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Adoption of Emerging Technologies by Digital Immigrants in Academia: Evidence from Selected Universities in Edo State Nigeria

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Abstract

Purpose: The study investigated adoption of emerging technologies by digital immigrants in academia in two selected Universities in Edo State Nigeria.

Methodology: The study adopted a descriptive survey research design. Questionnaire was used to elicit responses from the respondents. A sample size of 250 respondents was drawn from a population of 2289 academic staff in two universities in Edo state using random sampling technique. A total number of 250 copies of the questionnaire were administered while 238 copies were retrieved and found usable for analysis.

Findings: Findings revealed that the majority of the respondents were in the age bracket of 41- 50 years and above, this justifies that majority of the teaching staff of the universities studied belong to the older generation and as such, they are classified to be digital immigrants. The findings also show that the respondents possess personal electronic devices such as, desktop, laptops, printers and scanners, tablets and so on, use them towards making themselves relevant in the 21st century workplace. Absence of no fee-based internet facilities on campus, lack of management involvement in maintenance of emerging technologies owned by staff, resistance to change of teaching method to ICT-Based, inadequate ICT Infrastructure/lack of modern lecture halls, age of lecturers etc. were the major challenges of digital immigrants.

Originality/Value: the study concludes that, for digital immigrants to completely adopt emerging technologies, the challenges this study revealed should be addresses by University administrators. Subsequently, the University managements should make and enforce policies/laws either to fully "adopt ICTs by digital immigrants or perish in the academia".

Keywords: Emerging Technologies, ICTs, Digital Immigrants, Academia

Paper type: *Empirical research*

Introduction

Emerging technologies such as Information and Communication Technologies (ICTs) has made a laudable mark in all aspects of higher education in Nigeria. The academicians are predicted to work and pay more attention to students through the use of ICTs in creating autonomy and atmosphere of independence in the teaching, learning and research process. Therefore, there is gain saying that the teachers and students' relationship in communication process have also changed with new innovations and improvements taking advantages of the ICT tools for interactions.

In addition, teachers or trainers of today's students realize at some point that do not understand how many young students learn, or at least how they prefer to learn. Most do not analyze and articulate this realization. Few resolves to understand the apparent communication gap, and fewer still attempt to bridge it. Prensky define the gap when he posited that someday the educational system (primary, secondary, and tertiary) may utilize pedagogies very different from those developed for the Industrial Age model of education, which in many ways is still used today, he went further to add that unless the language gap between the digital natives and immigrants is closed, or at least narrowed, it is possible that the greater part of teaching efforts will be misdirected and ineffective, that organization's resources, whether teaching in formal education or in the workplace (Barnes, Ferris, & Marateo, 2007, Bennett, Karvin, & Maton, 2008; Rikhye R, Cook S. & Berge Z.L 2009).

According to Wang, Myers, & Sundaram (2012), digital immigrants are older and often less proficient users of technology. Therefore, digital immigrants in the academia are described as teaching staff eloquence with technology based on their age and status as it relates to workplace in the area of teaching, learning and research. The single biggest problem facing education today is that our Digital Immigrant instructors in the academia who speak an outdated language (that of the pre-digital age), are struggling to teach a population of students that

speaks an entirely new language. Digital Immigrants in the academia assume that learners (students) are the same as they have always been, and that the same methods that worked for the academia when they were students will work for their students now. But that assumption is no longer valid, he went further to state that Digital Immigrants instructors make their education not worth paying attention to (Prensky, 2001).

Finally, ICT is considered a powerful tool for educational change and reforms. The ICT tools expected to be adopted my digital immigrants for pedagogical activities include: computers, projectors, digital cameras, iPad, pen drive, scanner, microphones, DVD/CDs, tablets, iPod, computerized education software etc. If Digital Immigrants educators really want to reach all their students in this digital era, they will have to fulling adopt ICT tools mentioned above, learn the skills, change their teaching methodology and tools to encourage the university administrators support them in making available the ICT infrastructures and facilities. Therefore, there is urgent need for the digital immigrants in academia to possess the desired skills in completely adopting and use ICTs in their workplace. In spite of the benefits ICTs brought to the University environment most academicians are not comfortable using them for academics, the potentials it offers are seen not to be adequately harnessed. It is against this backdrop that study was conducted to investigate the adoption of emerging technologies by digital immigrants in academia: evidence from selected universities in Edo State - Nigeria.

