Gender, Previous Qualification and knowledge of Research, Interpretation of Computer Processed Data and Reportage by Postgraduate Students in South-Western, Nigeria

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Abstract

Gender, previous qualification and postgraduate students' knowledge of research, interpretation of computer processed data and reportage in South-West geo-political zone of Nigeria was investigated in this study. The sample consisted of 746 participants selected from six departments in three faculties from three federal, three states and two private universities in the zone. A valid and reliable instrument titled: 'Challenges of Application of the knowledge of Research and Computer Processed Data in Research' α = 0.86 was used. Being an ex-post-factor research, statistics like t-test, ANOVA and multiple regression were used. Males were found to have significantly better in interpretation of analysed research data, males M = 16.38; SD = 4.43 and females M = 17.03; S.D = 4.25; $t_{(2, 727)}$ = -1.96; df = 727; p< 0.05. Previous degree obtained by postgraduate students with a (β = 0.18) was found to account for 3.2% variance in computer literacy with a contribution of an R of 0.18, R^2 of 0.03, Adjusted R^2 of 0.03, significant at $F_{(1,722)}$ = 24.51, p< 0.05. Previous degree obtained by postgraduate students with a (β = 0.08), also accounted for 1% variance in students' interpretation of analysed data with a contribution of an R of 0.08, R^2 of 0.01 and Adjusted R^2 of 0.01 significant at $F_{(1,719)}$ = 4.84, p< 0.05. Study has potential for course review in research methodology and statistical methods at undergraduate level that allow for the designing of better approaches for developing adequate and sustainable research skills at postgraduate level for enhanced and timely research completion process by postgraduate students.

Keywords: Research knowledge, Gender and computer literacy, Interpretation
of analysed research data, and making of inferences

Introduction

The use of ICT by graduate students, is essential both in curricular and extra-curricular activities and there is no doubt that many university students make use of the computer now than ever before. None the less, to achieve both academic and professional activities students must be endowed with knowledge and skills to navigate these academic activities and to manage the information overload they are likely to be confronted with in their course of study and equally be proficient in ICT usage in their research undertaking. Khan and Omrane (2017) affirm that it is essential for future generations of university graduates irrespective of their academic disciplinary backgrounds and orientations to be able to work with technology effectively. This means they have to learn

at school the benefits of the uses of different technologies for learning purposes, solving problems and improving work performance. Accordingly too, Sabzwari, Bhatti and Ahmed (2012), contend that in this age of information communication technology, it is the requirement of each researcher to know all advance aspects of searching tools, manipulating and analysing data through software and use of word processor with complete command on its functions. However, Ismail, Jogezai and Baloch (2020) found several fundamental issues affecting knowledge and adoption of ICT while some other authors such as Mumtaz (2000), Hassan and Sajid (2013), Kanwal, Jan, and Azhar (2014), Simin and Sani (2015), revealed a number of non-manipulative and manipulative factors that include but not limited to; age, learner experience, computer skills and experience, trends in the education industry and availability of support and services; attitudes of students, knowledge of ICT, computer skills, the school commitment and efforts to implement and support technology for learning purposes as enabling or hindering to the process. These factors are found by Mumtaz (2000) and Agbo (2015) to be interrelated in impinging on ICT knowledge and adoption.

Based on previous research findings, where the course of exploring research knowledge production by students was reported, it can be concluded that students are confronted with several challenges in doing and writing research. These include: lack of motivation in writing researchable topics; lack of good knowledge in specialisation; poor steps in writing research proposal and dissertations/theses; wrong and inappropriate methodology of the study including, participants selection, research questions, and data collection and analysis; the results of the study; weak presentation of the findings of the study, and interpretation (Qasem & Zayid, 2019; Ahmed & Mahboob, 2016; Al-Qaderi, 2016; Manchishi, Ndhlovu & Mwanza, 2015). Similarly, many young academic members and teachers still have limitations in scientific research skills such as the selection of research methods, methods of implementing research, methods of analysing statistics, synthesising reports and posts.

