Research Article

Data Management Practices and Educational Research Effectiveness of University Lecturers in South-South Nigeria

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Abstract

The existing body of knowledge has witnessed gaps arising from the paucity of research literature on the quality of educational research output in higher education. This study shows how the management of data in higher education affects the quality of academic research conducted by university lecturers in South-South Nigeria. A sample of 602 lecturers were accessed during data collection and responded to two questionnaires (Data Management Practices Questionnaire – DMPQ and "Educational Research Effectiveness Questionnaire – EREQ). Multiple regression was employed in the analysis of data. Findings revealed amongst others that; data storage, data security, data retrieval, data sharing, and data re-use jointly contributed to the total variance in educational research effectiveness of university lecturers in terms of proper citations by 56.25%, problem-solving by 22.14%, knowledge creation by 34.50%, and generation of testable data by 36.88%. The five data management practices compositely influences the educational research effectiveness of university lecturers in terms of proper citations (F=152.25,p<.05), problem-solving (F=33.90,p<.05), knowledge creation (F=62.78,p<.05), and the generation of testable data (F=69.65,p<.05), is statistically significant. Based on the findings of this study, it was concluded that data management practices (storage, security, retrieval, sharing, and re-use) jointly and relatively contributes to the total variance in educational research effectiveness in terms of proper citations, problem-solving, knowledge creation and generation of testable data at varying extents. It was recommended, among others that, lecturers should practice the habit of managing research data in their personal computers and through manual channels. These records could become vital in the future for further problem-solving.

Keywords: Data, management, research, citation, storage, retrieval, sharing, effectiveness.

1. Introduction

The importance of data in research has become so important that there is a growing need for research data to be effectively managed. In recent times, many reputable journals advocate the submission of data alongside research reports. In the future, it will come as no surprise if data are made to be published in the same way as articles or along with articles. There is a growing concern in

less developed nations regarding how data are managed and the problems it poses to researchers who needs them. Although, at the moment, there seem to be no universal techniques or procedures for managing research data. However, if they are effectively managed, they should be effectively collected and used for desired purposes.

The goal of every research endeavour is to address societal issues that are peculiar to the milieu under focus. The context from which research reaches its ends is through a means that is propelled from the data gathered. Accordingly, Owan and Bassey (2018) posited that 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 evidences to justify such decisions (Owan & Bassey, 2018). It follows, therefore, that decisions (whether statistical or otherwise) are made based on evidences that are provided after data collection and analysis. It also makes sense to assert that without data, researches conducted in the field of education and beyond, would be baseless, speculative, and possess elements of bias. When researches in the field of education and related disciplines are conducted without bias, errors, and dishonesty, then the quality of researches produced can be said to be effective.

Bassey and Owan (2018) explained that the effectiveness of educational research refers to the degree at which researches conducted in education and related disciplines, strive to yield reliable and dependable results. It also deals with the conduct of research in line with global best practices to yield results that can be used to solve practical problems (Bassey & Owan, 2018). This implies that any research that is conducted without ethical considerations, poor reporting, inaccurate data analysis, and many more, is ineffective. The characteristics of effective educational research include the ability to solve real-life problems, it must not challenge what is widely known in the existing body of knowledge, use of proper instrumentation, clear evidence of research data, proper data storage and retrieval systems must be in place, there must be mechanisms for sharing and distributing research results, there must be a zero percent plagiarism rate, it must be an actual field survey (in the case of empirical studies), appropriate statistical techniques and/or software must have been used in data analysis (Bassey & Owan, 2018).

Following the characteristics of effective educational research as presented above, it is quite unfortunate and disheartening to point out that a deviation seems to exists between actual practices and expected practices. Many studies conducted in the field of education do not seem to be effective given the high rate of malpractices by some scholars when conducting researches. For instance, under ideal situations, a person only qualifies to be an author in a research work only when such a person has made a substantial contribution during the collection of data and manuscript preparation (Bassey & Owan, 2019). Within Universities in South-South Nigeria, it has been observed that many lecturers struggle to lead in papers they have not made any significant contributions to even qualify as authors (Owan & Bassey, 2019). There appears to be a high rate of plagiarism as many untoward lecturers make use of other scholars' works or data without giving credit to the original authors (Borghi, Abrams, Lowenberg, Simms & Chodacki, 2018).