Objectives of the Study

The ultimate aim of this research is to investigate the adoption of emerging technologies by digital immigrants in academia: evidence from selected universities in Edo State - Nigeria. The specific objectives include to:

i. find out the available ICT tools/facilities and personal digital devices owned by digital immigrants in the academia;
ii. establish the tools use by digital immigrants in preparation for teaching;
iii. determine the level ICT tools enhance digital immigrants' preparation for teaching;
iv. know the challenges experienced in using ICT tools by digital immigrants in the academia.

Research questions

The following questions were formulated from the objectives to guide the study.

1. What are the available ICT tools and personal digital devices owned by digital immigrants in the academia?
2. What is the major tools use by digital immigrants in preparation for lectures and teaching?
3. Does ICT tools enhance digital immigrants' preparation for teaching?
4. What are the challenges experienced in using ICT tools by digital immigrants in the academia?

Literature Review

Several studies have been conducted on the adoption of ICTs in higher institutions, but the study of Mereku, et al. (2009) cited in Obiri-Yeboah K., Kwarteng K. O & Kyere-Djan R. (2013) on Ghana's Report on ICT reveals that, availability of ICT syllabuses/manuals, ICT teachers who are willing to provide educators and availability of computers and computer laboratories that can be accessed periodically are some of the factors that encourage the usage of ICT in tertiary institutions. In the same vein, the study by Goyal, et al. (2010) also revealed that, ease of availability of ICT, upgrading teacher's ICT skills, convenience (time and place), time to upload and download (speed), improving communication between students and teachers, reliability of ICT, data security, availability of specialized IT teachers, availability of educational software, improving the presentation of the subject, providing encouragement to teachers to use technology in their teaching more often, ease of navigation of the course content through an ICT device, financial readiness of the institute to support ICT and learners with training are other factors that encourage the use of ICT. Furthermore, Shaikh and Khoja (2011) recommends ways to improve ICT usage in tertiary institutions to include: provision of ongoing staff training in developing ICT skills; generating consistent finances to support ICT use over the long-run; developing a systemic and politically committed method of implementation of robust, effective, and target-oriented ICT policy; adequate provision of technological resources; modifications in current higher education ICT curricula while emphasizing both theoretical and practical uses of ICT and piloting the chosen ICT-based higher education model.

Some of the strategies for promoting technology in education include the rapid deployment of ICT infrastructure, training of teachers to use ICT and the provision of varied learning resources and services

According to KENET, (2008) cited in Odongo T. A. M. (2011). ICTs enhance the quality of teaching and learning, research productivity of faculty and

effectiveness of universities.

Higher education institutions should be highly computerized, and all lecturers should be able to use ICT facilities to enhance their working methods (Ololube, Kpolovie & Makewa, 2015).

Ehikahamenor (2002) cited by Kpolovie, P. J. & Awusaku, O. K. (2016) indicates that ICTs are altering the ways in which academics hunt for information, communication with each other, conduct research and dispense research results. All these point to the fact that information and communication technology are very vital for effective teaching, learning and research activities in an academic setting. Darkwa and Anao in Umeagwu and Etu (2014) underlined the impact of ICT on the tertiary institution as improving both academic and business research by university and polytechnic lecturers and students. ICT has disentangled the problem of the task of the university and polytechnic lecturers with the current state of severe shortage of academic facility and staff facing our tertiary institutions. ICT could be leveraged through video conferencing so that students on various campuses pursuing the same or similar academic programmes could be connected at the same time to benefit from a lesson which they lack lecturers (Kpolovie, 2010a; Tomie, 2014: Kpolovie, et-al 2016)

The ICT adoption equally offers researchers with a ready opportunity for the dissemination of research reports and findings. Publication outlets include e-books, e-journals or through personal Websites. ICTs provide ready means for production of research reports. Furthermore, digital video, audio, software simulation, synchronous and asynchronous chats and interactive software, among others, bring vitality in describing a method or reporting result but are virtually not employed in Nigerian higher institutions of learning (Ololube, Umunadi and Kpolovie, 2014). Functional platforms for delivery of Massive Open Online Courses (MOOCs) are yet to be developed in Nigeria (Kpolovie & Iderima, 2016).

