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Utilization of Digital Technologies in Promoting Research Skills of Postgraduate Students: A Case Study of Ebonyi State University, Abakaliki

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Abstract

The study focused on issues relating to digital technologies and research skills of postgraduate students in Ebonyi State University, Abakaliki. Specifically, it determined; digital technologies necessary and available for developing research skills among postgraduate students in EBSU, factors that militate against the utilization of digital technologies for promoting research skills among postgraduate students in EBSU and ways of ameliorating challenges of utilization of digital technologies for promoting research skills among postgraduate students in EBSU. A survey research design was adopted. Population was 1,189; comprising of 565 lecturers and 624 postgraduate students of three academic years (2020/2021, 2021/2022 and 2022/2023 sessions) in Ebonyi State University, Abakaliki. Data were analyzed using mean and standard deviation. Findings of the study include 13 digital technologies (DT) necessary for developing research skills among postgraduate students in EBSU. These include, among others, projectors ($\overline{X}$ = 3.26), laptops ($\overline{X}$ = 3.53), desktop computers ($\overline{X}$ = 3.79), printer machines ($\overline{X}$ = 3.70). Only four of the DTs are availability, desktop computers ($\overline{X}$ = 3.79), printer machines ($\overline{X}$ = 3.70), photocopier machines ($\overline{X}$ = 3.44) and scanners ($\overline{X}$ = 3.37). Also nine challenges were identified, including inadequate number of computers to access digital information ($\overline{X}$ = 3.31), lack of skills to access digital information resources among students ($\overline{X}$ = 3.20), inadequate hardware and software ($\overline{X}$ = 3.11) and others. Furthermore, nine ways of ameliorating the challenges, including promoting internet connectivity and requisite subscription to address the challenges of inadequate computers to increase access to digital information ($\overline{X}$ = 2.92) promoting environmental friendliness for critical thinking in the university ($\overline{X}$ = 3.12) and others. Three recommendations were made for utilization of DT in promoting research skills of postgraduate students in EBSU.

Keywords: Digital, Technologies, Availability, Utilization, Research, Skills, Creativity, Innovation, funding, Universities, Postgraduate, Students.

Introduction

Digital technologies are an integral part of the debate on teaching and learning especially in higher education today. Digital technology according to Selwyn, et al, (2016) can include but not limited to: computers, tablets, smart phones, FaceBook, Moodle, online library services, Google, YouTube, writing essays on Microsoft Word, etc. Digital technology enables people to access the internet not just from home but in any location through portable devices. Institutions' and people's life have been greatly influenced by technological developments such as computers, portable devices and the internet, influencing their relation with information, knowledge and ways of working (Onyema, 2019). Global educational growth and competitiveness rest significantly on application of digital technologies, driven by a well-planned vibrant research skills acquisition system to integrate the research prowess of higher education with the demands of industry and larger society. Tertiary institutions all over the world are usually the key drivers of research and development activities.

Higher education institutions are expected to offer technology based computer infrastructures that support virtual organization and management of teaching and learning. Thus digital technologies in higher education have blurred the traditional borders between learning spaces and time, between formal and informal learning environments, between the use of specific tools for learning and personal use.

The introduction of new technology-assisted learning tools such as mobile devices, smart boards, tablets, laptops, simulations, dynamic visualizations, and virtual laboratories have altered education in institutions. The Social media as a learning tool is an integral part of digital technology which has come a long way towards making teaching and learning more interesting and participatory (Ankrah & Al-Tabbaa, 2015).

Digital tools has made it possible for online platforms that are currently available for conducting classes, sharing resources, doing assessment and managing the day to day activities of academic institutions (Jakobsen, et al, 2019). University graduates represent a huge potential for stimulating innovation and entrepreneurship, either by directly establishing their own firms or through their employment after graduation; therefore they need adequate knowledge on the application of digital tools to adapt in the present internet driven society. They need research skills which could be facilitated through digital technologies (Wilson, 2012; Geng 2014).

The task of preparing university graduate for careers in increasingly innovation-intensive working environments and helping them to acquire skills that enhance their entrepreneurial abilities, are amongst the mandates of universities that appeared not to be fully recognized (Robert, 2018). Digital technologies if

properly applied in the university would go a long way to developing research skills and associated potentials amongst postgraduate students in particular to facilitate new discoveries and innovations in the ever changing society (Agyei and Voogt 2011). It is practically impossible to imagine effective education without optimal use of ever-changing digital technologies in this hyper connected era. This argument is in line with the view of Nwajioha and Chukwu (2021) who stated that both teachers and students are currently passing through technology use and digital transition in education with its associated challenges.

