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RE-ENGINEERING UNIVERSITY EDUCATION IN NIGERIA FOR EMPLOYABILITY IN THE DIGITAL ECONOMY

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Abstract
The study looked at retooling university education in Nigeria for employability in the digital economy. This is predicated on the urgent need to reform university education in Nigeria to meet the needs of the digital economy for graduates' career paths and employability. Descriptive survey design was adopted for the study, and three research questions were answered. Population of the study consists of 10,907 which was the target population. This was made up of 4,670 ICT related-lecturers in federal public universities, and 6,237 professionals in the digital workforce in Southeastern Nigeria. A sample of 1,091 was drawn through the multi-stage sampling technique. The sample includes 467 lecturers and 624 digital economy professionals (software developers, web developers, graphic designers, digital enthusiasts, digital marketers and content creators, hardware technicians, and ICT facilitators) from ICT firms that are partnering with universities. A researcher-made tool, named "Questionnaire on Re-Engineering University Education for Employability in the Digital Economy" was used to collect relevant data. The questionnaire was examined for reliability using the Cronbach Alpha technique, after being validated by three academics. The reliability coefficient generated was 0.91, which was deemed excellent and suitable for the investigation. Mean and standard deviation were utilized to assess the data. It was discovered, among other things, that artificial intelligence, data analytics, and blockchain are some of the emerging technologies universities can integrate into their programmes. It was concluded that re-engineering university education for employability in the digital economy necessitates a multi-faceted approach.

Keywords: Re-Engineering, University Education, Employability, Digital Economy.

Introduction

The university is the apex of tertiary higher education and must be built and reordered to equip students with the skills, information, morality, and experiences they will need to be self-sufficient, labor employers, and employed in any organization. This is proven to be true because universities are the pinnacle of higher education, serving as a venue for adult learners to engage in research, development, and training that will prepare them for employment or self-employment. The term "university education" refers to the complete teaching and learning process that occurs at these higher institutions. Nyerere (1970), the Tanzanian Pan-Africanist, supports this position when he described it as an institution of higher learning, a place where people's minds are trained for clear thinking, independent thinking, analysis, and problem-solving at the highest level. Oshodi, Moshood, and Ubabudu (2022) asserted that universities serve more purposes than merely the preservation of knowledge, which may be

the case. Beyond the functionality that limits their goal to "teaching, research, and community service (TRC)" (Oshodi, et.al.2022), universities function as theatres for international connections and struggles. Universities currently place a high priority on internationalization and global competitiveness, incorporating an international component into their objectives (Woldegiorgis, 2023). In light of this, universities, the top institutions of higher learning, are saddled with the responsibility of helping students-especially those who are of working age become employable (Idaka, 2018). It is anticipated that recipients will be able to pursue rewarding careers that will enable them to significantly advance society as a whole. The Federal Republic of Nigeria's (FRN) National Policy on Education (2013) states that the goals of tertiary education in Nigeria include, but are not limited to, promoting national development through high-level manpower training, providing accessible and affordable quality learning opportunities in formal and informal education in response to the needs and interests of all Nigerians, reducing skill shortages by producing skilled manpower relevant to the local labour market and promoting and encouraging scholarship, entrepreneurship, and community service. It is crucial to note that it was explicitly stated that these goals would be pursued through quality student intake, quality teaching, and learning, research and development, provision of a more practical-based curriculum relevant to the needs of the labour market, and generation and dissemination of knowledge, skills, and competencies that enable students to succeed in a knowledge-based economy (NPE, 2013). Knowledge-based economies, as opposed to traditional economies, which place a higher priority on labour, land, and tangible capital, significantly rely on knowledge as the development engine (Woldegiorgis, 2023). This underscores the relevance of universities in the government's development agenda. The success, relevance, and conformance of universities to society's expectations, however, remain hotly contested issues given how these sophisticated information and technical tools are transforming and revolutionizing the educational landscape, necessitating the need for this empirical research study. In particular, the dynamic interaction between the knowledge economy and rapid technical improvements has greatly influenced the development of a digital economy and changed the function of higher education. This industry is characterized by terminology like "research and development," "information and communications technology," and "artificial intelligence," or "AI" (Woldegiorgis, 2023).

