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INNOVATION MANAGEMENT AND EFFECTIVENESS OF EDUCATIONAL RESEARCH IN TERTIARY INSTITUTIONS IN CROSS RIVER STATE, NIGERIA

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ABSTRACT

This study investigated innovation management and effectiveness of educational research in tertiary institutions in Cross River State. One research question and one null hypothesis were formulated to direct the study. The study adopted factorial research design. Census technique was adopted by the researcher in selecting the entire population of 80 participants from four (4) tertiary institutions in Cross River State. “Innovation Management Questionnaire (IMQ)” and “Effectiveness of Educational Research Rating Scale (EERRS) were used as instruments for data collection. The reliability of the instruments was established through test-retest method and reliability estimates of .89 and .86 were obtained. The null hypothesis was tested at .05 level of significance using multiple regression analysis with the aid of SPSS version 21. Findings from the study established a composite contribution of 70.5% of data management innovations, research ethics management, provision of research grants to effectiveness of educational research ($Adj. R^2 = .705$). The findings of this study also established that; data management innovations, research ethics management, and provision of research grants jointly has a significant influence on effectiveness of educational research ($F = 64.055, p < .05$). Data management innovations was the highest predictor ($\beta = .501, t = 7.778$), followed by research ethics management ethics management ($\beta = .311, t = 3.956$), and provision of research grants ($\beta = .291, t = 3.707$) in that order. Based on the findings, it was recommended, amongst others, that educational research data (including coded data) should be effectively managed by tertiary institutions using both manual and computerized data management devices with corresponding appropriate retrieval systems.

KEYWORDS: *Innovation; Management; Innovation management; Educational Research, Effectiveness of research; Tertiary Institutions.*

INTRODUCTION

Research capacity is an important prerequisite for developing countries to be able to use their human capital to the best advantage to achieve sustainable growth and development in the context of the knowledge economy. According to Olsson and Meek (2013), the accelerating importance of the global knowledge economy has had qualitative implications for

the way in which countries pursue economic development planning. One of the more significant consequences has been the attempts to integrate higher education and research systems into macroeconomic policies for stimulating technological renewal (research and innovation policy). The management of research, development and innovation has emerged as a specialised area within both funding agencies and higher

education institutions. Key areas include managing funds, liaising with funding bodies, project planning, implementation, monitoring and evaluation, as well as publications, research dissemination and, in some cases, commercialisation (Sideth, 2014). These indices mentioned above, and many others can be used to explain the effectiveness of educational research.

Effectiveness of educational research refers to the degree at which researches conducted in education and its related disciplines, strives to yield reliable and dependable results. It can also be the extent to which researches are conducted in line with global best practices to yield results that can be used to solve practical problems. For an educational research to be considered effective, the following must be in place: ability to solve real life problems, it must not challenge already existing knowledge, proper instrumentation must have been used, there must be clear evidence of research data, proper data storage and retrieval systems within the university, there must be mechanisms for sharing and distributing research results, there must be zero per cent plagiarism rate, it must be an actual field survey, appropriate statistical techniques and/or software must have been used in data analysis and so on. This goes on to imply that effectiveness in research activities is one of the ways through which new knowledge can be created or existing ones (knowledge) improved. As noted by Owan and Bassey (2018), the goal of every research is to solve a unique problem within the environment or to contribute to already existing knowledge by filling gaps that may exist in the literature. The means through which research reaches its end is through proper decisions that are made through inferences and deductions. Inferences are best made if there are empirical evidence to justify such decisions (Owan & Bassey, 2018).

In tertiary institutions in Cross River State currently, the state of educational research cannot be considered as very effective. This situation arises, perhaps from lack of understanding of and lack of political commitment to expanding educational research opportunities, particularly in areas deemed to be politically sensitive. Policies and legal documents expressing a commitment to educational research are not supported in practice. It is commonly understood that research prepares the ground for reforms and for improvements in the quality and effectiveness of policy processes and implementation. Public tertiary institutions need financial commitment from the government and external assistance agencies if they are to make any progress in developing their research capacity. While the government may have made some financial commitment to enhance research in Cross River State, it is difficult to trace exactly where and how large the commitment is. The way educational research is also being conducted in our tertiary institutions is also questionable. Many times, research data are often

falsified with the intent of arriving at desired results as opposed to the actual position of things. All these negative issues bordering around educational research have hindered the efficacy of research problem solving and will continue to lose quality if innovations and new dimensions are not integrated.

