

**INTERNATIONAL JOURNAL OF
INNOVATIVE RESEARCH AND KNOWLEDGE**

ISSN-2213-1356

www.ijirk.com**Knowledge and Skills Needs for Post Graduate Students to be Personally Involved in Statistical Data Analysis**

Joseph M. Mubichakani & Paul K. Rotich
Lecturer, Department of Science Education
University of Eldoret, Kenya

ABSTRACT

Knowledge is a key aspect of society development in all spheres. Knowledge has been determined to be created from research and innovations. Universities worldwide have been serving society for a long period of time by educating an ever greater proportion of the population and broadening its perspectives; by performing research that creates new understanding, new technologies and the potential for action; and by providing a store of knowledge and capabilities that society as a whole has been able to draw upon, In Kenya, however, University students have been accused of doing low quality research and in some cases hiring people to do their research and write theses, This implies that universities in Kenya may not be providing a store of knowledge and capabilities that society as a whole can draw upon, but rather they are relying on the society for research knowledge. The purpose of this study was, therefore, to establish the knowledge and skills needs for post graduate students to be personally involved in statistical data analysis: a case of selected universities in Western Kenya. The study adopted survey and case study design. The target population for the study was masters' students who had submitted theses for examination and research lecturers. Purposive, stratified and simple random sampling procedures were used to sample 97 respondents who participated in the study. Questionnaires and interview schedules were used to collect data for the study. The study found out that; majority of the students found it difficult when involved in data analysis and that statistics and computer knowledge are key needs to be involved

in data analysis. The study recommended that universities should put more emphasize on key knowledge and skills needs when training researchers.

Keywords: *Knowledge and Skills Needs, Statistical Data Analysis*

1.0 INTRODUCTION

Knowledge according to oxford dictionaries is defined as; facts, information, and skills acquired through experience or education. The dictionary also gives an alternative definition as the theoretical or practical understanding of a subject. This theoretical or practical understanding is valued as a vital asset for progress and prosperity in every sphere of human understanding, (Yamamoto, 2001). With this vital importance of knowledge it's noble to identify, protect and improve the source of knowledge. Yamamoto (2001) notes that the domain of knowledge especially scientific knowledge is ever expanding and he notes that this knowledge is resulting out of experimentation carried out at different levels. This trend makes scientific & technological activities more important because it expands the intellectual asset of human kind and solves important national problems (Yamamoto, 2001). Okafor (2011) noted that the primary aim of research is discovering, interpreting, and the development of methods & systems for the advancement of human knowledge on a wide variety of scientific matters of world & universe. The results stemming from research & development can be used to solve various kinds of problems that are confronted by the society world over. The argument presented by the scholars point out the key role that research plays in advancement of knowledge. Research is the incubator of knowledge where scholars come in with an idea, collect more information about the idea, do a thorough analysis and synthesize of the idea, test the idea and eventually emerge out of the research incubator with solid knowledge to be used by the society in general. This is just but one reason we should all protect and improve our research incubator so that it continues giving as better and advancement knowledge.

Clark (1993) notes that universities in many countries have taken up research as a fundamental activity, he also notes that research is also developed outside universities in state owned laboratories, business firms and nonprofit research organizations. Sawyerr (2004) indicates in his work that Africa's universities continue to provide the vast bulk of research and train virtually all African researchers. They have done this by educating an ever greater proportion of the population and broadening its perspectives; by performing research that creates new understanding, new technologies and the potential for action; and by providing a store of knowledge and capabilities that society as a whole has been able to draw upon. Despite this documented importance of research Liyod et al (2004) as quoted in Sabzwari et al, (2009) shows that clinicians' interest and involvement in research was declining in recent years. These findings are confirmed by Sabzwari et al, (2009) indicated that majority of the junior faculty of Pakistani medical universities who participated in their study were currently not involved in research.

