

A Proposed Model Using Ict with Training To Increase the Research Productivity of University Academics

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ABSTRACT

This paper presents a model regarding Information and Communication Technology (ICT) (SPSS, AMOS, Turnitin, EndNote and NVivo) with training to increase the research productivity of university academics. This aim was achieved by examining academic staff (ICT uses with training) to increase research productivity and the study was experimental and conducted at a public university in South Africa. The target population for the experiment consisted of academic staff from a university. The questionnaire was used based on two the theoretical frameworks, namely Technology Acceptance Model and Training Needs Assessment Model. The data were analyzed using WarpPLS 4.0 software. The main results of this study are a model, derived from the experiment and it has a high significant impact ($R^2 = 0.95$) on research productivity. In this regard, universities need to formulate strategies on ICT with training for researchers to use each software package in relation to improve their research productivity.

Keywords: Model, ICT Training, Increase, Research Productivity, University Academics.

Introduction

Research is understood “as the creation of new knowledge and/or the use of existing knowledge in a new and creative way so as to generate new concepts, methodologies and understandings” (Australian Research Council, 2010). The following extract from Altbach (2008) highlights the role of university research: “Research is the other core function of universities, dating back to the establishment of the University of Berlin by Wilhelm von Humboldt in the early 19th century (Ben-David and Zloczower, 1962). It has come to be the central value of top-tier universities in all countries, and academic rewards and institutional prestige for individual faculty members are bestowed largely on the basis of research productivity. Research is defined in different ways by various disciplines and can take many forms. Pure research—the discovery of new knowledge—is

generally considered the gold standard in terms of recognition and prestige. Nobel prizes are won for pure research. Applied research—increasingly emphasized as universities seek to generate income from research output—applies scientific discoveries to problems, commercial products or related practical goals. Research in the humanities may deal with interpreting texts or gaining insights on literature. Historical research may work from original data or may reanalyse existing research. Research in many scientific fields requires significant funding for laboratories and equipment. In other disciplines, research may need only basic library or internet resources. Research can thus take many forms and have different purposes. The focus on discovery, interpretation and originality links the vast array of research themes, methodologies and orientations”. However, in higher education, research productivity is still considered as low and measured must be sought to the remedy. In this relation, this study focuses low research productivity for the university academics and finally one could possible enhance their research productivity.

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Problem Statement

A noticeable trend in the research world is that academic staff tends to increase their research productivity. In Australia, a study conducted by Ramsden (1994), cited in Bentley (2009), on 890 staff at 18 higher education institutions over a five-year period found the average research output in universities to be low and “heavily skewed”. Similar findings were obtained from a survey conducted in 2001 in Norway by Kyvik (2003), cited in Bentley (2009), that research productivity might seem high, but there were still “inequalities in research output”, as raised by Fox (1983), cited in Ramsden (1994). Low research productivity and dwindling participation in research activities are also reported in the case of the Moi University, Kenya (Moi University Act 1984: article 4c, cited in Sulo et al. (2012). Similar results are presented in a report on the assessment of the research productivity of Nigerian universities by their National Universities Commission, which found that only 20 Nigerian universities (out of over 70) had an acceptable research output (National Universities Commission, 2005). A study conducted by Okiki and Iyabo (2013) indicated that the research productivity of the academic staff in Nigerian federal universities was lower in textbook publications, monographs, patents and certified inventions.

However, universities still face low and skewed research productivity and the cause for this is unknown. The ICT training for academics remains a challenge. Therefore, this research investigated possible challenges and suggested solutions that could be used for the effective implementation of ICT training to increase research productivity.

Aim and Objective

The aim of this study is to design a model for the increase in research productivity by academics in universities using ICT (SPSS, AMOS, Turnitin, EndNote and NVivo) with training.

In order to achieve the aim of this study, the following

research objective will be addressed:

- To examine research productivity using ICT (SPSS, AMOS, Turnitin, EndNote and NVivo) with training.

Literature Review:

The main purpose of this review is to study and identify relevant literature on the SPSS, AMOS, Turnitin, EndNote and NVivo for the increase of research productivity. The literature review will cover the ICT training on research productivity which will be examined include perceived usefulness, perceived ease of use, and acceptance level before and after training of the SPSS, AMOS, Turnitin, EndNote and NVivo.

Statistical Package for the Social Sciences (SPSS):

According to Triola (2011), “Statistics is the science of the planning studies and experiments, obtaining data and the organizing, summarizing, presenting, analysing, interpreting, and drawing conclusions based on the data”. SPSS (now called PASW Statistics) is a powerful tool for entering data, creating new variables, performing EDA, and performing formal statistical analyses (Learning SPSS, Data and EDA, n. d). Mills (2003) and Landau and Everitt (2004) stated that, in education and in the behavioural and social sciences, SPSS is a popular choice and it is a fairly user-friendly statistics software program that is windows-driven, and offers users a point-and-click way to generate the output. “In the era of computers, it is the high time to use computers in our statistical calculations, through the use of SPSS package during our research project. No doubt, before the advent of SPSS Package, many researchers have been using computers for their statistical analysis of data, but that process was not economical in terms of time, money and efforts” (Department of Education and ICSSR, 2014).

Analysis of Moment Structure (AMOS):

Wu et al. (2014:325) stated that “Analysis of moment structure (AMOS) implements a general approach to data analysis known as analysis of covariance structure, analysis of linear structure relations, structural equation modelling, or casual modelling”. AMOS is a statistical

software and used for Structural Equation Modelling, path analysis and confirmatory factor analysis, analysis of covariance or causal modelling software. In AMOS, models can be drawn graphically using simple drawing tools and it quickly performs the computations for SEM and displays the results (StatisticsSolution, n. d). According to Kühnel (2011), AMOS is frequently used at postgraduate level for the teaching of SEM. SEM computer packages utilise graphical interfaces that are rarely considered as a teaching tool that enhance the communication and understanding of the statistical concepts at the undergraduate level. A study by Cunningham and Wang (2005) indicated that the graphical interface of AMOS has the potential to enhance conceptual understanding and communication of the results in undergraduate statistical courses. Several researchers indicated that the” educational research has benefited from the use of SEM to examine: (a) the factor structure of the learner trains assessed by test or questionnaires (Silverman, 2010) and (Schoonen et al., 2003) (b) the equivalency of models across populations (Byrne et al., 1998; In’ami and Koizumi, 2012; Shin, 2005) (c) the effects of learner variables on proficiency or academic achievement at a single point in time (Ockey, 2011 and Wang and Holcombe, 2010) or across time (Kieffer, 2011; Marsh and Yeung, 1998; Okiki and Iyabo, 2013)”.

Turnitin

According to Turnitin.com (2010) as cited in Penketh and Beaumont (2014:95), “Turnitin, described as plagiarism detection software, allows for similarities to be identified between submitted work and a range of databases including the internet, student work and other electronic sources including ‘billions of pages of web content’”. According to Turnitin.com (2010), it is a powerful educational tool for teaching to cite properly and it is a formative tool that creates opportunities for the teachable moments. Bailey and Challen (2015) conducted a study on the 748 students from the University of

Wolverhampton and their study revealed that most of the participants thought that despite certain limitations the Turnitin software was very helpful in terms of learning for the appropriate source use, and wished that it had been introduced earlier in their degree course. Furthermore, Holi and Ali (2013) and Zwagerman (2008) indicated that using Turnitin®, instructors unfairly presumes students are guilty until software (Turnitin) proves them innocent.

Turnitin is a global leader for detecting electronic plagiarism detection and is recognised by the researchers around the world (Jones, 2008). According to Batane (2010), it is web-based software that helps to check for plagiarism. Crisp (2007) conducted a survey and found that 21% of the academic staff significantly improved their assessment practices as a result of using the Turnitin software. A study by Jocoy and DiBiase (2006) indicated that a manual system can detect plagiarism in only 3% of the assignments whereas Turnitin.com revealed a total of 13% plagiarism rate in the same assignments. Furthermore, they also indicated that the software can increase the performance to detect infraction.

EndNote

According to Fitzgibbons and Meert (2010), bibliographic management software package such as EndNote is well established among researchers and students as a time saving tool for writing academic papers. EndNote, in particular, is used in university bookstores as well as through independent distributors worldwide. EndNote allows the researchers “to save search strategies, going a long way in assisting researchers with keeping a research log. For projects as large as a thesis/dissertation and for the faculty, the most interesting features are that metadata can be extracted from PDF’s, including the ability to search across the full text of PDF’s, including the ability to search across the full text of PDF’s, and records can be compared and edited side by side” (Hensley, 2011). Harrison et al. (2005) stated that there are many benefits for using

EndNote such as improved references, use of those references within the citations and the list of references, increases the confidence of the academic work.

