

Comparison of Academic Achievement of Masters and Ph.D Students in Advanced Educational Research Method and Advanced Statistics Courses

Ezeugo, Nneka C.(Ph.D) Agu, Ngozi N.(Ph.D.)¹, Anachunam, Christian^{1*}

1,2,3. Department of Educational Foundations, Nnamdi Azikiwe University Awka, Nigeria

¹nc.ezeugo@unizik.edu.ng²n.agu@unizik.edu.ng³[sacovirtue@gmail.co](mailto:sacovirtue@gmail.com)

DOI: [10.56201/ijee.v10.no2.2024.pg128.140](https://doi.org/10.56201/ijee.v10.no2.2024.pg128.140)

Abstract

Doctoral students are supposed to be more knowledgeable than the masters students in Research and Statistics courses given their exposure to these courses at both undergraduate and masters levels. Cursory observations have however shown that sometimes masters students perform much better than Doctoral students in Research Methods and Statistics courses. Research to substantiate this is rare. This prompted this study which compared academic achievement of masters and PhD students in advanced educational research method and advanced statistics courses in Nnamdi Azikiwe University, Awka. Descriptive survey design was adopted for the study. The population of the study was made up of 353 masters and 96 doctoral students for the 2018/19 session, 302 masters and 62 doctoral students for the 2019/20 session and 287 Masters students and 52 doctoral students for the 2020/21 session. No sampling was done. Existing data of Masters and doctoral students' results in Advanced Statistics and Educational Research Method course were collected and analyzed using mean and standard deviation. The findings revealed that Masters students performed better than doctoral students in advanced statistic course across the years under review. The findings of the study further indicated that while masters students performed better in educational research method than PhD students in 2018, PhD students performed better than masters students in 2019 and 2020. Based on the findings of the study, it was recommended that concerted efforts should be made by university administrators to ensure that doctoral students in faculty of education are given reasons for being taught advanced statistics course. This is with a view to bridging the achievement gap between them and their counterparts in Masters degree programme.

Key words: Educational research, Advanced statistics, Statistical skills, Postgraduate students

INTRODUCTION

Postgraduate education students at universities are required to take courses in educational research methods as a component of their teacher education programme. The course covers the basic requirements of research (the qualitative and quantitative methods, data collection instruments and tools, data presentation, interpretation and analysis and research reports), so that students would be able to carry out simple scientific investigations. Educational research method course also engages students in understanding the stages of research design, that is, the components of conceptualizing and defining a research problem, conducting literature reviews, collecting and analyzing data (quantitative and qualitative) as well as writing and interpreting results (Papanastasiou in Papanastasiou & Zembylas, 2008). The completion of an advanced course in research methods is a critical step for postgraduate students who will conduct their own original research using the knowledge acquired from educational research method course and statistics course.

Educational research method course is vital in the entire research experience of a postgraduate student (Counsell, et.al.(2000); Daniel, 2022). It helps post-graduate students to define research problems; relate theories and concepts to hypotheses formulation; write components of the problems; carry out feasibility report of a research problem; review related literature; explain constructs and variables; select appropriate methodology for a specific research; define population and sample; select sample from a target population; utilize the different sampling techniques and write a research report (Oloyede, 2011). It enables the students to acquire requisite research skills and successfully undertake independent or collaborative studies to discover hidden truths (Mugenyi, 2018). The course provides the official experience to educational research concepts and practices received by postgraduate students in their teacher education programmes (Sunzuma, et.al, 2012). Basic research knowledge is imperative for postgraduate students given that a well-written thesis/dissertation is one of the cardinal pre-requisites for the conferment of degree at the expiration of postgraduate programme. More so, postgraduate students are also required to take courses in advanced statistics.

Advanced statistics course covers basic theory and techniques for application of descriptive and inferential statistics in educational research designs. It is compulsory for the postgraduate students in Faculties of Education to take statistics courses in order to graduate (Reeinna, 2014). Basic statistical knowledge enables postgraduate students answer research questions and test hypotheses based on the data they collected using appropriate statistical tool. In addition, it facilitates the analysis of data generated from the administration of instruments for data collection in a scholarly manner. It is hoped that after such a statistical course for the postgraduate students (masters or Ph.D.), they would possess the requisite statistical literacy to complete their research thesis.

