Challenges of Massive Application of Information Technologies in Niger Delta Universities in Nigeria

(Pp 365-373)

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Abstract
Effective diffusion of information technology and related initiatives in African Universities is hindered by various barriers. The paper investigated the challenges of massive application of information technology (IT) in Niger Delta universities in Nigeria. The research design was survey design, while the population consisted of lecturers from four federal universities in Niger Delta region of Nigeria. A sample of 654 (males 370 (56.6%); females 284 (43.4%) lecturers was selected through the use of stratified random sampling technique (each university forming a stratum from which the sample was randomly selected). The researchers prepared an 18- item instrument called "Information Technologies Application Questionnaire" for use in data collection, using 4-point Likert-scale response format of strongly agree, agree, disagree, and strongly disagree. The instrument yielded a reliability coefficient of .75, using Kuder-Richardson 21 formula. Independent t-test and Multiple Regression analysis were employed in analysing data. Findings showed that there is significant influence of human capital, infrastructural and institutional factors (t_{ob} = 8.40, 7.87, 8.06 respectively at .05). Research report of joint influence of the challenges indicated that all the variables exerted significant influence on massive application (i.e. on low utilization)

of IT in the Universities, with poverty and poor internet access leading the rest. It was recommended that identified barriers should be urgently and aggressively addressed; while universities should be equipped with necessary IT facilities and equipment alongside instituting viable interconnectivity within and amongst the institutions for productivity and effectiveness.

Keywords: Challenges, diffusing, IT educational initiatives, Nigeria

Introduction

The importance of information technology (IT) as the driving force behind modern organizational productivity, efficiency and performance effectiveness in all areas of development including education has been acknowledged by the National Policy on Education (FRN,2004) and the Millennium Development Goals (Bassey,2008). In reacting to the demands of the Millennium Development Goals (MDGs), the Federal Government of Nigeria launched a national computer literacy program in the late 1990s which made Nigeria rank sixty-ninth as provider of quality IT education in the world (Onuoha, 2007). In 1995 the National Universities Commission embarked on a project to link all federal tertiary institutions in a countrywide electronic network named Nigeria Tertiary Institutions Network (NUNet) with the aim of establishing interconnectivity among the institutions (p.128). Nigeria has a national policy for IT with thirty-one objectives emphasizing the need for wealth creation, poverty eradication, job creation, harnessing IT-educational initiatives and global competitiveness (Falade, Ojo & Oketunbi, 2007). In the field of education, Bassey, Okodoko and Akpanumoh (2008) argue that IT-educational initiatives are indispensable in effective teaching and learning of full-time, part-time, off-campus and distance education students. Information Technology is said to be important in designing research, implementing experimental and descriptive studies, statistical analysis, data production and dissemination of research information (p.6). Also, records of students, staff and accounts of our universities including periodic information reports for all units could be made readily possible through the use of electronic Management Information System (Alabi, 1994).

In spite of the avouched merits of adopting and applying relevant IT-educational initiatives in the universities and the efforts of government and National Universities Commission (NUC), it is disheartening to observe that the level of IT application in higher institutions is still very low in 21st century Nigeria. Various barriers and challenges operate as inhibitors of

large-scale and massive application of IT in these institutions. Tella (2007, p.94) identified difficulty in motivating faculty, inadequate equipment, absence of IT policy, poor attitude of staff, inadequate computers, and problem of connectivity to off-campus students. Jagboro (2003,p.316) reported low level of internet/computer outlet, high cost of cyber café facilities, substantial online learning resources, inadequate funds and facilities, faculty compensation for teaching online, and faculty's unwillingness to use IT for lack   of skill on the part of staff and students. Other inhibitors investigated at University of Port-Harcourt included lack of computer and computer knowledge, inadequate facilities/equipment at IT centres, irregular power supply, absence of alternative source of power, expensive nature of IT facilities, and lack of will-power by management to fully embrace IT revolution (Okorie, Agabi & Uche, 2005). Also, the findings of United Nations ICT task force (2004) and UNPAN (2005) have categorized these barriers broadly under three headings, namely: infrastructural, institutional and human capital factors. Infrastructural barriers take the forms of poor internet access, low bandwidth, high cost of IT services, lack of investments in IT, and poor power generation; institutional barriers are the presence of overt and covert resistance from management, staff/students' awareness problems and general organizational problems; while human capital factors are found in poverty, low literacy levels, poor IT skills and poor technical ability (Bassey, Okodoko & Akpanumoh, 2008). The problem of study, therefore, was to determine the nature and level of challenges posed by each of the three classes of barriers to massive application of IT-educational initiatives in Niger Delta universities. Four federal universities (Benin, Calabar, Port-Harcourt, Uyo) were investigated.

