Dynamics of Software usage on Research Quality: A Case of Academic Staff in Lagos State Tertiary Institutions

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ABSTRACT

The study investigated the dynamics of Software usage on Research Quality: A Case of Academic Staff in Lagos State Tertiary Institutions. The research design used for this study was an experimental research design where the pre-post test values were determined. The population of the study was all lecturers in Lagos State Tertiary Institutions while the target population was all academic staff in School of Education and Faculty of Education from colleges of education and university respectively. A purposive sampling technique was employed to select 10 lecturers each from four tertiary owned institutions aside Polytechnics in the state to make a total of 40 academic staff. Questionnaire titled "Dynamics of Software usage on Research Quality Questionnaire" (DSURQ) with 4likert scale type was used for data collection. The Cronbach Alpha value of 0.86 was derived which implies that the instrument is highly reliable and suited for the study. The data collected was analyzed using Analysis of Co-Variance (ANCOVA) to test the formulated hypothesis at 0.05 level of significance. The findings of the study revealed that training package, attitude of academic staff towards the apps and cognate knowledge of the apps usage on paper quality affects the quality of paper often times put forth. It concluded that conducting periodic training to staff on the use of statistical software in analysing data should be more timely and periodic as the study recommended that academic staff needs a wide variety of educational opportunities to improve their ICT skills which would in turn help them to function well in the use of SPSS, GENSTAT, Excel, E-view, LISREL, STRATA, BILOG, MULTILOG among others.

Keywords*:* Statistical Softwares; Research Quality; Research Design; Academic Staff, ICT, Dynamics.

1. INTRODUCTION

Education remains the bedrock of any nation as no economy can thrive well without the effective implementation of research findings. Studies by Fatokun, Egya and Uzoechi, (2016) revealed that research remains a revolving engine room for both developing and developed economies of the world today, hence the need to effectively invest in educational sector. Arguments have arose from different quarters that most countries in Africa rarely invest in education due to the lopsided nature of information reached by academics after a rigorous exercise of research activities. The holocaust of challenges confronting academics keeps piling up in virtually in all tertiary institutions. Insinuations from different quarters have always being that budding researchers are responsible for the poor quality of research due to their lack of experience in the field of education; How supportive have tertiary institutions being with respect to research?; What role do relevant bodies play in improving the quality of research in our institutions? among others. All these questions and many more would be answered only and only if the data generated are

analysed through the use of appropriate software packages thereby creating room for validity and reliability of data sourced (Akinnagbe, and Baiyeri, 2011).

Kerlinger, and Lee, (2000) said the use of software devices allows for a more reliable analysis and interpretation, should the data be adopted, adapted or self-constructed suited in any work. Examples of these softwares commonly used in education include, Statistical Package for Social Sciences (SPSS), Econometric View (E-VIEW), Analysis of Moment Structures (AMOS), LISREL, BI-LOG, MULTI-LOG among others. These Softwares are scientifically built for statistical analysis. Commonly use is the SPSS which was Long produced by SPSS Inc., it was acquired by IBM in 2009. The current versions (2014) or Version 22 are officially named IBM SPSS Statistics. Companion products in the same family are used for survey authoring and deployment (IBM SPSS Data Collection), data mining (IBM SPSS Modeler), text analytics, and collaboration and deployment (batch and automated scoring services). The software name stands for Statistical Package for the Social Sciences (SPSS), reflecting the original market.

These Statistical Softwares are widely used program for statistical analysis in social sciences, medicine, education and in all fields of human endeavour. It is also used by market researchers, health researchers, survey companies, government, accounting firms, economists, education researchers, marketing organizations, data miners, and others. The original SPSS manual has been described as one of "sociology's most influential books" for allowing ordinary researchers to do their own statistical analysis. In addition to statistical analysis, data management (case selection, file reshaping, creating derived data) and data documentation (a metadata dictionary is stored in the data file) are features of the base software. According to Benson (2012) the use of this software package includes: it allows for accuracy of data outcome, helps in drawing reliable inferences from empirical observations made, aids in making decisions on whether or not to reject hypothesized relations between phenomenon, assists in studying and comparing sources of variance of a given phenomenon, discourage the use of mental calculation of data among others. An Institution in India, Universitas Padjadjaran has added a course titled "SPSS" in Faculty of Psychology in a bid to allow academic staff read, understand and practicalise the software usage in other to teach learners as well. In addition, the addition of this course is with the hope that students can more easily calculate various statistics analysis so that use of software will be perceived as an easy device to use. In other words, the addition of this course will be expected to improve student attitudes toward statistics and achievement in statistics.

