Curriculum Restructuring and Job Creation Among Nigerian Graduates: The Mediating Role of Emerging Internet Applications

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Abstract

Existing literature on entrepreneurship education has continually highlighted its potential for job creation. However, much attention has not been paid to the restructuring of the curriculum that can enable entrepreneurship education to thrive for job creation. This study used a structural equation modelling approach to understand the mediating role that the deployment of emerging Internet Applications (IAs) play in the nexus between curriculum restructuring and job creation. Being a quantitative study, a virtual snowball sample of 4,628 higher education graduates (males = 2,362; females = 2,266) participated in an electronic survey that was designed by the researchers. Results indicate that curriculum restructuring has a substantial link with the deployment of emerging Internet Applications and job creation respectively. The deployment of emerging Internet applications substantially contributes to the job creation activities of Nigerian graduates. There is a significant positive mediation effect of the deployment of emerging Internet applications on the link between curriculum restructuring and job creation by Nigerian graduates. Based on these results practical implications are discussed, while it was concluded that curriculum restructuring and the deployment of emerging Internet applications are very important variables for job creation.

Introduction

The primary goal of education is the holistic development of the person. It has the potential to improve society (Bassey et al., 2011). Education is both a cultural and a learning experience (Hill et al., 2020). This allows all individuals to develop cognitive and physical talents, as well as build values and beliefs (Ukpor, et al., 2012). The goal of curriculum development is to enhance the educational provisions of nations, as well as its instructional activities and

practices, to boost students' participation in the learning process (Althauser, 2015; Aydin, 2012). It is one thing to learn and acquire skills, as it is another thing to make use of such knowledge and competencies for self-relevance and social development. Despite the quantity of education many citizens have received over the years, one major issue that continues to probe the quality of knowledge acquired is graduates' productivity when they are employed. Some studies have documented that the job performance of many Nigerian graduates in the labour is not favourable (Abbas & Sagsan, 2020; Aninye-Ranor, 2020; Bassey et al., 2019; Dockery et al., 2020; Odigwe et al., 2018).

For instance, reports from large-scale research based on seven European countries indicated that the supply of early graduates is a mismatch for the demand conditions required for the jobs they undertook based on their educational qualifications (Yue & Zhao, 2020). The study of Yue and Zhao also indicated that tertiary institutions contribute seriously to the formation of sustainable abilities among graduates for creativity and economic development. It was also revealed by the cited study that creative workers are more likely to find jobs that are outside their areas of specialization. Between 2016 and 2021, available evidence from a large-scale Nigerian study suggests that 41.70% of all graduates in Nigeria generated at least one job, even though 58.30% of all graduates have not done so (Owan, et al., 2021). This indicates that there is a low rate of job creation among graduates despite the introduction of entrepreneurship education. To add to this, Owan et al. discovered that 58.96% of the graduates that own Small and Medium Enterprises had not employed any worker, while 41.04% have hired at least one employee from 2016 to 2021. Using a new formula that was developed by scholars, the job creation index of Nigerian graduates was calculated to be approximately 50% (Owan et al., 2021).

It is no longer news that the curriculum of higher education institutions in Nigeria has witnessed some changes over the last decade, ushering in innovations like entrepreneurship and skill-related courses. The aim was to reduce unemployment through self-employment initiatives powered by the vocational skills of graduates. Over time, these skills have been shown to help students overcome the issue of job unemployment and sustain the lives of many citizens (Gamede & Uleanya, 2019; Hahn, 2020; Nabi et al., 2017). It is little surprise, the revelation that the job creation index of Nigerian graduates is about 50%. This is because individuals are gradually becoming aware that possessing higher education certificates is not a guarantee for high paying jobs (Rasit & Tahar, 2018), especially with the high number of graduates completing school each year increasing unemployment (Ayoade, 2016; Ekong & Ekong, 2016). Thus, with the vocational skills acquired (from formal, informal and non-formal outlets), many graduates with positive mindsets have ended up setting-up small, medium to large scale enterprises. Other studies have also shown that these approaches increased the chances of graduates' employability (Agetue & Nnamdi, 2017; Malgas et al., 2017; Manabete & Umar, 2018; Okolie et al., 2021; Oyedele, 2018; Zreen et al., 2019).