NVivo

NVivo is a computer software developed by QSR International and it is widely used by academic, government, health, and commercial researchers across various research fields. NVivo software can be used for two purposes, namely, for literature review and for the qualitative data analysis (e.g. interview, audio, and video).

NVivo Software used for the Literature:

According to QSR International (1999-2010) cited in Markham (2015:112), "Field notes and memos were maintained throughout the analysis process. The software package NVivo (V9) was used to organise, sort, retrieve and compare data during open, axial and selective coding". Bandara (2006) stated that NVivo is a computer program for the literature review analysis that is used to import and code textual data, edit the text; retrieve, review and recode coded data; search for combinations of words in the text or patterns in the coding; and import from or export data to other quantitative analysis software. "Literature reviews are a common feature of all dissertations, regardless of discipline or subject matter. However, they are usually overlooked as a form of qualitative analysis, yet the processes involved in building an argument from a body of literature are similar to processes involved in analysing qualitative data" (Gregario, 2000). Gregario (2000) states "only NVivo (to date) has a particular set of tools that is ideal for analysing literature". According to Azeem and Salfi (2012), the software package NVIVO is being used in a literature review to support the analysis processes involved for the literature review. NVIVO, among all the qualitative analysis software packages, has a particular set of tools and it is the most significant feature for analysing the literature and flexible as compared to other qualitative analysis of the software packages.

NVivo Software Used for the Qualitative Data Analysis (e.g., interview, audio, and video)

A study by Wong (2008) indicated that "NVivo, a Qualitative Data Analysis (QDA) computer software package produced by QSR International, has many advantages and may significantly improve the quality of research. Analysis of qualitative data has become easier and yields more professional results. The software indeed reduces a number of manual tasks and gives the researcher more time to discover tendencies, recognise themes and derive conclusion". On the other hand, Hoover and Koerber (2011) also indicated that the qualitative data analysis NVivo software enhances research in terms of efficiency, multiplicity, and transparency. According to Azeem and Salfi (2012), qualitative data analysis software NVivo helps researchers to link-DataBites, DocLinks, and NodeLinks. Castleberry (2014) states that "NVivo allows researchers to collect, organize, and analyse these varied data types. Documents can be imported from Microsoft Word (.doc and .docx), Portable Document Format (.pdf), Rich Text (.rtf), and Plain Text (.txt) formats. Almost any form of audio, photo, and video files can be imported along with Excel spreadsheets and Access databases. A cool new feature of version 10 supports the use of Web pages, Social Media (Facebook, LinkedIn, and Twitter), YouTube, and SurveyMonkey to import data directly. Bibliographic references can even be imported from EndNote, Mendeley, RefWorks, and Zotero to help manage literature reviews. This wide range of data importation makes this software attractive to researchers using various methods of data collection".

Methodology

This study was experimental, and the target population for the experiment consisted of academic staff from the Durban University of Technology, South Africa. A list of academic staff was obtained from university A to examine research productivity using ICT (EndNote, NVivo, AMOS, SPSS, and Turnitin), with training. A total of ±15 academics

participated for each software and a total of 85 questionnaires (SPSS 18 questionnaires to 18 participants, AMOS 14 questionnaires to 14 participants, Turnitin 13 questionnaires to 13 participants, EndNote 13 questionnaires to 13 participants, NVivo for qualitative data analysis 14 questionnaires to 14 participants and NVivo for literature review 13 questionnaires to 13 participants) were distributed. Sometimes this number (15) have changed because of the availability of academic staff. Professional trainers were hired to train software use for academics in order to see the impact of ICT with training and one of the software was facilitate by the researcher. And Data was collected over the first week and second week of October 2014 and the questionnaire consisting of Likert scale rating. Questionnaire consisted of the following three sections: perceived usefulness, ease of use, and the acceptance level. The questionnaire was designed in a manner that made it easy to read and understand. The data was analysed using WarpPLS 4.0 software.

Results

Reliability and Validity:

According to Pahnla and Warsta (2010), reliability

must exceed 0.70 for each factor. Similarly, another study by Bhattacharjee and Sanford (2009) also indicated reliability should exceed 0.70. Table 5.11 shows the Confirmatory Factor Analysis (CFA) with a maximum of 0.965 and a minimum of 0.5.4. According to Roca et al. (2006), the composite reliability is a measure for the overall reliability of a collection of heterogeneous, but similar items. On the other hand, Henseler et al. (2009) indicated that the composite reliability (CR) estimate of the outer loading of an item λ_i to represent the correlations between the item and the factor and it can be calculated as:

$$\alpha = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum (1 - \lambda_i^2)} \tag{i}$$

According to Cronbach (1951), the Cronbach alpha measurement is a set of items of the factors that can measure a single uni-dimensional factor and it can be

$$\alpha = \frac{N - \bar{r}}{1 + (N - 1) - \bar{r}} \tag{ii}$$

Table (1).

Composite Reliability

Coefficients and Cronbach’s Alpha Coefficients

Using ICT with Training	Composite Reliability Coefficients	Cronbach’s Alpha Coefficients
SPSSwt	0.864	0.823
AMOSSwt	0.790	0.702
TuitinW	0.914	0.888
EndNotW	0.941	0.931
NvivoDW	0.917	0.900
NvivoLW	0.885	0.855

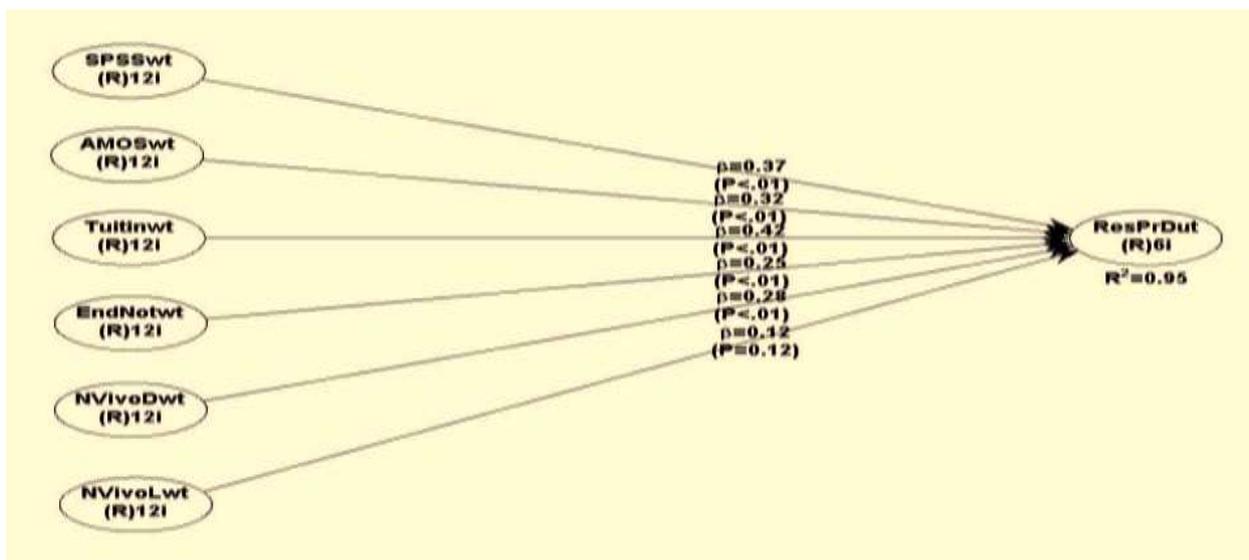


Figure (1)

Using ICT (EndNote, NVivo, AMOS, SPSS, and Turnitin) with training on research productivity

Table (2)

Significance values of SPSS, AMOS, Turnitin, EndNote, and NVivo

Software	Significance	Research Productivity
Using SPSS with training	$\beta = 0.37$	$R^2 = 0.95$
Using AMOS with training	$\beta = 0.32$	$R^2 = 0.95$
Using Turnitin with training	$\beta = 0.42$	$R^2 = 0.95$
Using EndNote with training	$\beta = 0.25$	$R^2 = 0.95$
Using NVivo (for data analysis) with training	$\beta = 0.28$	$R^2 = 0.95$
Using NVivo (for literature review) with training	$\beta = 0.12$	$R^2 = 0.95$

Figure 1 shows that SPSS with training has significant values of $\beta = 0.37$ and $p < 0.01$ on research productivity. AMOS with training has significant values of $\beta = 0.32$ and $p < 0.01$ which is less significant than SPSS with training. Similarly, EndNote for referencing, and NVivo for data analysis, have significant values of $\beta = 0.25$ and $p < 0.01$; and $\beta = 0.28$ and $p < 0.01$, respectively, on research productivity. However, among all the six software, Turnitin has the highest significance on research productivity with $\beta = 0.42$ and $p < 0.01$.

using ICT with training to increase the research productivity of university academics.