Consequently, universities have a responsibility to provide students with new learning models that are relevant to their changing career choices, the ability to produce meaningful work, aspirational employability in globally renowned companies like Goldman Sachs, Amazon, IBM, and Apple, and their growth as global citizens. This is the only way employers who are looking for labour will consider their graduates to be employable. Employability refers to the potential for employment as a result of having the necessary employment-related characteristics. Graduates who want to work for companies with a global reputation must be adept at using a variety of emerging technology components, such as artificial intelligence and machine learning, cloud computing and virtualization, user experience (UX) design, blockchain technology, cryptography, mobile app creation and software development, cyber security, and architecture, among others. Supporting this argument, Viljon (2023), advocated that universities ought to incorporate robotics, data analysis, artificial intelligence, and digital

ethics into their courses to stay ahead of technology and allow their students to gain the skills and knowledge necessary to thrive in this digital world. It is understandable that employers are often looking for persons who can apply their literacy, essential competence skills, and character traits in real-world scenarios and who have the analytical thinking ability to handle challenges. This point to the fact that the number of jobs that require creativity, innovation, and empathy is expected to rise with an increased need for information technology skills, going forward. It has become unavoidable that digital, virtual, and augmented realities, along with different styles of innovative teaching methodology be integrated into teaching and learning in higher tertiary institutions for the sustainability of the field of studies. For instance, Thompson (2023) observed that Chat GPT, one of the artificial intelligence platforms that provide digital solutions by interacting with humans, is altering the educational process and compelling institutions of higher institutions of learning to re-evaluate the instruction they give students. The importance of harmonizing digital and technological-oriented courses in tertiary education in Nigeria cannot be overemphasized. It is for this reason that Eaton (2023) highlighted the significance of technologies by pointing out the expansion of industrial use of artificial tools, including the education industry, and the Nigerian university system cannot be left in isolation for such life-changing development. Giving credence to the foregoing, Myklebust and Smidt (2021), stated that it is understandable that developing such wide skill sets requires a learning or growth mindset and the ability to keep developing skills over time. This explains why reengineering the Nigerian university programme is necessary. To re-engineer means to retool, to adjust, to revamp, to reprogram, to redo, to rebuild, to rethink, and so on. So, reengineering in the context of this study is basically about rethinking and drastically rebuilding university programmes and operations to make them more compatible with the digital economy, as well as ensuring that graduates therefrom stand better chances of being gainfully engaged in jobs. There is no doubt that rechanneling university education in Nigeria to the digital economy will be a win-win situation for the students, the university community, and the society at large. This is partly the reason the National Universities Commission (NUC) on the realization that, among other considerations, digitalization has dramatically altered teaching and learning in the university system globally while also creating new opportunities and problems, swung into action in 2022 by adjusting university learning contents in Nigeria. Suleiman (2023) reported that NUC in December 2022 introduced the Core Curriculum and Minimum Academic Standards (CCMAS) to replace the Benchmark Minimum Academic Standards (BMAS) which came into existence in 2007. This effort was necessitated to reengineer educational programmes in the apex learning institutions and, so as to be in tandem with the demands of the digital economy.

Digital economy entails the contemporary work system, where technological skills and experiences have become dominant forces in executing, almost all kinds of tasks at work. Similarly, Thompson (2023), stated that the digital economy has to do with the application of technologies in performing tasks that were a binitio only handled by human beings. Thompson further pointed out that in the contemporary work environment, data analysis, designs of all categories, global happenings, medical therapies, and engineering works, among others, could now be easily handled with the help of technology. By this view, the