However, since only a few graduates can create jobs that can employ others, it, therefore, means that higher education institutions have not done enough to alleviate unemployment. Although it was not revealed the sources where graduates acquired the skills,

they used in creating the jobs reported in Owan et al. (2021), it can be argued that many must have acquired such skills through apprenticeship or practical training outside the school. Consequently, many that relied on their certificates and knowledge acquired from school are still seen seeking employment. Some also tend to be underemployed as jobs that fitted their qualifications were not readily available. This observation tends to corroborate other studies that continually report underemployment among graduates worldwide (Jackson & Li, 2021; Ndiuini & Baum, 2021; Petreski et al., 2021; Searle, 2019), in developing nations (Kanwal et al., 2020; Ngwenya et al., 2020; Usoro et al., 2021) and Nigeria in particular (Agu et al., 2020; Angioha et al., 2018; Nwajiuba et al., 2020; Raifu et al., 2020).

It has since been argued that with technological innovation, job creation and unemployment should increase and decrease respectively (Balsmeier & Woerter, 2019; Choi & Kang, 2019; Kianian et al., 2015; Mortensen & Pissarides, 1998; Van Roy et al., 2018). This is due to the way technology is encroaching every aspect of life (Odigwe & Owan, 2020; Owan & Asuquo, 2021). Sadly, it has been reported in a study that there is a widespread lack of interest in new web-based technologies among Nigerian university students (Owan et al., 2021). The cited source provided further empirical evidence that so many Nigerian tertiary school graduates utilize emerging technologies for word processing, graphics and data science; yet, just a handful of graduates employ them for activities like printing, YouTube video creation and the design of online courses. This downtrend is quite surprising given the importance that various Internet applications (IAs) play for income generation.

IAs used to get, share, and display data from respective server systems (Yang et al., 2016). They are accessible exclusively over the internet and are completely inoperable without it. Among these applications are electronic device-based, digital technology-based, industrial internet-based, smartphone-based, smart home-based, smart grid-based, and smart city-based. The use of IAs enhances and enriches the educational process for students since smartphones are becoming students' living standards (Hussein & Nätterdal, 2015). Again, since the process of learning is a huge task for students, adopting IAs which is a part of their life would motivate them, thus fostering more academic and societal success. This study is therefore centred on curriculum restructuring for job creation using IAs among Nigerian Graduates. The study focuses on three areas including curriculum restructuring, DEIAs and job creation among graduates.

According to Mbanefo and Ebokab (2017), there are a lot of skills that are needed in science education for job creation, teachers are necessary to employ practical techniques in educating pupils, and many issues pose barriers to the acquisition of entrepreneurship skills in basic science education. Restructuring the curriculum as a way of enhancing students' skills would hence be appreciable in the community. Different studies have found that restructuring of curriculum to perk with the current development in the area enhance job creation. Though most studies have been centred on including entrepreneurship studies in the curriculum. (Andrade et al., 2018; Decker et al., 2014; Ferrier, 2013; Kim et al., 2018; Maina, 2014; Mehari & Belay, 2017; Obi & Okekeokosisi, 2018; Ozofor & Ozomadu, 2018; Rankhumise et al., 2020; Rey-Martí et al., 2016). A study in electrical/electronic engineering found that students'

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opportunities towards self-reliance are limited because the electrical installation has less attention in their curriculum (Okafor & Nwabueze, 2019).