There has been a growing demand for research and statistical methods in various disciplines; education inclusive. However, these courses often appear to be the least favorite course of many postgraduate students especially those in Faculties of Education probably because of their vast and mathematical nature (Carla, 2016). Carla added that educators would agree that most statistical concepts are complex and difficult; hence many postgraduate students find it hard to

understand and apply statistical ideas. Shaukat et al. (2014), opined that students classify research methods as difficult. In a study they carried out, to determine postgraduate students attitude towards research, they established among other things that researchers of higher degree were however significantly better than those of lower degree on attitude towards research usefulness. Yusof, (2021) in his study on research methodology knowledge between Masters and Doctoral education students, established that on the average, both groups had moderately low knowegde, although Doctoral students had better knowledge. Both groups had greater difficulty in the quantitative research concepts. Pondey and Singh, (2023) established that M.Ed and M.Sc, stream of postgraduate students exhibited better attitude towards research than M.A.(Edu) students in a study carried out with postgraduate students of government and private colleges of both urban and rural areas of India. The perceived difficulties that students experience in statistics courses and research methods may affect their academic achievement. It will therefore be interesting to find out if doctoral students who are higher in level, perform better than masters degree students.

In Faculties of Education in various Nigerian universities, doctoral and masters students are taught by the same lecturers either together in the same class or in different classes. Doctoral students who obtained their masters degree in other universities are expected to repeat educational research method and advanced statistics courses in their present university. In which case, they are exposed to the same lectures; same lecturers; same curriculum contents; same lecture schedule; same instructional materials and physical learning environment with masters students who are freshers in advanced research and statistics courses. Doctoral students therefore, are expected to be more knowledgeable in educational research method course and advanced statistics courses than masters students given their exposure to research project at both undergraduate and masters level. Consequently, doctoral students are expected to record better academic achievement than the masters students in educational research method and advanced statistics courses.

Statistical Skills and Academic Achievement of Students in Research and Statistics Courses

Statistical skill is one major component of research literacy (Abdulbajar, 2020). Educational research is frequently quantitative, requiring appropriate statistical skills for collecting, summarizing, presenting and analyzing data for the purpose of solving research puzzles, Li et. Al, (2012), however many educational researchers are perceived as quantitatively weak (Everson, 2022). As universities all over the world focus on research as part of a postgraduate programme, statistics courses are being offered to provide a platform where postgraduate students can acquire relevant statistical skills to help them complete their postgraduate researches. However, postgraduate students come from different backgrounds, which may influence their disposition to statistical skills. For instance students from the social sciences background may not have much experience with numbers, and may believe themselves to be weak with numbers (Koh, 2014). Postgraduate students at a Faculty of Education would include teachers with science background (teaching the sciences subjects, mathematics, health and Physical Education) and from the social science background (teaching Languages, Special Education , religious studies and other humanity subjects). These may have varying statistical skills and research experiences.

Students entering universities in these various disciplines are expected to enroll in courses that involve statistical-based content or processes. For more than a decade, the decline in statistical skills among students has been apparent even in higher level courses across many disciplines (Varua& Young, 2010). Students exhibit negative perception, low self confidence, increased anxiety and difficulty towards statistics even at the postgraduate level (Obilor and Ikpa, 2022). This leads to poor academic achievement of students in these statistics courses (Cherney& Cooney, 2005). It is a tough situation for students when these courses are compulsory courses within their programme of study. Factors that can contribute to students increased anxiety with subsequent impact on performance include difficulty in improving ones learning (Carieth, et al, 1996), limited time (Abouserie,1994), attitude and expectations,(Onwuegbuzie, 2003). It is therefore anticipated that students with more experience, exposure to the course content and adjustments to its demand should produce a better result. Naccache, (2012), however discovered that students in the introductory statistics class placed more value in the subject than students in the advanced course. Thus establishing that students tended to have better attitude towards statistics in their first enrollment. With regards to educational research, studies show that students express frustration and dissatisfaction towards the way the courses are designed and delivered (Counsell, et al.,2000; Daniel, 2018). They are of the opinion that the course content must have practical relevance. Daniel,(2022) emphasized that “the teaching is disengaged from practical problems with some teaching focused on the higher level of abstraction, with less opportunity to apply what is gained”(p). Doctoral students who have gained a more serious practical experience in the course of writing their masters thesis should therefore have an added advantage. Shaukat et al.(2014) equally discovered in their study that researchers with advanced degrees had a notably better attitude towards the usefulness of research compared to those with lower degrees. By implication, those with higher degrees should do better than those with lower degrees.