Software cannot be well internalized if ICT level of teachers is below expectation. Any institution that has a high percentage of its academic staff deficient in the use of ICT cannot excel in the smooth functionality of the device. The importance of ICT resources in empowering teachers and learners, and enhancing teaching and learning has been highlighted in several studies. The potentials of ICT resources to facilitate learning and improving teaching and quality of research have been established by various researchers (Kazu&Yavulzalp, 2008; Kirschner&Woperies, 2003). In addition, ICT resources technologies are computer based tools used by teachers to teach information and communication processing needs of an institution. These cover computer hardware and software, the network, and other digital devices like video, audio, camera, and so on, which convert information and resources (text, sound, motion, etc,) into digital form (Moursund&Bielefeldt, 1999). Successful integration of ICT resources in the school system depends largely on the competence and right attitude of lecturers towards the role of modern technologies in teaching and learning. Furthermore, ICT resources have very strong effect in education and it provides enormous tools for enhancing teaching and learning. There have been many studies that have highlighted the various ways that ICT resources may support teaching and learning processes in a range of disciplinary fields such as the construction of new opportunities for interaction between students and knowledge; accessing information and etc. ICT resources can have a useful effect on teaching and learning if it is used under right conditions including suitable sources, training and support.

ICT resources also offer the potential to meet the learning needs of individual students, to promote equal opportunity, to offer learning material, and also promote interdependence of learning among learners (Teo, 2008). The present and future teachers must be prepared to provide technology supported learning opportunities for their students and, therefore, need to have adequate ICT skills and digital competence themselves Marija and Palmira (2007) suggested that there were five important reasons for teachers to use ICT resources in education. it can be used for Motivation, distinctive instructional abilities, higher productivity of teachers, essential skills for information age, and offers support for new teaching techniques. In order to use ICT resources effectively, lecturers' attitude toward technology should be positive and they should be trained in using modern technologies in the field of education Kadel, (2005).

Chou (1997) also highlighted that computer experience influenced teacher attitudes toward software usage. Ropp (1999) found that there is significant relationship between computer access and hours of computer use per week and teachers attitudes. Computer literacy level of the teachers increases their integration of computer application in their teaching. Computer ownership has been consistently correlated to attitudes toward computers and positive effects for preparing towards a viable research exercise. Krumsvik (2008) emphasized that specific competence besides the ordinary technology competence is required from academics because the focus of their work is in information dissemination and instruction. He defined academics' ICT competence as one's proficiency in using ICT in a professional context with good pedagogic-didactic judgment and his or her awareness of its implications for the purpose of improving learning strategies. Kabakci (2009) proposed a framework for developing academics' ICT resources competence. His framework is based on a stage based model introduced by Zhao, and Cziko (2001) presenting teachers, technology use according to the following four stages: Survival stage, Mastery stage, Impact stage, and Innovation stage. Kabakci (2009) proposed that the most important aspect in the framework is that teachers should participate in professional development programmes according to the stages of technology use, while media resources related activities should be realized in the course of training as a well detailed training is targeted at enhancing high level of internalization.

An academic staff aside the primary task of teaching and assessment of learning, rendering of Corporate Social Service to the community (CSS) another is the writing of quality paper from time to time. The quality of research work put forth by such a member of staff depicts the extent of discovery and body of knowledge added to humanity. Research is one exercise expected to be carried out from time to time as it shows a symmetric trend in the line of duty while teaching. But most academics shy away from this exercise due to the intrigues involved in the use of software in analyzing the data gotten from the field (Fatokun, Egya, and Uzoechi, 2016). A great number of academics are not equipped with basic computer operational skills; therefore, for teachers to be able to integrate ICT resources into the school curriculum, groundwork must be done as the educators need to understand the dimensions of academics attitude as a means of developing teacher education curriculum relevant for the contemporary knowledge age (Lee, 1997). Yusuf and Balogun (2011) cited Yusuf (2005) on teachers' competence, teachers in Nigeria schools are not competent in basic computer operation and in the use of generic software and although, they have positive attitude towards the use of computer. They were of the opinion that the low level of ICT penetration in the Nigerian tertiary system, although the attitudes of teachers have been positive.

