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**Linking Practical Spss Training to Research Competence
Among Postgraduate Students at Jomo Kenyatta University
of Agriculture and Technology (JKUAT), Westland's Campus**

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Linking Practical Spss Training to Research Competence Among Postgraduate Students at Jomo Kenyatta University of Agriculture and Technology (JKUAT), Westland's Campus

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Abstract

Purpose: The purpose of the paper is to assess the effectiveness of the practical SPSS training to postgraduate students' research competency.

Methodology: An explanatory research design was used to establish the relationship between practical SPSS training and research competence of students. The population was 20 students and a census of the full population was taken. A questionnaire was administered at the end of the training to capture the pre and post training experience and test the effectiveness of the training. The analysis of the data was conducted through descriptive and inferential statistics. In particular, frequencies, means, standard deviations and paired t-test were used.

Results: The post training evaluation results reveal that majority of the respondents had low knowledge in data entry, descriptive statistics, regression and correlation analysis, parametric and non-parametric analysis, and journal article extraction and publication. Results also reveal that the level of knowledge significantly increased after the training. This is supported by the paired t-tests conducted on each aspect of training.

Unique Contribution to Theory, Policy and Practice: It was recommended that it would value to organize practical SPSS trainings regularly at the campus. It was suggested that University may consider supporting the training financially or the students to be requested to pay a token fee to make the training sustainable. In the event, that these recommendations were untenable, it was suggested that the training consultant to look for funding from the National Research Fund. It was also suggested that the training can be made compulsory for all students undertaking Business Research Methods and points to accrue once they attend the training. Further, trainings workshops can be used to test pedagogical theories which establish the right mix of training techniques, between theory based, practice based and the blend of theory and practical approaches to training.

Key words: SPSS, Practical Training, Research Competence, Post Graduate Students

1.0 INTRODUCTION

Today's experts must continuously reconstruct their expertise and be able to apply their theoretical knowledge in actual work (Katajavuori et al, 2006, Ogolla & Kimani, 2016). The development of expertise is a long process, during which theoretical, practical and metacognitive elements of expert knowledge are integrated into a coherent whole. It is important to foster student's learning and integration of theoretical knowledge in practice during tertiary education. One tool for this is to pay more attention to practical knowledge in the theoretical part of the curriculum (Kimani & Simba, 2017, Kimani, Guyo & Rotich, 2017).

Possession of research skills is necessary for students pursuing postgraduate studies. Research skills are also crucial at the workplace now that we are in the BIG DATA age. At a macro level, improved research skills imply increased research and innovation, all of which are important for achievement of Vision 2030 (Kimani & Simba, 2017). Scholars and policy makers have been on the forefront of identifying the challenge in linking research knowledge to practice as well as suggesting solutions for it. The most recurring solution among scholarly articles and policy documents has been to adopt a multidisciplinary research training/capacity building to improving productivity and performance. See for instance Ogollah and Kimani (2016) which advocates for a multidisciplinary research approach in order to bridge the Academic MBA projects (theory) and industry practice (what the industry requires its managers to know). Mwanthi & Kalele (2016); O'kane,(2010); Panda & Gupta (2014);Prachikapil, (2014); Prideaux (2012) and Belli (2010) also note the need for multidisciplinary approach in training. Vision 2030 has also highlighted the need for a multidisciplinary research training/capacity building in an effort to achieve economic growth.

Statistical Package for Social Sciences (SPSS) is a widely used program for statistical analysis in social science. It is also used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations and data miners (Wellman, 1998). The original SPSS manual has been described as one of "sociology's most influential books" for allowing ordinary researchers to do their own statistical analysis. In addition to statistical analysis, data management (case selection, file reshaping, creating derived data) and data documentation (a metadata dictionary is stored in the data file) are features of the base software (Dnuggets, 2013).

A study by Jatnika (2015) investigated the effect of SPSS (Statistical Package for the Social Sciences) Course to student attitudes and achievement about Statistics for students in Faculty of Psychology Universitas Padjadjaran. The results of the data processing revealed that there is a significant increase in the cognitive aspects of learning Statistics after using SPSS but there is a significant decrease in achievement. Kimani and Simba (2017) assessed the effect of practical SPSS training among postgraduates students at Jomo Kenyatta University of Agriculture and Technology(JKUAT) and concluded that the students' research competence significantly increased due to the hands-on SPSS training approach. The findings were similar to those in Kimani *et al* (2017) conducted at a different campus but in the same university. Using paired t-tests, results in Kimani *et al* (2017) revealed that students' understanding of data entry, descriptive statistics, regression and correlation analysis, parametric and non-parametric analysis significantly improved significantly after the practical training. It was therefore recommended that regular trainings would bring about continuous improvement in research skills.

