



Information Technology Enabled Information Management in Tertiary Institutions in Delta State, Nigeria: Concept, Challenges and Prospects

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

This study examined the relevance of information Technology (IT) in the management of information in Tertiary institutions in Delta State, Nigeria owned Tertiary Institutions. The study was motivated by the ever increasing challenges of effective information delivery in our school system and IT enabled processes as a solution to overcoming the identified challenges. The study sample was made up of 800 (eight hundred) staff and students A questionnaire seeking the relevance(s) of IT in information management was used to answer the five research questions raised for the study. The study identified that they exist challenges affecting information management in our institutions. Findings revealed that; there is over-dependence on paper with processing information which has generated lots of records in the system, the acceptance of technology is hinged on the available financial resource of the institution, and power supply is a major problem for technology adoption. The low ranking of institutions in Nigeria is dependent on the low internet presence of the

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institutions and information available on the school's website. Arising from the study findings, some recommendations were made which include; sourcing of alternative electricity source, regular training and retraining, management and consultants should set a realistic time frame for executing IT projects, technology should not be seen as power to solving problems but a tool for realizing acceptable solution. The study established that there is relevance(s) of IT in the effective management of information in Tertiary institutions and the possibility of a paperless Tertiary education society in Delta State.

Keywords: Tertiary education institution; information technology; information management; Nigeria; paperless society.

1. INTRODUCTION

Information has become an indispensable component of Tertiary education. Information Technology (IT) in information management is the application of scientific methods, equipments and tools in the overall delivery of information services across the campuses. Technology is generally becoming the major factor of productivity in any human endeavor. Tertiary institutions in Nigeria have witnessed the increased generation of information over time. The overall dependence of information delivery is the overall success of the institution's objectives, mission statements and goals [1].

Tertiary education in Nigeria is the highest level of education. Education in universities, colleges of education, polytechnics, monotechnics including corresponding courses [2]. It is the training places of persons who have successfully completed secondary education. Tertiary education is a complex system of any country developed, developing or underdeveloped. Management of information in the school system is complex as this has become a serious concern to administrators. The management structure of the organization determines the flow of information. Information in Tertiary institutions is multi-dimensional. It involves Information within campuses, campus community and the world at large.

Tertiary institutions in Nigeria are hindered by both internal and external forces. In schools operating multi-campus, slower rate of information dissemination is experienced. As information moves across campuses, the freshness of information is hampered by factors working against effectiveness of information delivery [1]. [3,1] remarked that Tertiary education is approaching the point at which science and technology particularly IT, plays a vital role in nearly all phases of the educational process.

IT is a set of technological tools and resources used to communicate and to create, disseminate, store and manage information [4]. These technologies include, but are not limited to, computers, the internet, broadcasting technologies and mobile telephone services. The effective adoption of IT in Tertiary institution information management in Nigeria will be a reliable vehicle for education, a platform for communication and a powerful tool for communication and economic growth [5].

Technology innovation and full acceptance of Tertiary institutions' information delivery in the banking, health and economic sectors in Nigeria have witnessed greater efficiency and increased productivity in performing tasks [6,1]. IT is largely associated with improvement in services and an increase in the quality of services rendered by the systems. IT is not specific to the Nigeria banking sector alone, which have effectively adopted it to its processes [7], nor country specific for developed countries [1]. The education system in Nigeria is long overage for full adoption of IT in all processes of the institution's life including information management.

Why IT in Tertiary education? Strategic investments in technology start with the identification of the overall cost and benefits of full adoption. Effective access to information with adequate feedback is achievable with IT adoption with a reduction in the overall cost of information management. The overall use of IT in Tertiary education is increasing day by day and the level of use of IT is satisfactory.

1.1 Possible IT Tools in Information Delivery

- a) **Mobile telephone services:** with 25 licensed operators in Nigeria shared into GSM (5 operators), CDMA (4 operators) and fixed wireless (16 operators), the

subscriber growth of 266,461 at inception of the GSM revolution in Nigeria (December 2001) has increased to 160,940,523 (April 2012) [8]. This statistics shows that almost every Nigerian owns a mobile phone. Communication in Tertiary institutions will be boosted if mobile telephone services are adopted effectively.