Innovation management refers to the act of ensuring that new ideas needed to change the way things are currently done, are developed, guided, and tailored towards ensuring that appropriate practices are followed. Innovation management is a continuous process which changes based on time changes. It also goes on to imply that innovations that are currently in place which are generally accepted as having met global best practices, are controlled, organized and monitored towards sustainability. In managing innovations, such practices and/or activities that are likely to degrade or breakdown good policies and existing structures are avoided.

According to Woźniak (2015), innovation management at the strategic level is primarily related to the determination of the main directions of changes in the company's activities in accordance with the assessments and expectations of consumers and based on the analysis of competitors' actions and cooperating entities. Bülbül, (2012) disclosed that we live in a World of radical changes occurring in many areas and where scientific and technological advancements keep a fast pace, and global competition comes up to the forefront. The changes occurring deeply influence not only all societies and individuals but also all organizations no matter what their main areas of engagement are (Bülbül, 2012). In this process of change, only those organizations which adopt the innovative culture and successfully achieving the innovative structure in them get enormous gains in terms of environmental fitness and adaptation to developments. In this sense, innovation poses vital importance for the success and sustenance of organizations (Bülbül, cited by Bülbül, 2012). However, innovation, which is vital for organizations as prescribed, doesn't occur suddenly, but requires a lot of work and efforts pursued according to a plan. Since organizations can neither inherit innovation as part of their legacy nor purchase it. Therefore, innovation should be created and sustained within the organization (Dobni, 2006).

The objective of creating innovation within the organization requires vision, deliberation and a strong belief. In addition, for a successful organization, the right conditions, structure, culture and climate should be created, as well as proper directions for the organization and innovation should encompass all areas and aspects of the organization. More importantly, the organization should be filled with right people who possess the required skills, attitudes and behaviours towards innovation (Watt, 2002). There are so many innovations

already in place as a result of technological developments. This paper is concerned with data management innovations, research ethics management, and provision of research grants.

Data management is an administrative process that includes acquiring, validating, storing, protecting, and processing required data to ensure the accessibility, reliability, and timeliness of the data for its users (Ngdata, 2018). Educational research data management (ERDM) refers to the process of collecting, processing, filing/storing, and retrieving and sharing educational research data, including all relevant research files and documents when needed (Owan & Bassey, 2018). They stressed further that, it is a term that describes the organization, storage, preservation, and sharing of data collected and used in a research project. It also involves decisions about how data will be preserved and shared after the project is completed (Owan & Bassey, 2018). Thus, data management innovations refer to those new trends in data management which are supposed to be adopted by scholars and researchers for improved efficiency, reliability and effectiveness. In Education, current trends in data management include: school information management (SIM), education management information system (EMIS), use of computer programs for data management and analysis, amongst others.

Research ethics management refers to the conscious effort made by all scholars, researchers, and supervisors in ensuring that proper procedures, rules, patterns and prescribed behaviours are followed in carryout studies. The aim is to ensure that data falsification issues are eliminated from the research process. It was revealed by Owan and Bassey (2018) that, managing research data is not without problems. Some of the challenges in research data management (RDM) identified include: copyright, data licensing, erroneous interpretation of data, data security, data privacy, mindset, method of data storage/retrieval (Owan & Bassey, 2018). All these problems can simply be put as ethical issues in educational research. Other issues that can also be added include: data falsification, plagiarism, swapping of old dates for new ones, poor citations and referencing, filling research instruments without the actual respondents and many others.

Provision of research grants refers to the support and funds provided by the government and other organizations to researchers which enables them to carryout investigations smoothly, and for publishing the results of such studies in learned Journals and other such publication ventures. "Increased funding level has allowed increased flexibility in how we approach our research, which should have a positive impact on our productivity and which is having a very positive effect on graduate student training" (Ballou, Mishkind, Mooney & van Kammen, 2002).