According to Achimugu, Oluwagbemi, Oluwaranti and Afolabi (2009) cited in Kpolovie, & Awusaku (2016) the adoption of Information and Communication Technology in the developing countries is one of the most demanding recent developmental issues.

Kpolovie, P. J. & Awusaku, O. K (2016) Lecturers' adoption of ICT in teaching and research could be a direct function of Technology Acceptance Model (TAM). Kpolovie, & Awusaku (2016) studied ICT adoption attitude of lecturers and found lecturers were weaker in ICT adoption vis-à-vis their students just as the current study has conclusively shown that younger and less experienced lecturers have an than older and more experienced lecturers in both federal and state universities in Nigeria. The institution of ICT in the delivery of the core services of teaching and research by universities clearly changed the way higher that education is executed (Ololube, et-al 2015).

Emerging ICT tools includes technologies such as desktop and laptop computers, software, peripherals and connections to the Internet that are intended to fulfill information processing and communications functions (Statistics Canada, 2008: Idiegbeyan-Ose J, Idahosa M & Adewole-Odeshi E 2014).

Many challenging factors have been identified as hindrances to the adoption of ICT in universities. Rogers (2003) cited in Obiri-Yeboah et-al (2013) indicates that, "Technological innovations are not always adopted rapidly, even when the innovation has proven advantages". Rogers went further to identify five innovation characteristics that influence the decision to adopt innovation as: relative advantage, compatibility, complexity, trialability, and observability. He believed that when an innovation is perceived by users as having greater relative advantage, compatibility, trialability, observability, and less complexity, the innovation will be adopted more rapidly. The view above corroborates the Technology Acceptance Theory (TAM) that "perceived usefulness, perceived ease of use, attitude toward using ICT and behavior are factors that influence the use of technology".

Goyal et al. (2010) reveals the following as barriers for ICT usage which leads to very low satisfaction levels for them. These are: all courses at the institute to have a course website, availability of a National Government Policy to implement ICT in the institute, providing library reserves electronically, policy to evaluate the effectiveness of the ICT use, time to upload and download (speed), mandatory technology courses such as MIS for all students/teachers, technical support to use ICT at the institutional level, better collaboration among teachers using online discussion boards, availability of resources to promote ICT usage".

Olutola & Olatoye (2015) affirm that one of the challenges of ICT adoption by digital immigrants is their inability to assist the students develop the ability and knowledge necessary to make them use these technologies effectively. Other challenges are:

i. Inadequate security for universities Cyber Café,

ii. Inadequate e-learning experts or manpower to train both the staff and the students,

iii. Internet facilities adopted in most universities are not functioning very well,

iv. Hardwares used for e-learning classes are costly and some universities cannot afford it,
v. Inadequate supply of electricity to e-learning centre's for effective teaching and learning,
vi. Inadequate funding of the universities to purchase emerging technologies and
vii. Inadequate laptops or computers for both the students and lecturers (Olutola & Olatoye 2015).

Ololube (2006) cited in Tella (2011) submits that many Nigerian lecturers have been unable to find effective ways to use emerging technologies in their classrooms or any other aspect of their teaching and learning life. The possible explanation for this lack of success by university teachers is not only that the use of technology in the classroom has not been encouraging but there is no adequate trained and retraining programme in using ICTs in teaching as a means for educational sustainability, the slow access to basic ICT equipment, low internet connectivity and computers, and the inadequacies in the use of audiovisual materials and equipment including films, slides, transparencies, projectors, globes, charts, maps, bulletin boards, plus programmed materials, information retrieval systems, and instructional tech board in teacher education programmmes are barrier to the effective and professional development of lecturers in Nigeria.

Although ICT holds great potentials in supporting and augmenting existing educational as well as national development efforts in Nigeria, several challenges remain. These challenges include: Resistance to change from traditional pedagogical methods to more innovative; technology-based teaching and learning methods by both students and academics; the attitudes of various managements in and outside institutions towards the development of ICT related facilities such as the Internet and procurement of computers is rather slow; Inadequate ICT infrastructure including Computer hardware and software and bandwidth/access; Lack of qualified ICT personnel; Most institutions lack computer literate teachers and ICT experts that would support and manage the Internet connectivity and/or application of computing in the teaching-learning process etc. (Albirini, 2006: Idowu A.I and Esere M 2013).