Many Lecturers have attributed their ineffectiveness in carrying out surveys to be a product of Government unwillingness and lack of political commitment in supporting scholars with funds through research grants (Bassey & Owan, 2018). Thus, a few lecturers tend to be squeezing their limited resources from personal income to fund researches from field surveys to publication. It stands, therefore, to reason that some lecturers are making concerted efforts to prove their scholarship, by coughing out huge sums from the rarely and inconsistently paid salaries to fund studies. While the reasons provided by academics appear to be apt and justifiable, it seems the problem of ineffectiveness in educational research may not totally be attributed to poor funding. Considering that all Lecturers receive the same service conditions, why then are some appearing more effective than others? Issues of plagiarism (when drafting research reports) and poor research ethics are not connected to the government nor inadequate funding (Owan & Bassey, 2019; Bassey & Owan, 2019; Borghi, et al., 2018). Could it be that many of these scholars' lack information retrieval

skills? Are they data already collected and managed by repositories such as ministry of education and others that can help simplify the process of data collection? It was based on these probing questions that this study was undertaken to assess the association between data management practices and educational research effectiveness of lecturers in South-South Nigeria.

If research in education is to be likened to a vehicle, then data is the steering because it is what the driver uses to give the car direction, in the same way, data is used to offer direction on decisions researchers make. Data in the context of this study refers to any evidence that is provided to show proof of an earlier claim and/or that can be used to pass valid judgment on events, constructs, or phenomena. Data can be numerical, pictorial, graphical, auditory or textual so long as it lends itself for observations to be made, inferences to be drawn, and perhaps accurate conclusions to be reached. Ezeagu (2013) maintained that data is the raw material that is processed into finished information products. It only becomes useful to any organization after being processed into meaningful information (Ezeagu, 2013). Accurate data is a crucial factor in the successful planning of the financial, physical and human resources in the school system by Ministry of Education and other relevant agencies (Binuyo as cited in Ezeagu, 2013; Tripathi, Shukla & Sonker, 2017).

Just like other resources within the school system, data must be effectively managed to meet the purpose of collection. Data management practices are a series of activities that defines the cycle in which data can be effectively handled to yield desired results and to solve intended problems for which the data were collected in the first place. It is a systematic process and must be carefully carried out without errors. Erroneous data management practices will yield misleading results and will further make the output from such research to be unreliable. Research data management (RDM), encompasses activities related to the storage, organization, documentation, and dissemination of data (Borghi, et al., 2018), and is central to efforts made to maximize the value of scientific investment (Holdren, 2013), while addressing concerns related to the integrity of the research process (Collins & Tabak, 2014). Unfortunately, when surveys are conducted, many researchers often acknowledge that they lack the skills and experience needed to manage and effectively share their data (Barone, Williams & Micklos, 2017; Federer, Lu, Joubert, Welsh, & Brandys, 2015; Tenopir, et al., 2016).

Ezeagu (2013) asserted that data management plays an essential role in any growing organization like staffing, placement of students, recruitment which are aided by the use of a computer. Data management involves data modeling, data warehousing, data movement, database administration and data mining (Ezeagu, 2013; Verhaar, et al., 2017). According to Binuyo as cited in Ezeagu (2013), constraints to data management practices of school administrators include lack of storage facilities such as a computer, shelves, cupboard, file cabinet, file jacket, and lock up drawers for data processing, storage, retrieval, and utilization. Patel (2016) added that issues in research data management also include copyright, data licensing, erroneous interpretation of data, data security, data privacy, and mindset which poses difficulty of all to convince some researchers to accept the idea of their data being made available for reuse. There are several practices in data management including data collection, preparation, analysis, storage, security, backup, retrieval, sharing, publication, re-use, and shredding (Owan & Bassey, 2019). Due to space constraints, this paper did not explain the meaning of these practices (see Owan & Bassey, 2019). This paper was on hinged on data storage, data security, data retrieval, data sharing, and data re-use as practices of data management. The researchers considered these five practices of data management for this study because they appear to be alienated and rarely studied data management practices.

For a thorough understanding of what is already known/covered in the literature, some related empirical studies were reviewed. A study conducted by Bassey and Owan (2018) investigated innovation management and the effectiveness of educational research in tertiary institutions in Cross River State. It was established that there is a composite contribution of 70.5% of data management innovations, research ethics management, and provision of research grants to the effectiveness of educational research. The findings further established that; data management innovations, research ethics management, and provision of research grants jointly have a significant influence on the effectiveness of educational research (F = 64.055, p <.05).