In terms of provision of research grants, Ballou et. al. (2002) conducted a survey on efficiency of grant

size and duration principal investigator (PI) FY 2001 grant award survey and institutional survey. Principal Investigators who indicated that additional funding would benefit their work were asked the extent to which they felt this additional funding would affect the quality, duration, or number of experiments they performed or their ability to recruit the highly qualified labour needed to conduct high-quality research. Findings showed that; more than half said that additional support would improve their research by allowing for a substantial increase in the number of experiments, tests, or subjects. 96% indicate that they pursue innovative ideas. 92% indicated that they will collaborate with researchers in their area of research. 92% also indicated that with adequate funding support, they will achieve their research objectives within the specified time.

Eighty-four per cent (84%) disclosed that they will collaborate with researchers in different areas of research, while 82% of the respondents indicated that they will disseminate their research findings. Those that believed that they will integrate research activity into their teaching and training if supported with funds were 81%; 79% though they will establish mentoring or other research-based education activities; 69% will develop partnerships with industry, other educational institutions, or national laboratories if funds were made available to them; 67% thought that they develop instrumentation or other enhancements for the research and education infrastructure. Those that thought they will access state-of-the-art equipment were 67%; 64% of the respondents indicated that they will improve public understanding of the project 64% if funds were provided (Ballou et al, 2002).

STATEMENT OF THE PROBLEM

The primary purpose for establishing institutions of higher learning is for training individuals and for research. Scholars within tertiary institutions are expected to carryout investigations in order to solve problems within their immediate environment, or in the society at large. It is expected under an ideal situation that these studies be conducted with all amount of efficiency so that the results obtained may be reliable, valid and applied to solving educational and societal problems. This means that the right tools are supposed to be used, and the necessary support provided in order to aid scholars, carry out empirical investigations.

Unfortunately, within the tertiary institutions in Cross River State, there seem to be no such visible incentives for conducting researches by lecturers and there is minimal or no link evident, between research achievements and either promotion or pay rises. The gaps come in many forms. First, there is a lack of strong political commitment, which combines with a weak national research capacity to push the responsibility for research onto public universities, colleges and public research institutes. The level of understanding of the

importance of research is not high among Cross River State political leaders. Policy decisions, for example, are often based more on assumptions, values and personal experiences, rather than on systematically collected data. More broadly, there seems to be no sound appreciation of the relevance of research results to the future economic independence and prosperity of Cross River State. At present, it is easier to buy solutions for complex problems in agriculture and industry from abroad, rather than invest in the development of a strong national research capacity in our tertiary institutions. The capacity for research in Cross River State is not yet well developed.

It was based on these setbacks that the researchers consider that if certain innovations are properly managed within the sphere of education, it might perhaps improve the effectiveness of educational research in Cross River State. Thus, the problem of this study put in question form is that: what influence has innovation management on the effectiveness of educational research? This study sets out to answer this question.

PURPOSE OF THE STUDY

The general purpose of this study was to investigate innovation management and effectiveness of educational research in tertiary institutions in Cross River State. Specifically, the study sought to investigate the influence of:

- i. data management innovations, research ethics management, and provision of research grants on effectiveness of educational research.

RESEARCH QUESTION

The following research question was posed to guide the study.

- i. To what extent does data management innovations, research ethics management, and provision of research grants contribute to effectiveness of educational research?

STATEMENT OF HYPOTHESIS

The null hypothesis below was formulated by the researchers to guide the study.

- i. data management innovations, research ethics management, and provision of research grants has no significant influence on effectiveness of educational research.

METHODS

This study adopted factorial research design. This design was considered appropriate because factorial designs allow experiments to have more than one independent variable (factors), and either a dependent variable or dependent variables with categories (levels). In this study, three factors were jointly studied to determine their influence on the dependent variable (effectiveness of educational research).

The population of this study comprised the Dean, and Head of departments in Faculty of Education in universities; and all the Deans, and Head of departments (HODs) in all the schools in Colleges of Education in Cross River State. There are two universities in Cross River State with Faculty of Education. This include the University of Calabar (UNICAL) and Cross River University of Technology (CRUTECH). There are two Colleges of Education in the state including Cross River College of Education, Akamkpa (COEA), Federal College of Education, Obudu (FCEO). The population of this study is presented on Table 1 for clarity.

TABLE 1
Population distribution of the study (N= 80)

School	Number of Dean(s)	Number of HODs	Total
UNICAL	1	13	14
CRUTECH	1	2	3
COEA	5	22	27
FCEO	7	29	36
Total	14	66	80

Census technique was adopted by the researchers in selecting the entire population of 80 participants from four tertiary institutions in Cross River State. Census technique is used in situations where the population to be studied is small or manageable such that, all the elements in it could be studied in entirety. This approach was considered appropriate due to the manageable number of deans and heads of departments in Cross River State, Nigeria.