Teachers (digital immigrants) related barriers was identified by Jegede (2009) and summarized as: Lack of knowledge or competence; Lack of confidence; Fear for change; Lack of training; and Age. The study of Abukari, (2016) also found that Lack of knowledge about computers, Inadequate LCD projectors in the classroom; Lack of ICT capacity building to lecturers; Age of lecturers; Lack of confidence; Lack of Management pressure on lecturers to use computers for teaching and learning; Computers are not accessible; Fear for change; Lack of previous ICT knowledge; Insufficient technician support if something goes wrong with the computers; Not sure how useful computers are; The myth that computers are unreliable to be the major challenges of lectures adopting and using ICTs.

RESEARCH METHODS

This study adopted descriptive survey research design. The population of this study consisted of all academic staff in the University of Benin, Benin City and Igbinedion University, Okada. The breakdown of the population is indicated in Table 1.

Institution	**Number of Academic Staff**
University of Benin	1889
Igbinedion University	400
Total	**2289**

From the population indicated in Table 1, a sample size of 250 (10.9%) respondents was drawn using random sampling technique. The questionnaire was the major instrument used to elicit data from respondents, who were academic staff of University of Benin and Igbinedion University.
The relevant data collected was analyzed using qualitative statistics to reach a conclusion through presentation of data in tables and analyzed with the aid of simple percentages and frequency.

PRESENTATION OF RESULTS

Two-hundred (250) copies of the questionnaire were administered to academic staff in University of Benin, Benin City and Igbinedion University, Okada both in Edo State. Two hundred and thirty-eight (238) respondents filled and returned their questionnaires, and they were considered good for analysis. Hence, the return rate was 95.2% return rate.

Demographic information

Table 2: Age Distribution of Respondents

S/N	Age	Number of Respondents	Percentage (%)
1.	21-30	14	5.9
2.	31-40	22	9.2
3.	41-50	104	43.7
4.	Above 50	98	41.2
	Total	**238**	**100**

Table 2. shows the age distribution of respondents. The table revealed that, the ages between 41 and 50 years and above constituted the majority of the respondence 41-50 104(43.7%) and above 50 years 98(41.2%) respectively. It can therefore be concluded that the majority of respondents were between the age bracket of 41-50 years and above. This shows that the majority of teaching staff of the universities studied belong to the older generation and as such, they are classified to be digital immigrants.

Table 3: Qualification of Respondents

S/N	Highest Qualification	Number of Respondents	Percentage (%)
1.	Master's Degree	109	45.8
2.	PhD	129	54.2
	Total	**238**	**100**

Table 3 shows the highest qualifications of respondents; more respondents have PhD as their highest than Master's degree. This finding could help predicts the expected high level of teaching and research.

Table 4: Available ICT tools

S/N	ICT Infrastructure	Number of Respondents	Percentage (%)
1.	Desktop Computer	238	100
2.	Projector/Screen	212	89.1
3.	Laptop	107	44.9
4.	Printer	238	100
5.	Scanner	206	86.5
6.	Photocopier	27	11.3
7.	iPads	53	22.3
8.	iPod	53	22.3
9.	Pen drive	53	22.3
10.	Voice projection system	187	78.5
11.	Digital Camera	28	11.8
12	Tablets	80	33.6

From 4, it is glaring that the major ICTs such as desktop computers, laptops, printers, scanner and projectors/screen, tablets and others were available.

Table 5: Personal ICT Tools Owned by Digital Immigrants in Academia

S/N	ICT Devices	Number of Respondents	Percentage (%)
1.	Desktop computer	39	16.4
2.	Laptops	206	86.5
3.	iPad	91	38.2
4.	Tablets	229	96.2
5.	Projector/screen	14	5.9
6.	Printer	197	82.7
7.	Scanner	128	53.8
8.	Photocopy machine	39	16.4
9	Camera	71	29.8

From 5 indicates that digital immigrants in tertiary institutions in selected universities possess personal electronic devices such as, desktop, laptops, printers and scanners, tablets etc. this make them relevant in the 21st century workplace.