Table 2 shows that using Turnitin with training has the highest significant values ($\beta = 0.42$) on the research productivity while the research productivity was $R^2 = 0.95$ as compared to using SPSS with training ($\beta = 0.37$) and followed by AMOS with training ($\beta = 0.32$), NVivo (for data analysis) ($\beta = 0.28$) with training, EndNote ($\beta = 0.25$) with training, and finally NVivo (for a literature review) with training.

Case Comparison and Evaluation of All Software Categories:

Table (2) represents the comparison of each software

Correlations Using ICT with Training:

Table (3) shows the results of the correlations using ICT (with training for indicators of all latent variables

and ICT with training are SPSS, AMOS, Turnitin, EndNote, and NVivo.

Table (3)
Correlations using ICT with training

	<i>SPSSwt</i>	<i>AMOSwt</i>	<i>TuitinW</i>	<i>EndNotW</i>	<i>NvivoDW</i>	<i>NvivoLW</i>
<i>SPSSwt</i>	1.000					
<i>AMOSwt</i>	0.217	1.000				
<i>TuitinW</i>	0.341	0.882	1.000			
<i>EndNotW</i>	0.761	0.526	0.027	1.000		
<i>NvivoDW</i>	0.435	0.718	0.550	0.380	1.000	
<i>NvivoLW</i>	0.182	0.846	0.277	0.536	0.123	1.000

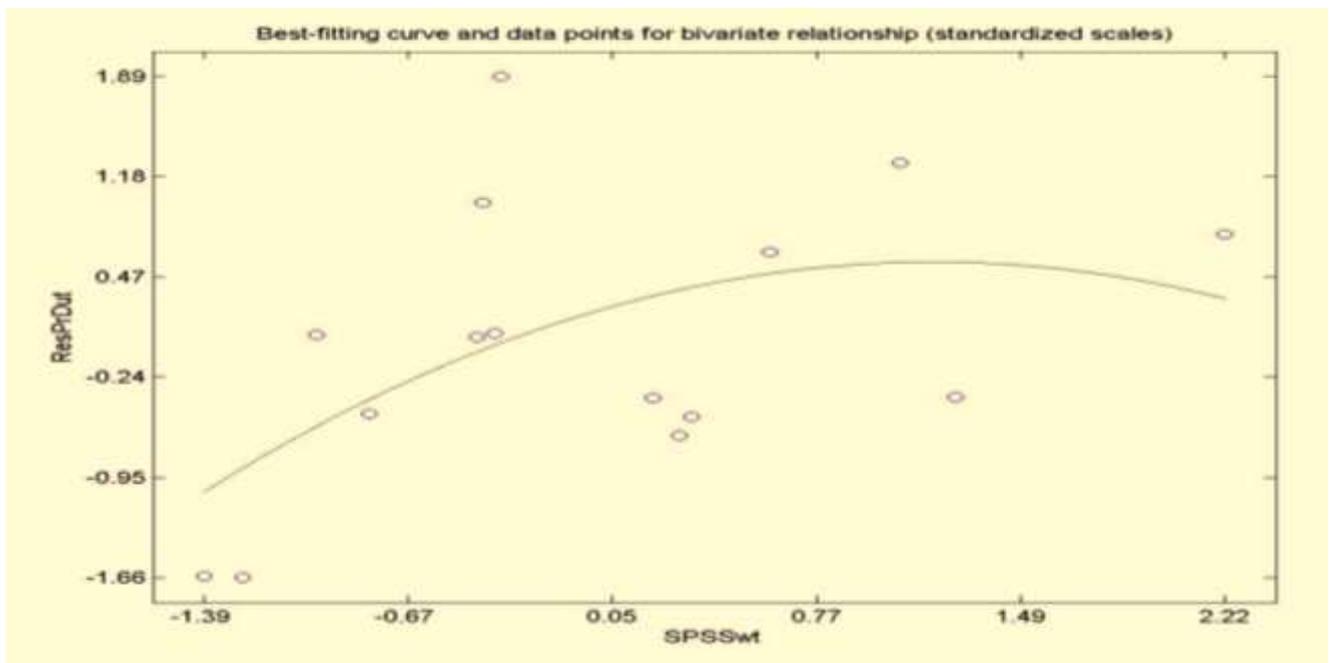


Figure (2a)

Using SPSS software with training and research productivity (Standarized Scales)

Table (4)
Mean and standard deviation ICT with training

Software	Mean	Standard Deviation	Variable	Mean	Standard Deviation
AMOS	3.36	1.44	Research Productivity	15.05	2.81
EndNote	4.77	1.47	Research Productivity	15.05	2.81
NVivo for data analysis	5.00	1.00	Research Productivity	15.05	2.81
NVivo for literature review	3.67	1.27	Research Productivity	15.05	2.81
SPSS	3.87	1.46	Research Productivity	15.05	2.81
Turnitin	4.15	1.73	Research Productivity	15.05	2.81

Mean and Standard Deviation of AMOS, EndNote, NVivo (for data analysis and for literature review), SPSS, Turnitin, and Research Productivity

Table (4) shows the mean and standard deviation of ICT (SPSS, AMOS, Turnitin, EndNote, and NVivo) with training and research productivity

Graphs Using ICT with Training

Graphs have been presented for each latent variable with the research productivity. Using ICT with training, namely, SPSS software with training and research productivity, AMOS software with training and research productivity, Turnitin software with training and research productivity, EndNote software with training and research productivity, NVivo software for qualitative data analysis with training and research productivity, and,

finally, NVivo software for literature review with training and research productivity.

Figure 2a shows that the relationship is positively supported and it is not linear. The relationship intensifies at approximately -0.67 standard deviation to the right of the mean of the standardised data. Further, the unstandardized scales figure 2b shows the nonlinear relationship where research productivity begins to increase when the mean for the research productivity is 15.05 and standard deviation is 2.81 (see Table (4). Similarly, using SPSS software with training, the mean is 3.87 and the standard deviation is 1.46 (see Table (4). Finally, it shows that using SPSS software with training for quantitative data analysis significantly increases research productivity.