Imboden as cited in Ezeagu (2013) carried out a case study of data analysis for decision making on education in developing nations. It was discovered that many of the countries even gathered more data than are analysed or even used in policy making. The situation was partly attributed to the fact that many data analysts do not have adequate knowledge of computer technology and are even ignorant of what analysis to do. In most cases, at the school level, people resort to calculators and simplistic estimation. Also, Ezeagu (2013) investigated data management practices of secondary school administrators in Nsukka Education Zone of Enugu State. The results of the data analysis revealed that the major ways adopted by the school administrators in management of data include the use of a computer, CD Rom, Microfilm, microfiche, flash disc, test scores, and questionnaire. Constraints to data management include requisite knowledge of managing data, lack of data storage, epileptic power supply, and inadequate fund.

Through the review of earlier studies, it was discovered that the area of data management as well as educational research effectiveness is very scanty in the literature, but not relatively new. Educational research effectiveness has not really been captured when compared with data management. The review showed that almost all the related studies cited, were conducted in South-eastern parts of Nigeria, with only one study which was conducted in South-South part of Nigeria. No foreign studies were found which are related to this study. In terms of approach and instruments used for the data collection, it was observed that all the studies had used varying methods, sample sizes, areas of studies, and instruments. The present study also adopted a unique and different approach from all other studies. It was based on the scarcity of research evidence on data management practices and educational research effectiveness that necessitated this study, as one of the means of bridging the identified gaps.

1.1 Contribution of the Research

Previous studies have attempted to show the importance of data in research, others have also attempted to mention some data management practices that must be followed as a cycle. To the researchers' knowledge, this study is the first to link data management practices to educational research effectiveness of university lecturers using empirical evidence from Nigeria. This study contributes to the existing body of knowledge by addressing the gaps arising from the paucity of research literature on educational research effectiveness.

2. Purpose of the Study

The main purpose of this study was to assess data management practices and educational research effectiveness of University Lecturers in South-South Nigeria. Specifically, this study investigated:
  i. The joint contribution of data storage, data security, data retrieval, data sharing, and data re-use to educational research effectiveness in terms of proper citations, problem solving, knowledge creation, and generation of testable data.
  ii. The composite effect of data storage, data security, data retrieval, data sharing, and data re-use to educational research effectiveness in terms of proper citations, problem-solving, knowledge creation, and generation of testable data.

3. Research Question

  i. What is the joint contribution of data storage, data security, data retrieval, data sharing, and data re-use to educational research effectiveness of university lecturers in terms of proper citations, problem solving, knowledge creation, and generation of testable data?

4. Statement of Hypothesis

i.   There is no significant composite effect of data storage, data security, data retrieval, data sharing, and data re-use on educational research effectiveness of university lecturers in terms of proper citations, problem solving, knowledge creation, and generation of testable data.

5. Methods

The study adopted a factorial research design. This design was considered most appropriate due to the multiple factors studied jointly to see their cumulative effects on the dependent variable. The area of this study is the South-South Nigeria which is the most oil-rich geopolitical zone in Nigeria. It is dominated by the Efik, Oron, Ibibio, Ijaw, Itsekiri tribes, among others. States in the South-South Nigeria are Akwa Ibom, Cross River, Bayelsa, Rivers, Delta, and Edo states.

The population of this study includes all the Faculty of Education academic staff in both public and private universities situated in South-South Nigeria. Thus, all universities with the Faculty of Education in the zone were selected for the study. Since the population standard deviation was unknown to the researchers, purposive sampling technique based on availability was adopted by the researchers in selecting the accessible Faculty of Education lecturers across the universities in the zone. Thus, a total of 602 lecturers were assessed based on their availability during data collection. The breakdown of the sample is presented in Table

Table 1: Sample distribution of the study showing Universities with Faculty of Education in South-South Nigeria

Schools	Location	Sample
Akwa Ibom State University	Akwa Ibom State	47
Ambrose Ali University, Ekpoma	Edo State	39
Benson Idahosa University	Edo State	32
Cross River University of Technology	Cross River State	54
Delta State University Abraka	Delta State	38
Ignatius Ajuru University of Education	Rivers State	49
Madonna University	Rivers State	30
Niger Delta University	Bayelsa State	43
Rivers State University	Rivers State	67
University of Benin	Edo State	55
University of Calabar	Cross River State	96
University of Uyo	Akwa Ibom State	52
	Total	602