Table 6: Tools Used by digital immigrants in Preparing for Lectures

S/N	Tools	Number of Respondents	Percentage (%)
1.	Desktop computer	78	32.8
2.	iPod	43	18.1
3.	Laptop	176	73.9
4.	Tablets	176	73.9
5.	iPad	141	59.2
6.	Printer	42	17.6

Table 6 shows that majority of the respondents use laptops, tablets, iPad and printer when preparing for lectures.

Table 7: ICT Tools Used by digital immigrants for Teaching

S/N	**ICT Infrastructure**	**Number of Respondents**	**Percentage (%)**
1.	Projector/Screen	212	89.1
2.	Printer	27	11.3
3.	Laptops	238	100
4.	iPads	53	22.3
5.	IPod	53	22.3
6.	Pen drive	53	22.3
7.	Voice projection system	187	78.5
8.	Digital Camera	28	11.8
9.	Tablets	80	33.6

Obvious from Table 7 is the fact that the majority of respondents do not incorporate the use of ICTs in the process of teaching and learning. Based on the level of availability of the projector as indicated in Table 5, it would be expected that majority will deploy its use in teaching and other devices.

Table 8: How ICT Tools Enhance digital immigrants' preparation for teaching and research

S/N	Tools	Number of Respondents	Percentage (%)
1.	To acquire information	208	87.4
2.	For classroom instructions	232	97.5
3.	To store information	238	100
4.	To retrieve information	238	100
5.	To disseminate information/knowledge	147	61.8
6.	Promotes research activities with students	238	100
7.	Facilitates collaborative research	238	100
8.	Course preparation	176	73.9
9.	Personal motivation	203	85.3
10	Seminar presentations	238	100

Table 8 Reveals that the responded have proper disposition about the potential's ICT tools offers, that the use of ICT tools enhances digital immigrant's information management skills, promotes individual and collaborative research, provides personal motivation, help in seminar presentations as well as assist them in course preparation etc.

Table 9: Challenges Experienced in Using ICT Tools by Academic Staff

S/N	Challenges	Number of Respondents	Percentage (%)
1.	Resistance to change of teaching method to ICT-Based	214	89.9
2.	lack of incentives/special allowance from the management for emerging technology associated hazards	195	81.9
3.	Age of lecturers	199	83.6
4.	Fear of Job loss if emerging technologies are fully adopted	174	73.1
5.	Little or no skills to cope with the	198	83.2

	emerging technologies		
6.	Lack of management involvement in maintenance of emerging technologies owned by staff	216	90.7
7.	Absence of workable national policy on emerging technology	157	65.9
8.	Irregular Power supply	176	73.9
9.	Inadequate ICT Infrastructure/lack of modern lecture halls	203	85.3
10	Absence of no fee-based internet facilities on campus	238	100

Table 9 shows the challenges faced by respondents when using the emerging technologies .The major challenges according to the responses given by respondents are: Absence of no fee-based internet facilities on campus 238 (100%), Lack of management involvement in maintenance of emerging technologies owned by staff 216 (90.7%), Resistance to change of teaching method to ICT-Based 214 (89.9%), Inadequate ICT Infrastructure/lack of modern lecture halls 203 (85.3%), Age of lecturers, 199 (83.6%), Little or no skills to cope with the emerging technologies 198 (83.2%), lack of incentives/special allowance from the management for emerging technology associated hazards, 195 (81.9%) respectively were found to be the major challenges in the adoption of emerging technologies by digital immigrants in academia.

Discussion of Findings

The findings revealed that the majority of teaching staff of the universities studied belong to the older generation and as such, they are classified to be digital immigrants. The findings therefore corroborate the study of Kpolovie, & Awusaku (2016) that shows that younger and less experienced lecturers have an incomparably better attitude towards ICT adoption than older and more experienced lecturers in both federal and state universities in Nigeria.

On the availability of the major emerging technologies, the finding revealed that desktop computers, laptops, printers, scanner and projectors/screen, tablets and others were available. This was inline with the study of KENET, (2008) cited in Odongo T. A. M. (2011) who stressed that availability of ICTs would enhance the quality of teaching, learning and research productivity of faculty and students, as well as the management and effectiveness of universities.