Although studies on curriculum restructuring and deployment of emerging IAs appear to be scarce in the literature, a recent study found that there is a low extent in the reengineering of the curriculum by most higher education institutions (Owan et al., 2021). Reengineering the school curriculum may help promote students' use of emerging technologies for job creation. This implies that the present study is the first, or among the first kickstarting studies integrating curriculum restructuring and job creation among Nigerian tertiary institution graduates using emerging IAs. Having carried out a thorough search of the literature using internet search engines and sites, the researchers can say that at the time of carrying out this study, no previous studies on emerging IAs and curriculum restructuring exist. The closest studies were focused on Information Communication Technology (ICT) and educational achievement, self-efficacy, job creation, and so on (Dobber et al., 2017; Kaware & Sain, 2015; Khanna & Mehrotra, 2019; Lu et al., 2015; Raju et al., 2016; Ratheeswari, 2018; Rohatgi et al., 2016; Tchamyou et al., 2019). For instance, Raju et al. (2016) found that ICT promotes the achievement of educational objectives.

Based on the paucity of research concerning the areas considered in this study, the present study is of utmost importance since it may bridge the gap in the literature. The study would be relevant to the curriculum developing bodies of higher institutions because it may reveal the usefulness of restructuring the curriculum to create job opportunities through the use of emerging IAs. The study would also be important to lecturers and students because it may interest them to start adopting/embracing IAs in teaching and learning. The central aim of the study was to investigate the contribution of curriculum restructuring to job creation through the use of emerging IAs.

Research questions

The following research questions were framed to guide the study.
   i.   To what extent has curriculum restructuring (CR) contributed to the job creation (JC) activities of university graduates?
  ii.   To what extent does the deployment of emerging Internet applications (IAs) contribute to the job creation activities of university graduates?
 iii.   How much contribution has curriculum restructuring (CR) to the deployment of emerging IAs among university graduates?

Methodology

This research employed quantitative approaches to data collection using an in-depth survey. The study covered all Nigerian tertiary institution graduates who received their degrees between 2016 and 2021 and are eligible for or exempted from National Youth Service. This population

was chosen for three reasons because they graduated during a period when certain curriculum reforms were implemented in Nigeria's tertiary institutions. Secondly, a plethora of highly sophisticated technologies emerged, particularly in the areas of programming, artificial intelligence, and machine learning. Thirdly, the internet underwent several revolutions, gradually phasing out or modifying some outdated systems.

The virtual snowball technique was used in the study in obtaining an accidental sample of respondents, the researchers were unaware of the population standard deviation. An electronic questionnaire tagged "Curriculum Restructuring, Deployment of Emerging Internet Applications, and Job Creation Questionnaire (CRDEIAJCQ) was used for data collection. The researchers created the instrument using Google Forms and divided it into five sections. The first section featured a lengthy letter outlining the study's goals, participants, estimated completion times and informed consent. Section 2 was created to collect respondents' biographical information (such as sex, age, marital status, university attended, year of graduation, and NYSC service information). Section 3 had 13 items that evaluated curriculum restructuring practices. The items in section 3 were all structured on a four-point Likert scale, with answer possibilities ranging from Strongly Agree to Strongly Disagree. The first portion of section 4 consisted of a 16-item rating scale asking respondents to score their use of emerging internet applications for different objectives. The response options ranged from 0 (no acquisition) to 4 (complete acquisition) (very high extent of acquisition). The second portion of section 4 consisted of a 16-item checklist for respondents to mark off what they use emerging IAs for. Graduates' job creation activities were measured in Section 5 of the instrument, which included questions like current employment status, current employer, number of persons employed (for self-employed graduates), and the total number of small and medium-sized enterprises (SMEs) owned.