2.0 METHODOLOGY

A formal request was sent by the trainers (Finstock Consulting) to the director of JKUAT Westlands campus to organize for the attendance and venue. The Director successfully organized for the event and the student attendance was quite impressive 20 students. The event began at 9 am on Saturday 20th May 2017. The first activity was installation of SPSS software on individual student laptops. The morning session which ran from 9 am to 1 pm covered basic SPSS, while the afternoon session which ran from 2 pm to 4pm covered intermediate SPSS. A questionnaire was administered at the end of the training to capture the pre and post training experience and test the effectiveness of the training. The analysis of the data was conducted through descriptive and inferential statistics. In particular, frequencies, means, standard deviations and paired-test were used. Below is pictorial representation of the training activities and participants.

Picture 1: Postgraduate Students Practicing SPSS



3.0 REPORT ON PRE-TRAINING EVALUATION

The students were requested to indicate their level of education and whether they had any experience in using SPSS software prior to this training. If they did, they were further requested to indicate whether they had basic knowledge of SPSS (ability to work with SPSS) at the beginning of the training.

3.1 Student Level of Education

The students were requested to indicate their level of education (Undergraduate, MBA or Ph.D). The results are presented in figure 1.

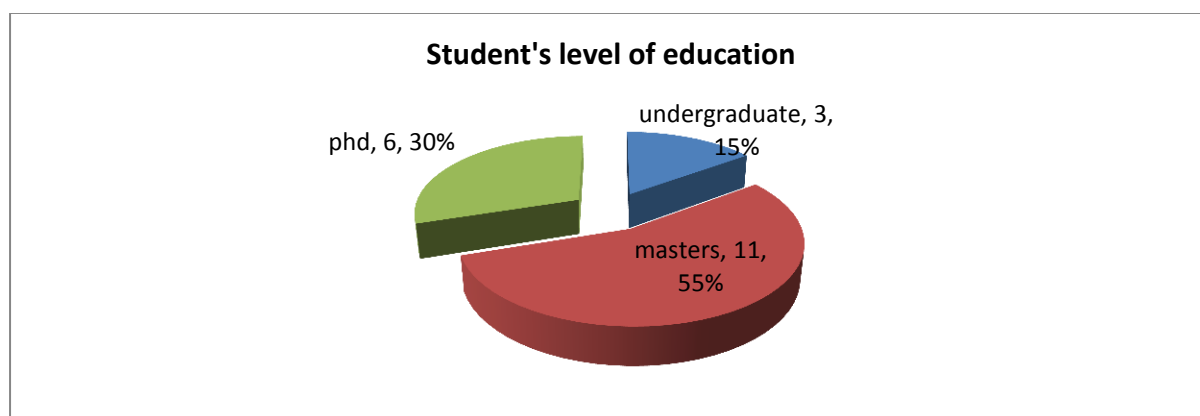


Figure 1: Student’s level of education

From the results, 55% of the students were masters students, 6% were PhD students while 15% where undergraduate students. This shows that there is widespread interest by both undergraduate and post-graduate students to learn how to analyze data by use of SPSS software.

3.2 Prior use of SPSS Software

A question was posed to test whether students possessed basic SPSS knowledge to analyze data. The results are presented in the figure 2.