In Kenya, University students have been accused of doing low quality research. Scott (2015) notes that there is a mismatch between Kenya's numerous bright students and our low academic research excellence. He argues that while Kenya retains high literacy rates and impressive university completion statistics, we rank frightfully low on quality of research output worthy of international acclaim and publication. He notes that in some cases university post graduate students have been hiring researchers to carry out their research for examination. These sentiments are also shared by Mukhwana et al, (2016) who noted in their report that post graduate students supervisors were often complaining about candidates who are unwilling, or unable to conduct serious research. They further recommend that capacity for research needs to be assessed critically to ensure that undue delays are not sustained

in the graduate schools. These reports and arguments by Scott (2015) and Mukhwana et al (2016) open up several questions about university education and more specifically in research. The guiding purpose of this paper was to determine the knowledge and skills needs for post graduate students to be personal involvement in statistical data analysis. The purpose was with a view to incorporate necessary measures into research training of post graduate students to develop a knowledgeable workforce in research.

The following two are the specific objectives that guided data collection for the study; to determine how post graduate students found the process of statistical data analysis and to determine knowledge needs for students' personal involvement in statistical data analysis.

2.0 DESIGN AND METHODOLOGY

This study was based on two philosophies, the positivism philosophy and interpretivism philosophy. These philosophies differ in various aspects including their view on the nature of knowledge and reality, however they complement each other on their weaknesses and that was the main reason for using them both. The study adopted a descriptive survey design, and the study also used a case study design to catch the complexity and situatedness of behavior among post graduate students. The two designs were adopted to meet the needs of the two different philosophies used in the study.

The study was carried out in universities of western region of Kenya. Kenya is a country in East Africa with coastline on the Indian Ocean. The study divided the country into six regions namely, northern region, eastern region, costal region, Nairobi region, central region and western region. Kenya had a total of 48 chartered universities by the end of the year 2017. Out of the 48, 30 were public universities and 18 were private universities. The universities are distributed in the regions as shown in table 1.1 below.

Table 1.1: Distribution of Chartered Universities in Kenya

Region	Public	Private	Total
Western	11	5	16
Nairobi	4	11	15
Central	10	2	12
Costal	3	0	3
Eastern	2	0	2
Total	30	18	48

The target population for the study was masters' students who had submitted their theses for examination from selected public and private universities in Western Kenya. These groups of individuals were picked on because they had gone through a detailed research process. The memory of how the experience was assumed to be still fresh, and it was easy to recall the general knowledge and skills needs to be involved in data analysis. Out of the target 16 universities, 11 public and 5 private, in western region of Kenya stratified random sampling was used to sample 3 universities, 2 public and 1 private. Further simple random sampling procedures were used to sample masters' students from the school of business, education and social sciences. The sampling arrived at a sample of 90 post graduate students who participated in the descriptive survey. Purposive sampling was also used to select seven individuals 4 masters' students and 3 research lecturers who were taken through a detailed interview to catch the complexity and situatedness of behavior among post graduate students. A total of 97 respondents participated in the study.

Questionnaire and depth interview schedules were used in data collection. The researcher began by giving the sampled students questionnaires. After a period of one month from the collection of questionnaires the researcher interviewed four students for in depth information. Lastly the researcher interviewed three lecturers for more information. Collected data was analyzed using frequencies.

3.0 FINDINGS AND DISCUSSION

3.1 Respondents Background Information

The sample size for the study was 94 masters’ students and 3 research lecturers. At the end of data collection exercise the study managed to get data from 80 masters’ students, 76 being through filling of questionnaire and 4 being interviewed. The study managed to interview all the 3 sampled research lecturers. This therefore translated to a total of 83 respondents who participated in the study translating to 85.6% of the sampled respondents. Out of the 76 students who participated in survey 48.7% were male and 51.3% were female. The youngest student respondent was 26 years old and the oldest was over 45 years. From the sampled students 32% were from private universities and 68% were from public universities.

3.2 Masters’ Students Personal Involvement in Statistical Data Analysis

Personal involvement in data analysis was the dependant variable of the study. According to this study personal involvement was defined as the act or process of taking part in statistical data analysis. Personal involvement in this study was measured using four attributes. The four attributes were; personal involvement being very difficult, being difficult, being easy and being very easy. A question was posed to the respondents and the study found out that 7.9% of the respondents found data analysis to be very easy, 23.7% found it a little easy, 44.7% felt it was a little difficult and 23.7% found the process to be very difficult. Summary of the findings is as indicated in figure 1.1 below.