Agyei and Voogt (2011) noted that lack of knowledge about integrating digital technologies in the classroom, lack of training opportunities related to technology integration, shortage of ICT-based facilities and school plants, and lack of internet connectivity in schools, among others, are barriers to the application of digital technologies in teaching and learning. Incidentally, the world is changing as a result of technological and economic advancement, which create peculiar problems and challenges to most Nigerian graduates. There is an increased search for skilled workers and specialists in various fields, just as there is a declining job market for university products that mostly lack necessary skills or ability to utilize the knowledge acquired from the university to solve immediate problems. Sadly too, the few self-employed graduates are mostly in quandary, as scant infrastructural facilities make it impossible for them to effectively ply their trade. It is on the bases of the above that this study sought to investigate the issues relating to digital technologies in promoting research skills amongst students with particular reference to Ebonyi State University, Abakaliki.

Objectives of the Study

This study focused on issues relating to utilization of digital technologies in promoting research skills of postgraduate students of Ebonyi State University (EBSU), Abakaliki. Specifically, the study determined

1. digital technologies necessary and available for developing research skills among postgraduate students in EBSU.
2. factors that militate against the utilization of digital technologies for promoting research skills among postgraduate students in EBSU.
3. ways of ameliorating challenges of utilization of digital technologies for promoting research skills among postgraduate students in EBSU.

Methodology

***Design of the Study*:** This study adopted a descriptive survey research design.

***Area of the Study*:** The study was conducted in Ebonyi State University, EBSU, Abakaliki. It was established in 2000, EBSU offers courses and programs leading to many recognized higher education degrees in several areas of study. EBSU operates under a multi-campus structure, with efforts still ongoing to unify the campuses in her permanent site. The school is

seriously in need of basic ICT and digital tools as most of the campuses, like faculty of education lack function internet connectivity for effective e-learning and research development

***Population for the Study*:** The population of the study was made up of both lecturers and postgraduate students of Ebonyi State University, Abakaliki; numbering 1,189. A breakdown of the population showed that there exist a total of 565 lecturers in EBSU; while the number of students admitted for postgraduate studies for all the programmes in 2020/2021, 2021/2022 and 2022/2023 sessions stood for 211, 196 and 217 respectively. The population of lecturers as presented in this study is comprised of 274 females and 291 males from the rank of Lecturer I and above who are involved in teaching postgraduate programmes in different Department and Faculty of the University. Similarly, the total number of 624 postgraduate students in this study comprised 351 females and 273 males in all postgraduate programmes of the University for the three Sessions as indicated in this study. (Sources: Personnel Unit of EBSU and Admission Office of the School of Postgraduate Studies, EBSU).

***Sample for the Study*:** A stratified random sampling technique was used to draw a sample size of 253 respondents from the population. Ten lecturers who are involved in the teaching and supervision of Postgraduate programmes were drawn from each of the eleven Faculties in the university, making a total of 110 lecturers of 57 female and 53 male. The sample was also made up of 13 postgraduate students from each of the 11 Faculties, which amounted to 143 (53 female and 50 male) from various faculties of the University as research participant in this study.

***Instrument for Data Collection*:** The instrument for data collection was a structured questionnaire. It was developed through literature review based on the objectives of the study. The instrument was made up of 32 items, which were grouped in three clusters in line with the specific objectives of the study. It was a 4-point scale instrument. The instrument was validated by three university experts in digital technology. It was subjected to a test of reliability using Cronbach Alpha procedure. This yielded the reliability coefficient of 0.67.

***Data Collection Method*:** A total of 253 copies of the instrument were administered as follows: 110 copies to lecturers and 143 copies to postgraduate students. All the 253 copies were properly completed and retrieved. This represents 100 percent return. This arrangement ensured a hundred percent return rate of the administered copies of the instrument.

***Data Analysis Techniques*:** The collected data was analyzed using mean and standard deviation. A mean score of 2.50 constitute a benchmark for an item as affirmative opinion of respondents and interpreted as "agreed". This implies that items with mean scores of 2.49 and below were considered as negative responses of the respondents and interpreted as "disagreed".