Theoretical Model
Information technology (IT) models evolved from classroom replication towards models that integrate administrative and pedagogical issues. Content, service and technology IT model (Ike-Obioha, 2007) believes that IT went through a hypercycle triggered by technology expectations and technology vendors. It only slumped into a trough of disillusionment when the realities of IT became clear - educators and learners have not embraced IT-educational initiatives as expected and desired learning outcomes are not being achieved (Logan, 2001). It therefore seems apparent that massive adoption and application of IT in Nigerian universities is awaiting a warm embrace to be given to the revolution by management, staff and students of our higher institutions.

Hypotheses

To guide this study, three null hypotheses were postulated and tested:

1. Human capital factors have no significant influence on massive application of IT in Niger Delta universities.

2. Infrastructural factors have no significant influence on massive application of IT in Niger Delta universities.

3. Institutional factors have no significant influence on massive application of IT in Niger Delta universities.

Methodology

The research design for this study was survey design. The subjects of study and hence the population consisted of lecturers from four federal universities in the Niger Delta region of Nigeria. A sample of 654 (male 370 (56.6%); female 284 (43.4%) lecturers was selected using stratified random sampling technique (700 lecturers were selected out of which 654 returned the questionnaires correctly completed). Each university formed a stratum from which the sample was randomly selected. The main instrument for this study was the Information Technologies Application Questionnaire (ITAQ), an 18-item questionnaire designed by researchers using four-point Likert-scale response format of strongly agree, agree, disagree, and strongly disagree. They elicited information on human capital, infrastructural and institutional barriers. The instrument was face-validated by three lecturers in measurement and evaluation in the faculty of education, University of Uyo and pilot tested with 100 lecturers from two Niger Delta universities that were not part of the main study. A test of its reliability, using Kuder-Richardson 21 formula yielded a reliability coefficient of .75. The instrument was administered by the researchers with the help of research assistants – three lecturers co-opted for assistance in each university. Data obtained were analysed using independent t-test statistics and Multiple Regression analysis. All the hypotheses were tested at .05 level of significance. See the results in Tables 1, 2, 3 and 4.

Results

Hypothesis 1: Human capital factors have no significant influence on massive application of IT in Niger Delta Universities. In order to test this hypothesis, independent t-test statistics was done and the result is on table 1.

The test in Table 1 resulted in a t-value of 8.40. This is higher than the critical value of 1.98 with 653 degrees of freedom at an alpha level of .05.

The null hypothesis was therefore rejected. This means that human capital factors have significant influence on massive application of IT in Niger Delta universities.

Hypothesis 2: Infrastructural factors have no significant influence on massive application of IT in Niger Delta Universities. In order to test this hypothesis, independent t-test statistics was done and the result is on table 2.

Table 2 indicates that the calculated t-value (7.87) was greater than the critical t-value of 1.98, with 653 degrees of freedom at .05 alpha level. The null hypothesis was abandoned. This suggests that infrastructural barriers exercise significant influence on massive application of IT in Niger Delta universities.

 Hypothesis 3: Institutional factors have no significant influence on massive application of IT in Niger Delta Universities. To test this hypothesis, independent t-test statistics was employed. The result is shown on table 3.

The computed t-value of 8.06 is greater than the critical t-value (1.98) at .05 alpha level and 653 degrees of freedom. Consequently, the null hypothesis was dropped. This implies that institutional factors exert significant influence on massive application of IT in Niger Delta universities.

Table 4 shows that all the six variables (human capital 1,2; infrastructural 3,4; institutional 5 and 6) exercise significant influence on massive application of IT in Niger Delta universities. Again, the computed F (4.200) is greater than the critical F (2.21) with 649 degrees of freedom and .05 level of significance. Hence, there is joint significant factors influencing massive application of IT in Niger Delta universities. The value of R^2 (21.44) implied that the six variables jointly contributed 21.44% to the variation in massive application of IT. Poverty (Beta = .199) and organizational problems (Beta .080) contributed highest and least, respectively, to massive application of IT. The values of t were significant indicating that all the six variables made significant influence on poor utilization of IT by the university publics.