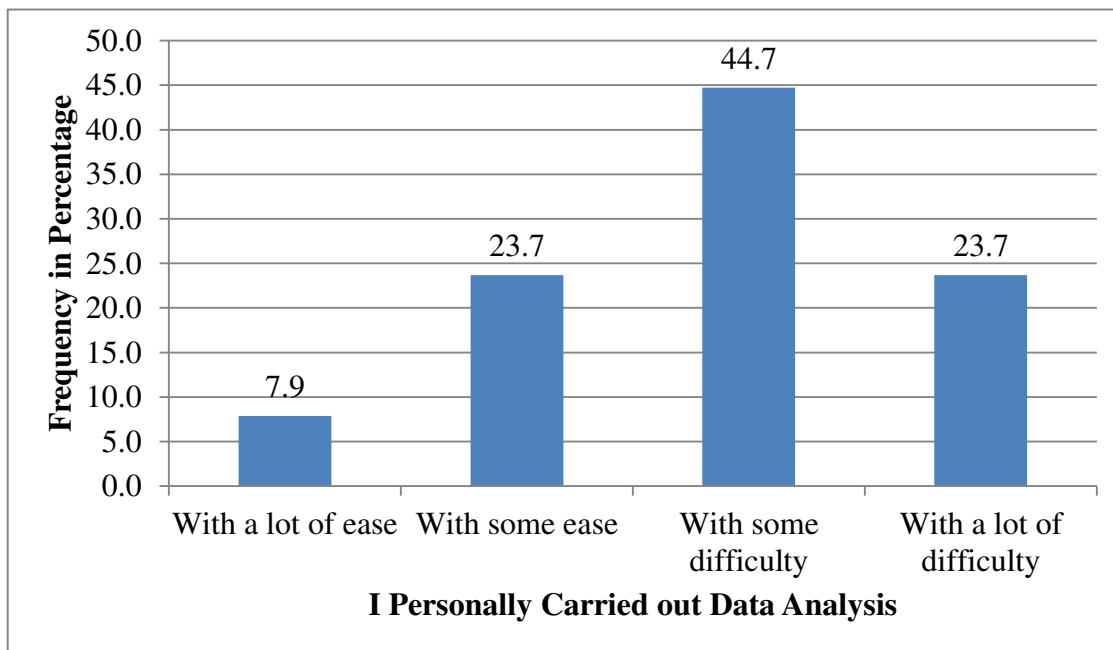


Figure 1.1: Students Personal Involvement in Data Analysis

The study determined that majority of the masters students 68.4% were finding it difficult to personally carry out statistical data analysis. This finding was after the students had gone through masters' level research training and they had participated in the one year research project requirement. This finding therefore raises questions on the quality of research training that the students underwent, or if not the training then questions are raised about the type of students or the context from which they were operating. During the interview one of the students interviewed noted that she sought help from an external researcher to assist in data analysis because analysis was so complicated for her to pull through on her own.

Clark (1993) noted that there is ample reason to doubt the existence of a close research teaching relationship throughout modern systems of higher education in Federal Republic of German, Great Britain, France, The United States and Japan. Liyod et al (2004) as quoted in Sabzwari et al, (2009) shows that clinicians' interest and involvement in research was declining in recent years. These findings are confirmed by Sabzwari et al, (2009) indicated that majority of the junior faculty of Pakistani medical universities who participated in their study were currently not involved in research. The finding of this study agrees with this other findings from international level and adds a voice from a Kenyan context that actually the society has reason to worry in relation to research training in Kenyan universities. These findings concur with Scott (2015) who notes that there is a mismatch between Kenya's numerous bright students and our low academic research excellence. The findings also explain why post graduate students supervisors are often complaining about candidates who are unwilling, or unable to conduct serious research as noted by Mukhwana et al, (2016).