Even though the researchers developed the instrument, it was evaluated by six specialists (three of Economics of Education; three of Research, Measurement and Evaluation). After a trial test on 30 final year students at a public institution, the Cronbach alpha technique was used to establish the internal consistency of sections 3 and 4 of the instruments for reliability. The trial test was conducted on 30 final year students who had finished their final year examination but are not eligible to participate because they are yet to go for service or granted exemption. However, it was believed that they shared similar attributes a those who would be studied in the main research because they have completed the higher education curriculum. Curriculum restructuring and the deployment of emerging Internet applications both had reliability estimates of .83 and .91, respectively. Due to the nature of the variable, no reliability study was performed for job creation.

The researchers began collecting data by sending the link to the questionnaire to graduates who fit the criteria for selection through email, WhatsApp, Facebook, and Telegram groups. These respondents were encouraged to participate willingly and to share the link to the questionnaire with additional friends, family, and/or neighbours who fulfilled the previously mentioned inclusion criteria. They were informed to instruct those targeted peers to share the link with others. The link to the questionnaire was shared and distributed consecutively. A

moderating factor (year of graduation) was added to section 2 to eliminate any potential bias and guarantee that answers were obtained from respondents who met the inclusion criteria. The computerized survey garnered a total of 4,874 replies throughout the country after a four-month duration. Collected data were cleaned, converted, and recoded, with 246 replies from participants who did not match the participation requirements being eliminated. As a result, 4,628 replies matched the requirements for data analysis.

The respondents of this study are 51% males (n = 2362) and 49% females (n = 2266). The age distribution shows that 18.9% of the respondents of this study (n = 876) are less than 25 years; 21.1% (n = 976) are between 25 and 29 years; 20.4% are between 30 and 34 years (n = 943); 19.7% are between 35 and 39 years (n = 912); while those 40 years or older constitute 19.9% of the study's participants (n = 921). Regarding marital status, the analysis of respondents' demographic information shows that 65.4% of the respondents (n = 3,026) are single, 33.41% (n = 1546) are married, 0.9% (n = 41) are divorced, while 0.3% (n = 15) are separated from their partners. Regarding year of graduation, 9.5% (n = 439), 10.1% (n = 467), 9.7% (n = 447), 9.9% (n = 457), 9.6% (n = 446), 10.6% (n = 492), 10.5% (n = 488), 10.2% (n = 471), 10% (n = 465), and 9.9% (n = 456) of the respondents graduated in 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020 respectively. Regarding the National service status, the result of the analysis revealed that 90.5% (n = 4,188) have completed their service with the NYSC; while 9.5% of the respondents (n = 440) were currently serving. In terms service year, the result indicated that 19.5% (n = 901), 18.6% (n = 859), 17.3% (n = 802), 17.9% (n = 828), and 17.3% (n = 799) of the respondents completed their NYSC service in year 2016, 2017, 2018, 2019 and 2020 respectively, while 9.5% of the respondents serving in 2021.

Model specification

The SEM for the mediation model of this study is specified structurally in Fig. 1.
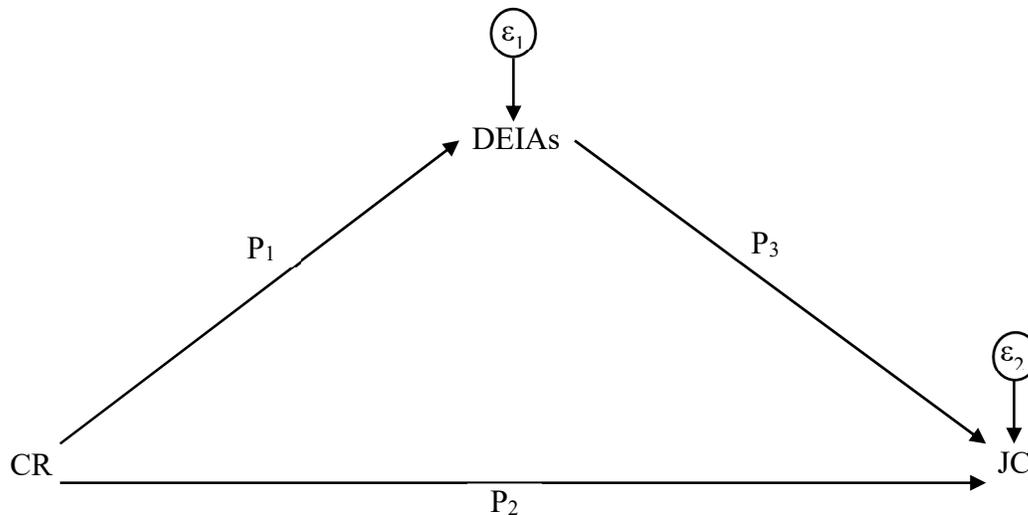