Discussion of Results
The findings of this study showed that there is significant influence of human capital, infrastructural and institutional factors on massive application of IT in Niger Delta universities (t_{ob} = 8.40; 7.87; 8.06, respectively). Researchers in support of this report included Jagboro (2003), Tella (2007) and Otakhor (2008). Some of the reasons adduced for low level of IT utilization by university staff and students were low level of connectivity, high cost of

cyber café facilities, inadequate funding, poor attitude of staff, lack of IT policy, irregular power supply and absence of alternative source of power (Bassey, Okodoko & Akpanumoh, 2008). Also in support are the research reports of G8 DOT Force (2001), United Nations ICT task force (2004) and UNPAN (2005) on challenges facing African universities in massively adopting and applying IT-educational initiatives. The challenges were grouped as infrastructural, institutional and human capital barriers.

The research report of joint influence of human capital, infrastructural and institutional barriers suggested that all the variables exerted significant influence on massive application of IT in Niger Delta universities (R^2 = 21.44) (see table 4). The research findings of United Nations ICT task force (2001) and UNPAN (2005) are in line with this report. It was also observed that all the six variables made significant influence on low utilization of IT in the Universities, with poverty and organizational problems contributing the highest and lowest (Beta .199; Beta .080) respectively.

Conclusion and Recommendations

Based on the findings and data analysis, it was concluded that the three groups of barriers (human capital, infrastructural, institutional) significantly influence massive application of IT in Niger Delta universities, with poverty and poor internet access exerting greater influence on low IT usage than the other four variables.

In line with the foregone analysis, it was recommended that:

The identified classes of barriers to massive IT-usage should be vigorously pursued and addressed by the government and relevant authorities, especially those factors that fall within the purview of MDGs of the United Nations. Effective management and prosecution of the MDGs will solve most of the challenges, since all the barriers under human capital and most barriers under infrastructural factors are covered within the scope of the MDGs.

All federal universities should come up with viable IT policies framed to cater for the peculiar developmental needs of each institution. It might be necessary to establish IT as a distinct department or IT office under the Vice Chancellor's office. Staff and students should be given periodic training on use of IT. Departmental and faculty offices should be equipped with computers, while staff (both teaching and non-teaching) should be assisted to own laptops or personal computers. Interconnectivity should be established in university offices, libraries, research and distance education units (Egboka, 2008). Viable electronic management information system (MIS) should be

instituted, e-teaching and e-learning classrooms should be established, web-based portals for delivering integrated computer services are indispensable, viable cyber café with facilities for internet and other services alongside alternative source of power and viable IT maintenance units are needed in the universities, if massive IT application and increased productivity should become a reality.

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Table 1: t-test Analysis of Influence of human capital factors on massive application of IT in Niger Delta universities

Variables	Σ	Σd^2	df	f
Human Capital Factors	-12164	2323018	653	-8.40*
Massive Application of IT technologies				

*Significant $p < .05$; N = 654

Table 2: t-test Analysis of Influence of infrastructural factors on massive application of IT in Niger Delta universities

Variables	Σd	Σd^2	df	f
Infrastructural Factors	-13080	3023111	653	-7.87*
Massive Application of IT technologies				

*Significant $p < .05$; N = 654

Table 3: t-test Analysis of Influence of institutional factors on massive application of IT in Niger Delta Universities

Variables	Σd	Σd^2	df	f
Institutional Factors	-13734	3186203	653	-8.06*

Massive Application of IT technologies

*Significant p< .05; N = 654

Table 4: Multiple Regression Analysis of joint influence of human capital, infrastructural and institutional factors on massive application of IT in Niger Delta Universities

S/N	Variables	Beta	SE	t$_{ob}$
	(Human Capital)			
1.	Poverty	.199	.040	8.40*
2.	Poor IT skill	.081	.038	7.87*
	(Infrastructural)			
3.	High cost of ICT services	.146	.078	8.06*
4.	Poor internet access	.185	.040	8.39*
	(Institutional)			
5.	Organizational problems	.080	.030	7.30*
6.	Awareness problems	.142	.040	8.09*
Multiple R	=	.463		
R Square	=	.2144		
Adjusted R Square	=	.2141		
Standard Error	=	.422		

ANALYSIS OF VARIANCE

Source of Variance	df	SS	MS	F
Regression	5	5632.32	1126.46	4.200*
Residual	649	174043.82 268.11		

*Significant p< .05