digital economy is seen as the entire work system where manual operations are no longer relevant, but being understandably replaced with automated and digital operations. Universities that are considered world-class are known to offer their students with learning experience that is compatible with the digital economy, thereby empowering them better, especially for employment. However, considering the fact that the Nigerian university continues to struggle with the obvious issue of inadequate finance, which has continued to fuel protests by the Academic Staff Union of Universities (ASUU), one wonders whether the necessary adjustments to the curriculum to reflect the digital prowess could be effectively carried out. Lecturers, who are anticipated to play key roles in revamping the curriculum of instruction at universities, don't appear to be satisfied with the state of their welfare, as seen by the numerous examples frequently presented by ASUU. To buttress this fact, Suleiman (2023), observed that ASUU recently referred to the NUC's CCMAS as "an aberration to the Nigerian University System" and said that the regulatory body had neglected to include essential university departments. This is true notwithstanding recent accusations of some Nigerian university graduates who were dubbed as half-baked, unprepared, unqualified, untrained, of poor quality, unsatisfactory in all other respects, and unemployed. It is saddening that Nigeria's 151 million young, who make up 70% of the nation's 217 million inhabitants, has a youth unemployment rate of 53.40 percent, according to the National Bureau of Statistics (NBS, 2022), and that 3.6 million jobs are needed annually. Adebisi (2023), added that to make matters worse, Nigeria's information was completely missing from the Global Knowledge Index, which ranked 138 nations in 2022, with an average score of 0%. Hence, it might make sense to say that Nigeria is considered as one of the world's centers of poverty, as a result of the huge rate of unemployment. Experience has shown that most of the graduate unemployment situations are as a result of incompatible skills and training. For instance, Myklebust and Smidt (2021), lamented that most graduates from the Nigerian university system are either unemployed due to a dearth of job opportunities or due to not possessing the qualities required for the few available opportunities. There is also a challenge on the part of some faculty members not possessing relevant knowledge, skills, and experience in different aspects of emerging technologies, hence, cannot boast of impacting on students in the right direction (Idaka, 2018). Also, without the required expertise from faculty members, who under ASUU, seem not comfortable with NUC's proposed CCMAS, the attempt to integrate emerging technologies into the programmes and operations of universities in Nigeria might just be hanging in the air. This implies the curriculum of the university system is still housing contents that are limited in scope to what is required in the digital economy. Based on this observation, the thrust of this study is on re-engineering university education in Nigeria to increase students' employability in the technologically advanced workplace.

Statement of the Problem

Nigerian universities, just like their counterparts elsewhere are meant to train students and offer them all the learning experience needed to ensure they are employable, especially in the contemporary world of today and the future. It is only when graduates from such institutions are gainfully employed and making progress in life that their alma maters can proudly claim

to have achieved the goals for which they were set up. However, Nigerian universities are believed to be lagging behind in integrating emerging technologies into their programmes, and attempts made by NUC to ensure that this aspect of the learning experience is incorporated into the system seem not to have progressed. Most lecturers, through ASUU, seem not comfortable with NUC's proposed CCMAS and integration of emerging technologies into the programmes and operations of universities in Nigeria, as they termed the approach as aberration and imposition on the university and called for a review (Suleiman, 2023). It also seems that some lecturers lack relevant expertise in emerging technologies. The university system is also known to be hugely underfunded and lacks the capacity to fully integrate and implement the contents of emerging technologies. The inadequacies and yet-to-be-integrated technological prowess into the Nigerian university system make it difficult for her graduates to be gainfully employed, hence, the high rate of youth unemployment bedeviling graduates from the system. Based on this, the problem of the study is how can university education in Nigeria be re-engineered for employability in the digital economy.

Purpose of the Study

The main purpose of the study was to investigate how university education in Nigeria can be reformed to ensure that graduates are employable in the digital economy. The specific objectives of the study were to:

1. Identify the aspects of emerging technologies that need to be redesigned and integrated into the Nigerian university education curricula.
2. Highlight how universities and digital firms can collaborate to avail students of practical experience of technologies used in world-renowned organizations.
3. Point out feasible measures that could be adopted to enforce technology-driven teaching and assessment methods in Nigerian universities.

Research Questions

The following research questions guided the study:

1. What aspects of emerging technologies need to be redesigned and integrated into the Nigerian university education curricula?
2. How can universities and digital firms collaborate to avail students of the practical experience of emerging technologies?
3. What feasible measures could be adopted to enforce technology-oriented teaching and assessment methods in universities?