Computer literacy (knowledge) as used in this study is as conceived by Loyd and Gressard (1984); Simonson, Maurer, Montag-Torardi and Whitaker, (1987) and Li (2008) and is cited in Okwilagwe (2020). It is a basis of making decisions on a student's ability to perform specific tasks on a personal computer as a result of experience and use, programming skills and ability to use software, and its importance; it lies on its ability to transform the computer's capability into proficient and productive activities. It also consists of the experience and ability to operate computers, including knowing the structures of computer software and hardware, having the skills to operate computer software, and applying computer usage to social issues (Li, 2008).

Proficiency in computer usage in many areas of life research inclusive may be influenced by a litany of factors. Some researchers such as Morahan-Martin (1992), suggest that personal factors such as gender, age, experience, and interest in computers might affect students' attitudes toward computer use and their computer skills. Khan and Omrane (2017) categorised the factors that influence students' use of technology in higher institution into three as follows: faculty, contextual and student, while Kim and

Bagaka (2005), generally found that students tended to use technology tools for individual and personal practices rather than for instructional activities. They also found that students' usage of word processing, interactive, and productivity tools was significantly lower in schools located in urban and rural than in those in suburban communities, suggesting that access to computers at home are an important factor in students' utilisation of computer resources. However, GÜÇLÜ (2010) referring to Kennedy, Lawton and Plumlee (2002) contend that many students do not have the knowledge, memory, learning, intelligence, or expertise to assess what they do and do not know, and what they need to learn to succeed in a particular course. Additionally, Lan Chi Le, Thai Dinh Do, Nhi Van Kieu (2020) posit that besides, some universities' lecturers are still young, starting to participate in scientific research activities and learning to improve their qualifications at master's and doctoral levels, so most of them lack experience in scientific research. In view of the above, how do gender and previous degrees obtained by students influence these research and computer usage challenges? These have being examined in the following paragraphs.

With respect to gender and computer usage, data interpretation and making of inferences, results from previous studies have shown that disparities exist by gender in both the use and proficiency with computers (Huber & Schofield; Kelly, cited in Kim & Bagaka, 2005), a difference that is attributed to students' predispositions. Specifically, Shashaani (1995) found that male students do not only show more interest in computers compared to their female counterparts, but that they also received more encouragement to use them. Using a sample of 7,896 students Poelmans, Truyen and Deslé (2009), established a significant gender, branch and computer experience effect on undergraduate students' perceived computer literacy as male students have a significant higher computer literacy score than female students. In line with extant literature, a difference in computer literacy level between male and female students is observed (Zin, Zaman, Judi, Mukti, Amin, & Others, 2000). Males had greater computer experience than females and there was a significantly greater use of some software and applications by males than by females as was reported by Alakpodia (2014). Although gender disparity was not observed in the Kim and Bagaka (2005) study, a report by the American Association of University Women (AAUW) Educational Foundation (2000), as cited by Kim and Bagaka (2005) found that girls are significantly underrepresented in computer science and technology- related fields, suggesting further that computing and its usage is a male dominated domain.

Studies on gender difference conducted at undergraduate level in developing countries have reported mixed findings. Azeta and van der Merwe (2018) citing several studies highlighted below reported that males have a technology-usage dominance (Appianing & VanEck, 2015), females dominance (Zhou & Xu, 2007; Milis, et al, 2008; Cuadrado-García et al, 2010), while (Efuwape & Aremu, 2013;) reported no gender difference. A small number of studies have considered ICT usage and literacy at post graduate level in developed countries, the most notable however, reported by Mandap (2016) being Barret and Lally (1999) who found a bias in favour of males. Previous

studies at the postgraduate level reported males to be more likely to use computer technologies (Mahmood, 2009), while negligible gender gaps found by Azeta and van der Merwe (2018) pointed to no significant gender differences in hardware and software use as well as challenges of ICT use among technology students in tertiary institution. Meaning that with a rise in ICT use challenges, academic performance is negatively impacted. In another study, male students had a higher level of computer software use than female students and there was gender difference on the problems faced by students in the acquisition of skills and use of computer (Alakpodia, 2014).