Fig. 1. Hypothesized one-factor mediation model showing causal relationships among the variables

From Fig. 1, the specific linear models of this study are specified as follows:

$$\text{DEIAs} = \beta_0 + \beta_{p1}\text{CR} + \varepsilon_{\text{DEIAs}} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\ 1$$

$$\text{JC} = \beta_0 + \beta_{p3}\text{DEIAs} + \beta_{p2}\text{CR} + \varepsilon_{\text{JC}} \dots\dots\dots\dots\dots\dots\dots..\dots\dots\dots\dots\dots..\ 2$$

Where:

M = the mediator variable (Adoptiopn of emerging Internet applications [DEIAs])

Y = the endogenous variable (Job creation [JC])

X = the exogenous variable (Curriculum restructuring [CR])

β_0 = the intercept or constant term;

$\beta_{p1} - \beta_{p3}$ = the standardized regression weights of the partial effects of CR and DEIAs in the model;

ε = The error term associated with outcome variables DEIAs and JC

Results

Research question 1

To what extent has curriculum restructuring (CR) contributed to the job creation (JC) activities of university graduates? The result of simple linear regression analysis in Table 1 shows that CR has a contribution of 92% to the total variance in the JC activities of Nigerian graduates. The result implies that 8% of the unaccounted portion of the variance is attributable to other explanatory variables not included in the model. Further evidence in Table 1 shows that the amount of variance in the JC activities of graduates, explained by CR is statistically significant ($F_{[1, 4625]} = 52057$, $p < .05$. By implication, the adjusted R squared value of .918 earlier reported, was not a product of chance. It was predicted in Table 1 that a 1% increase in the restructuring of the curriculum is connected with a 0.25% increase in the job creation activities of university graduates, so long as other variables remain constant.

Table 1: Simple linear regression analysis of the contribution of CR to the JC activities of university graduates

R	R^2	Adj. R^2	SE	B	β	t
.96	.92	.92	.62	.25	.958	228.16
Source	SS	Df	MS	F	P	
Regression	19926.20	1	19926.2	52057.55	.000	
Residual	1770.32	4625	0.383			
Total	21696.52	4626				

Research question 2

To what extent does the deployment of emerging Internet applications (DEIAs) contribute to the job creation (JC) activities of university graduates? A simple linear regression analysis was performed to answer this research question. As shown in Table 2, result the DEIAs explained 69% of the total variance in the JC activities of Nigerian graduates. By implication, other

extraneous variables not included in the model may account for the remaining 31% of the unexplained variance. The ANOVA result in Table 2 further revealed that the contribution made by the DEIAs to the JC activities of university graduates is statistically significant ($F_{[1, 4625]}$ = 10210.83, p < .05). Predictively, Table 2 revealed that as long as other variables remain unchanged, a 1% increase in the DEIAs will lead to a 0.19% increase in the job creation activities of university graduates.

