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Challenges of Microsoft excel in statistical analysis on Education: A case study of federal college of freshwater fisheries technology, Baga, Borno State, Nigeria

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Abstract
The study is a trial to assess the challenges of Microsoft Excel in statistical analysis on teacher and student education in Federal College of Freshwater Fisheries Technology, Baga, Borno State, Nigeria. Both primary and secondary data were obtained through face-to-face interview and the used of check list from 1st to 31st March, 2021. Both qualitative and descriptive technique were employed in the data analysis. The result showed that; majority of the teaching staff lack adequate knowledge of the use of Microsoft Excel although it has impacted on teacher education on interpretation of student academic record and facilitated the task of the examination officer tremendously. There was less impact of Microsoft Excel on student education in contrast to teacher education in the study area.

Keywords: Microsoft Excel, Statistical Analysis, Challenges, Teacher/Student Education

Introduction
Microsoft Excel in Student and Teacher Education; Microsoft Excel, which was developed first for the Apple Macintosh, but which was also the first real Microsoft Windows application. In fact, the earliest versions of Excel ran under MS-DOS, but with a special Windows runtime environment. Other major spreadsheets were Super Calc (1980, for CP/M operating system), Multiplan (Microsoft), Plan Perfect (WordPerfect Corp.), Quattro Pro (Borland), VP-PLANNER and as Easy As. Since the mid-1990s, Microsoft has held the dominant market share, and now commands in excess of 90% of the spreadsheet market (Walkenbach, 2003) [29]. The basic paradigm of an array of rows-and-columns with automatic update and display of results has been extended with libraries of mathematical and statistical functions, versatile graphing and charting facilities, powerful add-ins such as Microsoft Excel's Solver, attractive and highly functional graphical user interfaces, and the ability to write custom code in languages such as Microsoft's Visual Basic for Applications (Power, 2003) [26].
Microsoft EXCEL provides tools for simple statistical analysis, such as ttests, F-test, correlation and regression (Slezák, Bokes, Námer, and Waczulíková, 2014) [28]. Duller (2008) [7] believes that Excel can be used to teach statistics in many ways. By using Excel in teaching statistics, one can use simulations to teach distributions (Carlberg, 2014) [5]. Bartz (2007) showed how to use Excel to calculate and illustrate probabilities.
More importantly than the variety in the ways Excel can be used in teaching statistics, statistical software's such as EXCEL have the capacity to promote conceptual learning in statistics (Carlberg, 2014) [5]. Price and Zhang (2007) [27] used Excel to enhance understanding important ideas in statistics and Nash and Quon (1996) [23] implemented Excel to develop statistical thinking. Newfeld (2016) [25] used Excel assignments to quickly cement in the student minds both the applicability of statistics courses materials in the real world as well as their own ability to master it. In a series of studies, Hunt (2003, 2005, and 2007) used Excel to prepare individualized tasks for students. Therefore, it can be seen that Excel can be used in teaching several statistics topics in a variety of ways and for developing various skills and attaining various practical benefits.
Despite all these benefits, Duller (2008) [7] states that teaching statistics is a big challenge and teaching it with Excel is even a bigger one. However, he adds that one has to accept to use it because the other special software is either expensive or requires technical expertise such as using command line interfaces (Duller, 2008) [7]. In other words, he finds Excel the easiest and most accessible one might prefer to call it sustainable software in teaching statistics. Considering that one in seven people on the planet (Microsoft, 2016) uses Excel and in most cases all university students possess that software, it would be wise to attempt to use it in teaching statistics in teacher education.
(Hall, 1995) [14] concludes that: This approach to teaching mathematics, with an intimate mix of mathematical theory, numerical examples and graphical representations, together with the use of modern computing aids, seems appropriate for engineers.

Warner and Meehan (2001) [30] express similar support, stating that: Individual instructors will need to weigh the costs and benefits of using a spreadsheet program versus specialized statistical package, but we believe a spreadsheet, such as Excel, will prove more attractive in many situations. Using Microsoft Excel in basic statistics (Gomes, Passeri and Albergarias 2006; Slezak, Bokes, Namer and Waczulikova, 2014) [13, 28], especially in teaching statistics (Carlberg., 2014) [5] was previously shown as feasible. This study confirmed the same argument that using Excel in Teacher Education in Statistics Course is feasible in most topics. Excel seems to have some advantages over the other commercials. For example, since Microsoft Windows is a standard in most countries of the World, most pre-service teachers seem to possess Microsoft Office and Excel. Teaching a subject using a software which could be bought and possessed by everyone meets the social aspect of sustainable development which contains ideas of equality and social justice (Hopwood, Mellor and O'Brien, 2005) [15]. Excel has eye-catching tables and graphs which help construct new concepts easily. Researchers claim that good graphs should summarize data without distortion (Cleveland, 1994; Oliver, 1998) [6]. In this sense, Excel can be argued to provide good graphs. Most pre-service teachers have basic file-management skills in Excel which is a real time-saver in such an effort to instruct a whole course using a software. Natek and Zwiling (2014) [24], mentioned the same advantage of Excel that it can be used in statistical analysis because it's normally available to most professors. Thus, when designing a course that will be fully instructed with a software, it should be considered that being widely available is an important criterion.