In terms of previous qualification and computer literacy and research proficiency, there seems to be dearth of previous literature. However, two questions here are: i.) are students who are exposed to computer usage in their previous degree of study during their undergraduate courses be more attuned to computer usage in various aspects of life including research and data analysis activities than others who did not? ii.) are students who have taken courses in computer-related disciplines be more familiar to computer usage in various aspects of life including research and data analysis activities than others who did not? Previous studies such as Yi (2014) established that the computer technology application had no significant effect on the computer literacy, whereas, findings from Meerah, Osman, Zakaria, Ikhsan, Krish, et al (2012) study indicate that generally, the graduates used in their study have moderate knowledge and competencies to conduct research.

Postgraduate students being more matured are expected to exhibit greater exposure to the use of ICTs, show improved statistical reliability of reported effects, demonstrate a capacity and dedication for independent learning at this level, and use a wide variety of learning strategies (Azeta & van der Merwe, 2018). Students who major in behavioural science courses have been found to have higher hours of using computer than those who major in computer-related courses. eh Students in behavioural science courses also had more difficulties in computer technology application, although there was no significant difference in their internet information application and community information sharing ability. Also, their computer technology application had no significant effect on computer literacy (Yi, 2014).

In view of the foregoing, the challenges that male and female postgraduate students in universities in South- West, Nigeria face in terms of their proficiencies in computer data analyses of their research work, application of research knowledge obtained and interpretation of analysed research data from computer printouts while reporting and making inferences on research outcomes were undertaken in this study. The influence of students' previous qualification on these competences was also investigated.

Research Questions
These questions guided the study investigation.
1. Do male and female postgraduate students differ significantly in:
    a) computer literacy?

   b) the application of research knowledge in data analysis? and
   c) the challenges of interpreting analysed research data?
2. To what extent is previous degree obtained influential in students' computer literacy, application of research knowledge in data analysis and interpretation of analysed data?

Methodology
Study Design
The study is an Survey adopting the correlational and ex-post facto approach ex-post-facto study.
Sampling Technique and Sample
The study adopted multistage-stratified sampling technique which enabled the researcher to categorise the universities in the South-West geopolitical zone of Nigeria into three. Three federal universities, three state universities and two private universities were selected from the geo-political zone. Six departments were then selected from each of the three faculties in each of the universities. Finally, a total of 746 university students selected at the rate of six students per department and from the three categories of universities participated in the study. However 733 of the participants who had complete data formed the sample. One hundred and eight students were randomly selected from six departments in three faculties in each university and from three federal universities, three state universities and two private universities.

Instrumentation
Data were collected using a valid and reliable instrument: 'Challenges of Application of the knowledge of Research and Computer Processed Data in Research' which consists of five sub-sections; the demographics (7 items), 'Computer literacy' (13 items), 'Skillfulness in the Application of Research knowledge in Data Analyses' (6 items) and 'Challenges that Postgraduate Students Encounter in Interpreting Analysed Research Data' (12 items) was developed. For the Computer Literacy sub –component, participants were to respond as 'Yes' and 'No' for the factual items. The Application of Skillfulness of Research Knowledge participants responded on a 4point scale of 'Very Correct' = 4, 'Correct' = 3; Partly Correct' =2 and 'Not Correct' = 1; while on the 'Challenges that Postgraduate Students Encounter in Interpreting Analysed Research Data', the participants responded on a 4point scale of 'Very True' =4, 'True' =3, 'Partly True' =2 and 'Not True' =1 The instrument was validated using 120 participants and analysed with Cronbach alpha method, which yielded a reliability coefficient of 0.86.
Procedure for Data Collection
Six research assistants trained on the data collection procedure participated in the collection of data. Six students randomly selected were administered the questionnaire and collected back within a short space of time. Where the students in a department were less than six in a course, the exact number found in the class was selected to respond to the questionnaire. Obtaining information from private universities was a herculean task

unlike in other categories of universities. This explains why only two private universities participated in the study.

Data Analysis Procedure

The data collected were cleaned to remove incomplete data before they were coded into SSPS 20.0. Six research assistants trained on the data collection procedure participated in the collection of data. Six students were randomly selected from selected departments in three faculties from three federal universities, three state universities and two private universities. Where the students in a department were less than six in a course, the exact number found were selected to respond to the questionnaire. Unlike in other categories of universities, obtaining information from private universities was a herculean task as they did not want to divulge information concerning their operation. This explains why only two private universities participated in the study. Only participants' with complete data were analysed using inferential statistics like t-test and ANOVA to analyse significant differences.