Source: Field survey (2019)

Two instruments were used for data collection – "Data Management Practices Questionnaire (DMPQ)" and "Educational Research Effectiveness Questionnaire (EREQ)." These instruments were both designed by the researchers. The former (DMPQ) comprised 15 items that were grouped into five clusters, with each cluster having three items. The three items in each cluster were designed to obtain data with respect to the sub-variables of the independent variable. All the items in the questionnaire were laid on the revised four-point Likert Scale, i.e. Strongly Agree, Agree, Disagree, and Strongly Disagree. The latter (EREQ) comprised 12 items that were organized in four clusters, with each cluster having three items. Each cluster represented one of the four sub-variables of the dependent variables. The 12 items were also arranged on the revised four-point Likert scale as in the former (DMPQ). The reliability of the instruments was established through Cronbach alpha, and

estimates of .857 and .932 for both instruments were obtained. With these values, the instruments were both considered internally consistent for measurement.

The research question was answered, and the null hypothesis tested, at .05 level of significance using multiple regression analysis. The choice of statistical method was based on the purpose of the study and the nature of data that were collected continuously at the interval level (scale) of measurement which suits the assumptions of multiple regression analysis. All the results of this study were computed with the aid of Minitab software v18, and the results obtained are presented in the following section.

6. Presentation of Results

6.1 Research Question

What is the joint contribution of data storage, data security, data retrieval, data sharing, and data re-use to educational research effectiveness in terms of proper citations, problem solving, knowledge creation, and generation of testable data? As presented in Table 2, the results indicated that; data storage, data security, data retrieval, data sharing, and data re-use jointly contributed to the total variance in educational research effectiveness in terms of proper citations by 56.25% (Adj. R^2 = 55.88%, Pred. R^2 = 55.16%), problem solving by 22.14% (Adj. R^2 = 21.49%, Pred. R^2 = 20.38%), knowledge creation by 34.50% (Adj. R^2 = 33.95%, Pred. R^2 = 32.94%), and generation of testable data by 36.88% (Adj. R^2 = 36.35%, Pred. R^2 = 35.31%). Thus, other independent variables not included in the study could be held accountable for the remaining 43.75% (for proper citations), 77.86% (for problem-solving), 65.5% (for knowledge creation), and 63.12% (for generation of testable data) of the total variance.

Table 2: Summary of multiple regression model showing the joint contribution of data storage, data security, data retrieval, data sharing, and data re-use to educational research effectiveness of university lecturers in terms of proper citations, problem-solving, knowledge creation, and generation of testable data

Dependent variable	SE	R-sq	R-sq (adj)	R-sq (pred)
Proper citations	1.92277	56.25%	55.88%	55.16%
Problem-solving	2.63711	22.14%	21.49%	20.38%
Knowledge creation	2.41242	34.50%	33.95%	32.94%
Generation of testable data	2.29880	36.88%	36.35%	35.31%

Predictors: data storage, data security, data retrieval, data sharing, and data re-use.

6.2 Test of hypothesis

There is no significant composite effect of data storage, data security, data retrieval, data sharing, and data re-use on educational research effectiveness of university lecturers in terms of proper citations, problem solving, knowledge creation, and generation of testable data. The hypothesis was tested at the .05 alpha level using the Analysis of variance results of the regression model as shown in Table 3 to Table 6. From Table 3 results presented shows that the p-value of 0.000 is less than the .05 level of significance at 5 and 596 degrees of freedom. This result implies that the five independent sub-variables (data storage, data security, data retrieval, data sharing, and data re-use) had a significant composite effect on educational research effectiveness of university lecturers in terms of proper citations (F = 153.25, p<.05). Relatively, data storage data retrieval and data re-use were statistically significant in predicting educational research effectiveness of university lecturers in terms of proper citations. Data re-use is the highest predictor (t = 18.48), followed by data storage (t = 9.26), and then data retrieval (t = -2.88). However, data security and data sharing are non-significant predictors of

the dependent variable in terms of proper citations.