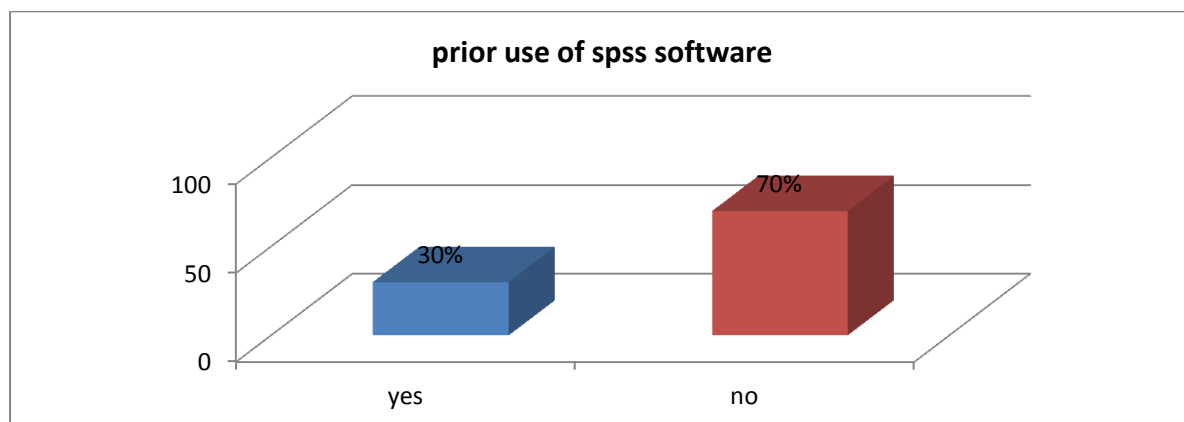


Figure 2: Prior use of SPSS software

The results reveal that the majority (70%) of students had not used SPSS software previously. Only 30% of student had used SPSS software prior to the training. Most students also

admitted that they could not use any other statistical software -Stata, Eviews, SAS, and R. This implies that a gap in statistical training exists

3.3 Extent of Basic Knowledge of SPSS (Ability to input data into SPSS)

The students were requested to indicate the extent to which they were able to input data in SPSS (a basic parameter to test whether students possess SPSS analysis skill). Results were presented in figure 3.

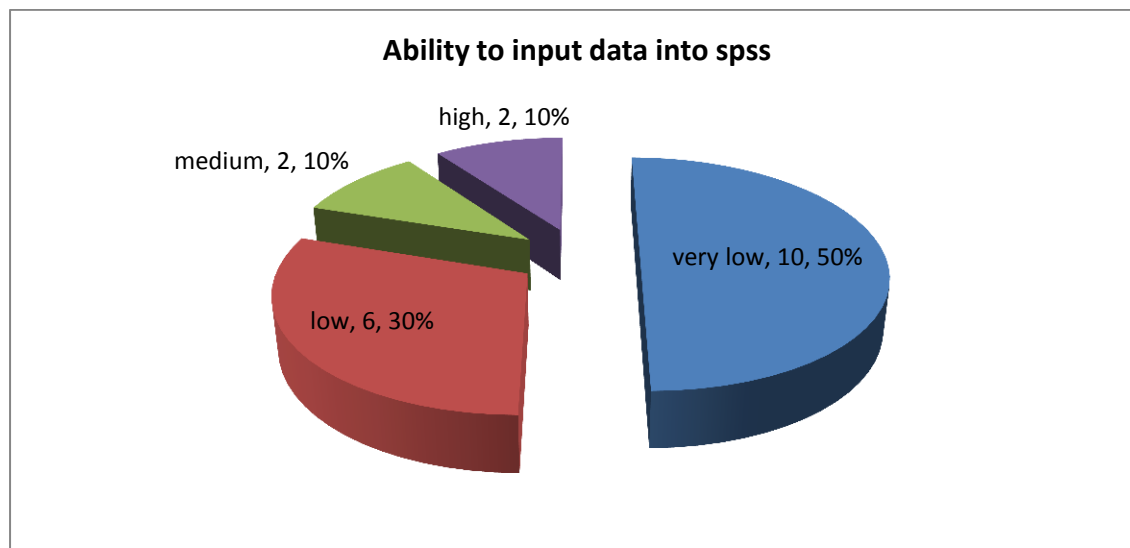


Figure 3: Ability to input data into SPSS

Results in figure 3 reveal that 50% of the students had very low skills, 30% had low skills bringing to a total of 80% of those who had low skills. Ten percent (10%) indicated that they had medium skills. This implies a dire need for hands-on statistical training and corroborates earlier findings in this paper that revealed that overwhelming majority of 70% had not used SPSS software previously.

4.0 POST TRAINING EVALUATION

A questionnaire was administered to the participants after the training. The participants were requested to rate their understanding and knowledge of data analysis aspects namely,

- Data entry before and after training
- Descriptive analysis before and after analysis,
- Regression and Correlation before and after analysis
- Journal article extraction and publication
- Overall knowledge before and after training

The responses from the students were analyzed using means, standard deviations frequencies and presented using bar graphs.