Garfield and Ben-Zvi (2007) [12], reported that Students who may not be strong in mathematics may work hard and enjoy statistics. This confirms the former sentence that in the treatment group pre-service teachers spent more effort and thus might have enjoyed statistics more. They claim that students learn and enjoy statistics by active involvement in learning activities. After reviewing current literature on teaching statistics, the authors also suggest using technological tools to teach statistics to help students visualize and explore data for making sense (Garfield and Ben-Zvi, 2007) 12].

Motonrayo, Mathew, Oladele, Hadiza Abbajime and Sani (2018) [22] despite the disruption caused by the conflict in Borno State of Nigeria, as a result of Microsoft Excel statistical analysis, there are still several data sources available for the Borno State of Nigeria Education sector. The State Universal Basic Education Commission, Education Management Information System (EMIS) team have conducted their school-based data collection exercise from 1,346 schools. They have also collected school level data about pupils, teachers and buildings. The census has collected; name, sex, rank (in school or LGEA hierarchy), dates of birth, first appointment and last promotion, highest qualification, area of specialization, and mobile telephone number for all Pre-Primary, Primary, or Junior Secondary School (JSS) teachers and for the LGEA administrators. In 2010 -11, the Millennium Development Goals (MDG) Information System, office of the Presidency in Nigeria, to facilitate the dispersal of the funds released to Nigeria under the Paris debt forgiveness program. In collaboration with Columbia University, had created a mobile phone-based system for capturing basic data including Global Positioning System (GPS) coordinates and pictures on clinics, public and private schools, that covered all facilities in Nigeria. In Borno they covered almost all the local government areas in the state and produced data for 1078 schools containing 16,510 teachers and 337,923 Pupils).

With the application of Microsoft Excel statistical analysis, the government was able to realize that Education in Borno State of Nigeria stands out as having some of the lowest education indicators in the country. In 2015 only 16% of parents or guardians sampled in Borno State were literate, compared to 28% in the North East and a national literacy rate of 47%. By contrast, the 2010 National Literacy analysis found that adult literacy in any language in Borno is at 58.6% compared to 71.6% nationally. A similar pattern is observed on other dimensions of educational attainment, such as numeracy, which stood at 24.6% in Borno compared to 54.5% for Nigeria as a whole. What is clear is that Borno State lags behind other states when it comes to literacy and numeracy rates and consistently ranks among the five poorest performing states in the country (Motonrayo, Mathew, Oladele, Hadiza Abbajime and Sani, 2018) [22].

Problem Setting and Objective

The Federal College of Freshwater Fisheries Technology, Baga, Borno State of Nigeria is lagging behind to capitalize on the application of Microsoft Excel on student and teacher education which is a major problem on Education for Sustainable Development (EDS) which requires diffusion on Information Communication Technology (ICT) to teachers which requires wider use of available technology. As a result of the devastative effect of Boko Haram insurgency, the college was displaced from its original based as result, the study area have become somehow marginalized institution in contrast to other sister institutions across the country settlement base wise thus the (ICTs) empowerment and help to facilitate greater access to Education for Sustainable Development learning by disadvantage people, marginalized group, and communities (the digital divide) still remain the major challenges in the study area thus both teacher and student are not benefitting from the topics in which Excel can be used not to talk of benefitting from the influences of excel in student learning and development as opined by (Makrakis, 2011) [21].

The appearance of Microsoft Excel computer application as alternative instructional tools in statistical analysis does not fully applied in the study area due to inapplicability of computer in teacher and student education for sustainable development in the study area. It applicability in educational institutions as instructional tools has created serious problems in those institutions. What more of the study area that is completely not in use? Its problem may be more serious than those institutions that have applied. As observed by Abramovich and Brantlinger (1998) [2] this is particularly the case for mathematic and or statistic teacher education, because technology as a mathematical or statistical tool is not always used appropriately in schools. Indeed, some teachers who attempt to incorporate technology in to the curriculum limit it use to routine computations only due to a lack of experience with this technology. The Microsoft Excel mathematical and statistical analysis community views this problem as a great challenge to computer application in educational reform.