Table 3: Regression results of the composite and relative influence of data storage, data security, data retrieval, data sharing, and data re-use on educational research effectiveness of university lecturers in terms of proper citations

Source	DF	Adj SS	Adj MS	F-value	p-value
Regression	5	2832.78	566.56	153.25	0.000
Error	596	2203.44	3.70		
Lack-of-Fit	545	2159.52	3.96	4.60	0.000
Pure Error	51	43.92	0.86		
Total	601	5036.22			
Term	**Coef**	**SE Coef**	**t-value**	**p-value**	**VIF**
Constant	1.189	0.368	3.23	0.001	
Data storage	0.4408	0.0476	9.26	0.000	3.06
Data security	0.0184	0.0275	0.67	0.503	1.01
Data retrieval	-0.1375	0.0477	-2.88	0.004	3.08
Data sharing	-0.0261	0.0289	-0.90	0.368	1.17
Data re-use	0.5602	0.0303	18.48	0.000	1.25

Dependent variable: Educational research effectiveness of university lecturers in terms of proper citations

Table 4: Regression analysis of the composite and relative influence of data storage, data security, data retrieval, data sharing, and data re-use on educational research effectiveness of university lecturers in terms of problem-solving

Source	DF	Adj SS	Adj MS	F-value	p-value
Regression	5	1178.90	235.781	33.90	0.000
Error	596	4144.79	6.954		
Lack-of-Fit	545	3928.71	7.209	1.70	0.010
Pure Error	51	216.08	4.237		
Total	601	5323.70			
Term	**Coef**	**SE Coef**	**t-value**	**p-value**	**VIF**
Constant	3.505	0.505	6.94	0.000	
Data storage	0.0343	0.0653	0.53	0.599	3.06
Data security	-0.0422	0.0377	-1.12	0.263	1.01
Data retrieval	0.2456	0.0654	3.75	0.000	3.08
Data sharing	0.3185	0.0397	8.03	0.000	1.17
Data reuse	-0.0348	0.0416	-0.84	0.402	1.25

Dependent Variable: Educational research effectiveness of university lecturers in terms of problem solving

The results presented in Table 4 revealed a p-value of .000 which is less than the alpha level of .05 at 5 and 596 degrees of freedom. This provided enough statistical evidence to conclude in this section that the composite effect of data storage, data security, data retrieval, data sharing, and data re-use on educational research effectiveness of university lecturers in terms of problem-solving is statistically significant (F = 33.90, p<.05). Looking at the individual contributions, it can be seen that data retrieval and data sharing were significant respectively, in the prediction of educational research effectiveness of university lecturers in terms of problem-solving. The highest predictor of the two is data sharing (t = 8.03), before data retrieval (t = 3.75). However, data storage, security and re-use are non-significant predictors of educational research effectiveness of university lecturers in terms of problem-solving.

Table 5: Regression analysis of the composite and relative influence of data storage, data security, data retrieval, data sharing, and data re-use on educational research effectiveness of university lecturers in terms of knowledge creation

Source	DF	Adj SS	Adj MS	F-value	p-value
Regression	5	1826.69	365.34	62.78	0.000
Error	596	3468.57	5.82		
Lack-of-Fit	545	3325.57	6.10	2.18	0.000
Pure Error	51	143.00	2.80		
Total	601	5295.26			
Term	**Coef**	**SE Coef**	**t-value**	**p-value**	**VIF**
Constant	3.146	0.462	6.81	0.000	
Data storage	-0.0202	0.0597	-0.34	0.736	3.06
Data security	0.0041	0.0345	0.12	0.906	1.01
Data retrieval	0.1868	0.0599	3.12	0.002	3.08
Data sharing	0.5420	0.0363	14.94	0.000	1.17
Data reuse	-0.1492	0.0380	-3.92	0.000	1.25

Dependent variable: Educational research effectiveness of university lecturers in terms of knowledge creation

The results presented in Table 5 shows that the regression p-value of .000 is less than the .05 level of significance at 5 and 596 degrees of freedom. This result implies that the five predictor variables have a significant composite influence (F = 62.78, p<.05) on the educational research effectiveness of university lecturers in terms of knowledge creation. A cursory look at the relative contribution of each predictor variable, it was revealed that data retrieval, data sharing, and data re-use were the only significant predictors (p<.05) out of the five variables. Data sharing was the highest predictor (t = 14.94), followed by data retrieval (t = 3.12) and data re-use (t = -3.92) in that order. Non-significant predictors of the dependent variable in terms of knowledge creation include data storage and data security.