4.1 Understanding and Knowledge of Data Entry before and after Training

The results presented in figure 1 indicated that 80% of the workshop attendants had low or very low ability to input data into SPSS before the training. However, 85% (70%+ 15%)

reported a high ability to input data after the training. These findings imply that the training on data entry was effective.

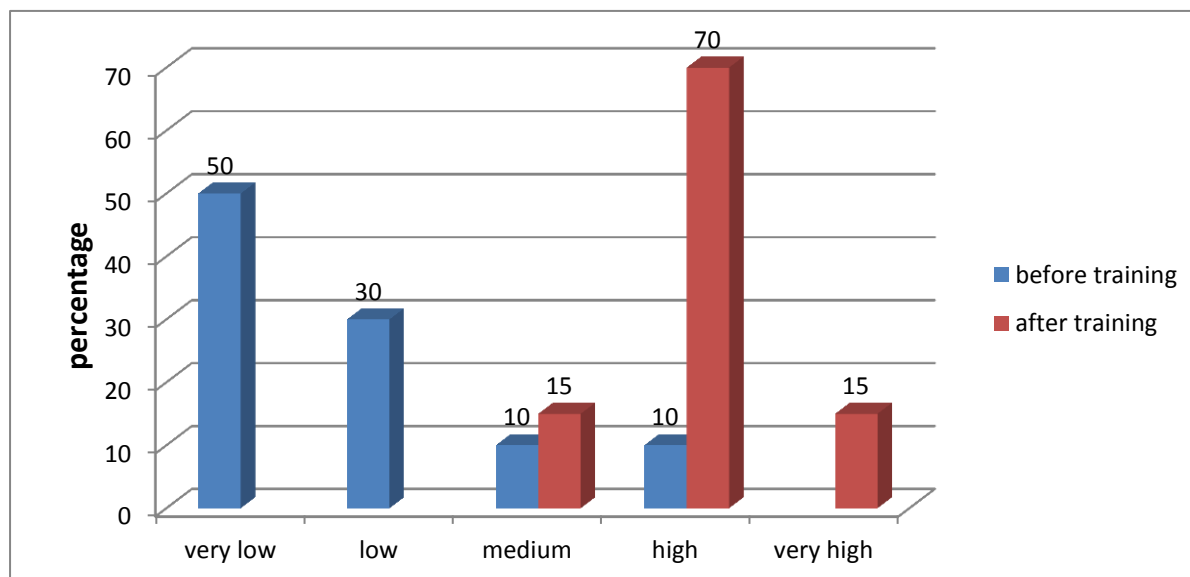


Figure 4: Understanding and knowledge of Data entry before and after training

Inferential statistics were conducted to support the descriptive results. In particular, a paired t-test was employed. Table 1 shows the results. The results lead to the conclusion that the knowledge of data entry was significantly higher after the training implying that the training was effective ($t = -9.787, p = 0.000$).

Table 1: Paired t-test for Understanding and knowledge of Data entry before and after training

Training aspect	Mean	Std. Deviation	mean difference	t stat	P value	conclusion
Your ability to input data in SPSS-Before Training	1.800	1.000	-2.200	-9.787	0.000	There is a significant difference in knowledge before and after training- This implies that the training in data entry was effective
Your ability to input data in SPSS-After Training	4.000	0.561				

4.2 Understanding and Knowledge of Descriptive Statistics before and after Training

The results presented in the figure 5 indicated that 75% (50% + 25%) of the workshop attendants had low or very low knowledge of descriptive statistics before training. However, after training, 85% (55%+30%) of the respondents indicated that they had high knowledge of descriptive statistics. These findings imply that the training was effective.