Table 2: Simple linear regression analysis of the contribution of the DEIAs to the JC activities of university graduates

R	R^2	Adj. R^2	SE	B	t
.83	.69	.69	1.21	.19	101.05
Source	SS	Df	MS	F	p-value
Regression	14932.74	1	14932.74	10210.83	.00
Residual	6763.79	4625	1.462		
Total	21696.52	4626			

Research question 3

How much contribution has curriculum restructuring (CR) to the deployment of emerging Internet applications (DEIAs) among university graduates? The result of the analysis using simple linear regression analysis (see Table 3) shows that 74% of the total variance in the DEIAs is accounted for by CR. This result suggests that 26% of the unexplained portion of the variance is attributable to other predictor variables not enlisted in the model. The ANOVA section of Table 3 proved that the contribution of CR to the DEIAs is statistically significant ($F_{[1, 4625]}$ = 12979.31, p < .05). The prediction in Table 3 is that a 1% increase in curriculum restructuring relates to a 0.94% increase in the deployment of DEIAs, other things being equal.

Table 3: Simple linear regression analysis of the contribution of CR to the DEIAs among university graduates

R	R^2	Adj. R^2	SE	B	t
.86	.74	.74	4.77	.94	113.93
Source	SS	Df	MS	F	p-value
Regression	294823.5	1	294823.5	12979.31	.00
Residual	105056.3	4625	22.72		
Total	399879.8	4626			

Research question 4

To what extent does the deployment of emerging Internet applications (DEIAs) mediate the nexus between curriculum restructuring (CR) and job creation (JC)? To answer this research question, the standardized total, direct and indirect effects of a structural equation modelling approach was used (See Fig. 2). The result of our analysis revealed that CR has a standardized total effect of β = .958 on JC activities of graduates. Out of this effect, β = .936 is direct and β

= .022 is indirect. This implies that the indirect effect of .022 is due to the mediation of the DEIAs. To test for the statistical significance of the mediation effect, the results from Haye's PROCESS macro revealed that the mediation effect of DEIAs on the link between CR and JC (β = .0220) falls within the lower and upper limits of the bootstrapped confidence intervals -.0057 and .0503, with a bootstrapped standard error of .014. This implies that the mediation of DEIAs on the nexus between CR and JC is significantly different from zero. Therefore, DEIAs positively and significantly mediate the association between CR and JC.

Based on these results, the following equations are fitted:

$$\text{DEIAs} = -8.274 + 0.859_{CR} + 0.182 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\text{ 1}$$

$$\text{JC} = -3.243 + 0.26_{DEIAs} + 0.936_{CR} + 0.028 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\text{ 2}$$
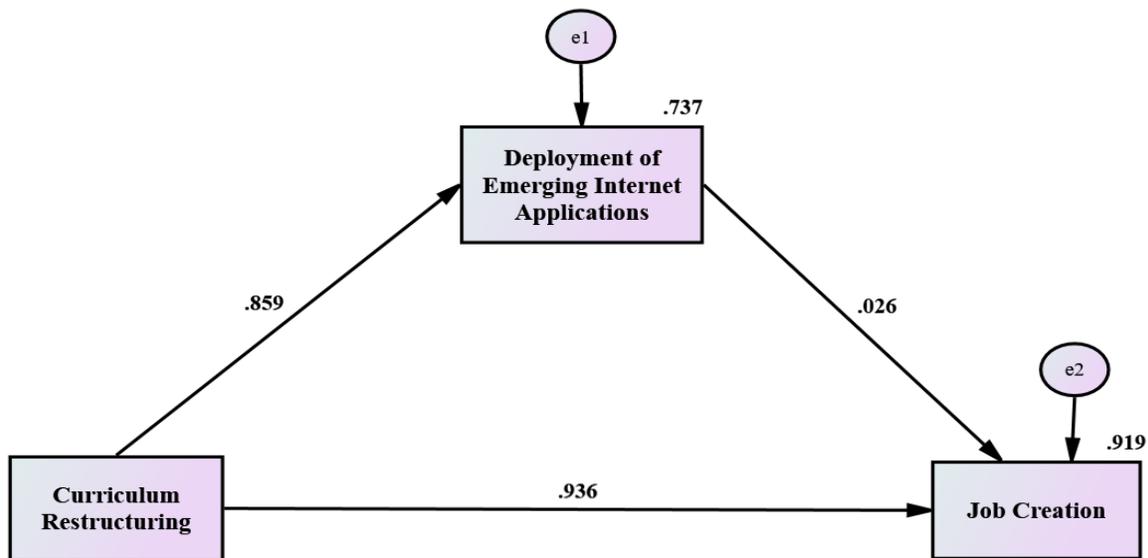