Table 6: Regression analysis of the composite and relative influence of data storage, data security, data retrieval, data sharing, and data re-use on educational research effectiveness in terms of generation of testable data

Source	DF	Adj SS	Adj MS	F-value	p-value
Regression	5	1840.28	368.056	69.65	0.000
Error	596	3149.55	5.284		
Lack-of-Fit	545	3004.64	5.513	1.94	0.002
Pure Error	51	144.92	2.842		
Total	601	4989.83			
Term	**Coef**	**SE Coef**	**t-value**	**p-value**	**VIF**
Constant	2.063	0.440	4.69	0.000	
Data storage	0.2139	0.0569	3.76	0.000	3.06
Data security	0.0340	0.0329	1.04	0.301	1.01
Data retrieval	0.0578	0.0570	1.01	0.311	3.08
Data sharing	-0.0339	0.0346	-0.98	0.327	1.17
Data reuse	0.4570	0.0362	12.61	0.000	1.25

Dependent variable: educational research effectiveness in terms of generation of testable data

The results in Table 6 disclosed that the regression p-value of .000 is less than .05 alpha level at 5 and 596 degrees of freedom. This leaves enough evidence to conclude that the composite effect of data storage, data security, data retrieval, data sharing, and data re-use on educational research effectiveness of university lecturers in terms of generation of testable data is statistically significant. The results from the relative section of Table 6 indicate that only data storage and data re-use were

relatively significant in exerting effect on educational research effectiveness of university lecturers in terms of the generation of testable data. Out of the two significant predictors, data re-use is the highest predictor ($t = 12.61$) followed by data storage ($t = 3.76$). However, data security, retrieval and sharing are not relatively significant predictors of educational research effectiveness of university lecturers in terms of generation of testable data.

Generally, the results presented from Table 3 to 6 revealed that all the regression p-values were less than .05 alpha level at 5 and 596 degrees of freedom. Given these results, the null hypothesis was rejected while the alternate hypothesis was upheld. The implication of this outcome is that the composite influence of data storage, data security, data retrieval, data sharing, and data re-use on educational research effectiveness in terms of proper citations, problem solving, knowledge creation, and generation of testable data is statistically significant. The variance inflation factors (VIFs) as shown from table 3 to 6 indicates that data storage (with VIF = 3.06), and data retrieval (with VIF= 3.08) has moderate correlations with other predictive variables in the model respectively. Data sharing (with VIF = 1.17), and data re-use (with VIF = 1.25) has weak correlations with other predictor variables in the model. However, data security (with VIF = 1.01) has no correlation with other predictive variables. The variance inflation factor (VIF) as shown, indicates that data storage (with VIF = 3.06), and data retrieval (with VIF= 3.08) has moderate correlations with other predictive variables in the model respectively. Data sharing (with VIF = 1.17), and data re-use (with VIF = 1.25) has weak correlations with other predictor variables in the model. However, data security (with VIF = 1.01) has no correlation with other predictive variables in the model.

The regression equations of this study are as follows:

PC	=	1.189 + 0.4408 DST + 0.0184 DSE - 0.1375 DRE - 0.0261 DSH + 0.5602 DRU	1
PS	=	3.505 + 0.0343 DST - 0.0422 DSE + 0.2456 DRE+ 0.3185 DSH - 0.0348 DRU	2
KC	=	3.146 - 0.0202 DST + 0.0041 DSE + 0.1868 DRE + 0.5420 DSH - 0.1492 DRU	3
GTD	=	2.063 + 0.2139 DST + 0.0340 DSE+ 0.0578 DRE - 0.0339 DSH+ 0.4570 DRU	4

Where
PC = Proper citations; PS = Problem solving; KC = Knowledge creation; GTD = Generation of testable data; DST = Data Storage; DSE = Data Security; DRE = Data Retrieval; DSH = Data Sharing; DRU = Data Re-Use.

7. Discussion of Findings

The findings of this study established that; data storage, data security, data retrieval, data sharing, and data re-use jointly contributes to the total variance in educational research effectiveness of university lecturers in terms of proper citations problem-solving, knowledge creation, and generation of testable data at varying percentage levels. This study also discovered that there is a significant composite effect of data storage, data security, data retrieval, data sharing, and data re-use on the educational research effectiveness of university lecturers in terms of proper citations, problem solving, knowledge creation, and generation of testable data is statistically significant. The finding of this study corroborates the finding of Bassey and Owan (2018) which established that there is a composite contribution of 70.5% of data management innovations, research ethics management, provision of research grants to the effectiveness of educational research (Adj. R^2= .705); and further showed that, data management innovations, research ethics management, and provision of research grants jointly have a significant influence on the effectiveness of educational research ($F = 64.055$, $p <.05$).