The findings in this study and other findings discussed above comes at a time Galagher (2000) has observed that universities were putting in more emphasis on research training. Galagher was quoted in Pearson & Brew (2002), stating that there is a shift in universities approach to research. He indicated that they are now giving more emphasis to explicit skills formation, including the skills of future researchers. This finding of inefficiency of students personal involvement in data analysis indicate that the efforts being put in by universities in research training are not being fruitful enough. This study dug deep to determine the reasons why majority of masters' students found it difficult to carry out data analysis and only a few found easy. The findings are as discussed in the subsequent sections in this chapter.

3.3 Knowledge and Skills Needs for Data Analysis

It was important for the study to establish the knowledge and skill needs for one to be effectively and efficiently involved in data analysis with ease. This formed the first objective of the study. A set of questions were presented to respondents to determine the knowledge and skills that were very key to their carrying out data analysis based on the experience they had. This needs assessment was carried out so as to enable the study's investigation on whether the needs were being catered in research training. Several statements were presented to respondents to assess whether particular aspects were necessary in data analysis or not.

Data analysis showed that, 93.4% of respondents agreed that knowledge of determining the statistic to use was beneficial, 96.1% agreed that interpreting figures and tables was important, 75.0% agreed descriptive analysis was important, 68.4% agreed inferential statistics was important, 88.2% agreed that basic computer skills were important and 76.3% agreed knowledge of how to use computer software to carry out data analysis was important. Summary of the finding is as presented in figure 1.2 below.