Two set of questionnaires were used as instruments for data collection. This included “Innovation Management Questionnaire (IMQ)” and

“Effectiveness of Educational Research Rating Scale (EERRS). The instruments were developed by the researchers with the former (IMQ) having 30-items that were organized on a four-point Likert scale of and was used to measure the three sub-variables of the study. The latter (EERRS), comprised ten items arranged on a scale of Very effective (VE), Effective (E), Fair (F) and Not effective (NE). The variables were all measured continuously at the interval level. The reliability of the instruments was established through test-retest method after a trial testing was conducted using 60 Lecturers from UNICAL and CRUTECH who were randomly

selected and were not part of the study’s sample. After two weeks, the same instrument was administered to the same set of respondents. Both administrations were correlated using Pearson Product Moment Correlation Analysis. The result realized from the reliability analysis of the instrument were 0.89 and 0.86 respectively. The indication of these results was that, the instrument was internally consistent in measuring what it purported to measure.

The collected data were prepared on a person by item matrix using a computer spreadsheet program (Microsoft Excel version 2016). The null hypothesis was tested at .05 level of significance using multiple

regression analysis with the aid of IBM SPSS (Statistical Package for the Social Sciences) software version 21.

PRESENTATION OF RESULTS

Research question one

To what extent does data management innovations, research ethics management, and provision of research grants contribute to effectiveness of educational research? In answering this question, the results of Multiple regression analysis model presented in Table 2 was used.

TABLE 2.

Summary of regression model of the contributions of data management innovations, research ethics management, and provision of research grants to effectiveness of educational research in Cross River State, Nigeria.

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.847 ^a	.717	.705	5.328	

a. Predictors: (Constant), data management innovations, research ethics management, provision of research grants.

The results presented in Table 2 indicates a high positive relationship between data management innovations, research ethics management, provision of research grants and effectiveness of educational research (R= .847). The results further disclosed that, the three variables (data management innovations, research ethics management, and provision of grants) contributed 70.5% (Adj. R² = .705) to the total variance in effectiveness of educational research. By implication, the remaining 29.5% was due to other factors not considered in this study. Although the variance was high, it is yet to be known if it was statistically

significant in predicting the effectiveness of educational research. Thus, there is need to test for significance as shown below.

Hypothesis one

Data management innovations, research ethics management, and provision of research grants has no significant influence on effectiveness of educational research. The result of the analysis of data using one-way analysis of variance of the regression analysis is presented in Table 3.

TABLE 3

Analysis of variance of the regression analysis.

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	5454.254	3	1818.085	64.055	.000 ^{*b}
1 Residual	2157.133	76	28.383		
Total	7611.388	79			

*Sig. at p < .05

The results presented in Table 3 shows that data management innovations, research ethics management, and provision of research grants has a significant influence on effectiveness of educational research (F = 64.055, p < .05). With this result, the null hypothesis was rejected while the alternate hypothesis was upheld. This implies that the adjusted R² value of .705 obtained in Table 2, was not due to chance. This means that 70.5% of the variance in the dependent

variable (effectiveness of educational research) could be accounted for jointly by data management innovations, research ethics management, and provision of research grants in tertiary institutions in Cross River State. However, in determining the variable with the highest influence and to further examine the various/respective contributions of the variables, the results presented in Table 4 was used.

TABLE 4

Relative contributions of data management innovations, research ethics management, and provision of research grants to effectiveness of educational research

Model	Coefficients ^a			T	Sig.	Rank	
	Unstandardized Coefficients		Standardized Coefficients				
	B	Std. Error	Beta				
(Constant)	-3.580	1.994		-1.795	.077		
1	Data management innovations	.525	.068	.501	7.778	.000	1 st
	Research ethics management	.320	.081	.311	3.956	.000	2 nd
	Provision of research grants	.298	.080	.291	3.707	.000	3 rd

a. Dependent Variable: Effectiveness of educational research

The results presented in Table further revealed that data management was statistically significant ($p = .000 < .05$), research ethics management was significant ($p = .000 < .05$) and provision of research grants was also statistically significant ($p = .000 < .05$) in predicting the effectiveness of educational research. The result also shows that is a difference in the predictions of the three variables of this study. Data management innovations was the highest predictor ($\beta = .501$, $t = 7.778$), followed by research ethics management ($\beta = .311$, $t = 3.956$), and provision of research grants ($\beta = .291$, $t = 3.707$) in that order.

