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Improving Research Competence Through Practical SPSS Training Among Postgraduate Students in Jomo Kenyatta University of Agriculture and Technology (JKUAT) CBD Campus

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Abstract

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

Methodology: An explanatory research design was used to establish the relationship between practical SPSS training and research competence of students. The population was 173 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 to the campus director that frequent trainings be organized at the convenience of the campus. It was suggested that university to consider supporting the training financially or the students to be requested to pay a token fee to make the training sustainable. Other financing approaches to enhance sustainability included having the consultant seeking funding from the National Research Fund. It was suggested that the training can be made compulsory for all students undertaking Business Research Methods and points to accrue once they attend the training. The results were useful in theory building as they validated the efficacy of practical training pedagogical approaches.

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

1.0 INTRODUCTION

Sheikh (2013) notes that both practical and theoretical experiences go hand in hand and each has their own importance. Both theoretical knowledge and practical skills are necessary to master a field. Theoretical learning gives the guidance to the mind and mind guides our body to convert that theoretical learning into practical performance. Theoretical learning is good but not using that knowledge practically is of no use. Hence it is very important to utilize the knowledge practically; otherwise there is no point to gain theoretical knowledge. So to have perfect learning experience one should gain both practical and theoretical knowledge.

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. Linking research education at postgraduate level with industry needs through practical training is crucial in demonstrating the academic-industry nexus (Ogolla and Kimani, 2016).

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 measurement used was the measurement developed by Schau *et al.* (2003), named Survey of Attitudes toward Statistics (SATS) that can help understand attitude and how it impacts the learning process. SATS consists of six aspects: Affect (feelings of students toward Statistics), Cognitive competence (attitudes of students about their knowledge and skills when applying Statistics), Value (student attitudes about the usefulness, relevance and benefits of Statistics in personal and professional life), Difficulty (student attitudes about the difficulty of Statistics as a subject), Interest (the interest of students to Statistics), Effort (student efforts to learn Statistics). The data analysis will be calculated using the Wilcoxon test and t test. The results of the data processing show 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) conducted a study on then effectives of practice SPSS training on students research competence among 38 postgraduate students enrolled Jomo Kenyatta University of Agriculture and Technology Mombasa Campus. Pre-training findings indicated that the students had low competence while post training evaluation indicated that the students' competence significantly increased. The results implied that practical SPSS training plays an important role in improving the research competence of postgraduates and this goes a long way in enhancing improved academic research output.

2.0 METHODOLOGY

A formal request was sent by the trainers (Finstock Consulting) to the Director of JKUAT CBD campus to organize for the attendance and venue. The Director successfully organized for the event and the student attendance was quite impressive 173 students. The event began at 9 am and ran for two days, Saturday 17th and Sunday 18th March 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 are pictorial representation of the training activities and participants.

Picture 1: Postgraduate Students keenly following the practical demonstration-Saturday Session



Picture 2: Post graduate Students keenly following the practical demonstration- Sunday Session



3.0 REPORT ON PRE TRAINING EVALUATION

The participants were requested to indicate whether they had any experience in using SPSS prior to this training. Furthermore, the students were 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 PhD). The results are presented in figure 1.