In view of the above, this research work was undertaken with the main objective to assess the challenges of Microsoft Excel in statistical analysis with particular reference to teacher and student education in such a way to find some avenues of remedying its limitation to maximized it application to attain a higher degree of efficiency and effectiveness in it applicability in the Federal College of Freshwater Fisheries Technology, Baga, Borno State of Nigeria and for the overall development of the ICT contribution to the educational sector. The specific objectives are to:

1. Assess the constraint of Microsoft Excel in statistical analysis on teacher education in the study area;
2. Assess the constraint of Microsoft Excel in statistical analysis on student education in the study area.

The output of this research work may be useful in decision making processes that has to do with the development of the educational sector in the area of provision of infrastructural facilities and other teaching and learning materials to the study area. It may also enable the school authority and other organization at the apex level for the organization of a program to improve the working capacity of the workers either by the way of sponsorship for the furtherance of the staff educational level or through the organization of workshop, seminars, for capacity building to improve their skillfulness, consequently attained higher degree of efficiency in the discharge of duty. The outcome of this research work may enable planners at the educational sector to formulate policies toward the development of ICT among others which may also improves the application of Microsoft Excel in statistical analysis on teacher and student education for technological development of the education sector. The outcome of this research work may also result in comparative study analysis that may initiate educational system that will accelerate the much needed development; for example, the growth in technology is impacting on homes, streets, schools and other social, economic and political institutions thus introduction of educational system in line with required changes.

Data collection for the research work was carried out within the period of one (1) month, from 1st to 31st March, 2021, Considering the fact that within that period both teachers and the students were in full session carrying out academic activities and the period coincided with the period of annual school record update submersible to the National Board for Technical Education, Kaduna, Nigeria (NBTE), an organization responsible for regulating the academic activities of the College.

Methodology and data

The study area was Federal College of Freshwater Fisheries Technology, Baga, Kukawa Local Government Area of Borno State, located on the shores of the Nigerian portion of the Lake Chad Basin (FCFFT, 2009) [8], re-located to National Institute for Freshwater Fisheries Research, New Bussa, Niger state (NIFFRI) Zonal Office in Maiduguri in the year 2014 as a result of rumors of Boko Haram security threats. (See Appendix Ia & Ib, Pp. 12 & 13). The College was established by the proxy of the Federal Research Institutes Decree of 1975 (supplement to official gazette No. 61 volume 63 of 1975) which established Lake Chad Research Institute, Maiduguri, Borno State, Nigeria. As a result of the nationwide reorganization of Federal Research Institutes between 1988 to 1989, the supervision of the College was transferred to National Institute for Freshwater Fisheries Research, New Bussa, Niger State of Nigeria, which is under the supervision of the Agricultural Research Council of Nigeria (ARCN) Abuja, the apex body of all the agricultural research institutes in the country, Nigeria. The study area has a population of about three hundred and forty-eight (348) inhabitants, which comprises students, teaching and non-teaching staff and other auxiliary staff. The college concentrates on the training of fisheries personnel leading to the award of; Pre-National Diploma in Science and Technology, Vocational Certificate in Fisheries Technology, National Diploma in Fisheries Technology and Higher National Diploma in Fisheries Technology (FCFFT, 2009) [8].

The targeted population for this study consist of two hundred and twenty (220) teaching staff, non-teaching staff and student from the study area, out of which thirty-five (35) respondents were used for the study.

Data for the study was obtained from primary and secondary source. Both the primary and secondary data were obtained through a face-to-face interview and the check list was used to elicit information from the respondents.

Multi-stage sampling procedure was adopted for this study. In the first stage Federal College of Freshwater Fisheries Technology, Baga, - Maiduguri was purposively selected out of the Educational institutions in the state for this study. The second stage involved the selection of teaching, non-teaching staff and student in all the department of the institution and finally five (5) teaching staff, five (5) student in each of the three (3) departments were selected and five (5) non-teaching staff across all the three departments were also selected making a total of thirty-five (35) respondents for the study.

Both qualitative and descriptive technique were employed in the analysis of data to assess the constraint of Microsoft Excel in statistical analysis on teacher education in the study area (objective i), assess the constraint of Microsoft Excel in statistical analysis on student education in the study area (objective ii).