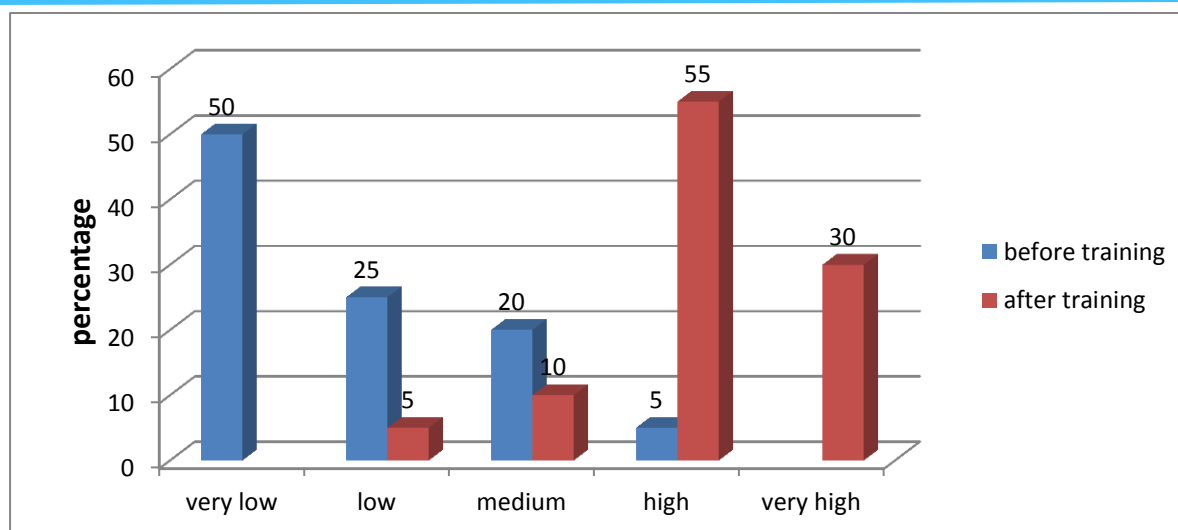


Figure 5: Understanding and knowledge of descriptive statistics before and after training

Inferential statistics were conducted to support the descriptive results. In particular, a paired t-test was employed. Results in table 2 show the results. The results lead to the conclusion that the knowledge of descriptive statistics was significantly higher after the training implying that the training was effective ($t = -11.898, p = 0.000$).

Table 2: Paired t-test for understanding and knowledge of descriptive statistics before and after training

Training aspect	Mean	Std. Dev	Mean difference	t stat	P value	Conclusion
Ability to do descriptive statistics-Before Training	1.800	0.951	-2.300	-11.898	0.000	There is a significant difference in knowledge of descriptive statistics before and after training
Ability to do descriptive statistics-After Training	4.100	0.788				

4.3 Understanding and Knowledge of Regression and Correlation Analysis before and after Training

The results presented in the figure 6 indicated that 55% (30% + 25%) of the workshop attendants had low or very low knowledge of regression and correlation before training. However, after training, 75% (55% + 20%) of the respondents indicated that they had high knowledge of regression and correlation. These findings imply that the training was effective.

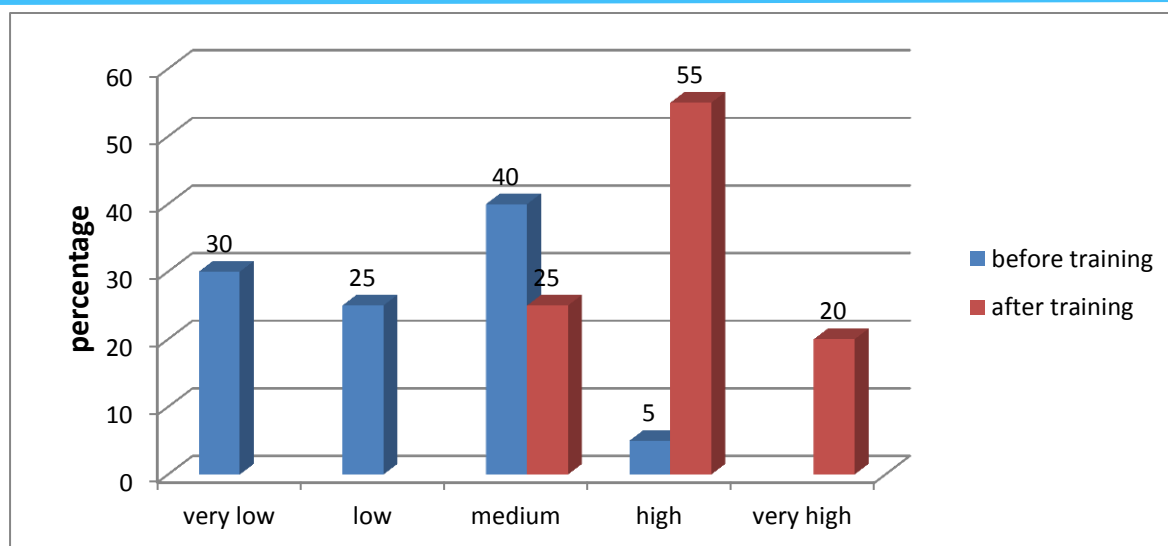


Figure 6: Understanding and knowledge of regression and correlation analysis before and after training

Inferential statistics were conducted to support the descriptive results. In particular, a paired t-test was employed. Table 3 presents the results. The results lead to the conclusion that the knowledge of regression and correlation analysis was *significantly* higher after the training implying that the training was effective ($t = -9.200, p = 0.000$).