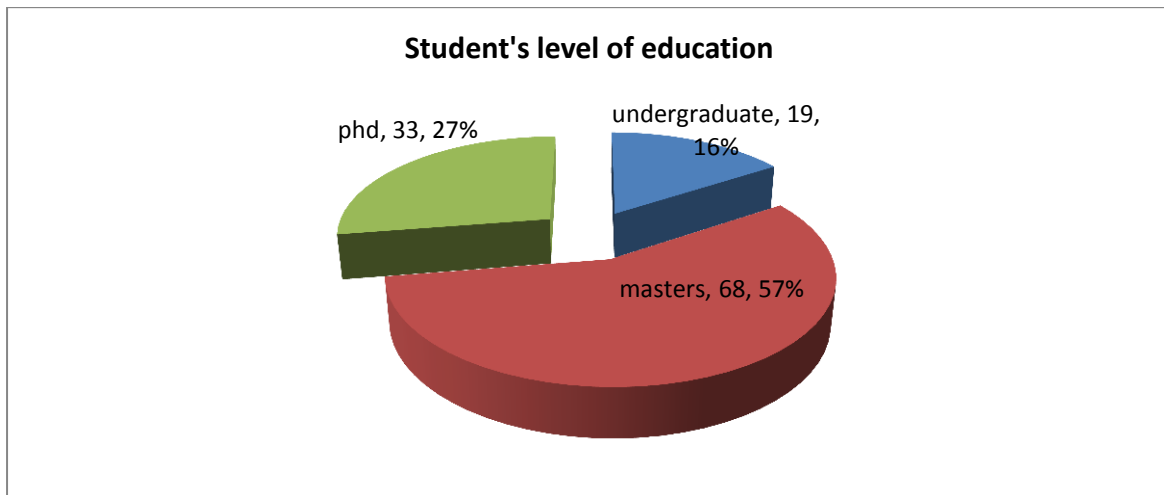


Figure 1: Students level of education

From the results, 57% of the students were MBA students, 27% were PhD students while 16% were 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.

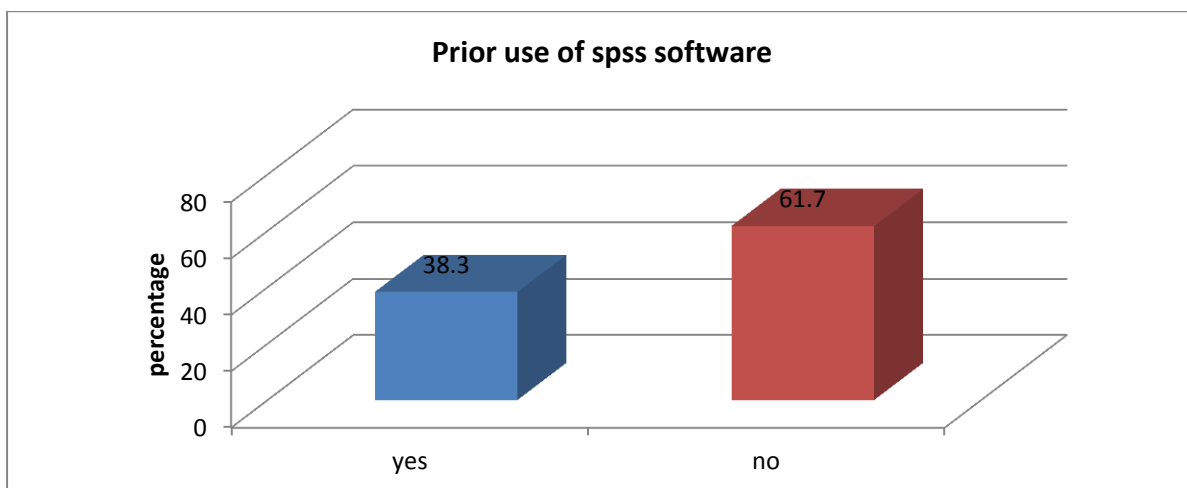


Figure 2: Prior use of SPSS software

The results reveal that the majority (61.7%) of students had not used the SPSS software previously. Only 38.3% 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. In addition, undergraduate students were less proficient with statistical analysis software as compared to the post graduate students.

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.