RESULTS

Table 1: Mean Responses of Lecturers and Postgraduate Students on the Digital Technologies Needed for the Development of Research Skills among Postgraduate Students in EBSU,

S/N	Digital Technologies (DT)	Necessary			Availability		
		$\overline{X}_{1n}$	$\overline{X}_{2n}$	$\overline{X}_{gn}$	$\overline{X}_{1a}$	$\overline{X}_{2a}$	$\overline{X}_{ga}$
1	Projectors	3.41	3.11	3.26	2.24	2.23	2.24
2	Laptops	3.05	4.00	3.53	2.02	2.21	2.12
3	Computer application software	3.11	3.32	3.22	2.31	2.11	2.21
4	Modem for internet connectivity	3.22	3.23	3.23	2.41	2.41	2.41
5	Desktop computers	3.72	3.84	3.79	2.75	2.62	2.69
6	Printing machines	3.69	3.71	3.70	2.62	2.59	2.61
7	Photocopier	3.87	3.01	3.44	2.61	2.58	2.60
8	Scanners	3.62	3.11	3.37	2.53	2.59	2.56
9	Google Classroom	3.10	3.12	3.11	2.24	2.28	2.36
10	Google Drive	3.21	3.09	3.15	1.58	1.74	1.66
11	Haiku Deck	3.65	3.13	3.39	1.65	1.83	1.74
12	e-library	3.11	3.21	3.16	2.13	2.22	2.18
13	e-resources	3.23	3.08	3.16	2.23	2.34	2.29
	Grand Mean	**3.38**	**3.30**	**3.35**	**2.26**	**2.29**	**2.27**

$\overline{X}_{1n}$ = Mean of lecturers on necessary DT; $\overline{X}_{2n}$= Mean of students on Necessary DT; $\overline{X}_{gn}$ = Grand mean of lecturers and students on necessary DT; $\overline{X}_{1a}$ = Mean of lecturers on availability DT; $\overline{X}_{2a}$ = Mean of students on availability DT; $\overline{X}_{ga}$ = Grand mean of lecturers and students on availability DT.

Table 1 shows that the grand mean ($\overline{X}_{gn}$) for all the 13 items on **necessary DT** for the development of research skills among postgraduate students are all more than the criterion mean of 2.50 ($\overline{X}$ ≥2.50). On the contrary, for availability it is only 4 items of serial numbers 5, 6, 7 and 8 that have grand mean scores that are greater than the criterion mean of 2.50 indicating the only digital technology which are available for the development of research skills among postgraduate students in Ebonyi State University and perhaps, other public universities in Nigeria.

Table 2: Mean Responses of Lecturers and Postgraduate Students on Factors that Militate Against Utilization Digital Technologies for Promoting Research Skills among Postgraduate Students in EBSU.

S/N	Ways of Ameliorating Challenges	$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{X}_g$	SD_g	RMks
1	Inadequate hardware and software	3.10	0.52	3.11	0.51	3.11	0.52	A
2	Paucity of finance to procure the	3.09	0.41	3.01	0.76	3.05	0.59	A

	needed ICT resources							
3	Lack of expertise and human resources to maintain the technologies effectively	3.02	0.60	3.11	0.65	3.07	0.63	A
4	Epileptic nature of power supply	3.30	0.65	3.04	0.72	3.17	.69	A
5	Inadequate number of computers to access digital information	3.41	0.48	3.21	0.64	3.31	0.56	A
6	Lack of proper maintenance culture	3.13	0.54	3.13	0.57	3.13	0.56	A
7	Lack of skills to access digital information resources among students	3.19	0.43	3.21	0.54	3.20	0.49	A
8	Poor attitude of some lecturers towards embracing Internet use and digital tools	3.21	0.54	3.01	0.61	3.11	0.58	A
9	Frequent breakdown and vandalization of facilities in the university.	3.31	0.49	3.04	0.53	3.18	0.51	A
	Grand Mean/Std Dev	**3.20**	**0.52**	**3.10**	**0.61**	**3.15**	**0.57**	**A**

$\overline{X}_1$ = Mean of lecturers; SD_1= standard derivation of lecturers; $\overline{X}_2$ = Mean of students; SD_1= standard derivation of students; $\overline{X}_g$ = Grand mean of lecturers and students; SDg =Grand standard derivation of lecturer and students..