Table 3: Understanding and knowledge of regression and correlation analysis before and after training

Training aspect	Mean	Std. Dev	Mean difference	t stat	P value	Conclusion
Ability to do regression and correlation- Before training	2.200	0.951	-1.750	-9.200	0.000	There is a significant difference in knowledge of regression and correlation before and after training
Ability to do regression and correlation-After Training	3.950	0.686				

4.4 Understanding of Parametric and Non parametric Tests before and after Training

The results presented in figure 7 indicated that 85% (40% + 45%) of the workshop attendants had low or very low knowledge of parametric and non-parametric tests before the training. However, after training, 70% (60%+10%) reported to have high knowledge of parametric and non-parametric tests. These findings imply that the training was effective.

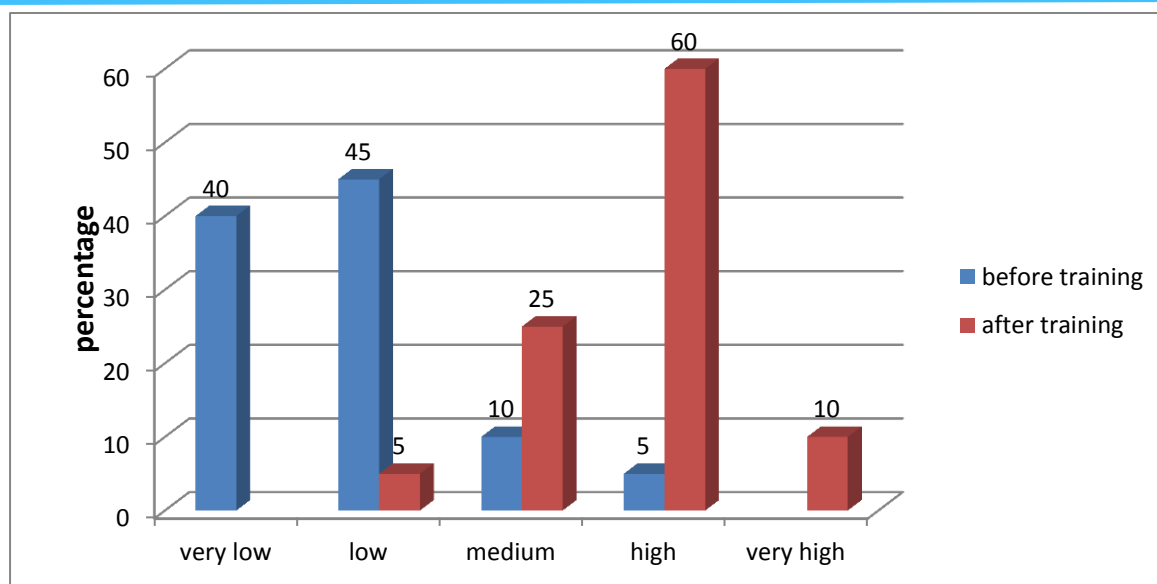


Figure 7: Understanding of parametric and non-parametric tests before and after training

Inferential statistics were conducted to support the descriptive results. In particular, a paired t-test was employed. Table 4 shows the results. The results lead to the conclusion that the knowledge of parametric and nonparametric analysis was *significantly* higher after the training implying that the training was effective ($t = -9.233, p = 0.000$).

Table 4: Understanding of parametric and non-parametric tests before and after training

Training aspect	Mean	Std. Dev	mean difference	t stat	P value	conclusion
Overall knowledge of parametric and non parametric tests in this training-Before training	1.800	0.833				There is a significant difference in knowledge of parametric and non-parametric analysis before and after training This implies that the training was effective
Overall knowledge of the parametric and non parametric tests in this training-After Training	3.750	0.716	-1.950	-9.233	0.000	

4.5 Understanding of Journal Article Extraction and Publication before and after Training

The results presented in the figure indicated that 70% (55% + 15%) of the workshop attendants had low or very low knowledge of journal article extraction and publication before the training. However, after training, 60% (40%+20%) reported to have high knowledge of journal article extraction and publication. These findings imply that the training was effective.