Researches have shown that learning achievement in the area of advanced statistics and research are on the decline (Achebe& Okoye, 2022; Daniel, 2022). Poor statistical skills are frequently related to poor academic performance of students in statistics-based disciplines. Most of these students discover they need to master their statistical skills, tools and applications to achieve success in their chosen disciplines. Students’ statistical ability plays an important role in determining their academic achievement in disciplines such as educational research.

Research and statistical skills are required by all postgraduate students towards the completion of their thesis. Moreover, masters and Doctoral thesis have been discovered as key factors to early completion or abandonment of the postgraduate programme(Agu, 2014). In some universities in Nigeria, it has been observed that doctoral students, who are supposed to be more knowledgeable than the masters students in educational research method course and statistics course, given their exposure to these courses at both undergraduate and Masters level, sometimes, show apathy and look up to the masters students on issues of research and statistics. There is equally high anxiety level and negative attitude towards the study of research and statistics by these levels of students(Rosli, Maat & Rosli, 2017). Some studies carried out in this area focused on students’ attitude (Naccache, 2012; Pondey& Singh, 2023; Shaukat et al, 2014;), students’ perceptions (Nwogwugwu&Ovat, 2021; Obilor&Ikpa, 2022), test anxiety and self-efficacy

Achebe & Okoye, 2022; Obilor&Ikpa, 2022). Not much has been done towards comparing achievement in these courses based on the level of study. It will therefore be interesting to ascertain, by empirical investigation, whether differences exist in the academic achievement scores of Masters and Ph.D. students in educational research method and advanced statistics courses. In view of the foregoing, the following research questions were raised:

1. How comparable are the mean achievement scores of Masters and doctoral students in educational research method from 2018-2021 academic sessions?
2. How comparable are the mean achievement scores of Masters and doctoral students in advanced statistics course from 2018-2021 academic sessions?

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant difference between the mean academic achievement scores of masters and doctoral students in advanced statistics course from 2018-2021 academic sessions.
2. There is no significant difference between the mean academic achievement scores of Masters and doctoral students in educational research method from 2018-2021 academic sessions.

METHOD

Research Design: Survey research design was used to give direction to the study. This design is considered appropriate for the present study because it seeks to utilize existing scores of students in order to ascertain whether differences exist in the achievement scores of masters and doctoral students in advanced statistics and Educational research courses in Nnamdi Azikiwe University, Awka.

Procedure: Data collection was done using already existing data of masters and doctoral students' results in Advanced Statistics and Educational Research Method course for 2018/19, 2019/20 and 2020/21 academic sessions for all the 353 masters and 96 doctoral students for the 2018/19 session, 302 masters and 62 doctoral students for the 2019/20 session and 287 masters students and 52 doctoral students for the 2020/21 session.

Data Analysis: Data analysis was carried out using mean and t-test statistics. Statistical Package for Social Sciences (SPSS) version 20 was used. For the hypotheses, p-value interpretation was used with the decision rule that if the p-value is low (<0.05), the null hypothesis was rejected but when the p-value is high (>0.05), the null hypothesis was not rejected.