Table 2 shows that the mean ($\overline{X}$) for all the nine items therein for both lecturers and postgraduate students are all greater than the criterion mean of 2.50 ($\overline{X}$≥2.50). The grand mean ($\overline{X}_{gn}$) of 3.15 is also greater than the criterion mean of 2.50 indicating that all the items therein constitute factors that militate against the utilization of Digital Technologies for promoting research skills among postgraduate students in Ebonyi State University.

Table 3: Mean Responses of Lecturers and Postgraduate Students on Ways of Ameliorating Challenges of Utilizing Digital Technologies for Promoting Research Skills among Postgraduate Students in EBSU.

S/N	Challenges	$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{X}_g$	SD_g	Rmks
1	Training lectures and resource person in up- to-date 21st century skills of ICTs usage.	3.01	0.67	3.11	0.49	3.06	.0.58	A
2	Voting a reasonable amount of fund to education during the appropriation of annual budget by governments at all levels.	3.03	0.61	3.01	0.63	3.02	0.62	A
3	Ensuring infrastructural overhaul to guide against epileptic nature of power supply.	3.02	0.63	3.11	0.65	3.07	0.64	A
4	Promoting internet connectivity and requisite subscription to address the challenges of inadequate or slow band	2.80	0.59	3.04	0.58	2.92	0.59	A
5	Provision of adequate computers to	3.11	0.49	3.21	0.51			

	increase access to digital information					3.16	0.50	A
6	Providing functional security network to safeguard university facilities from vandals	2.97	0.51	3.13	0.47	3.05	0.49	A
7	Motivating lecturers through enhanced pay packages to minimize brain drain and attrition rate.	3.58	0.52	3.21	0.54	3.40	0.53	A
8	Ensuring easy access of students to research grants	3.35	0.50	3.01	0.65	3.18	0.58	A
9	Promoting environmental friendliness for critical thinking in the university.	3.43	0.69	3.04	0.48	3.24	0.59	A
	Grand Mean/Std Dev	**3.14**	**0.58**	**3.10**	**0.56**	**3.12**	**0.57**	**A**

$\overline{X}_1$ = Mean of lecturers; SD_1= standard derivation of lecturers; $\overline{X}_2$ = Mean of students; SD_1= standard derivation of students; $\overline{X}_g$ = Grand mean of lecturers and students; SDg =Grand standard derivation of lecturer and students.

Table 3 shows that the mean ($\overline{X}$) for all the nine items therein for both lecturers and postgraduate students are all greater than the criterion mean of 2.50. The grand mean ($\overline{X}_{gn}$) of 3.12 is also greater than the criterion mean of 2.50 indicating that all the items therein constitute ways of ameliorating the challenges of utilizing digital technologies to promote research skills among postgraduate students in Ebonyi State University.

Discussion of Finding

The result of data analysis as presented on Table 1 of this study revealed that the necessary digital technology (DT) for the development of research skills among postgraduate students included but not limited to: projectors, laptops, computer application software, modem for internet connectivity, desktop computers, printing machines, photocopying machines, scanners, Google classroom, haiku deck and Google drive etc. Unfortunately, the result showed also that most of the necessary digital tools as highlighted therein are not usually available for the development of research skills among postgraduate students in Ebonyi State University and perhaps, other public universities in Nigeria. The findings showed specifically that Google Classroom is not available to provide self-directed spaces, such as blogs and forums that satisfy researchers' curiosity for problem solving; while Google Drive is also mostly not available to allow lecturers and students to use Google Docs, Google Forms and other Google services to create, store, share and retrieve useful information for quality research.

This finding is in line with Villani, et al, (2017) who argued that digital technologies that are highly required in tertiary institution for research development and innovation are mostly insufficient and in some cases not even available at all in most public institutions. These scholars stated that digital technologies posses huge potential to transform teaching and learning practices in schools and open up new horizons that can facilitate:

innovative pedagogic models, improve higher-order thinking skills, conceptual understanding and enhance students' creativity, imagination and problem-solving skills for quality research. The findings also corroborated with the view of Biagi & Lio (2013) who maintained that digital technologies provide opportunities for simulations such as remote or virtual online laboratories which provide relatively low-cost, flexible access to experiential learning and build research skills on the learners.