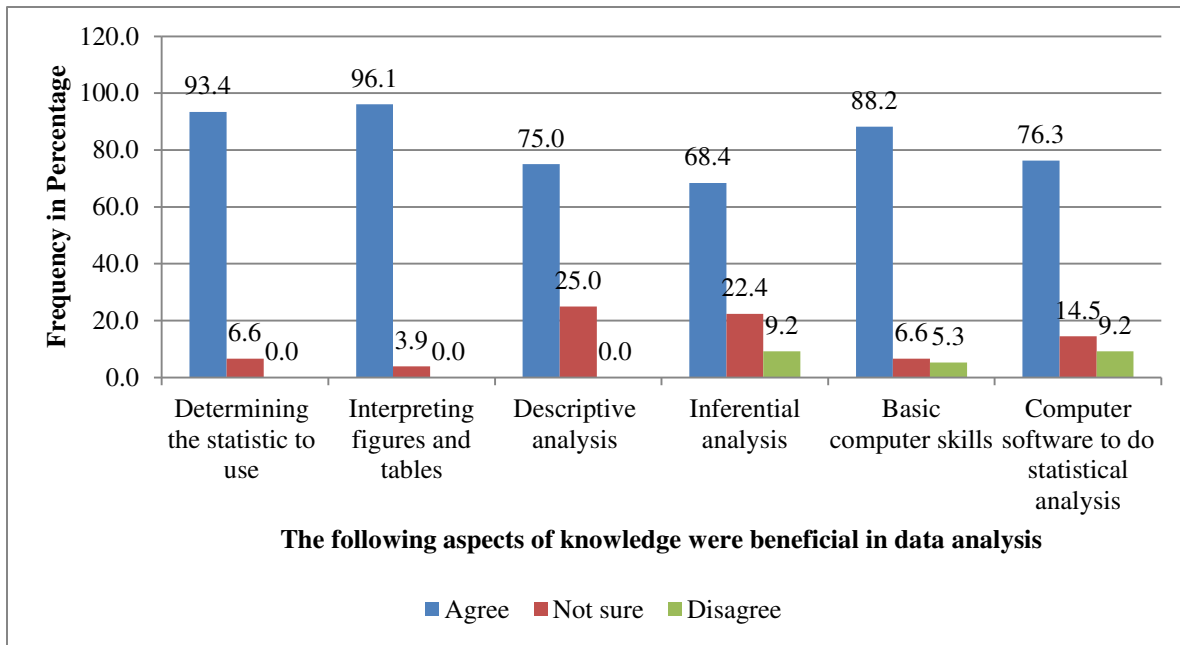


Figure 1.2: Knowledge needs for Data Analysis

The study established the following needs to be personally involved in data analysis; knowledge of statistics specifically, having knowledge of carrying out descriptive and inferential statistics together with hypothesis testing, determining statistics to be used and interpreting statistical figures, basic computer skills including and not limited to use of word and excel packages and knowledge of using computer software to carry out data analysis. During interview with lecturers the study determined that not all students used inferential statistics because it is mainly limited to testing hypotheses and therefore it was not a requirement to those who used research questions. This however does not eliminate it from the needs to be involved in data analysis. The interviewed students shared the same needs with their colleagues who answered questionnaire. The established needs reflect the entrant of data analysis software in the world of data analysis. Respondents indicated the need to have basic computer knowledge and knowledge of how to use computer software to carry out data analysis.

This finding is in line with Collis (2002) assertion that information and communication technology (ICT) is a force that has changed many aspects of the way we live. He fronted his argument by stating that the way different fields operate today is vastly different from the ways they operated in the past. The study determined that ICT issues in data analysis can no longer be ignored. The students together with research lecturers acknowledged that computer skills and computers statistical software knowledge are crucial for one to be able to carry out data analysis, but this should be alongside the traditional knowledge of descriptive and inferential statistics. The study was however had noted earlier that the students still had hard time being involved in data analysis despite being trained. This could be hypothesized that these needs were not met in during research training.

4.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The study determined that majority of the students 68.4% found it difficult when they were personally involved in statistical data analysis during their research towards the end of their masters program. The study sought to determine the knowledge and skills needs for a student to be involved in carrying out data analysis. The investigation determined that knowledge and skills in the following concepts was necessary for data analysis; statistics, specifically having knowledge of carrying out descriptive and inferential statistics together with

hypothesis testing, determining statistics to be used and interpreting statistical figures. In addition to statistics knowledge and skills in basic computer, including and not limited to use of word and excel packages and knowledge of using computer software to carry out data analysis. Based on the above findings the study states that masters' students are finding it challenging when they are personally involved in data analysis and what they need to be comfortable with data analysis is the knowledge of statistics and the knowledge and skills of using computer software to carry out data analysis. The study recommends that during research training universities should put more emphasize on the key needs for masters students to be involved in data analysis.

REFERENCES

- Clark R. B. (1993), *The research Foundations of Graduate Education. Germany, Britain, France, United States, Japan*. University of California press, Los Angeles.
- Collis, B. (2002). Information technologies for education and training. In Adelsberger, H., Collis, B, & Pawlowski, J. (Eds.) *Handbook on Technologies for Information and Training*. Berlin: Springer Verlag.
- Mukhwana, E. Oure, S. Too J. and Some D. K. (2016): *State of Postgraduate Research Training in Kenya. Commission for University Education*. Discussion Paper 02. Nairobi, Kenya.
- Mukhwana, S. Oure, S. Kiptoo, A. Kande, R. Njue, J. Too and D.K. Some (2016). *State of University Education in Kenya*. Commission for University Education. Discussion Paper 04. Nairobi, Kenya.
- Okafor, V. N. (2011). *Comparative analysis of research output of federal universities in Southern Nigeria*. Library Philosophy and Practice. Retrieved from <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1516&context=libphilprac>
- Pearson, M & Brew, A (2002), Research Training and Supervision Development in *journal of studies in higher education* volume 27, No. 2, pp 135-150
- Sabzwari, S. Samreen, K. & Khuwaja, A. K. (2009), Experiences, attitudes and barriers towards research amongst junior faculty of Pakistani medical universities in *journal of BMC Medical Education*.
- Sawyer, A. (2004), African Universities and the Challenge of Research Capacity Development in *JHEA/RESA* Vol. 2, No. 1, pp. 211–240
- Scott, (2015), *Why Kenya ranks low on quality of academic research*, retrieved from <https://www.businessdailyafrica.com/lifestyle/society>
- Yamamoto, S. (2001). *Basic research and the role of universities in Japan: Workshop on basic research at Oslo, Norway, 29-30 October 2001*. Retrieved from <http://www.oecd.org/dataoecd/39/32/2674535.pdf>