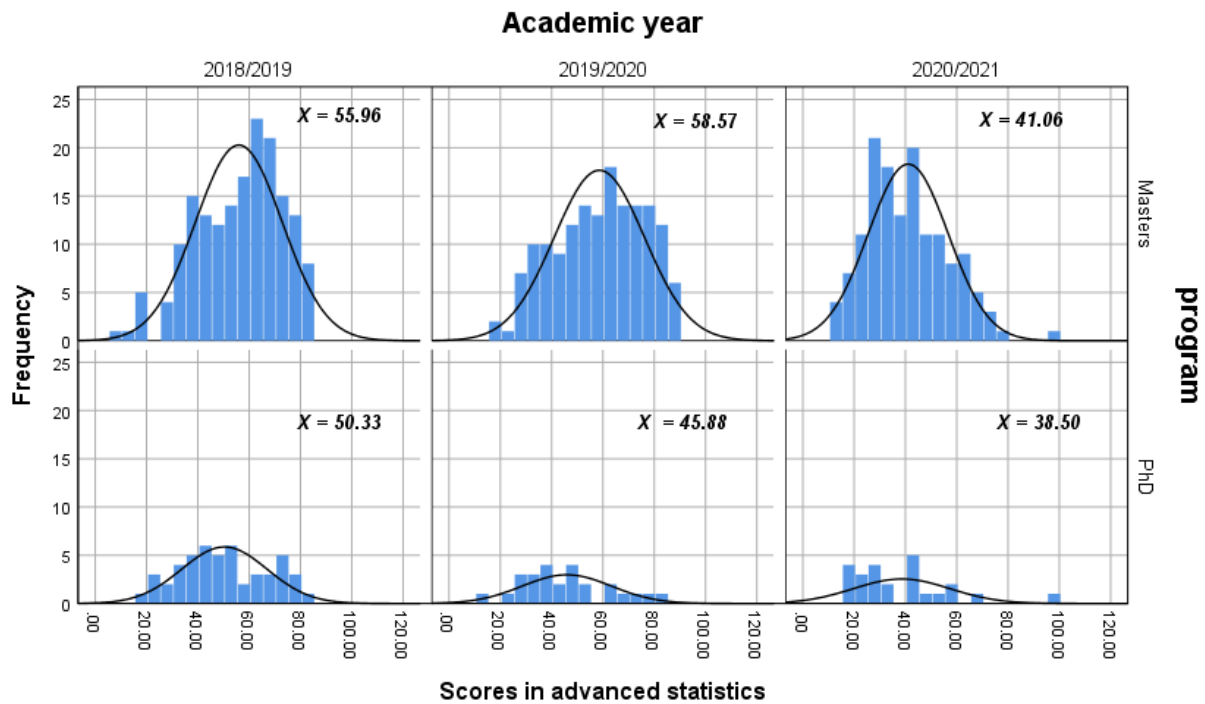
RESULTS

Research Question1: What are the mean achievement scores of Masters and doctoral students in educational research method from 2018-2021 academic sessions?

Table 1: Mean Achievement Scores of Masters and Doctoral Students in Advanced Statistics from 2018-2020 Academic Sessions.

Years	Source of variation	N	Mean
2018	Masters	172	54.1
	PhD	49	46.9
2019	Masters	156	58.0
	PhD	26	43.7
2020	Masters	143	40.0
	PhD	24	34.5

Data in Table 1 show that the mean scores of masters students in advanced statistics across 2018, 2019 and 2020 academic sessions are 54.1%, 58.0% and 40.0% while those of PhD students are 46.9, 43.7% and 34.5%. These indicate that the performances of masters students across the years are consistently far higher than those of PhD students in advanced statistics. There is also consistent decline in the performance of Ph.D. students. This result is further reflected in figure1. Figure 1: Graphical summary of performance in advanced statistics between masters and PhD students



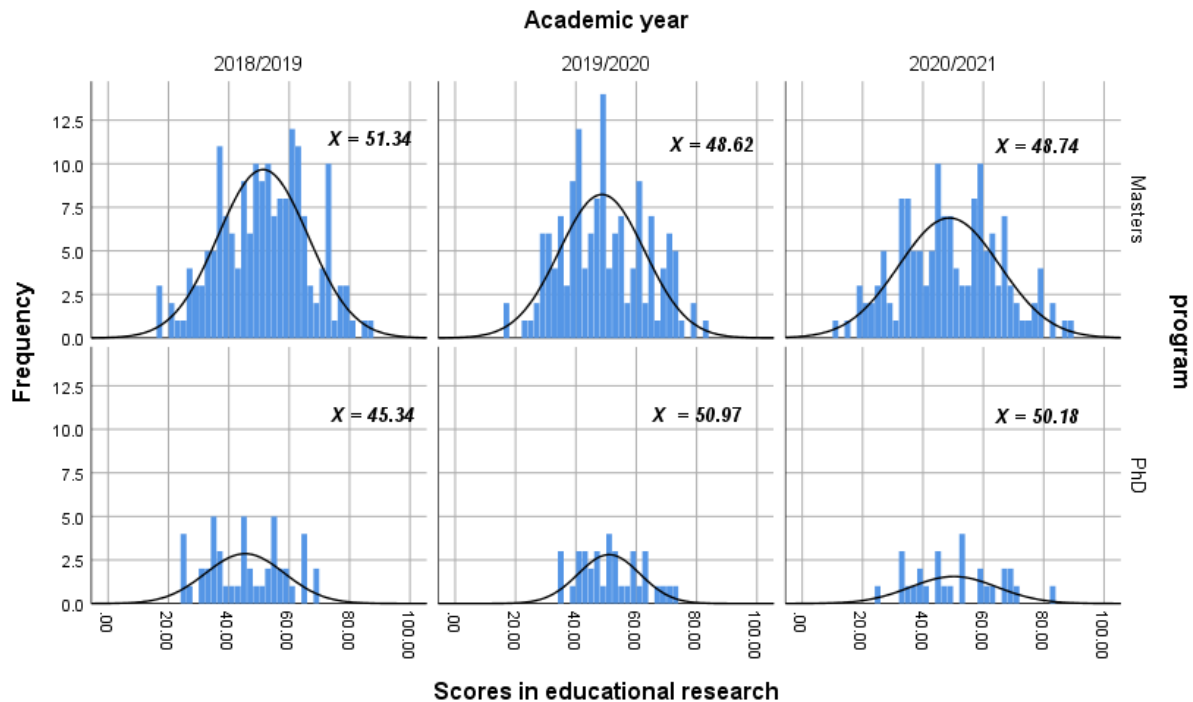
Research Question2: What are the mean achievement scores of Masters and doctoral students in advanced statistics course from 2018-2021 academic sessions?