Fig. 2: Fitted one-factor mediator model showing the mediation of DEIAs on the nexus between CR and JC

Discussion

This study was designed to inter-link curriculum restructuring (CR), deployment of merging technologies (DEIAs) and job creation (JC) among Nigerian higher education graduates. The quantitative research method was used with primary data collected from an electronic survey. Our analysis proved that curriculum restructuring has a substantial link with the deployment of emerging IAs and job creation respectively. This result implies that when the curriculum of the educational system is reengineered, Nigerian graduates are more likely to adopt current technologies for various purposes and create jobs. This implies further that the restructuring of the school curriculum may reduce unemployment in Nigeria. The result is explainable because the restructuring of the curriculum may lead to schools offering more STEM-based courses and those that meet the current needs of Nigerian society. The curriculum implementation phase

may also allow for lesson contents and learning experiences that are skill-based to be offered. The acquisition of skills and competencies are the requirements for the effective use of technological products and job creation. This result aligns with the position of other studies that the introduction of entrepreneurship programmes to the school curriculum increases the chances of graduates' employability through job creation (Agetue & Nnamdi, 2017; Manabete & Umar, 2018; Okolie et al., 2021; Zreen et al., 2019).

It was also confirmed in this study that the deployment of emerging Internet applications substantially contributes to the job creation activities of Nigerian graduates. The finding implies that a high rate of job creation is connected to a high rate of deployment of emerging IAs. Thus, graduates that can utilize emerging Internet applications are more likely to create jobs than those that do not. The result should not be a surprise because many firms are constantly in search of manpower with the capacity to utilize state-of-the-art devices for work performance. Possessing the ability to manipulate such devices may enable graduates to grab such opportunities rather than firms seeking skilled personnel from overseas. Furthermore, experience has shown that many jobs have been created by skilled personnel through training initiatives. This suggests that graduates with the capacity to utilize emerging IAs may start earning from teaching others how to use the same or similar technologies. This result corroborates the finding of Mbanefo and Ebokab (2017) that there are a lot of skills that are needed in science education for job creation; thus, teachers need to employ practical techniques in educating learners to acquire such skills.

Lastly, the current study established a significant positive mediation effect of the deployment of emerging Internet applications on the link between curriculum restructuring and job creation by Nigerian graduates. This result implies that the effect of curriculum restructuring on job creation (earlier discussed) can be strengthened significantly if students adopt emerging IAs. This finding suggests that graduates of a reengineered curriculum that adopt emerging IAs are more likely to create jobs than their colleagues that do not adopt emerging Internet applications. The boost that curriculum engineering receives from the deployment of emerging IAs to push job creation activities further is due to the diverse perspectives DEIAs brings. While the restructuring of the curriculum will equip learners with the needed skills, DEIAs provides a platform for them to practice or demonstrate such skills for useful purposes.

Conclusion

The conclusion reached in this study is that curriculum restructuring and the deployment of emerging Internet applications are very important variables for job creation. Curriculum restructuring offers students the opportunity to acquire relevant skills for effective functioning in contemporary society. However, the deployment of emerging IAs provides them with the opportunity to make meaningful use of such skills. Although both CR and DEIAs can function independently for graduates to create jobs, job creation chances are higher when both variables are jointly practised. Therefore, efforts must be made by all stakeholders to reengineer the

higher education curriculum for future job creation among graduates. Graduates must ensure that the latest technologies across different fields are adopted for increased job creation in Nigeria.

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