Results and Discussion

Constraints of Microsoft Excel on Teacher Education in the Study Area

The finding of the study on the challenges of Microsoft Excel on teacher education in the study area shows that majority of the teaching staff do not possess the knowledge of the use of Microsoft Excel, thus there was less impact on teacher education in the study area.

This result shows inconsistency with the findings of Formby, Dawn, and Ellington (2017) we can no longer afford intellectual luxuries in universities. Education should create productive and economically sustainable members of society, implying that knowledge alone without skills is incomplete education.

The few teaching staff that have the skill to use Microsoft Excel in teacher education in the study area accordingly, reveals that; Microsoft Excel have impacted on teacher education in the aspect of data analysis; data computation, production of graph, pie-chart, bar chart and other graphical presentation. Moreover, in statistical analysis, data and distributions, measure of central tendency, measure of dispersion, how variables move jointly correlated, testing differences between means. Interpretation of student academic related data such as student attendance, homework, assignment, determination of student grades and student overall aggregates termly and seasonally which the finding

reveals that it has facilitated the task of the examination officer tremendously.

This result shows consistency with the finding of (Carlberg, 2014) [5] one primary reason that an application such as Microsoft Excel, or an application specifically and solely designed for statistical analysis, is so helpful. It takes the drudgery of the arithmetic off your hands and frees you to think about what the number actually mean. Statistics is conceptual. It is not just arithmetic. And it should not be taught as though it is.

Constraints of Microsoft Excel on Student Education in the Study Area

On the of challenges Microsoft Excel on student education in the study area, finding reveals that majority of the students do not have adequate knowledge of the use of Microsoft Excel in the study area; thus there was less impact of Microsoft Excel on student in contrast to teacher education in the study area.

This result shows inconsistency with the findings of Friedman and Friedman (2015) makes a compelling case that institutions must stress and teach skills that help students be successful and survive and thrive in the new knowledge economy. Formby, Dawn and Ellington (2017) confirmed that students must have not only a proficiency in Microsoft Excel but have advanced skills.

The study further reveals that students within their intellectuals' capability in the study area among others used Microsoft Excel in the conversion of raw-data in to meaningful, tracked research goals, performed calculations faster and accurately.

This result confirmed to the finding of Lim (2003) Microsoft Excel spreadsheets, which are widely available in home, business and community settings. The "world ware" also called "application-software" nature of spreadsheets means that students will have greater opportunities to use and become familiar with spreadsheets than with for example symbolic mathematical packages, leading to greater utility and expertise.

Summary and Conclusions

The study covered challenges of Microsoft Excel in statistical analysis on teacher and student education in Federal College of Freshwater Fisheries Technology, Baga, Borno State of Nigeria. The study revealed that Microsoft Excel have not impacted adequately in teacher and student education at the institutional level owed to the fact that only few teachers have the skill to use Microsoft Excel and the student have inadequate knowledge of Microsoft Excel thus less impact at individual personal level on both student and teacher education in the study area. But at the institutional level there was no any impact except challenges as a result of the inapplicability of the Microsoft Excel in statistical analysis on teacher and student education in the study area. Therefore, it worth mentioning that Microsoft Excel application in the study area should be compel to both student and teacher as opined by friedman and friedman (2015) that institutions must stress and teach skills that help students be successful and survive and thrive in the new knowledge economy. The following recommendations were made: -

1. Lack of facilities to use Microsoft Excel in statistical analysis to both student and teacher should be remedied by ensuring access to computer by the way of computer skill acquisition as well provision of computers in the study area for both teacher and student usage.
2. Find an avenue for the speedy exposure and exploration on the use of Microsoft Excel in statistical analysis on both teacher and the student in the study area. For example, Microsoft Excel course should be introduced and incorporated in to the Federal College of Freshwater Fisheries Technology, Baga, Borno State of Nigeria academic curriculum as compulsory course, proficiency in Microsoft Excel either by working experience or academic qualification should be made pre-requisite requirement for employment and admission in to the Federal College of Freshwater Fisheries Technology, Baga, Borno State of Nigeria.
3. Appropriate authorities at the apex level e.g. Agricultural Research Council of Nigeria, (ARCN) Abuja should be made, duly and accordingly informed for the implementation of the above as appropriate.

APPENDIX Ia: Study Area Map

Map Showing Maiduguri, the Borno State Capital

Source: Agence France Press (2015)

Fig 1

Appendix IB: study area map

Map showing the Lake Chad Area (Baga)

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Source: Abubakar (2007)

Fig 2

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