Table 2: Mean Achievement Scores of Masters and Doctoral Students in Educational Research from 2018-2020 Academic Sessions.

Years	Levels	N	Mean
2018	Masters	181	50.7
	PhD	47	45.8
2019	Masters	146	48.8
	PhD	36	50.5
2020	Masters	144	48.8
	PhD	28	51.9

Data in Table 2 above show that the mean scores of masters students in educational research across 2018, 2019 and 2020 academic sessions are 50.7%, 48.8% and 48.8% while those of PhD students are 45.8, 50.5% and 51.9%. These indicate that while masters students performed better in educational research than PhD students in 2018, PhD students performed better than masters students in 2019 and 2020. This is further illustrated in figure 2.

Figure 2: Graphical summary of performance in educational research between masters and PhD students



Hypothesis 1: There is no significant difference between the mean academic achievement scores of masters and doctoral students in advanced statistics course from 2018-2021 academic sessions.

Table 3: Independence sample t-test between the Achievement Scores of Masters and Doctoral Students in Advanced Statistics from 2018-2021 Academic Sessions.

	Masters	PhD	t-test	P-value	Remark
	N (%Score)	N (%Score)			
1. 2018	172(55.96%)	49(50.33%)	2.080	.040	Sig
2. 2019	156(58.57%)	26(45.88%)	3.433	.002	Sig
3. 2020	143(41.06%)	24(38.50%)	.632	.533	Not Sig

Table 3 shows that the t-value of 2.080, 3.433 for years 2018 and 2019 and their corresponding p-values which are less than the stipulated level of significance. This implies that there is a significant difference between the achievement scores of masters and doctoral students in advanced statistics in 2018 and 2019 in favour of the masters students. For year 2020, the t-value of .632 has a corresponding p-value of 0.533 which is greater than the stipulated p-value. This shows that there

is no significant difference between the achievement scores of masters and doctoral students in advanced statistics for that year.

Hypothesis 2: There is no significant difference between the mean academic achievement scores of Masters and doctoral students in educational research method from 2018-2021 academic sessions.

Table 4: Independent sample t-test between the Achievement Scores of Masters and Doctoral Students in Educational Research from 2018-2021 Academic Sessions.

	Masters	PhD	t-test	P-value	Remark
	N (%score)	N (%Score)			
1. 2018	181(51.34%)	47(45.34%)	2.710	.008	Sig
2. 2019	146(48.62%)	36(50.97%)	.937	.350	Not Sig
3. 2020	144(48.74%)	28(50.18%)	.472	.639	Not Sig

Table 4 shows that for year 2018, the t-value of 2.710 and the corresponding p-values which is less than the stipulated level of significance, implies that there is a significant difference between the achievement scores of masters and doctoral students in educational research method in 2018 infavour of the masters students. For years 2019 and 2020, the t-values of 0.937 and 0.472 and their corresponding p-value which is greater than the stipulated level of significance shows that there is no significant difference between the achievement scores of masters and doctoral students in educational research method.