Methodology

Research Design

Descriptive survey research design was adopted for the study. This kind of design is suitable when a researcher intends to empirically investigate an issue with the view of ascertaining and interpreting the opinions of a targeted population on the matter being examined. The design was considered appropriate for the study because it sought to find out the average perception of ICT-related lecturers and digital technologists on the issue of re-engineering university education in Nigeria for employability in the digital economy.

Population of the Study

The population of the study consists of 10,907 which made up the target population. This was made up of 4,670 ICT-related lecturers in federal public universities and 6,237 professionals in the digital workforce (software developers, web developers, graphic designers, digital enthusiasts, digital marketers and content creators, hardware technicians, and ICT facilitators) from ICT firms that are partnering with universities in Southeast Nigeria.

Sample and Sampling Technique

A sample size of 1,091 was drawn through the multi-stage sampling technique. Firstly, federal universities and digital technologists in South-eastern Nigeria were purposively sampled because they were not only located in the same state but were partnering with universities in the Southeast Nigeria. Secondly, purposive sampling was utilized to select lecturers of federal universities and digital technologists. Finally, proportionate sampling was employed in drawing 10% of each category of the population, which resulted in 467 lecturers in ICT-related disciplines and 624 digital economy professionals (software developers, web developer, graphic designer, digital enthusiasts, digital marketers and content creators, hardware technicians, and ICT facilitators) from ICT firms that are partnering with universities. The researcher's choice of 10% sample size was as recommended by St. Olaf College (University), USA (2021), that a minimum ratio of 30% can be drawn from a population below 1,000, and a minimum of 10% for a larger population of up to 10,000 respectively in order to ensure adequate representativeness.

Data Collection, Validity, and Reliability

A researcher-made tool, named "Questionnaire on Re-Engineering University Education for Employability in the Digital Economy" was used to collect relevant data from May 3rd to June 30th 2023. The questionnaire was examined for reliability using the Cronbach Alpha technique, after being validated by three academics, two of them were from the Department of Educational Foundations (Measurement, Research and Evaluation option), and the third was from the Department of Educational Management and Policy. The reliability coefficient generated was 0.91, which was deemed excellent and suitable for the investigation. Seven research assistants helped in collecting relevant data, and the exercise lasted from May 3rd to June 30^{th,} 2023, or a month.

Method of Data Analysis

Mean and standard deviation were utilized to answer the research questions.

Results

Research Question 1: What aspects of emerging technologies need to be redesigned and integrated into the Nigerian university education curricula?

Table 1: Mean rating of lecturers and digital technologists on the aspects of emerging technologies that need to be redesigned and integrated into the Nigerian university education curricula.

S/N	Items	Lecturers (n=467)		DEP (n=624)	
		Mean	Remark	Mean	Remark
1.	Artificial Intelligence, Robotics and Machine Learning	2.84	Agree	2.77	Agree
2.	Cloud Computing and Virtualization	2.73	Agree	2.78	Agree
3.	User Experience (UX) Design and Digital Ethics	2.66	Agree	2.76	Agree
4.	Block chain Technology and Cryptography	2.69	Agree	2.62	Agree
5.	Mobile App Creation and Software Development	3.60	Agree	2.64	Agree
6	Cyber security and Architecture	3.45	Agree	3.00	Agree
7	Digital Marketing and Social Media Utilities	3.02	Agree	3.40	Agree
8	Digital Imaging and Photography	3.12	Agree	2.53	Agree
9	Internet of Things (IoT) and Interconnectivity	2.61	Agree	2.72	Agree
10	Data Science and Analytics	3.44	Agree	3.13	Agree
	Cluster Mean	**3.02**	**Agree**	**2.84**	**Agree**

** DEP is Digital Economy Professionals*

In Table 1, it was revealed that the Mean ratings of lecturers and digital economy professionals are greater than 2.50 for each of the 10 questionnaire items. This means that both the lecturers and the digital technologists are in affirmation that all the suggested innovations in the digital world be incorporated into Nigerian university's curricula.

Research Question 2: How can universities and digital firms collaborate to avail students of the practical experience of emerging technologies?