It was seen on Table 2 that the mean ($\overline{X}$) for all the 9 items therein for both lecturers and postgraduate students are all greater than the criterion mean of 2.50. The grand mean ($\overline{X}_{gn}$) of 3.15 is also greater than the criterion mean of 2.50 indicating that inadequate hardware and software, paucity of finance to procure the needed ICT resources, lack of expertise and human resources to maintain the technologies effectively, epileptic nature of power supply and poor attitude of some lecturers towards embracing Internet use and digital tools among others are the factors that militate against the utilization of Digital Technologies for promoting research skills among postgraduate students in Ebonyi State University and perhaps, other public universities in Nigeria.

These findings are in line with Haleem, et al, (2022) who stated that some students, even at postgraduate level are still having some difficulties in absorbing digital tools as a result of many factors relating to lack of funds facilities and motivation. Some students according to them come from low-income families and do not have money to procure any of the digital tools to enhance their adaptability to the new order. Millions of young- stars simply do not have access to the internet at home and in some cases in school too (Agwu, 2021). Teachers are also having difficulty since some are utterly inexperienced with digital technologies. Nonetheless, it was noted that inculcation of digital skills for innovative research would be efforts in futility without proper information and communication technology equipment, internet/mobile network connectivity, instructional resources, and teacher motivation/training and students' awareness drive.

Result of data analysis on Table 3 showed that the mean ($\overline{X}$) for all the 9 items therein for both lecturers and postgraduate students are all greater than the criterion mean of 2.50. The grand mean ($\overline{X}_{gn}$) of 3.12 was also greater than the criterion mean of 2.50 indicating that all the items therein constitute ways of ameliorating the challenges of utilizing digital technologies to promote research skills among postgraduate students in Ebonyi State University and perhaps, other public universities in Nigeria. The findings specifically showed among others that the challenges of utilizing DT can be ameliorated by training lectures and resource person in up- to-date 21st century skills of ICTs usage, voting a reasonable amount of fund to education during the appropriation of annual budget by governments at all levels, ensuring infrastructural overhaul to guide

against epileptic nature of power supply, promoting internet connectivity and requisite subscription to address the challenges of inadequate or slow band etc

These findings are in line with Villani, et al, (2017) who argued that the application of digital technology in the university can be facilitated through the provision of adequate computers, upgrading infrastructural facilities, internet connectivity, security and by promoting environmental friendliness for critical thinking in the university. Therefore, it could be noted that students will become more interested in research if the application of digital tools are promoted in the universities. This is because youngsters of nowadays are pretty accustomed to the usage of electronic gadgets; incorporating them into schooling would undoubtedly assist in piquing their interest and enhancing their involvement levels (Cheok & Wong., 2016). Promoting the application of digital technology into education will provide students at all levels with an engaging learning experience, allowing them to remain more interested and participatory. The utilization of projectors, computers, and other cutting-edge technical gear in the classroom may make studying fascinating and entertaining for students. Thus, student learning can become more dynamic and engaging; resulting to creative thing, curiosity and other innovative research skills.

Conclusion

University in Nigeria is faced with lots of challenges which continually threaten university effectiveness in keeping pace with the technological advancement and innovation in the society. It has been identified that the possession of a university degrees is not just enough for the holder to contribute positively to the development of the society in which he/she is a member. University education should be properly repositioned to equip graduates with the requisite innovative competences and entrepreneurial skills that would enable individuals to find their fittings in the continually dynamic and technology-driven society that is characterized by unemployment. Promoting the application of digital technology in the university, especially at postgraduate level will go a long way to facilitate creative thing, curiosity and other innovative research skills among postgraduate students.

Digital technology as highlighted in this study promotes computer-based creative thinking and enhances divergent thinking abilities of postgraduate students for job creation and enhances creativity-stimulating conditions which create opportunities to examine problems from new perspectives. It was pointed out also that digital technologies enhances creative tourism of students and increases their understanding of innovative trends of the jet age.

Recommendations

1. Government should improve funding to university to guarantee the provision of necessary facilities including digital technology.

2. University management should show more commitment in the application of digital technologies by providing functional digital resources for postgraduate students.
3. Technological capabilities of lecturers should be enhanced through appropriate training, workshops and seminars.

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