- b) **Email services:** Electronic mail (e-mail) is a method of exchanging digital messages from one author to another or more recipients. There are challenges of using email in communication no doubt, but relevant technologies and proper education on usage abound in making it safer for usage. Its usage cuts across age, gender, status or geographical boundaries. "My father is 80, my mother 79; we communicate daily and regularly" by email assert Mrs. Ifuko Omoigui-Okamu [9].
- c) **Social Media:** With the growing usage of social media, its success outweighs the fears it initially posed. The speed of information transfer in the age of the social media cannot be neglected to the background. The use of Facebook, twitter, and other media available in Tertiary education information delivery will be a positive light in overcoming the current slow rate of information transfer.
- d) **Short message services (SMS):** SMS is a communication protocol. It is the message component of a mobile phone which allows the exchange of short text messages between fixed lines or mobile phone devices. Affordable and reliable text messages platform abound in Nigeria. They can be used to send messages across. SMS notifications can be used in Sending resumption dates to students on their mobile phone which will be cheaper than making publications in newspapers.
- e) **Telepresence:** A technological construct coined by Marvin Minsky. Telepresence is not science fiction; it is a work in artificial intelligence [10]. It refers to a set of technologies which allows a person to feel as if they were present. [11] described telepresence as the human experience of being fully present at a real world location from one's own physical location. It can be applied in varied ways in the school system. Can be used in

interviews, oral examination/defense at post graduate school, matriculation or convocation addresses in institutions operating multi-campus systems.

- f) **Website:** this proves as a reliable means of spreading information. The institutional website serves as the information directory for seekers of information. The uploading and update of the institutions website will increase the internet visibility of the school and will improve the university web ranking or web presence (WEBOMETRICS).

2. PROBLEM STATEMENT

Management of information in Tertiary Education in Delta State, Nigeria has been an issue of concern. The current challenges of information delivery with the slow pace of information processing, dissemination across campuses, poor retrieval and inadequate storage compelled this study.

The school system has witnessed the full adoption of Post-UTME (Unified Tertiary Matriculation Examination) in its admission process. Prospective students travel across the state borders to seek for information regarding the examination conduct. On successful completion of registration, students are expected to write the examination. It becomes a serious concern for both prospective parents and students to locate examination venues and seats. Students' information details are pasted at the institutions gates. Examinations run into late night and some prospective students missing out of the examination. Poor management of such information leads to crisis as the late display of information(venues, seat numbers, invigilators schedule) which may result to incidences of examination cancellations, students unrest and health challenges.

Graduates in search of academic transcript daily crowd the institutions examination and records division in search of academic records. Such records may be arranged academic sessions ago and becomes difficult for such records to be processed as it is poorly or misfiled within the available spaces with little or no labeling. What are the time limitations in generating transcripts? Why should records be difficult to retrieve and process for onward collection by graduates in search for further knowledge? Is there an adequate means of easy, faster and reliable way of transcript generation?

Departmental, faculty and school board meetings and project defense are regularly conducted information notices of meetings are printed and dropped in staffs information boxes in the department. The increased generation of information (notices, projects, conferences calls for papers, invitations and bulletins) makes this information often missed. Is there a way out of these challenges? Is there an appropriate feedback pattern to show notices are received? What if the proposed information receiver is unavailable (out of town, on official duties, vacation, attending to conference and personal matters) and has not visited the departments to check for messages?

This study aims at seeking the place of Information Technology in improving information management in Tertiary Institutions in Delta State, Nigeria. The statement of problem for this study is thus, how effective can adoption of IT in information management in our institutions to bring about effective management of information within and outside our campuses.

2.1 Research Questions

The following research questions were generated as a guide to the study.

1. What is the current state of information delivery in Tertiary institutions?
2. What are the consequences of adoption of IT in information delivery in HEI in Delta State?
3. What are the Perceived benefits of IT adoption in information management?
4. What are the current challenges of information delivery in Delta State higher education institutions?

5. What are the perceived solutions in overcoming the identified challenges of IT adoption in information management?

3. METHODS AND PROCEDURES

The study has adopted the Quantitative research method to seek ways to effectively manage information in institutions of Higher learning in Delta State, Nigeria. The study population comprised of all staff and students of state owned Tertiary institutions in Delta State of Nigeria (Universities, Polytechnic, Monotechnics and Colleges of Education). The stratified random sampling technique was used to select the study sample of 800 (eight hundred). 300 (three hundred) for University institution type, 200 (two hundred) of Polytechnic; 150 (one hundred and fifty) for Monotechnics and 150 (one hundred and fifty) for Colleges of Education. A structured questionnaire was developed from an earlier instrument used for a similar study (Edho, 2014). The instrument was modified by adding and removing unrelated items. The scoring order of Strongly Agree (SA) = 4. Agree (A) = 3. Disagree (D) = 2 and Strongly Disagree (SD) = 1 was used to collect the study data and analyzed using Mean scores ratings.