Although lecturers in tertiary institutions consider themselves to be knowledgeable and confident, due to the new expectations and challenges, they have a perception of a gap between their current knowledge and what they need to know to enhance their research and teaching. Training therefore became inevitable, training is generally seen to be a good thing; it is not too easy to send someone on an expensive ICT training course without being sure that the course is worthwhile, or even that it is the right course for the person. Before this is done, it is quite important to take into account the lecturers' own perceptions about the areas in which they feel proficient, those in which they feel there is need to be trained and those areas in which they have deficiencies but they are completely unaware of them. This process should be based on a well-designed needs analysis phase. A needs analysis may identify more than one training need. These needs should be prioritized, and either placed into a formal training plan, or prepare a database for future training. Hence, the need to identify the ICT training needs required of the lecturers in the various institutions for effective teaching and research (Lakkala, Ilomaki and Kantosalo (2011) Cited (Krumsvik, 2008).

1.1 Statement of problem
Putting up a comprehensive and well informed paper remains a skill that is appreciated in the academic environment. Application of statistical package in modeling of items, describing information and analysing of data remains a trait sort after by lecturers in virtually all disciplines and area of study. Researchers both locally and internationally are confronted with the problem of lack of technical know-how on how to use statistical package in analysing primary and secondary data, the nature of statistical tool to adopt in data analysis, availability of this packages in institutions, attitude of lecturers towards the use of this package among others. This study is out to investigate the dynamics of Software usage on Research Quality: (A Case of Academic Staff in Lagos State Tertiary Institutions).

1.2 Objective of the study
This study is designed to achieve the following objectives, prominent among them include:
a. To investigate how attitude of lecturers towards software package affects the quality of paper.
b. To identify the role of training package as it affects the quality of paper write up
c. To explain how background knowledge on statistical can affect quality of paper

1.3 Research Hypothesis

Ho_1: There is no significant effect of training package, academic staff attitude and software cognate knowledge of software usage on quality of paper.

1.4 Significance of the study

- The outcome of this study would be relevant to researchers in the sense that its findings would serve as a research bank and pool of resources for further studies on software usage in paper quality.
- Teachers would also find the study useful because its findings would also address the various ills of arm-chair writing by many lecturers in our institutions as many lecturers are known for manufacturing fake and irrelevant materials in the course of paper writing.

2. METHODOLOGY

Solomon IV Pre-Post experimental research design was used for this study. The researcher adopted this design because the samples were grouped into four groups and randomisation of respondents of all sort was carried out in the study as the outcome variables can be manipulated (Kerlinger and Lee, 2000). This design is very strong in that the demand for comparison is satisfied. The groups are statistically equivalent since subjects are assigned at random and consequently extraneous variables like history, maturation or regression are all controlled.

A 3x3x2 schematic type was used for the study as represented below:

E_1: O_{11} X_1 O_{12} (Pre-tested group)
E_2: O_{21} O_{22} (Pre-test group)
E_3: X_2 O_{32} (Unpre-test group)
C_4: O_{42} (Unpre-test group)

*Where $O_{11,}$ O_{21} – represents Pre-test measures and
                  $O_{21}, O_{22}, O_{31,}$ and $O_{42,}$ – represents Post-test measures
                  X_{1} and X_{2} ---- represents Treatment conditions

The population of the study was all lecturers in Lagos State Tertiary Institutions while the target population was all academic staff in School of Education and Faculty of Education respectively. The study adopts the purposive sampling technique to select 10 lecturers each from four tertiary institutions in the state to make a total of 40 academic staff in other to carry out the study effectively. Respondents were selected based on their willingness to participate in the study and being full time teaching staff in their various institutions and also have flair for the use of softwares in the course of writing papers. A four-point likert scale self-constructed questionnaire titled "Dynamics of Software usage on Research Quality Questionnaire" (DSURQ) was used for data collection. The numerical value of each response ranges from 4 to 1 with the highest rating of 4 indicating the highest level of agreement and the least of 1 showing the lowest level of agreement. The items on the questionnaire were validated by experts in educational measurement while the final draft of the questionnaire was pilot studied to an equivalent sample of ten respondents not used in the main study.

The Cronbach Alpha measure of internal consistency was used to determine the reliability. The reliability value of the questionnaire was 0.86 which implies that the instrument is highly reliable. Ethical consideration for the study was adhered to in conducting the research. We informed the respondents about the aims of the research, data management and their expected role in the research which enable them to give us their informed consent. Above all, we assured them of the confidentiality and the use of pseudonyms if necessary. The data collected were analyzed using inferential statistics of Analysis of Co-Variance (ANCOVA) to test the formulated hypothesis at 0.05 level of significance.