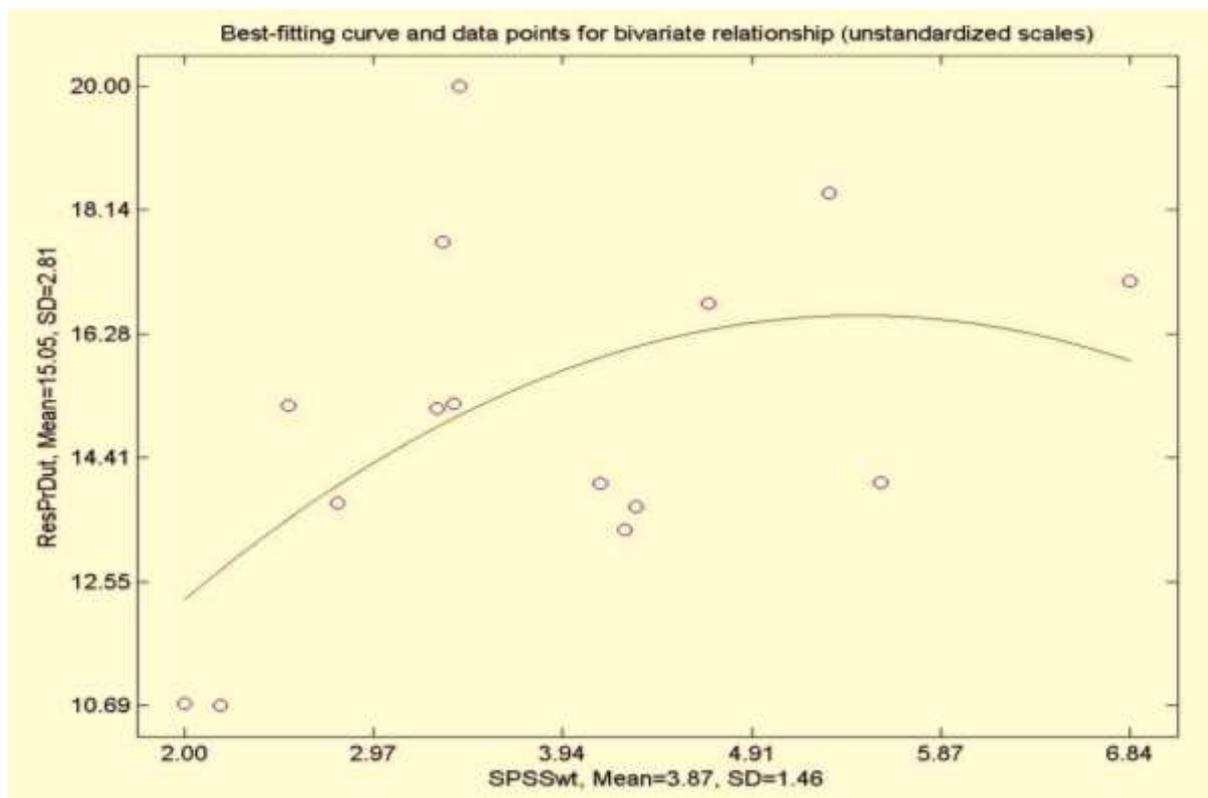


Figure (2b)

Using SPSS software with training and research productivity (Unstandardized scales)

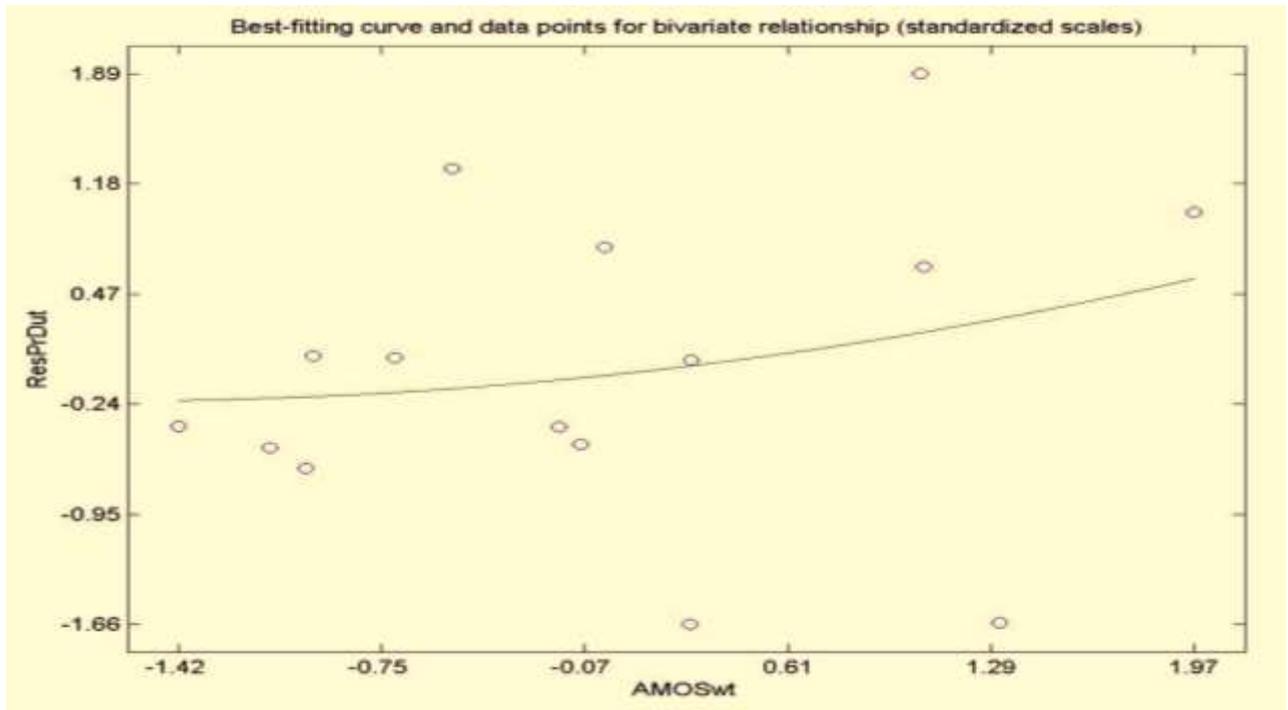


Figure (3a)

Using AMOS Software with Training and Research Productivity (Standardized Scales)

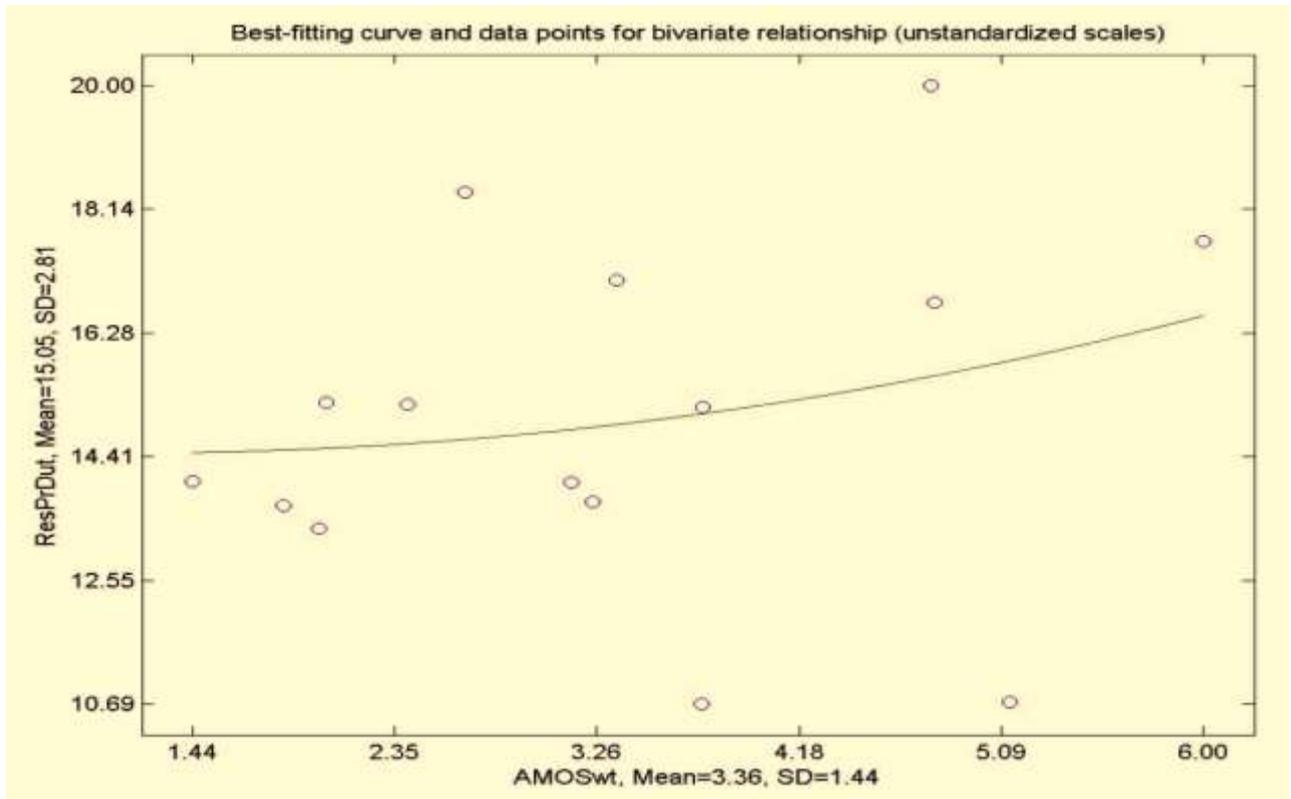


Figure (3b)

Using AMOS Software with Training and Research Productivity (Unstandardized scales)