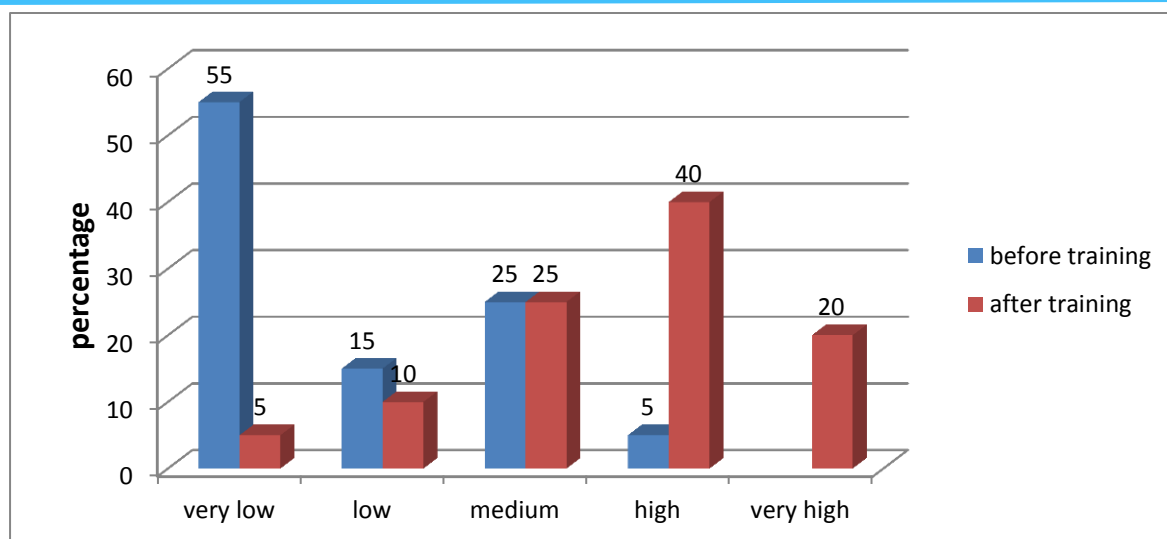


Figure 8: Understanding of journal article extraction and publication before and after training

Inferential statistics were conducted to support the descriptive results. In particular, a paired t-test was employed. Table 5 below shows the results. The results lead to the conclusion that the knowledge of journal article extraction and publication was *significantly* higher after the training implying that the training was effective ($t = -8.461, p = 0.000$).

Table 5: Understanding of journal article extraction and publication before and after training

Training aspect	Mean	Std. Dev	mean difference	t stat	P value	conclusion
Overall knowledge of journal article extraction and publication in this training-Before training	1.800	1.005	-1.800	-8.461	0.000	There is a significant difference in knowledge of journal article extraction and publication before and after training
Overall knowledge of journal article extraction and publication in this training-After Training	3.600	1.095				This implies that the training was effective

4.6 Training Applicability and Relevance to Students' Courses

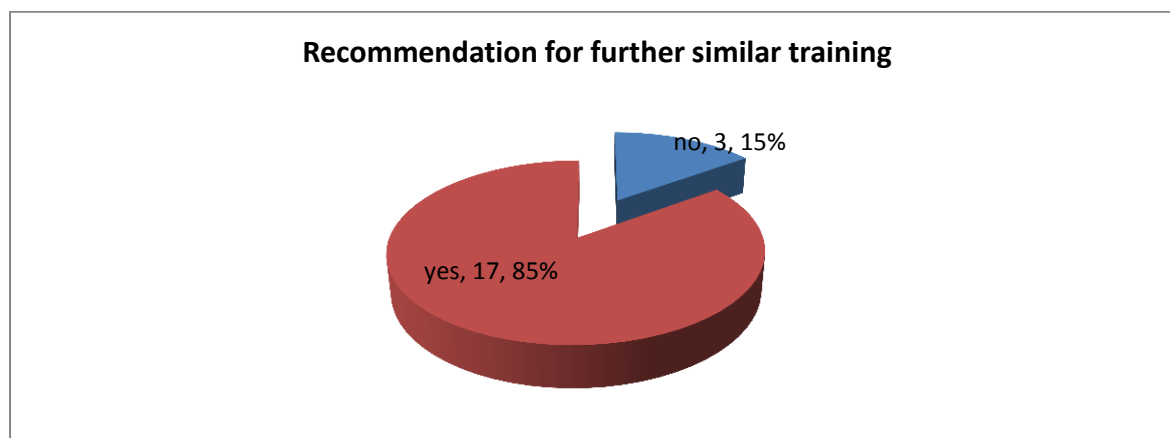
Students were asked to indicate the extent to which the training was applicable and relevant to their course work. Options ranged from very low extent, low extent, medium extent, large extent to very large extent. These findings in table 6 reveal that the majority, 95% (55%+40%) of the students thought that the training was applicable to their course to large extent and very large extent. The results confirm that the training was relevant to students' needs.