3. RESULTS

Research Question 1: Attitude of lecturers towards the use of statistical software on paper quality in tertiary institutions?

To answer this research question, mean and standard deviation of the data collected were computed and result is presented in table 1 below:

Table 1: Mean value of lecturers attitude towards software usage

S/N ITEM	Mean	SD	Rank
a. It's a difficult package that cant be easily understood	2.38	0.76	7th
b. Its not relevant in the field of education	2.49	0.88	6th
c. Figures can be manipulated by anybody	1.68	0.63	10th
d. Software usage is not useful in education	3.26	0.93	1st
e. Only arithmetic related disciplines can use the app.	2.72	0.73	5th
f. Difficult to use	2.92	1.13	3rd
g. Discourages data adaptiveness	2.83	0.62	4th
h. Its not a compulsory concept in education	1.83	0.86	9th
i. Educational phenomenon cant be explained with use of software	3.04	0.94	2nd
j. Software should not be used in education	1.95	0.81	8th

The table above shows the mean values and standard deviation of lecturers' attitude towards the use of statistical software on paper quality in tertiary institutions especially in Lagos State. This result indicates that most academic staff do not conform to the use of statistical software in education claiming that its not relevant and useful having the highest mean value of 3.26 and standard deviation of 0.93. Moreover, the second rated mean value from the table above (Mean=3.04; SD=0.94) is the statement that educational phenomenon cant be best explained with use of software due to the dynamic traits humans possess. The third rated mean value is difficulty in its usage (Mean=2.92; SD=1.13). This shows that some lecturers have tagged the usage of these softwares as being difficult.

The result shows that it discourages data adaptiveness by other scholars as the fourth item (Mean=2.83; SD=0.62); Only arithmetic related disciplines can use the app. had the fifth rated mean value (Mean=2.72; SD=0.73); Its not relevant in the field of education had the sixth rated mean value (Mean=2.49; SD=0.88); It's a difficult package that cant be easily understood had the seventh rated mean value (Mean=2.38; SD=0.76); Software should not be used in education had the eighth rated mean value (Mean=1.95; SD=0.81) and the ninth rated item, Its not a compulsory concept in education (Mean=1.83; SD=0.86). The least rated item for the instrument, figures can be manipulated by anybody have its mean and standard deviation values as (Mean=1.68; SD=0.63). This means that many academic staff belief that with the use of statistical software, figures can be manipulated by anybody who deems it fit to do so as such values cannot be verified.

Hypothesis 1:
There is no significant interaction effect of training package (treatment), attitude and knowledge on quality of paper.

Table 2: Summary of Analysis of Covariance (ANCOVA) on interaction effects of training package (treatment), attitude and knowledge on quality of paper

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	6543.654a	15	436.244	53.546	.000
Intercept	202.876	1	202.876	24.526	.000
Post test	137.041	1	137.041	28.827	.000
Training package	675.654	2	337827	54.770	.000
Attitude	211.725	1	211.725	20.100	.006
Knowledge	57.064	2	28.532	3.304	.041
Training package * attitude	213.093	2	106.54	5.05	.005
Training package * knowledge	119.219	4	29.80	2.67	.004
knowledge * attitude	118.811	2	59.40	3.089	.040
Training package * attitude * knowledge	3.963	1	3.963	3.43	.00
Error	898.150	39	23.029		
Total	82607.000	40			
Corrected Total	6149.992	37			

3.1 Interpretation
Table 1 shows that there is significant interaction effect of training package, attitude and knowledge on paper quality; $F_{(1,40)} = 3.43$, $P < 0.05$. This implies that training package, attitude of academic staff and their knowledge level on the use of these softwares have significant effect on the quality of academic papers written and presented hence the alternative hypothesis is hereby accepted. The table further shows a two way interaction effect that Training package and attitude on paper quality at $F_{(2,40)} = 5.05$, $P < 0.05$(significant interaction effect exists); a two way interaction effect that Training package and knowledge on paper quality at $F_{(4,40)} = 2.67$, $P < 0.05$(significant interaction effect exists) and a two way interaction effect that knowledge and attitude on paper quality at $F_{(2,40)} = 3.089$, $P < 0.05$(significant interaction effect exists).