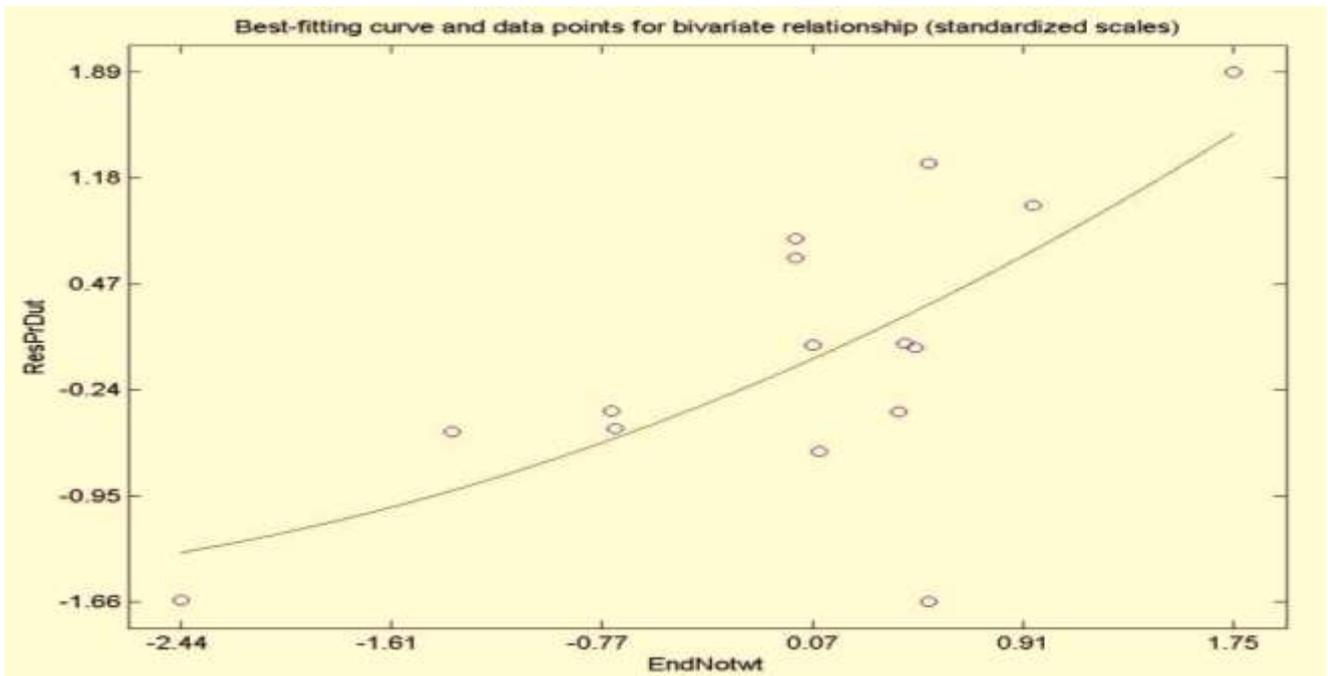


Figure 5a.

Using EndNote Software with Training and Research Productivity (Standardized Scales)

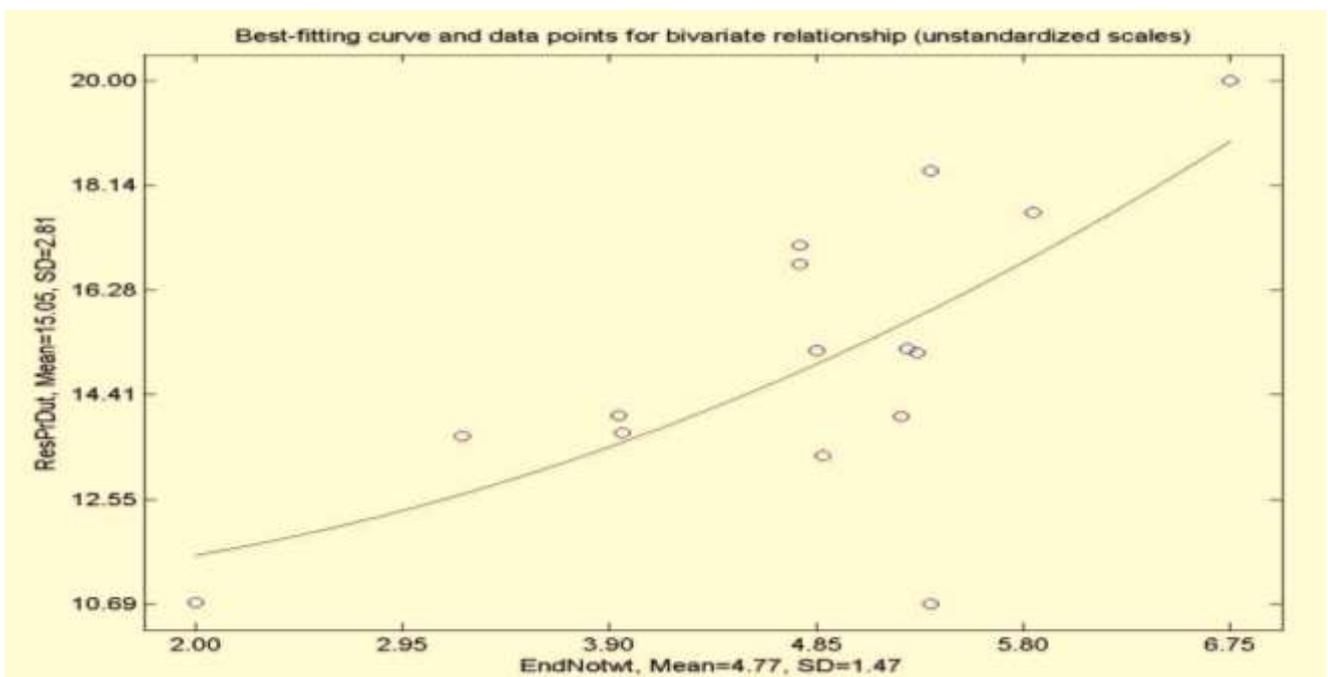


Figure 5b.

Using EndNote Software with Training and Research Productivity (Unstandardized scales)

Figure 3a shows that the relationship is positively supported and it is not linear. It begins to intensify at approximately -0.75 standard deviation to the right of the

mean of the standardized data. Further, the unstandardized scales figure 3b shows the nonlinear relationship where research productivity begins to increase

when the mean for the research productivity is 15.05 and standard deviation is 2.81 (see Table 4). Similarly, using AMOS software with training, the mean is 3.36 and the standard deviation is 1.44 (see Table 4). Finally, it shows that using AMOS software with training for modelling significantly increases research productivity.

Figure 4a shows that the relationship is positively supported and it is linear. It begins to intensify at approximately -1.22 standard deviation to the right of the mean of the standardized data. Further, the unstandardized scales figure 4b shows the linear relationship where research productivity is 15.05 and standard deviation is 2.81 (see Table (4)). Similarly, using Turnitin software with training, the mean is 4.15 and the standard deviation is 1.73 (see Table (4)). Finally, it shows that using Turnitin software with training for plagiarism significantly increases research productivity.

Figure 5a shows that the relationship is positively supported and it clearly shows that it is not linear and it begins to intensify at approximately -1.61 standard deviation to the right of the mean of the standardised data. Further, the unstandardized scales 5b shows the

nonlinear relationship where research productivity begins to increase when the mean for the research productivity is 15.05 and standard deviation is 2.81 (see Table (4)). Similarly, using EndNote software with training, the mean is 4.77 and the standard deviation is 1.47 (see Table (4)). Finally, it shows that using EndNote software with training for referencing significantly increases research productivity.

Figure 6a shows that the relationship is positively supported and it is not linear. It begins to intensify at approximately -1.60 standard deviation to the right of the mean of the standardized data. Further, the unstandardized scales 6b shows the nonlinear relationship where research productivity begins to increase when the mena for the research productivity is 15.05 and standard deviation is 2.81 (see Table (4)). Similarly, using NVivo software with training for qualitative data analysis, the mean is 5.00 and the standard deviation is 1.00 (see Table 3). Finally, it shows that using NVivo software with training for qualitative data analysis significantly increases research productivity.