Table 2: Mean rating of lecturers and digital technologists on how universities and digital firms can collaborate to avail students with practical experience of emerging technologies.

S/N	Items	Lecturers (n=467)		DEP (n=624)	
		Mean	Remark	Mean	Remark
1.	Establish partnerships with digital technology companies to offer internship programs for students.	3.34	Agree	2.79	Agree

2.	Invite professionals from digital technology companies to deliver guest lectures, sharing their insights, experiences, and expertise in emerging technologies	2.93	Agree	3.03	Agree
3.	Collaborate with digital technology companies on research projects related to emerging technologies	2.88	Agree	2.70	Agree
4.	Form industry advisory boards comprising representatives from digital technology companies.	2.60	Agree	2.78	Agree
5.	Organize hackathons, coding competitions, or innovation challenges in collaboration with digital technology companies	2.61	Agree	2.92	Agree
6	Partner with digital technology companies to offer professional certification programs.	2.76	Agree	3.07	Agree
7	Conduct workshops and training sessions led by professionals from digital technology companies	2.91	Agree	2.98	Agree
8	Collaborate with digital technology companies to identify industry projects that students can work on as part of their coursework or as extracurricular activities	2.89	Agree	2.78	Agree
9	Establish mentorship programs where students are paired with professionals from digital technology companies	2.64	Agree	2.99	Agree
10	Create innovation labs in collaboration with digital technology companies	2.58	Agree	3.20	Agree
	Cluster Mean	**2.81**	**Agree**	**2.92**	**Agree**

** DEP is a Digital Economy Professionals*

Table 2 shows that lecturers and digital economy experts rated all the items highly, as the average rating score of each item is greater than the minimal point of acceptance or rejection, which is 2.50. Thus, all the items of the research instrument are accepted as the pragmatic ways universities and digital firms can collaborate to avail students of the practical experience of emerging technologies.

Research Question 3: What feasible measures could be adopted to enforce technology-oriented teaching and assessment methods in universities?

Table 3: Mean rating of lecturers and digital technologists on the feasible measures that should be adopted to enforce technology-oriented teaching and assessment methods in the universities.

S/N	Items	Lecturers (n=467)		DEP (n=624)	
		Mean	Remark	Mean	Remark
1.	Implement an LMS platform to facilitate online course delivery, content sharing, discussion forums, and assignment submissions	2.80	Agree	2.95	Agree
2.	Utilize virtual classroom platforms that offer live audio and video interaction, screen sharing, and chat features	2.80	Agree	2.72	Agree
3.	Encourage the use of multimedia presentations, such as slideshows, videos, and interactive simulations, to make lectures more engaging and visually appealing	2.76	Agree	2.77	Agree
4.	Implement online quizzes and assessments through the LMS, allowing students to take tests remotely and receive instant feedback	2.67	Agree	2.69	Agree
5.	Adopt a flipped classroom approach where students review pre-recorded lectures or materials before class and engage in active discussions, problem-solving activities, and collaborative projects during class time	2.71	Agree	2.62	Agree
6	Incorporate gamification elements into learning activities to increase student engagement.	2.77	Agree	2.90	Agree
7	Assign group projects that require students to collaborate online using tools like Google Docs, shared project management platforms, or virtual meeting spaces.	2.90	Agree	3.14	Agree
8	Utilize virtual laboratory simulations and software tools to provide hands-on experience in science, engineering, and other practical disciplines	2.68	Agree	2.67	Agree
9	Implement online peer review systems where students can provide feedback and critique each other's work.	2.71	Agree	2.77	Agree

10	Integrate data analysis and visualization tools into relevant courses, enabling students to explore and interpret	2.75	Agree	2.85	Agree
	Cluster Mean	**2.76**	**Agree**	**2.81**	**Agree**

** DEP is a Digital Economy Professionals*

The result in Table 3 revealed that all the 10 items have mean ratings above 2.50, for both lecturers and digital entrepreneurs. This implies that universities can adopt all items as functional measures to enforce technology-oriented teaching and assessment methods in the system.