Table 3: Analysis of Covariance (ANCOVA) showing significant difference in the Pre-Post test scores of the participants in the group

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	4232.844a	1 5	282.1896	40.542	.000
Intercept	184.804	1	184.804	24.526	.000
PRETEST	132.863	1	132.863	25.827	.000
POST TEST	345.431	1	345.431	33.432	.063
TREATMENTS	435.543	2	217.7	54.770	.000
Main Effect	653.654	3	217.88	55.304	.007
Error	675.654	39	17.3		
Total	67864.432	40			
Corrected Total	6149.992	3 7			

Table 3 shows that there is significant main difference between the pre-test scores at $F_{(1,40)} = 25.827$, $P < 0.05$ and Post-test scores of the participants at $F_{(1,40)} = 33.432$, $P > 0.05$. This implies that due to the effective and relevant treatment condition, significant difference was observed in the Post-test scores of participants on quality of paper outcome.

4. DISCUSSION OF FINDINGS

From the study it revealed that training package, attitude of academic staff towards the apps and cognate knowledge of the apps usage on paper quality is significantly interacted which depicts a synergy on the various moderating variables on quality of paper often times put forth. This study is in agreement with the works of Akinnagbe and Baiyeri, (2011) in "training needs analysis of lecturers for information and communication technology (ICT) skills enhancement in Faculty of education", who identified that lecturers need periodic training in data analysis using computer software irrespective of their age and experience. This is a clear indication that, to promote effective research in tertiary institutions, lecturers must be able to input, run and analyse data effectively using statistical software in other to ensure its reliability and efficiency of the results.

Effective and efficient training package leads to an improved paper presentation. The outcome of this work conforms to that of Hosein, (2008) and Tasie, (2011) who maintained that training is very important in academics as it serves as the true window through which other members of staff can be exposed to the various dynamics of information which comes along with the much talked about change especially in academic environment. Training on software packages is necessary in other to improve the quality of research publications of academic staff. When lecturers in the various institutions improve their analysis skill, the possibility of their supervisees (who are future academics) works would be of high quality. This could also contribute in solving some of the research problem in areas of choosing appropriate statistical tool for analysis which is a huge problem in paper writing.

According to Taise (2011) effective usage of this software package ensures accuracy of data outcome, draws reliable inferences from empirical observations made, aids in making decisions on whether or not to reject hypothesized relations between phenomenon, assists in studying and comparing sources of variance of a given phenomenon, discourage the use of mental calculation of data among others. Academic staff in Nigeria institutions suffers drastically from under-usage of these software apps. The rate at which these apps are used in analyzing items generated from papers is below expectation.

Unwin (2005), Smaldino, Lowther and Russel (2008) stressed that attitude towards software package goes along way in affecting the quality of paper put forth in academics. An academic staff who detest the use of IT devices such as statistical software apps and depend massively on its descriptive ability is likely to come up with a less empirical work because the data generated from such a work did not go through analytical process hence may be faulted by many scholars. Developing a negative attitude towards software usage only hinders the quality of paper produced as its usage allows for healthy verification through the replication of such studies in other climes thereby comparing their results.

5. CONCLUSION

This study assessed the dynamics of software usage on research quality: (A case of academic staff in Lagos State Tertiary Institutions). The role played by training of staff on the usage of this software in academics for improvement in pare quality cannot be underestimated. There is obviously a paradigm shift from the stand point of theoretical writing to empirical write-up in academic globally, as a careful understanding on the usage of this software would help validate ones paper thereby giving a bright stand point for other researchers to carry out similar work in a different clime. From the study it would be concluded that:

- Conducting periodic training of staff on the use of statistical software in analysing data should be more timely and periodic.
- The knowledge on software usage would promote more quality paper presentation especially in empirical studies.
- They also need to exemplify a willingness to explore and discover new technological capabilities that would enhance and expand learning experiences.

6. RECOMMENDATIONS

From the study, the following recommendations were put forth:

- Academic staff needs a wide variety of educational opportunities to improve their ICT skills. These could be in basic areas like SPSS, GENSTAT, Excel, E-view while they can build themselves up in advance packages like LISREL, STRATA, BILOG, MULTILOG among others.In-service teachers should be compelled as a matter of compulsion to update themselves on emergent programmes designed to improve the teaching profession.
- Periodic assessment of academic staff input to research works and contribution to knowledge should be carried out at intervals.
- To meet the educational needs of the new global organization, lecturers need continuing professional development in order to maintain and upgrade their skills.
- Efforts should also be made by institutions to looks beyond development of programmes that merely focus on training lecturers in the operation of computers and ICT literacy per se but plans to work actively towards enabling each member of staff to efficiently and effectively master ICT usage as an effective tool to improve teaching and research studies.

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