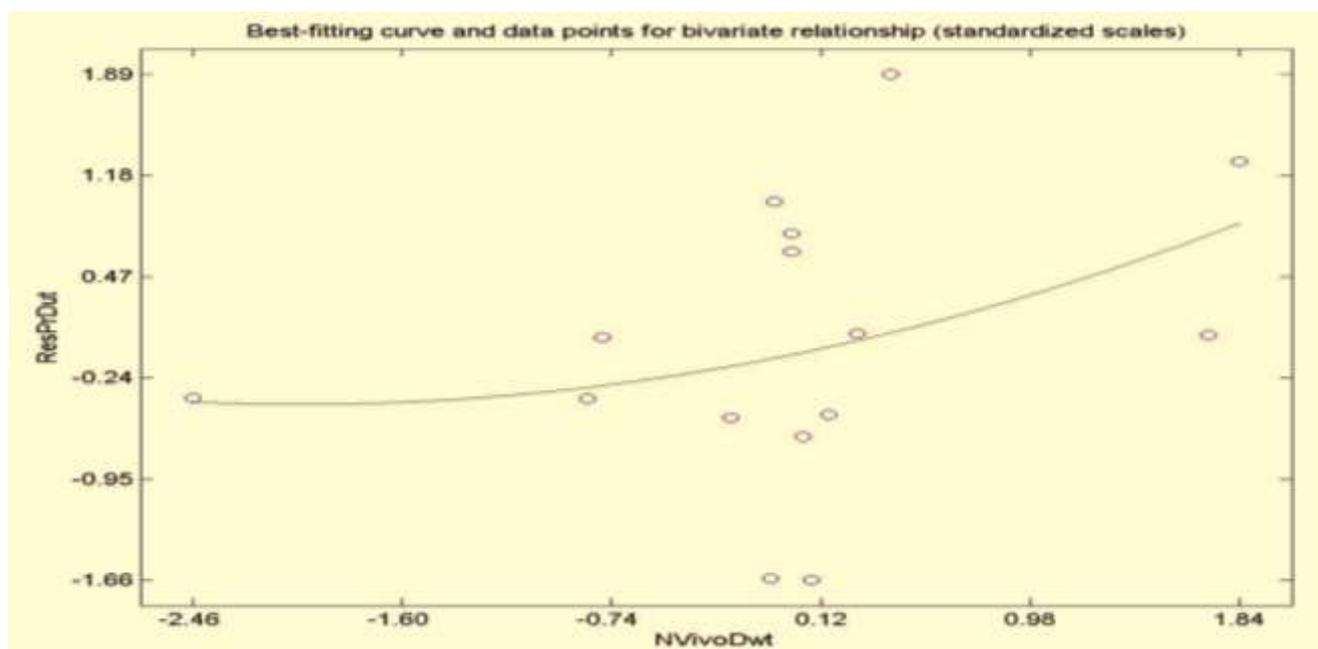


Figure (6a)

Using Nvivo software for qualitative data analysis with training and research productivity (Standardized Scales)

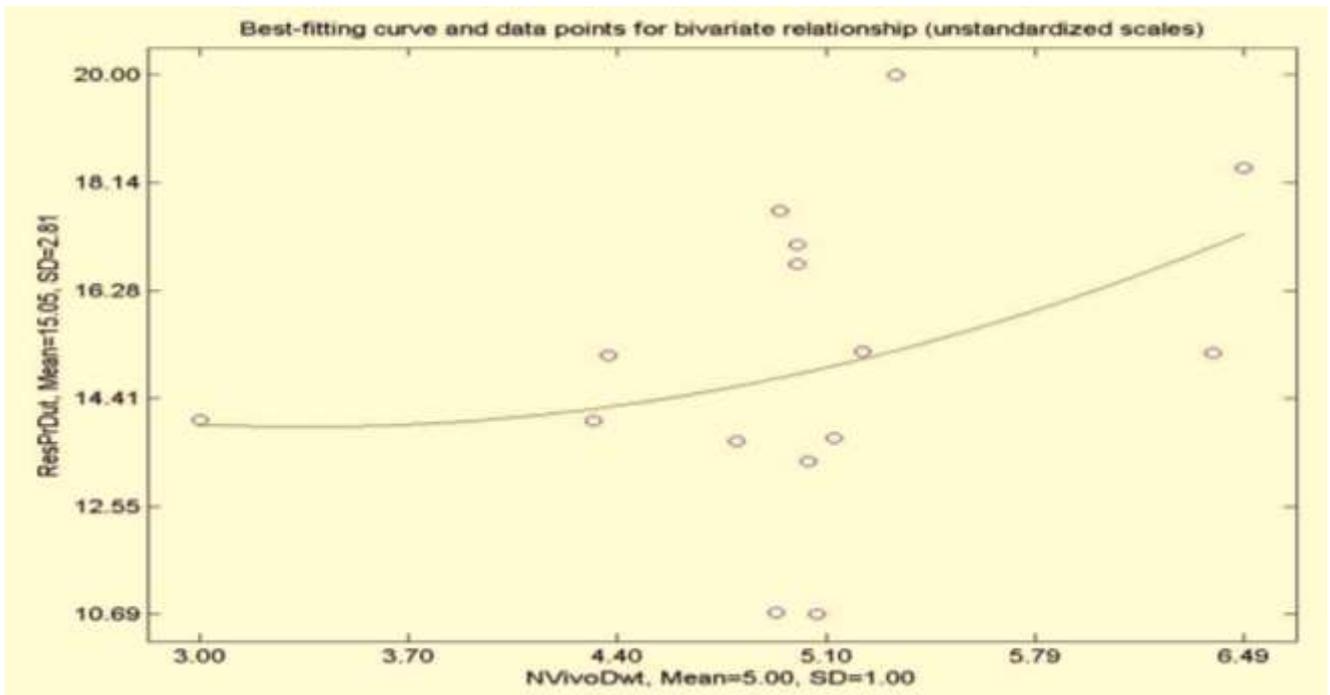


Figure (6b)

Using Nvivo software for qualitative data analysis with training and research productivity (Unstandardized scales)

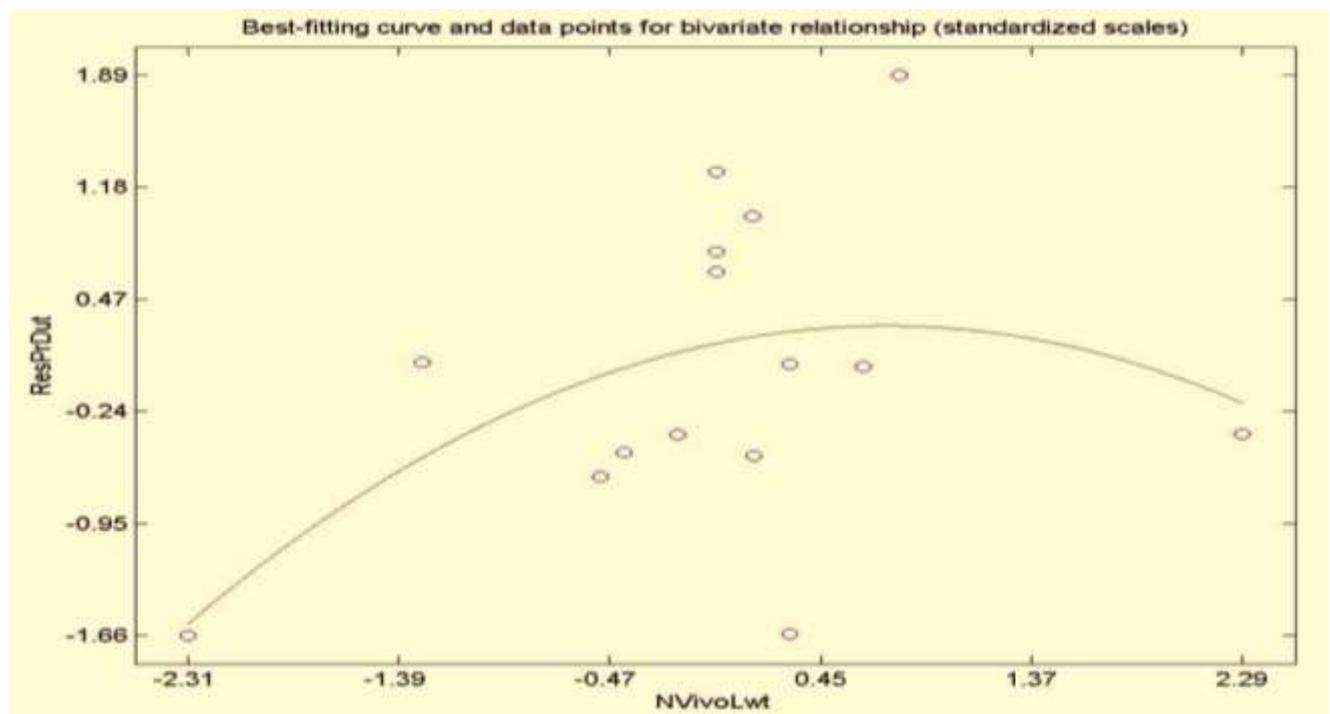


Figure (7a).