DISCUSSION

The findings of the study revealed that masters students performed better than doctoral students in advanced statistics in 2018/19, 2019/20 and 2020/21 academic sessions. The findings of the study further revealed that a significant difference existed between academic achievement scores of masters and doctoral students in advanced statistics course in favour of masters students. This is rather surprising given that doctoral students have been exposed to statistics at both undergraduate and masters degree level unlike the masters students that are undertaking statistics for the second time in their university education. However, the trend may not be extricated from the fact that the doctoral students may perceive the statistics as a ‘masters course’ having undertaken research work at masters level; hence, the lack of motivation to follow through the course. This finding is supported by Naccache, (2012), who established that students enrolling first in their statistics course had better positive attitude towards statistics. Since attitude and expectations can influence performance (Onwuegbuzie, 2003), it should be anticipated that Masters students may be more adaptive to new learning

The findings of the study further indicated that while mastersstudents performed better in educational research method than PhD students in 2018, PhD students performed better than masters students in 2019 and 2020. This trend in 2018 is contrary to the general expectation and attributed to several factors such as quality of the students admitted into the programmes, level of

commitment in studying, and attendance to lectures etc. These are subject to further investigations. In contrast, the trend of performance in advanced educational research method in 2019 and 2020 is rather not startling given that doctoral students have been exposed to research more than their masters counterparts. Thus, doctoral students are expected to be less-test anxious than the masters students as result of gained experience and adaptability Cherney & Cooney, (2005). Doctoral students having written their masters thesis stand a better chance to appreciate the intricacies of research methods. This finding is supported by Shaukat et al.(2014) who opined that researchers with advanced degrees showed more positive attitude towards the usefulness of research compared to those with lower degrees. The logical consequences of low text anxiety are high self-efficacy and improved academic achievement. Additionally, the findings of the study indicated that while a significant difference existed between the achievement scores of masters and doctoral students in educational research method in 2018 infavour of the masters students, no significant difference existed between the achievement scores of masters and doctoral students in educational research method in 2019 and 2020. In general, the performances of both the Masters and Ph.D students in research and statistics were observed to be low over the three years period. This agrees with the findings of Achebe&Okoye,(2022); Daniel, (2022), who also established that learning achievement of students in advanced sresearch and statistics are on the decline.

Conclusions

Based on the findings of the study, it was concluded that masters students performed better than PhD (doctoral) students in advanced statistic course across three years of 2018, 2019 and 2020. It was further concluded that there was variation in performance of masters and PhD students in educational research method across 2018, 2019 and 2020. While masters students performed better in educational research method than PhD students in 2018, PhD students performed better than masters students in 2019 and 2020. The mean performances of both masters and Ph.D students in the two courses across the three years were low.

Recommendations

In line with the findings, the following recommendations were made:

1. Concerted efforts should be made by university administrators to ensure that doctoral students in faculty of education are given reasons for being taught advanced statistics course. This is with a view to bridging the achievement gap between them and their counterparts in masters degree programme.
2. Lecturers in educational research method should ensure that they evolve teaching strategies that will improve the performance of both masters and PhD students in educational research method.

REFERENCES

- Abdulbajar, S. I. (2020). Statistics in relation to educational research. A seminar paper presented at Seminar series for researchers held on 8th November, 2020 at Katsina College Katsina. <https://www.researchgate.net/publication/346015055>
- Abouserie, R. (1994). Sources and levels of stress in relation to locus of control, self-esteem in university students. *Educational Psychology*, 14(3), 323-330
- Achebe, N. O & Okoye, R. O, (2022), Postgraduates students test anxiety and self efficacy as predictors of their academic achievement in advanced statistics in South East federal universities. *South Eastern Journal of Research and Sustainable Development*, 6(2), 60-83. [Sejrsd.org.ng/index.php/SEJRSD/article/view/177/140](https://sejrsd.org.ng/index.php/SEJRSD/article/view/177/140)
- Agu, N. (2014). Variables attributed to delay in thesis completion by postgraduate students. *Journal of Emerging Trends in Educational Research and Policy Studies*, 5(4). <https://hdl.handle.net/10520/EJC159302>
- Carla M. M. (2016). Examining gender differences in statistics anxiety among college students. *International Journal of Education and Research*, 4(6), 2411-5681.
- Cherney, I. D. , Cooney, R,R, (2005). Predicting student performance in a statistics course using the mathematics and statistics perception scale (MPSP). *Transactions of the Nebraska Academy of sciences* 30: 1-8. [Core. ac. uk / download / pdf /188065573 pdf](http://core.ac.uk/download/pdf/188065573.pdf)
- Counsel, C. , Evans, M., McIntyre, D., & Raffan, J. (2000). The usefulness of Educational Research for Trainee Teachers Learning *Oxford Review of Education*, 26(3/4), 467-482. <https://www.jstor.org/stable/1050771>