Table 6: Training applicability and relevance to students' courses

Statement	Frequency	Percent
medium extent	1	5
large extent	11	55
very large extent	8	40
Total	20	100

4.7 Recommendation for Further Training

A question was posed regarding whether the workshop participants would recommend further similar training in future. Results in Figure 9, reveal that majority of the respondents (85%) indicated that they recommended further similar trainings whereas 15% said that they would not recommended further similar trainings. Going by the majority choice, it was concluded that there is need for similar trainings so as to help equip students with analytical skills.

**Figure 9: Recommendation for further training**

5.0 SUMMARY OF KEY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Key Findings

Pre training evaluation results revealed that there was widespread interest by both undergraduate and post graduate students to learn how to analyze data by use of spss software. Descriptive results show that majority of respondents (70%) had no prior knowledge of SPSS. In addition, majority (80%) were familiar to basic SPSS to a low extent implying a dire need for training on SPSS basics.

The post training evaluation results reveal that majority of the respondents had low knowledge in data entry, descriptive statistics, regression and correlation analysis, parametric and non parametric analysis, and journal article extraction and publication. Results also reveal that the level of knowledge significantly increased after the training. This is supported by the paired t-tests conducted on each aspect of training.

Majority of the respondents (95%) indicated that the training was relevant to their course work. The majority of the respondents (85%) indicated that they recommended further similar trainings and this led to the conclusion that there is need for similar trainings so as to help equip students with analytical skills.

5.2 Conclusions

The report concludes that there was widespread interest by both undergraduate and post graduate students to learn how to analyze data by use of spss software. There is a need for continued training in statistical software's. The hands-on training methodology is effective in improving understanding of spss data entry, descriptive statistics, regression and correlation analysis, parametric and non parametric analysis, journal article extraction and publication. The training is relevant to students course work. Students would attend future trainings if organized. The training workshops are useful for imparting vision 2030 relevant skills

5.3 Recommendations

The recommendations given may influence practice, policy and theory as follows;

5.3.1 Recommendation for Practice

It was recommended that frequent trainings on statistical softwares be organized at the convenience of the campus.

5.3.2 Recommendation for Policy

It was recommend that the University may improve the sustainability of the trainings by, either supporting the campus financially so that the campus can be giving a token of appreciation to the trainers or in the event that is impossible, the students should be requested to pay a token fee of say kes 2,000 instead of the commercial rate of kes 18,000 (kes 7500 for basic spss, kes 7500 for intermediate spss and kes 3,000 for the software installation).In the event that the later option is tenable, it is further proposed that the students should pay to a paybill provided by Finstock Consulting to avoid adding an administrative burden to the campus. In the event that all this was not possible, the training consultant should seek financial funding from the national Research Fund so as to ensure that this training are regularly held.

It was further proposed that SPSS training to be made compulsory for all students undertaking Business Research Methods and points to accrue once they attend the training. This will be similar to points that accrue for CPD hours when accountants attend trainings or points accrue when students go for attachments. Doing so would ensure that students attend the trainings regularly and acquire the appropriate competence.

5.3.3 Recommendation for Theory Building

We recommend that the trainings workshops can be used to test effectiveness of theoretical approaches to pedagogy, practical approaches to pedagogy or a blend of the two. That is, the right mix of theoretical and hands on data analysis training approaches should be employed for effectiveness.

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