ICT (cell phone, email, radio, television, and internet). The utilization of ICT was categorized into low, moderate and high based on respondents mean score on utilization of ICT (cell phone, email, radio, television, and internet) sub scale. Respondents who scored below the mean regions were categorized as low, those who scored within the mean region were categorized as moderate and those who scored above the mean region were categorized as high. Based on this the influence of utilization of ICT (cell phone, email, radio, television, and internet) on administrative effectiveness in terms of communication was computed using One way analysis of variance (ANOVA). The result is as presented in Table 4

Table 4: One way analysis of variance (ANOVA) of the influence of the utilization of ICT (cell phone, email, radio, television, and internet) on administrative effectiveness in terms of communication in Tertiary Institutions

	N	\bar{X}	S D		
Low utilization	24	14.6250	10.84200		
Moderate utilization	48	10.8750	3.80719		
High utilization	90	11.2000	3.59838		
Total	162	11.6111	5.45820		
	Sum of Squares	Df	Mean Square	F-ratio	p-level
Between Groups	259.225	2	129.613	4.542*	.012
Within Groups	4537.275	159	28.536		
Total	4796.500	161			

*p<0.05; d.f= (2, 159); critical F= 3.14

The result in Table 4 revealed that, the calculated F- value of 4.54 was found to be greater than the critical F-value of 3.14 needed for significance at 0.05 level of significance with 2 and 159 degrees of freedom. With this result, the null hypothesis was rejected; it therefore means that the utilization of ICT facilities (cell phone, email, radio, television, and internet) has a significant influence on administrative effectiveness in terms of communication. Given the significant F-value a post hoc test was conducted using Fisher least significant difference (LSD) multiple comparison. The result is presented in Table 5

Table 5: Fishers’ least significant difference multiple comparison Influence of the utilization of ICT (cell phone, email, radio, television, and internet) on administrative effectiveness in terms of communication in Tertiary Institutions

(I) Utilization of ICT3	(J) Utilization of ICT3	Mean Difference (I-J)	Std. Error	p-level
Low utilization	Moderate utilization	3.75000*	1.33548	.006
	High utilization	3.42500*	1.22723	.006
Moderate utilization	Low utilization	-3.75000*	1.33548	.006
	High utilization	-.32500	.95477	.734
High utilization	Low utilization	-3.42500*	1.22723	.006
	Moderate utilization	.32500	.95477	.734

The result in Table 5 revealed that, there was a significant higher mean difference for communication between secondary school administrators who were categorized as high in the utilization of ICT (cell phone, email, radio, television, and internet) than those who were categorized as low (MD = 3.75, p<0.000) and moderate (MD=3.42, p=0.006). No significant mean difference exist in record keeping between secondary school administrators who were categorized as moderate in the utilization of ICT (cell phone, email, radio, television, and internet) and those categorize as high (MD =1.31, p=0.09). This result implied that school administrators who were categorized as high communicate effective more than those who were categorized as moderate and as low.

Summary of the study

The main purpose of this study is to investigate the utilization of information and communication technology (ICT) and administrative effectiveness in Tertiary Institutions. Three hypotheses were formulated to guide and direct the study. Literatures on the major variables were reviewed. Survey research design was adopted for the study. A total of 168 respondents were sampled and 162 used for the study. A well validate structured questionnaire was used for data collection. Data collected were analyzed using one way analysis of variance (ANOVA). The results of the analysis revealed that:

- i. Utilization of ICT (computer, flash drive, zip disk, hard disk, electronic class roll etc.) significantly influence administrative effectiveness in terms of record keeping in Tertiary Institutions.
- ii. There is no significant influence of the utilization of ICT (scanner, printer, photocopying machine, spreadsheet, scoring machine etc.) on administrative effectiveness in terms of result production in Tertiary Institutions.
- iii. Utilization of ICT (cell phone, email, radio, television, internet, etc.) significantly influence administrative effectiveness in terms of communication in Tertiary Institutions.

Conclusion

Based on the findings obtained from this study, it was concluded that, Utilization of ICT facilities (computer, flash drive, zip disk, hard disk, electronic class roll etc.) significantly influence administrative effectiveness in terms of record keeping in Tertiary Institutions and there is no significant influence of the utilization of ICT (scanner, printer, photocopying machine, spreadsheet, scoring machine etc.) on administrative effectiveness in terms of result production in Tertiary Institutions. The findings also lead us to the conclusion that utilization of ICT (cell phone, email, radio, television, internet, etc.) significantly influence administrative effectiveness in terms of communication in Tertiary Institutions and there is no significant influence of the utilization of ICT (projector, computer, cell phone, interactive white board, video, video conference etc.) and administrative effectiveness in terms of scheduling of responsibilities in tertiary institutions.

Recommendations

In the light of the conclusion drawn on this study, it was recommended that:

1. Tertiary Institutions administrators should try as much as possible to utilize ICT in keeping records in the institutions. This will make them to be more effective in the administration as they could provide any document within limited amount of time when demanded
2. Though ICT utilization did not influence results production in the area. It is highly recommended that administrators should utilize this method effectively as it will enable to be accurate in result production within the shortest possible time
3. Management are highly advised to use ICT in the communication process. This is because with ICT information could be circulated within the shortest possible time with low cost.

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