4. RESULTS

Results have been presented in line with the research questions raised for the study. They are presented in tables on the basis of the research questions.

4.1 Research Question One

What is the current state of information delivery in Tertiary institutions?

Table 1. Mean of Current state of Information Processing in Tertiary Education Institutions in Delta State Nigeria

S/N	Current State of information processing in Tertiary Institutions	SA	A	D	SD	Mean	Decision
1.	Files are arranged haphazardly within the limited available spaces	1288	477	84	76	3.21	Accept
2.	Overdependence on paper in information processing	1384	570	72	27	3.43	Accept
3.	Inadequate record keeping and transit and processed information	1268	480	118	63	3.22	Accept
4.	Slow rate of delivery of communicated message	1152	294	298	64	3.02	Accept
5.	There is an increase in population and generation of information in the school system.	1644	348	76	34	3.51	Accept

Table 1 presents the responses of the study sample to the current state of information processing of information in Tertiary institutions in Delta State, Nigeria. The mean values of the items were considered very high with the agreement level of 3.0. There is Increase in school population (3.51); inadequate record keeping of transit and processed information (3.22); slow rate of delivery of communicated message (3.02); haphazard arrangement of files within the limited spaces available (3.21) and overdependence on paper in information processing (3.43). All identified current challenges of information delivery in Delta State, Nigeria Tertiary institutions were agreed upon as no item was rejected. From the respondents' responses, the current state of information processing as itemized is a true state of the school system.

4.2 Research Question Two

What are the consequences of adoption of IT in information delivery in HEI in Delta State?

A summary of response as perceived by the respondents on the acceptance of technology is as shown in Table 2. The overall means of the 7 (seven) items (2.81) is less than the acceptance level of 3.00. This shows respondents rejected 5(five) of the 7 (seven) identified consequences of adopting IT in our school systems. Rejected items included that; traditional methods of communication is preferred to adapting IT(2.16);The adoption of technologies in communication is not determined by the structure of Higher Education (2.53); IT deployment doesn't outweighs the overall benefits (2.89), the change culture of Higher education is not dependent on adoption of technology (2.49). It was agreed that, IT adoption in communication process makes communication process more effective and reliable (3.33) and IT saves money invested in paper and storage spaces if fully adopted (3.39).

4.3 Research Question Three

What are the Perceived benefits of IT adoption in information management?

Table 2. Consequences of Technology Adoption in Tertiary Institutions

S/N	Acceptance of technology	SA	A	D	SD	Mean	Decision
1	IT makes communication process more effective/reliable	1300	567	86	42	3.33	+
2	IT is strategically important for achieving organizational goals and objectives in communication process	1020	351	270	92	2.89	-
3	Adoption of IT helps saves money invested in the process of communication through the reduction in paper and storage spaces	1352	567	76	34	3.39	+
4	The overall risk in deploying IT in communication outweighs the overall benefits.	964	519	124	123	2.89	-
5	The complexity of Higher Educational structures makes full adoption of IT in communication difficult	820	288	224	186	2.53	-
6	The institutional change culture is a factor for the slow adoption of new technologies	720	285	326	161	2.49	-
7	Traditional methods of communication are preferred to adopting technological communication tools	472	318	252	249	2.16	-

Table 3. Mean score of the Benefits of Adoption of technology in Communication process

S/N	Consequences of technology adoption	SA	A	D	SD	Mean	Decision
1	Faster rate of information delivery	1264	594	84	33	3.30	+
2	Better processing of information	1288	435	190	37	3.26	+
3	Reduction in the overall cost of managing information	1284	459	90	80	3.19	+
4	Adoption of technology in communication process will reduce the paper usage in Tertiary institutions in Tertiary Institutions	956	606	110	103	2.96	-
5	Reduction in manpower strength (Job)	392	396	178	280	2.08	-

Table 3 presents the responses to the research items designed for the question, what are the perceived benefits of IT adoption in information management. The consequences of technology acceptance include, faster rate of information delivery (3.30), better processing of information (3.26) and reduction in the overall cost of managing information (3.19). Respondents disagreed that; the consequences of technology adoption will reduce the manpower strength resulting in job losses (2.08) and a reduction in the paper usage in Tertiary institutions (2.96).

4.4 Research Question Four

What are the current challenges of information delivery in Delta State Tertiary Education Institutions?