Results and Discussion

Table 1 (a): Gender and Computer Literacy

Gender	N	Mean	Std. Deviation	Std. Error Mean	Df	T	Sig
Male	437	19.07	3.287	0.157			
					733	-1.266	0.206[NS]
Female	298	19.38	3.230	0.187			

NS = Not significant p> 0.05

Table 1a shows that there is no significant gender difference in computer literacy between males, M =19.07; SD = 3.29 and females M = 19.38; S.D =3.23.

Table 1(b): Gender and Application of Research Knowledge in Data Analysis

Gender	N	Mean	Std. Deviation	Std. Error Mean	Df	T	Sig
Male	434	16.38	4.452	0.214			
					727	-1.958	0.051*
Female	295	17.03	4.246	0.247			

*= Significant at p < 0.05

Table 1b shows that there is significant gender difference in application of research knowledge on analysed research data between males M =16.38; SD = 4.43 and females M = 17.03; S.D = 4.25. $t_{(2, 727)}$ = -1.96; df = 727; p< 0.05.

Table 1 (c): Gender and Interpretation of Analysed Research Data

Gender	N	Mean	Std. Deviation	Std. Error Mean	Df	T	Sig
Male	435	31.72	9.081	0.435			
					729	0.327	0.744[NS]

Female	296	31.50	9.115	0.530

NS = Not significant p> 0.05

Table 1c shows that there is no significant gender difference in interpretation of analysed research data, males, M =31.72; SD = 9.08 and females M = 31.50; S.D =9.12.

Table 2a: Regression Summary of Previous Degree Obtained and Students' Computer Literacy

R	= 0.181
R Square	= 0.033
Adjusted R Square	= 0.032

Model	Source of Variation	Sum of Squares	Df	Mean Square	F	P-value
1	Regression	251.048	1	251.048	24.51	0.000*
	Residual	7385.076	721	10.243		
	Total	**7636.124**	**722**			

*= Significant at p < 0.05

Table 2a shows that the multiple regression of R = 0.18, R^2 is 0.03 and Adjusted R^2 is 0.03, significant at $F_{(1,722)}$ = 24.51, p< 0.05. This means that a contribution of 3.2% variance is accounted for in computer literacy by previous degree obtained.

Table 2b: Regression Coefficient of Previous Degree Obtained and Students' Computer Literacy

Model		Unstandardised Coefficients		Standardised Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	17.153	0.438		39.155	0.000
	Previous_Degree	0.716	0.145	0.181	4.951	0.000*

*= Significant at p < 0.05

Table 2b shows that the relative contribution of previous degree obtained by postgraduate students (β = 0.18) was significant in predicting computer literacy.

Table 2c: Regression Summary of Previous Degree on Students' Application of Research Knowledge in Data Analysis

R	= 0.038
R Square	= 0.001
Adjusted R Square	= 0.000
Std. Error of the Estimate	= 4.397

Model	Source of Variation	Sum of Squares	Df	Mean Square	F	Sig
1	Regression	20.37	1	20.37	1.054	0.305[NS]
	Residual	13843.20	716	19.334		
	Total	**13863.57**	**717**			

NS = Not Significant p> 0.05.

Table 2c shows that the multiple regression of R = 0.04, R^2 is 0.00 and Adjusted R^2 is 0.00. This means that a contribution of 0.0% variance is accounted for in students' application of research knowledge in data analysis

Table 2d: Regression Coefficient of Previous Degree on Students' Application of   Research Knowledge in Data Analysis

| Model | | Unstandardised Coefficients | | Standardised Coefficients | | |
		B	Std. Error	Beta	T	Sig.
1	(Constant)	16.043	0.603		26.587	0.000
	Previous_Degree	0.204	0.199	0.038	1.026	0.305[NS]

NS = Not Significant p> 0.05

Table 2d shows that the relative contribution of previous degree obtained by postgraduate students (β = 0.04) was not significant in predicting students' application of research knowledge in data analysis.