Daniel, B.K (2018) The need for innovation in research methodology,*University World News*
<https://www.Universityworldnews.com/post-mobile.Php?Stroy=20181107093621402>

Daniel, B. K. (2022). The role of research methodology in enhancing postgraduate students research experience. *The Electronic Journal of Business Research Methods*. <https://doi.org/10.34190/ejbrm.20.1.2253>

Everson, K. C. (2022) Statistical skills gap of professors of Education at U.S. Universities and HBCUs. *Journal of Statistics and Data Science Education*, 30(1), 45-53. <https://doi.org/10.1080/26939169.2022.2034488>

Garfield, J. ,&Ahlgran, A. (2018). Difficulties in learning basic concepts in probability and Statistics: Implications for research. *Journal of Research in Mathematics Education*, 19(5), 44-63

Li, K. ,Uvah,J. ,& Amin,, R,(2012).predicting students performance in elements of statistics. US – China. *Education Review*, 875-884 <https://files.eric.ed.gov/fulltext/ED537981.Pdf>

Mugenyi, R. (2018). Relevance of research methods to academic requirements at both under and postgraduate levels. *International Journal of Research Publication*, 3(1), https://ijrp.org/paper_detail/107

Naccarche, H, S (2012). Factors related to student performance in statistics courses in Lebanon. *Dissertation*. 852. <https://aquila.usm.edu/dissertations/852>

- Nwogwugwu, C. E. &Ovat, S. V. (2021). Role of gender in students' perception of research and statistics in education: A panacea for sustainable governance. *Global journal of Educational Research*, 20: 139-143 <https://dx.doi.org/10.4314/gjedr.v20i2>
- Obilor, E. I. ,&Ikpa, A, I. (2022)Assessment of the influence of statistical anxiety on academic performance of post graduate students in tertiary institutions in Rivers State. *International Journal of Advanced Academic and Educational Research*. 13(6). Pp12-24
- Oloyede, O.E. (2011). *Branding programmed instruction composed with other materials for learning mathematics by Nigerian secondary school students*. Unpublished M.Ed. Thesis of University of Ife, Ile-Ife.
- Onwuegbuzie, J. (2003). Expanding the framework of internal and external validity in quantitative research. *Research in the schools*, 10(1), 71-90.
- Pandey, B., & Singh, J. k. (2023). Study of attitude of students studying in post graduate towards academic research. *International Journal of Creative Research Thoughts (IJCRT)* 11(6) www.ijert.org pp326-333
- Papanastasiou, E. C. &Zembylas, M. (2008). Anxiety in undergraduate research methods course: its nature and implications. *International Journal of Research and Method in Education*, 31(2), 155-167.
- Reeinna, N. A. (2014). Student's attitude towards introductory statistics course at public universities using partial least square analysis. *Interdisciplinary Journal of Contemporary Research in Business*,6(4), 94–123

- Rosli, M.K., Maat, S., & Rosli, N. (2017). Students' attitude and anxiety towards statistics : A descriptive analysis. <https://api.semanticscholar.org/CorpusID:204382864>
- Shaukat, S., Abiodullah, M. , & Siddiquah, A. (2014). Postgraduate students' attitudes towards research. <https://www.researchgate.net/publication/281346659>
- Sunzuma, G. B., Zezekwa, N. B. & Bhukuvhani C. B. (2012). Undergraduate students' views on their learning of research methods and statistics (RMS) course: Challenges and alternative strategies. *International Journal of Social Science Tomorrow*, 1(3), 2277-6168.
- Uche, C. M. & Augustine, S. E. (2015). Relevance of post graduate diploma in education program to students in furthering their education: A case study of university of Port-Harcourt. *Journal of Educational Research and Review*, 3(5), 75-85.
- Yusof, I. J. (2021). Research methodology knowledge between master and Doctoral education research students. *Revista Gestao Inovacao e Tecnologias*, DOI:10.47059/revistageintec.v11i2.1801