Using Nvivo software for literature review with training and research productivity (Standardized Scales)

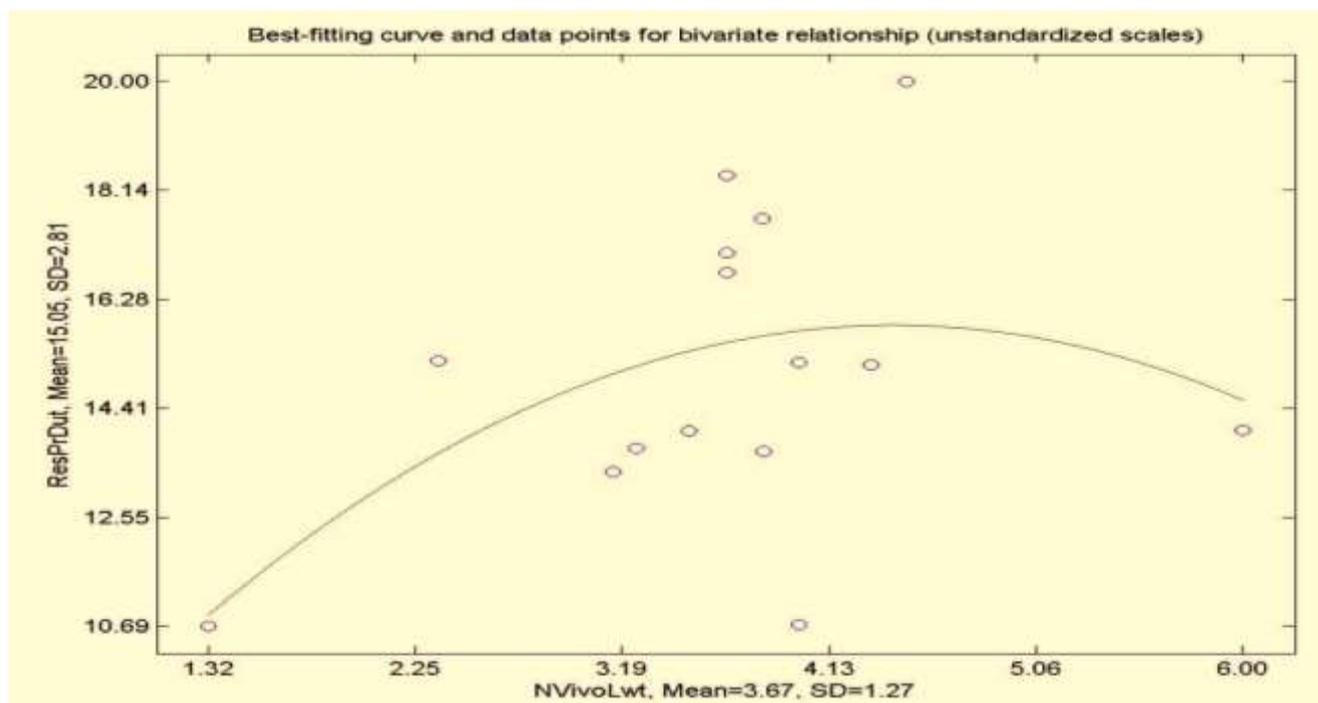


Figure (7b)

Using Nvivo software for literature review with training and research productivity (Unstandardized scales)

Figure 7a shows that the relationship is positively supported and it is not linear. It begins to intensify at approximately -1.39 standard deviation to the right of the mean of the standardized data. Further the unstandardized scales 7b shows the nonlinear relationship where research productivity begins to increase when the mean for the research productivity is 15.05 and standard deviation is 2.81 (see Table (4)). Similarly, using NVivo software with training, the mean is 3.67 and the standard deviation is 1.27 (see Table (4)). Finally, it shows that using NVivo software with training for literature review significantly increase research productivity.

Discussion

The originality of this study is the fact that ICT (SPSS, AMOS, Turnitin, EndNote and NVivo) with training increases research productivity for university academics is the first study for the research productivity. The final results of this study shows that ICT (Turnitin) with training leads to increase research productivity with a view of $\beta = 0.42$ when $R^2 = 0.95$ as compared to

SPSS, AMOS, EndNote, and NVivo. It means that the better the application of ICT with training, the higher the research productivity (Adogbeji and Akporhonor, 2005; Azad and Seyyed, 2007). This study uses two different types of methodologies for the increase of the research productivity for university academics namely for the experiment a training needs’ assessment model, and for the analysis of the data a questionnaire designed based on TAM (Technology Acceptance Model).

Conclusions and Recommendation

This study has concluded that the role of ICT (EndNote, AMOS, Turnitin, SPSS, and NVivo) training has been recognised worldwide as key to academic researchers. However, this study, ICT with training does increases research productivity. The findings indicated that ICT with training has a high significant impact ($R^2 = 0.95$) on research productivity. In this connection, universities need to formulate strategies on ICT with training for researchers to use each software package in relation to improve their research productivity.

Research studies usually have some limitations that may raise doubts as to the validity and reliability of the findings. One major limitation of the study was that, due to cost and limited time, training could only take place over a limited period of time. In future studies, more time for training should be allocated which could enhance the

study. Another limitation was the limited sample size, which forced the researcher to use WarpPLS 4.0 rather than AMOS for modelling. In higher education, therefore, need to formulate strategies that motivate academics to trained in each of the software package.

REFERENCES

- Adogbeji, O. B. and Akporhonor, B. A. (2005). The impact of ICT (internet) on research and studies: the experience of Delta State University students in Abraka, Nigeria. *Library Hi Tech News*, 22, (10), P: 17-21.
- Altbach, P. G. (2008). The complex roles of universities in the period of globalization, *Higher Education in the World 2008*, GUI Series on the Social Commitment of Universities, P: 5-13.
- Australian Research Council. ERA. (2010). Evaluation Guidelines. Excellence in Research for Australia, Australian Government, Australian Research Council, Canberra.
- Azad, A. and Seyyed, F. (2007). Factors influencing faculty research productivity: Evidence from AACSB accredited schools in the GCC countries. *Journal of International Business Research*, 6, (1), P: 91:112.
- Azeem, M. and Salfi, N. A. (2012). Usage of NVIVO software for qualitative data analysis, *Academic Research International*, 2, (1), P: 262-266.
- Bailey, C. and Challen, R. (2015). Student perceptions of the value of Turnitin text-matching software as a learning tools. *Practitioner Research in Higher Education*, 9, (1), P: 38-51.
- Bandara, W. (2006). Using NVivo as a research management tool: a case narrative. In Ruth, A. (Ed). *Quality and Impact of Qualitative Research: Proceedings of the 3rd International Conference on Qualitative Research in IT & IT in Qualitative Research*, Griffith University, Brisbane, 6-19.
- Batane, T. (2010). Turning to turnitin to fight plagiarism among university students, *Educational Technology & Society*, 13, (2), P: 1-12.
- Ben-David, J. and Zloczower. A. (1962). Universities and academic systems in modern societies, *European Journal of Sociology*, 3, (1), P: 45-84.
- Bentley, P. (2009). Gender differences in research productivity: A comparative analysis of Norway and Australia, Masters Thesis. Institute for Educational Research, University of Oslo.
- Bhattacharjee, A. and Sanford, C. (2009). The intention-behaviour gap in technology usage: the moderating role of attitude strength. *Behaviour & Information Technology*, 28, (4), P: 389-401.
- Byrne, B. M. Baron, P. and Balev, J. (1998). The beck depression inventory: A cross-validated test of second-order factorial structure for Bulgarian adolescents, *Educational and Psychological Measurement*, 58, (2), P: 241-251.
- Castleberry, A. (2014). NVivo 10 [software program]. Version 10. QSR International: 2012, *American Journal of Pharmaceutical Education*, 78, (1), 25.
- Crisp, G. T. (2007). Staff attitudes to dealing with plagiarism issues: Perspectives from one Australian University, *International Journal for Educational Integrity*, 3, (1), P: 3-15.
- Cunningham, E. G. and Wang, W. C. (2005). Using AMOS graphics to enhance the understanding and communication of multiple regression, Paper presented at ISI/IASE Conference on Assessing Student Learning in Statistics. Guimaraes, Portugal, P: 1-8.
- Department of Education and ICSSR. (2014). Research methodology and use of SPSS package, 21, 22, & 23 March, Three, National Workshop.
- Di Gregario, S. (2000). Using NVivo for your literature review. Strategies in qualitative research: issues and results from analysis using QSR NVivo and NUD*IST, Conference at the institute of Education, London 29-30 September.
- Fitzgibbons, M. and Meert, D. (2010). Are bibliographic management software search interfaces reliable?: A comparison between search results obtained using database interfaces and the EndNote online search function, *The Journal of Academic Librarianship*, 36, (2), P: 144-150.
- Fox, M. F. (1983). Publication productivity among scientists: a critical review, *Social Studies of Science*, 13(2), pp. 285-305.
- Harrison, M., Summerton, S. and Peters, K. (2005). EndNote training for academic staff and students: The experience of the Manchester metropolitan University Library. *New Review of Academic Librarianship*, 11, (1), P: 31-40.