The findings revealed that digital immigrants in tertiary institutions studied possess personal electronic devices such as, desktop, laptops, printers and scanners, tablets etc. this make them relevant in the 21st century workplace, that they use laptops, tablets, iPad and printer when preparing for lectures. The findings support the study of Ololube, Kpolovie & Makewa, (2015) that affirm that higher education institutions should be highly computerized, and all lecturers should own and be able to use ICTs to enhance their working methods.

The study revealed that majority of respondents do not incorporate the use of ICTs in the process of teaching and learning. This conform with the study of Kpolovie & Iderima (2016) that revealed that functional platforms for delivery of Massive Open Online Courses (MOOCs) are yet to be developed in Nigeria universities.

Furthermore, the study reveals that the respondents have proper disposition about the potential's ICT tools offers, that the use of ICT tools enhances digital immigrant's information management skills, promotes individual and collaborative research, provides personal motivation, help in seminar presentations as well as assist them in course preparation etc. it was in tandem with the study of Goyal, et al. (2010) states that ease of availability of ICT, upgrading teacher's ICT skills, convenience (time and place), time to upload and download (speed), improving communication between students and teachers, reliability of ICT, data security, availability of specialized IT teachers, availability of educational software, improving the presentation of the subject, providing encouragement to teachers to use technology in their teaching more often, ease of navigation of the course content through an ICT device, financial readiness of the institute to support ICT and learners with training are other factors that encourage the use of ICT.

Finally, the findings revealed avalanche of challenges faced by the respondents in the adoption of emerging technologies .The major challenges as revealed by in the study are: Absence of no fee-based internet facilities on campus, lack of management involvement in maintenance of emerging technologies owned by staff, resistance to change of teaching method to ICT-Based, the above challenges supports the position of Olutola & Olatoye (2015) who affirm that one of the challenges of ICT adoption by digital immigrants is their inability to assist the students develop the ability and knowledge necessary to make them use

these technologies effectively. Other challenges as revealed by this study are inadequate ICT Infrastructure/lack of modern classrooms, age of lecturers, little or no skills to cope with the emerging technologies, lack of incentives/special allowances from the management for emerging technology associated hazards. The findings follow with the study of Ololube (2006) cited in Tella (2011) who submits that many Nigerian lecturers have been unable to find effective ways to use emerging technologies in their classrooms or any other aspect of their teaching and learning life. The finding on the challenges also validates the study of Abukari, (2016) who found that Lack of knowledge about computers, Inadequate LCD projectors in the classroom; Lack of ICT capacity building to lecturers; Age of lecturers; Lack of confidence; Lack of Management pressure on lecturers to use computers for teaching and learning; Computers are not accessible; Fear for change; Lack of previous ICT knowledge; Insufficient technician support if something goes wrong with the computers; Not sure how useful computers are; The myth that computers are unreliable to be the major challenges of lectures adopting and using ICTs.

Conclusion

For digital immigrants to completely adopt emerging technologies, all the challenges this study revealed should be addresses by University administrators. Subsequently, the University managements should make and enforce policies/laws either to fully "adopt ICTs by digital immigrants or perish in the academia".

Recommendations

Arising from the findings and conclusion are the following recommendations.

1. University managements should recruit academic staff through Computer-Based Test to ascertain their level of workforce readiness in order to reduce older generation (digital immigrants) from the academia in this technological age.
2. Emerging technologies should be procured for free as part of motivation that could influence usage by the digital immigrants in order to enhance their working methods (teaching and research).
3. Regular training and re-training of digital immigrants already in the academia should be enforced for appropriate disposition on the potential's ICTs offer, that the use of ICT tools enhances digital immigrant's information management skills, promotes individual and collaborative research, provides personal motivation, help in seminar presentations as well as assist them in course preparation.
4. Finally, for digital immigrants to be able to surmount the challenges, no fee-based internet facilities, adequate management involvement in maintenance of emerging technologies owned by staff if they cannot provide, enforcement on change of teaching method to ICT-Based, adequate ICT Infrastructure/modern classrooms, incentives/special allowances for the management of emerging technology associated hazards, sufficient technical support should be put in place by the University managements in order to create and enabling environment for the adoption of emerging technologies by digital immigrants in academia.

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