Table 2e: Regression Summary of Previous Degree Obtained on Students' Interpretation of   Analysed Data

R	=0.082
R Square	=0.007
Adjusted R Square	=0.005

Model	Source of Variation	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	397.712	1	397.712	4.843	0.028*
	Residual	58959.09	718	82.116		
	Total	**59356.8**	**719**			

*= Significant at p < 0.05

Table 2e shows that the multiple regression of R = 0.08, R^2 is 0.01 and Adjusted R^2 is 0.01, is significant at $F_{(1,719)}$ = 4.84, p< 0.05. This means that a contribution of 1% variance is accounted for in students' interpretation of analysed data.

Table 2f: Regression Coefficient of Previous Degree Obtained on Students' Interpretation   of Analysed Data

Model	Standardised Coefficients	Sig.

	Unstandardised Coefficients	Std.			
	B	Error	Beta	T	
1					
(Constant)	29.136	1.242		23.459	0.000
Previous_Degree	0.902	0.41	0.082	2.201	0.028*

*= Significant at p<0.05

Table 2f shows that the relative contribution of previous degree obtained by postgraduate students (β = 0.08) was significant in predicting students' interpretation of analysed data.

Discussion of Results
Gender was found to be significant in interpretation of analysed research data between males (M =16.38; SD = 4.43) and females (M = 17.03; S.D = 4.25); $t_{(2,\ 727)}$ = -1.96; df = 727; p< 0.05. Gender was however, not significant in predicting computer literacy and usage of research knowledge in data analysis implying that male and female postgraduate students are good in these activities. On a general note, the students used in the Sabzwari, Bhatti and Ahmed (2012) study were reported to seldom use any of these methods of statistical data analysis: One-way T-test, two-way T-test, Anova, Chi square, SPSS and Manova. Respondents' behaviour regarding statistical analysis of data was not up to the marks which showed that no one had provided awareness/ guidance about use of these statistical analysis tools/ methods. Also, higher education commission (HEC) subscribed data bases was also very low and it showed that awareness about these databases had not been provided to the research students. Also, study findings contradicted Morahan-Martin (1992) and Poelmans, Truyen and Deslé (2009) results. In respect of the finding that males had greater computer experience than females, and there was a significantly greater use of some software and applications by males than by females was reported by Mahmood; Barret and Lally in Mandap (2016). Male superiority in application of research knowledge on analysed research data corroborates findings by Huber and Schofield (1998); Kelly (2000) cited in Kim and Bagaka (2005) who found that disparities exist by gender in both the use and proficiency with computers especially in the area of application of research knowledge in analysed research data.

Previous degree obtained by postgraduate students was found to account for 3.2% variance in computer literacy with a contribution of an R = 0.18, R^2 = 0.03, Adjusted R^2 = 0.03, significant at $F_{(1,722)}$ = 24.51, p< 0.05. Previous degree obtained by postgraduate students was also found to account for 1% variance in students' interpretation of analysed data with a contribution of an R of 0.08, R^2 = 0.01 and Adjusted R^2 = 0.01 significant at $F_{(1,719)}$ = 4.84, p< 0.05. However, no contribution was made by previous degree obtained to students' application of research knowledge in data analysis. Although findings in this study were significant but low, they find support in such work as, Yi (2014) who reported that computer technology application had no significant effect on the students' computer

literacy. Findings from this study support Meerah et al (2012) study which indicated that generally, the graduates used in their study have moderate knowledge and competencies to conduct research.

Conclusion and Recommendations

Research knowledge in data analysis through the medium of proficiency in computer literacy is very important in a student's academic activities, as these can translate to efficient data analysis and making of inferences on research outcome. Deficiencies in any of these phases of learning and skills acquisition can result in poor computer utilisation, poor skillfulness in the application of learnt research knowledge that could led to challenges and impede speedy completion of research projects. In view of these, it is recommended that:

1. The study has potential for course review in research methodology and statistical methods at the postgraduate level that allows for the designing of better approaches for developing adequate and sustainable research skills in postgraduate students by their faculties for enhanced and timely research completion process rather than being presumptuous of their abilities.
2. Relevant courses that are necessary prerequisites to understanding the various stages in research project writing phases should be well presented by experts in the field and are taught prior to the writing phase. Similarly, support system should be provided to students with inadequate knowledge in this area through short or supplementary courses.
3. Students should show greater interest in the use of technology as this is the only way to go in this 21st century.

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