- Henseler, J., Ringle, C. M. and Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing*, 20, P: 277-319.
- Hensley, M. K. (2011). Citation management software: Features and futures, *Reference and User Services Quarterly*, 50, (3), P: 204-208.
- Holi Ali, H. I. (2013). Minimizing Cyber-plagiarism Through Turnitin®: Faculty's & Students' Perspectives. *International Journal of Applied Linguistics & English Literature* 2, (2), P: 33-42.
- Hoover, R. and Koerber, L. (2011). Using NVivo to answer the challenges of qualitative research in professional communication: Benefits and best practices tutorial, *IEEE Transaction on Professional Communication*, 54, (1), P: 68-82.
- In'nami, Y. and Koizumi, R. (2012). Factor structure of the revised TOEIC ® test: A multiple-sample analysis, *Language Testing*, 29, (1), P: 131-152.
- Jocoy, C. and DiBiase, D. (2006). Plagiarism by adult learners online: a case study in detection and remediation, *The International Review of Research in Open and Distance Learning*, 7, (1), P: 1-15.
- Jones, K. O. (2008). Practical issues for academics using the turnitin plagiarism detection software, *Proceedings of International Conference on Computer Systems and Technology*, Gabrovo, Bulgaria.
- Kieffer, M. J. (2011). Converging trajectories: Reading growth in language minority learners and their classmates, kindergarten to grade 8, *American Educational Research Journal*, 48, (5), P: 1187-1225.
- Kühnel, S. (2011). The didactical power of structural equation modelling, In Cudeck, R. S. du Toit, S. du. and Sörbom, D. (Eds.), *Structural Equation Modeling: Present and Future*, A Festschrift in honor of Karl Jöreskog. Chicago: Scientific Software International, Inc.
- Kyvik, S. (2003). Changing trends in publishing behavior among university faculty, 1980-2000, *Scientometrics*, 58, (1), P: 35-48.
- Landau, S. and Everitt, B. S. (2004). *A Handbook of Statistical Analyses using SPSS*. Chapman and Hall/CRC Press LLC.
- Learning SPSS, Data and EDA (n. d). An introduction to SPSS with emphasis on EDA. Available at <http://www.stat.cmu.edu/~hseltman/309/Book/chapter5.pdf>
- Marsh, H. W. and Yeung, A. S. (1998). Longitudinal structural equation models of academic self-concept and achievement: Gender differences in the development of math and English constructs, *American Educational Research Journal*, 35(4), pp. 705-738.
- Mills, J. D. (2003). SPSS textbooks: A review for teachers, *Statistics Education Research Journal*, 2, (2), P: 59-70.
- National Universities Commission (NUC). (2005). Nigeria.
- Ockey, G. (2011). Self-consciousness and assertiveness as explanatory variables of L2 oral ability: A latent variable approach, *Language Learning*, 61, (3), P: 968-989.
- Okiki, O. C. and Iyabo, M. (2013). Impact of information literacy skills on academic staff research productivity in Nigerian Federal Universities, *Information and Knowledge Management*, 3, (2), P: 9-18.
- Pahnila, S. and Warsta, J. (2010). Online shopping viewed from a habit and value perspective. *Behaviour & Information Technology*, 29, (6), P: 621-632.
- Penketh, C. and Beaumont, C. (2014). 'Turnitin said it wasn't happy': can the regulatory discourse of plagiarism detection operate as a change artefact for writing development? *Innovations in Education and Teaching International*, 51, (1), P: 95-104.
- Ramsden, P. (1994). Describing and explaining research productivity, *Higher Education*, 28, (2), P: 207-226.
- Roca, J. C., Chiu, C. M., and Martinez, F. J. (2006). Understanding e-learning continuance intention: An extension of the Technology Acceptance Model. *Human-Computer Studies*, 64, P: 683-696.
- Schoonen, R. A. van. Gelderen, A. van. Gloppe, K. de, Hulstijn, J. Simis, A. Snellings, P. and Stevenson, M. (2003). First language and second language writing: The role of linguistic knowledge, speed of processing, and metacognitive knowledge, *Language Learning*, 53, (1), P: 165-202.
- Shin, S. K. (2005). Did they take the same test? Examinee language proficiency and the structure of language tests, *Language Testing*, 22, (1), P: 31-57.
- Silverman, S. K. (2010). What is diversity? An inquiry into preservice teacher beliefs, *American Educational Research Journal*, 47, (2), P: 292-329.
- Statistics Solutions. (n. d). Advancement through Clarity. Available at: www.statisticssolutions.com/amos/ Accessed on 14th September 2014.
- Sulo, T. Kendagor, R. Kosgei, D. Tuitoek, D. and Chelangat, S. (2012). Factors affecting research productivity in public universities of Kenya: the case of Moi University, Eldoret, *Journal of Emerging Trends in Economics and Management Sciences*, 3(5), pp. 475-484.
- Tong, F. Lara-Alecio, R. Irby, B. Mathes, P. and Kwok, O. M. (2008). Accelerating early academic oral English development in transitional bilingual and structured English

- immersion programs, American Educational Research Journal, 45, (4), P: 1011-1044.
- Triola, M. F. (2011). Essentials of Statistics. Boston: Pearson.
- Turnitin.com. (2010). Quick facts. Retrieved January 8, 2010. From Turnitin website: <http://www.turnitin.com/static/index.html>
- Wang, M. T. and Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement in middle school, American Educational Research Journal, 47, (3), P: 633-662.
- Wong, L. P. (2008). Data analysis in qualitative research: A brief guide to using NVivo, Malaysian Family Physician, 3, (1).
- Wu, E. M. Tsai, C. C. Cheng, J. F. Kuo, S. L. and Lu, W. T. (2014). The application of water quality monitoring data in a reservoir watershed using AMOS confirmatory factor analyses. Environmental Modeling and Assessment, 19, pp. 325-333, doi. 10.1007/s10666-014-9407-5
- Yeo, S. Fearington, J. and Christ, T. J. (2011). An investigation of gender, income, and special education status bias on curriculum-based measurement slope in reading, School Psychology Quarterly, 26, (2), P: 119-130.
- Zwagerman, S. (2008). The Scarlet P: Plagiarism, Panopticism, and the Rhetoric of Academic Integrity. College Composition and Communication, 59, (4), P: 676-710.

نموذج مقترح باستخدام تكنولوجيا المعلومات والاتصالات بالتدريب لزيادة إنتاجية البحوث في جامعة الأكاديميين

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ملخص

تقدم هذه الورقة نموذجاً بشأن تكنولوجيا المعلومات والاتصالات ((SPSS، ICT، AMOS)، تورنيتين، الحاشية و(Nvivo) مع التدريب لزيادة إنتاجية البحثية للأكاديميين في الجامعة حيث تحقق هذا الهدف من خلال دراسة هيئة التدريس (يستخدم تكنولوجيا المعلومات والاتصالات مع التدريب) لزيادة الإنتاجية و البحوث و الدراسة التجريبية و أجريت في إحدى الجامعات الحكومية في جنوب أفريقيا، يتألف السكان المستهدفين للتجربة أعضاء هيئة التدريس من الجامعة، تم استخدام استبانة مبنية على اثنين من الأطر النظرية وهي تقنية قبول النموذجية و تقييم احتياجات التدريب النموذجي. وقد تم تحليل البيانات باستخدام (WarpPLS 4.0) البرمجيات، أهم نتائج هذه الدراسة نموذجاً ، والمستمدة من التجربة ولها تأثير كبي على إنتاجية البحوث، وفي هذا الصدد، يتعين على الجامعات لصياغة إستراتيجيات تكنولوجيا المعلومات والاتصالات مع التدريب للباحثين لاستخدام كل حزمة برامج في العلاقة لتحسين الإنتاجية أبحاثهم.

الكلمات الدالة: تدريب تكنولوجيا المعلومات والاتصالات، وزيادة البحوث الإنتاجية والأكاديميين جامعة.

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