The results of this study are not surprising because when data (which constitute the basis for making research decisions) are effectively managed, they would improve the quality of research output. Conversely, when data are not managed using appropriate techniques, it could pose difficulty in the collection, retrieval, and re-use of research output. It could further mislead the findings of researches if data are not properly secured against theft, viruses, and humans with malicious intent.

However, data management practices appear to be strange to many lecturers who are either unaware of the practices or lack the skills to effectively manage research data. Imboden as cited in Ezeagu (2013) revealed that many people do not have adequate knowledge of computer technology and are even ignorant of what analysis to do. In most cases, at the school level, people resort to calculators and simplistic estimation. The results of Ezeagu (2013) revealed that the major ways adopted by the school administrators in management of data include the use of a computer, CD Rom, Microfilm, microfiche, flash disc, test scores, and questionnaire. Constraints to data management include requisite knowledge of managing data, lack of data storage, epileptic power supply, and inadequate fund. It can be seen that a lot of people are still using analogous techniques to manage data when there are new and innovative approaches to data management in research generally, and educational research specifically.

In relative terms, this study further showed that data storage, retrieval and re-use were statistically significant in predicting educational research effectiveness of university lecturers in terms of proper citations. Data retrieval and sharing were significant respectively, in the prediction of educational research effectiveness of university lecturers in terms of problem-solving. Data retrieval, sharing and re-use were the only significant predictors of educational research effectiveness of university lecturers in terms of knowledge creation. Lastly, data storage and re-use were relatively significant in exerting effects on the educational research effectiveness of university lecturers in terms of the generation of testable data. This finding goes on to explain that when data are stored, they can be easily retrieved for use and re-use, and in making use of such data, appropriate citations have to be made to give credit to the sources where such data are hosted. Thus, citations cannot be made when data of other people are not used, and we cannot have access to data when they are not stored.

When research data are shared and retrieved, it creates room for problem-solving as the researchers make use of the available data to study observed phenomena. This also goes further to modify existing knowledge and/or creating new knowledge on how to handle the problem under study. It comes, therefore, as no surprise when this study revealed that data storage and re-use are significantly influential in predicting educational research effectiveness of university lecturers in terms of the generation of testable data because data stored, can offer a platform for future retrieval and re-use. Thus, those making use of such data in the future can generate testable data for re-use, especially if such data (before storage) were properly collected and managed.

8. Conclusion

The conclusion reached in this study generally is that data management practices have a significant influence on educational research effectiveness of University Lecturers in South-South Nigeria. Data management practices such as storage, security, retrieval, sharing, and re-use, jointly and relatively contributed to the total variance in educational research effectiveness in terms of proper citations, problem-solving, knowledge creation and generation of testable data at varying extent. Thus, Universities Lecturers who are good data managers are more research effective than their counterparts who are not good managers of data. The implication of this study is that proper data management practices will improve the quality of research in education and related disciplines in the future. By making data readily available in repositories and databases in ministries of education and other organisations which could further reduce the cost of gathering primary research data.

9. Recommendations

Based on the findings of this study, the following recommendations were made:
   i.   There should be an up-to-date database or data warehouse in Ministries of Education where researchers can easily access data in order to increase the quality of researches in the future and eliminate the problems of data fabrication and falsification.
   ii.   Lecturers should practice the habit of managing research data in their personal computers

and through manual channels. These records could become vital in the future for further problem-solving.

iii. The government at the Federal and State levels should provide grants and aids consistently to researchers in the field of education, as well as those in other fields. This will enable them to carry out surveys in small and large scales and publish (distribute) the findings of such studies to affected areas for improvement.

iv. Computerized techniques for data especially in the cloud (internet) is highly recommended for practice. This will promote data sharing, re-use, and security by encrypting such data with passwords and other security tools.

v. University lecturers should also ensure that they cite appropriately, sources from where they have collected secondary data from. This helps in eliminating the problem of plagiarism making the finding of researches effective and continuous.

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