DISCUSSION OF FINDINGS

The finding of this study established a high positive relationship between data management innovations, research ethics management, provision of research grants and effectiveness of educational research ($R = .847$). This result implies that an improvement in innovative practices such as data management, research ethics management and provision of grants, will lead to an improvement in the effectiveness of educational research. The findings of this study also established that; data management innovations, research ethics management, and provision of research grants has a significant composite influence on effectiveness of educational research ($F = 64.055$, $p < .05$).

The findings of this study also disclosed that, the three variables contributed 70.5% to the total variance in effectiveness of educational research. This variance was statistically significant and was not due to chance in predicting the effectiveness of educational research. Data management innovations was the highest influence ($\beta = .501$, $t = 7.778$), followed by research ethics management ($\beta = .311$, $t = 3.956$), and provision of research grants ($\beta = .291$, $t = 3.707$) in that order.

Respectively, it was discovered through the findings of this study that data management innovation has a significant influence on effectiveness of educational research. This finding has practical implications which are in line with the position of other scholars. This is because when data are appropriately

generated, harnessed, managed and stored, it allows for easy retrieval in the future thereby providing an avenue or a pool from where other researchers may obtain secondary data. In line with this result, Tripathi, Shukla and Sonker (2017) found that; in the libraries of the best 20 universities, there are research data consultation groups which help the researchers in maintaining and preserving data life cycles; they publish and deposit data to data repositories as per their requirements; they describe their data with metadata and save data in appropriate file formats preferably in non-proprietary formats; they manage and handle personal, sensitive data and adhere to the protection requirements; they backup data, organise and save qualitative data, reference and cite data, and license data; The university libraries studied have RDM policies.

It was also established through the findings of this study that; research ethics management has a significant influence on the effectiveness of educational research. This result may have been so because educational research ought to be carried out with ethical concerns at the back of the researchers' mind and with all amount of integrity especially with the data, and in conducting actual field surveys. The implication of this finding was that a decrease in research ethics management will decrease the effectiveness of educational research. This goes on to mean that ethical issues must be avoided if research in education must move to the next level. Such poor ethical issues that must be managed were identified by Owan and Bassey (2018) to include copyright, data licensing, erroneous interpretation of data, data security, data privacy, mindset, method of data storage/retrieval. All these areas must be given due consideration if research in education must be driven towards effectiveness

Lastly, this study disclosed through its findings that; provision of research grants has a significant influence on the effectiveness of educational research. This corroborates the finding of the study of Ballou et al (2002) which revealed that, 92% of the respondents indicated that with adequate funding

support, they will achieve their research objectives within the specified time; 84% disclosed that they will collaborate with researchers in different areas of research; 82% of the respondents indicated that they will disseminate their research findings; 69% believed they will develop partnerships with industry, other educational institutions, or national laboratories if funds were made available to them; and so on. Conversely, it can be added that where such provisions are denied to researchers, none of such intents or objectives can be achieved. This is especially true given the backwardness of research in Nigeria.

CONCLUSION

It was concluded generally based on the findings of this study that, innovation management has a significant relationship/influence on the effectiveness of educational research in Cross River State, Nigeria. Data management innovations, research ethics management, and provision of research grants significantly influence the effectiveness of educational research jointly and/or individually. Data management has the highest influence followed by research ethics management, and provision of research grants (in that order) on the effectiveness of educational research.

RECOMMENDATIONS

Based on the findings of this study, it was recommended that:

- i. Educational research data (including coded data) should be effectively managed by tertiary institutions using both manual and computerized data management devices with corresponding appropriate retrieval systems.
- ii. Researchers, scholars and the entire academia should endeavour to carry out investigations following proper ethics of research. All forms of data falsification and adjustment should be avoided by scholars.
- iii. The government, Non-governmental organisations, and even institutions of higher learning should from-time-to-time, provide financial supports in form of grants to scholars to enable them carry out empirical investigations and publish the results of such studies.

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