Table 4 presents the perception of respondents on the designed current challenges of IT adoption in the effective management of information in Tertiary Institutions in Delta State, Nigeria. The respondents agree with the following as current challenges of IT adoption. Low computer culture (3.44); high cost in executing IT project (3.67), issues of limited and scarce funds (3.15), the overall dependence on consultants on executing projects (3.41), failed IT projects in the past (3.35), power supply (3.73). They disagreed that, people are skeptical in the

use of new technology (2.40), reliance on traditional best practices in doing things (lack of innovativeness) (2.93), lack of awareness on the importance of IT in communication and the challenges of manpower (2.91). The respondents agreed greatly to the challenges of full adoption of IT in Tertiary Institutions.

4.5 Research Question Five

What are the perceived solutions in overcoming the identified Challenges of IT adoption in information management?

Table 5 presents the respondents view of the perceived solutions of the identified current challenges of IT in Tertiary Education Communication processes. The respondents disagreed with the item that, the reduction in taxation of IT equipments will help solve the current challenges (2.75). Possible solutions include; setting realistic framework for accomplishments of IT projects (3.31), training and retraining (3.52), increased computer education(3.32), general reorientation of IT stakeholders (3.41), development of plans (3.39), reduction in the approval procedures (3.13), improvement in power supply and funding of alternative power sources (3.66) and proper monitoring and supervision of IT projects (3.42).

Table 4. Mean score of the Current challenges of IT adoption in communication in Tertiary Institutions

S/N	Current challenges of IT adoption in communication	SA	A	D	SD	Mean	Decision
1	People are generally afraid and skeptical in the use of technology.	596	411	230	198	2.40	-
2	Overall belief/reliance on traditional best practices in doing things	904	564	200	85	2.93	-
3	Increased incidences of computer aided crimes/activities	636	492	248	152	2.55	-
4	Low computer culture	1580	381	48	53	3.44	+
5	Electric Power supply	1912	282	26	14	3.73	+
6	High cost of connection to the internet	1568	414	56	41	3.47	+
7	General lack of awareness of the importance of IT in communication	664	351	288	172	2.46	-
8	High cost in executing IT projects	1920	186	68	23	3.67	+
9	Unrealistic/slippery deadlines in accomplishing IT projects	628	801	250	50	2.89	-
10	Institutions are not willing to invest the little fund available on IT projects	1232	483	84	87	3.15	+
11	Inadequate infrastructure/skilled manpower	868	558	240	76	2.91	-
12	Failed IT executed/implemented projects in the past	1380	486	92	46	3.35	+
13	Overdependence on consultants in executing IT projects/over expectations from IT solutions	1516	411	70	48	3.41	+

Table 5. Mean score of the Perceived Solutions to Identified Challenges of IT in Information Management in Tertiary Institutions

S/N	Perceived solutions to current challenges of IT in Communication	SA	A	D	SD	Mean	Decision
1	Realistic time frame for executing IT projects	1268	627	32	57	3.31	+
2	Development of project plans, feasibility study, risk management before any plan	1388	534	68	40	3.39	+
3	Training Training/retraining of IT personnel's	1720	255	94	37	3.52	+
4	Increased computer education	1288	567	250	40	3.32	+
5	Increased funding/budgetary allocations to IT projects	1304	357	250	29	3.24	+
6	General reorientation of all stakeholders on the importance of IT in communication	1312	609	110	13	3.41	+
7	Reduction in taxation of IT equipments for Tertiary Institutions IT projects	648	744	136	121	2.75	-
8	Reduction in the approval procedures for IT projects	948	681	224	23	3.13	+
9	Improvement in electric power delivery/improved funding of alternative power sources	1828	282	68	14	3.66	+
10	Proper monitoring/supervision/evaluation of IT projects	1588	306	114	43	3.42	+

5. DISCUSSION OF RESULTS

The study sought to investigate Technology adoption in the effective management of information in Tertiary Institutions in Delta State, Nigeria. The results of the study point to the fact that, tertiary institutions are great producers of information. The over-dependence on paper in processing of information has brought the dire need for improved storage spaces. There is a slow rate of delivery of communicated information especially with institutions operating multi-campus school system. The distances running into tens of kilometres have made the delivery of information at a slow pace.

Adoption of IT in communication process will make information transfer "faster than the speed of light". This is in agreement with [5] "IT is a powerful tool for communication and economic growth". The study revealed that files are haphazardly arranged within the limited available spaces in our campuses. This poor and haphazard arrangement of files is a concern for information management with the rising need for generation of information in the school system. [12,13,14] pointed at different times that, record kept by Nigerian Universities, Tertiary Institutions acquisition policy, methods of preserving and disseminating them are faulty. IT deployment in information generation, processing and preservation will help solve the faulty nature of record management in our school system.