Discussion of findings

Results of the study revealed that the aspects of emerging technologies that need to be redesigned and integrated into the Nigerian university education curricula, include: Artificial Intelligence and Machine Learning; Cloud Computing and Virtualization; User Experience (UX) Design; Blockchain Technology and Cryptography; Mobile App Creation and Software Development; Cyber security and Architecture; Digital Marketing and Social Media Utilities; Digital Imaging and Photography; Internet of Things (IoT) and Interconnectivity, and Data Science and Analytics. The finding is in affirmation with Viljon (2023), who advocated that universities should incorporate robotics, data analysis, artificial intelligence, and digital ethics into their courses to stay ahead of technology and allow their students to gain the skills and knowledge necessary to thrive in this digital world. Full integration of modern technological courses in the Nigerian university system will usher in an era of assured jobs for her graduates.

Findings also showed that in order to provide students with hands-on exposure to cutting-edge technologies, institutions, and digital businesses should cooperate with these businesses to offer internship programs to students; collaborations with digital technology companies on research projects involving emerging technologies; offer professional certification programs in collaboration with digital technology organizations like Cisco and Huawei certification, the establishment of industry-driven advisory boards with members from digital technology companies; inviting experts from the field to give guest lectures and share their knowledge, expertise, and insights in emerging technologies. Similarly, Abia and Udofia (2023) advised that private sector participation should be encouraged, especially in the profession of modern and up-to-date technical equipment. Abia and Udofia added that NGOs should provide an infrastructure for the training of youths, establish trade centres, and contribute to curriculum development in some technical areas through public lectures and seminars, thus increasing the number of trained skilled manpower to enrich students' practical experience in the course of their varsity studies.

The study also showed that implementing a Learning Management System (LMS) platform to facilitate online course delivery, content sharing, discussion forums, and assignment submissions; using virtual classroom platforms that offer live audio and video interaction, screen sharing, and chat features; and encouraging the use of multimedia presentations, such as PowerPoint presentations, are some of the practical approaches

universities can adopt to enforce technology-oriented teaching and assessment methods in the universities. The use of flipped classrooms, where students review pre-recorded lectures or materials before class and participate in active discussions, problem-solving activities, and collaborative projects during class, is another option for allowing students to take tests remotely and receive immediate feedback.

Others include incorporating elements of games into learning activities to increase student engagement; assigning group projects that require students to collaborate online using tools like Google Docs, shared project management platforms, or virtual meeting spaces; utilizing virtual laboratory simulations and software tools to provide hands-on experience in science, engineering, and other practical disciplines; implement online peer review systems where students can provide feedback and critique each other's work, and integrate data analysis and visualization tools into relevant courses, enabling students to explore and interpret. In the same vein, Idaka (2018) posited that the inclusion of oral presentations, performance assessments, use of real-world examples in teaching, group working, more projects in the final year to develop independent learning skills, employers' involvement in teaching and assessment, and increase weighting in assessment for problem-solving and numeracy skills and lower weighting for theoretical knowledge are better teaching and assessment methods for the contemporary society.

Conclusion

According to the study's findings, re-engineering university education for employability in the digital economy requires a multi-faceted approach, which will involve integrating new digital-oriented courses, strategically developing synergies and collaborations between Nigerian universities and digital technology firms for students' internships, as well as adopting and successfully implementing innovative teaching methods, learning, and assessment.

Recommendations

The following recommendations were put forward based on the findings of the study:

1. National Universities Commission and the various universities in Nigeria should cooperate, harmonize, and integrate the 10 digital-oriented courses into the varsity system. This will afford candidates an opportunity to subscribe or enroll in the programmes for more employment prospects in world-renowned organizations.
2. Nigerian universities should establish industry advisory committees with members from digital technology firms. Through this platform, a more practical system to give students real-world experience might be established and put into operation. They support the convergence principle, according to which interested parties work together to find answers to the significant problems that our nation is currently experiencing.
3. Universities and the Tertiary Education Trust Fund (TET Fund) should collaborate to continuously support the training of instructors and lecturers in the area of cutting-edge, digitally-driven pedagogies. The academic community will have access to all

the facilities required to support innovative teaching and assessment strategies with adequate funding.

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