Technology acceptance in the school system should be borne by the need to improve standards in communication while maintaining organizational goals. The results of the study showed that the understanding of the awareness of technology, its benefits, and consequences of its adoption must be fully comprehended. The benefits of adoption of technology in our school system will include; faster rate of delivery of information, better processing of information, reduction in the overall cost of managing information and the reduction in paper and storage spaces.

The study revealed that there are currently challenges affecting the full adoption and deployment of IT in institutions communication process. The challenges include; power supply as a main problem for effective use of IT in communication. Millions of Naira is spent monthly from scarce and inadequate funds by Institutions in attempting to provide alternative sources of power in running noisy generators. This is in agreement with [15] "DELSU (Delta State University, Abraka-Nigeria) spends 13 (thirteen) million naira monthly in running generator in one campus". For a system to be fully ready for IT adoption, electricity (national power, alternative source of power-generator, solar, inverters) must be in place.

The study respondents agreed on the need of adoption of technology tools in management of

information in Tertiary Institutions. Advances in Technology have brought about information and communication revolution leading to fundamental changes in the way information is collated, communicated and stored. Memos are written, bulletins are printed, Senate proceedings are produced for all attendees running into volumes of sheets of papers, results are prepared, corrected and re-corrected utilizing a deal of reams of papers. The agreed IT tools are: telephones (mobile calls), SMS (text messaging), social networking (Facebook, Twitter), Website, internet, E-radio (electronic radios), e-mail (electronic mail), Video conferencing. There should be a shift from the current traditional communication procedures in Tertiary Institutions to technology processes which affords better feedback as [13] identified the selection of proper channel to convey messages with appropriate feedbacks in the communication process.

The overall dependence on consultants in executing IT projects and over-expectations from IT solutions, unethical practices of IT professionals, training, low computer culture, funding, high cost of connection to the internet and purchases of equipments, slippery deadlines for IT projects are identified as challenges to full adoption of Technology in Tertiary Institutions. These agree with the views of [3,16,17,9] on identified challenges of full adoption of IT processes.

The world has developed fully into a global driven village backed by technology usage where information sourcing is done at the click of the computer mouse or mobile phones. World institutions ratings are determined by a number of criteria including the availability of the information of the institutions on the web (website). Full adoption of technology in information management in the school system is a path towards gaining improved global institution ranking in years to come. This is in agreement with "if the Web performance of an institution is below the expected position, it will be ranked low" [18]. Web presence which is increased with full adoption in Tertiary Institutions will improve the rankings of the institution in the global league of educational Institutions.

The perceived solutions to the identified challenges in information management in Tertiary Institution include ; setting realistic time frame for executing IT projects, training and retraining of IT personnel's, increased computer education, increased funding and budgetary

allocation, improvement in power delivery and improved funding of alternative sources of power, reduced procedures for approval of projects, proper monitoring and supervision of IT projects and less dependence of consultants in executing projects. The study perceived solutions are in line with [3,15,13,17,9].

6. CONCLUSION AND RECOMMENDATIONS

Tertiary education in Nigeria is the highest education level and the third level of education coming after full completion of the Secondary level of education. There is increased generation of information in the school system attributed to a number of factors including the increased students' population as a result for the attainment of higher knowledge. The flow of information in the system is determined by the management structure of the institutions.

The overall consequences of deployment of Technology (IT) in the management of information cannot be ignored. The enormous challenges of technology adoption as seen in the study have countermeasures and solutions to them. The gains of tapping into the ever increasing tools of IT in meeting the identified needs and peculiarities of communication in the institutions will make information spread global. Adoption of IT is used to solve the identified challenges of information.

In view of the findings of this study, the following recommendations are proffered:

- With the limited available resources for management of institutions, allocations should be made to IT projects.
- Paperless system of information management should be adopted in the school system.
- Technology should not be seen as power to solving problems of the organization but as a tool to realizing a solution.
- Institutions should source for cheaper alternatives to electric power supply.
- Government at all levels should reduce taxes imposed on the importation of IT equipments and mark them as educational uses to reduce the price of purchasing them.
- Institutions should have technical knowledge of the tool to be deployed and the relevance of the tool/solution in solving the needs. The desired state in any

technology deployment should be improvement in the state of the process before its deployment.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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