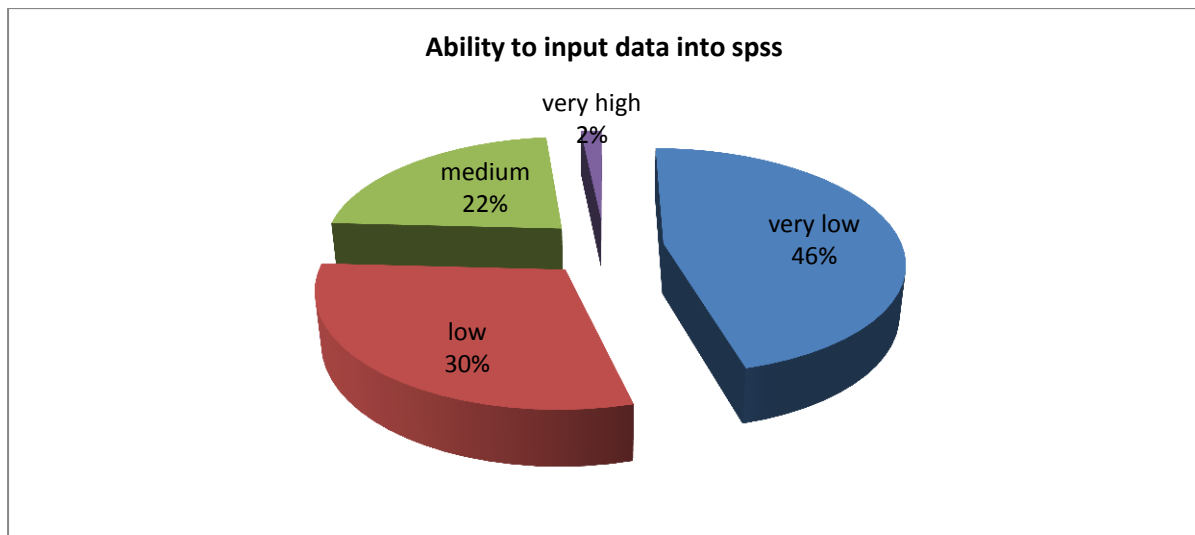


Figure 3: Ability to input data into Spss

Results in figure 3 reveal that 46% of the students had very low skills, 30% had low skills bringing to a total of 76% of those who had low skills. Twenty two percent (22%) indicated that they had medium skills. This implies a dire need for hands-on statistical training.

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
- Applicability of Training to course work

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 4 indicated that 77.5% of the workshop attendants had low or very low ability to input data into SPSS before the training. However, 71.6% (50.8%+ 20.8%) reported a high ability to input data after the training. These findings imply that the training on data entry was effective.

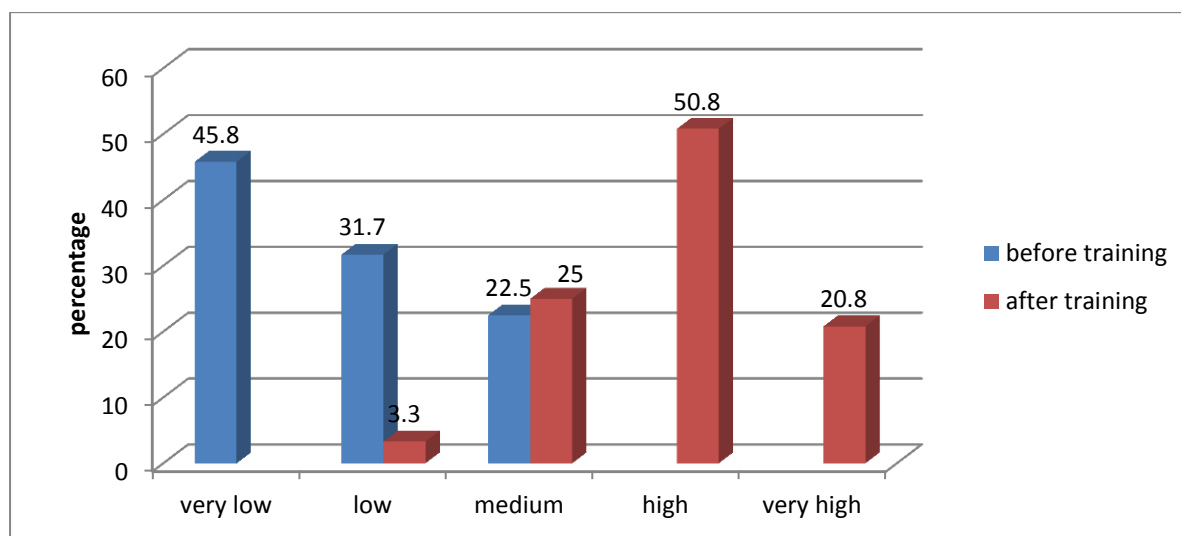


Figure 4: Understanding and knowledge of Data entry before and after training

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 ($t = -22.701$, $p = 0.000$).

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	1.77	0.796	-2.125	-22.701	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	3.89	0.765				

4.2 Understanding and Knowledge of Descriptive Statistics before and after Training

The results presented in the figure 5 indicated that 76.7% (35% + 41.7%) of the workshop attendants had low or very low knowledge of descriptive statistics before training. However, after training, 75% (50.8%+24.2%) of the respondents indicated that they had high knowledge of descriptive statistics. These findings imply that the training was effective.

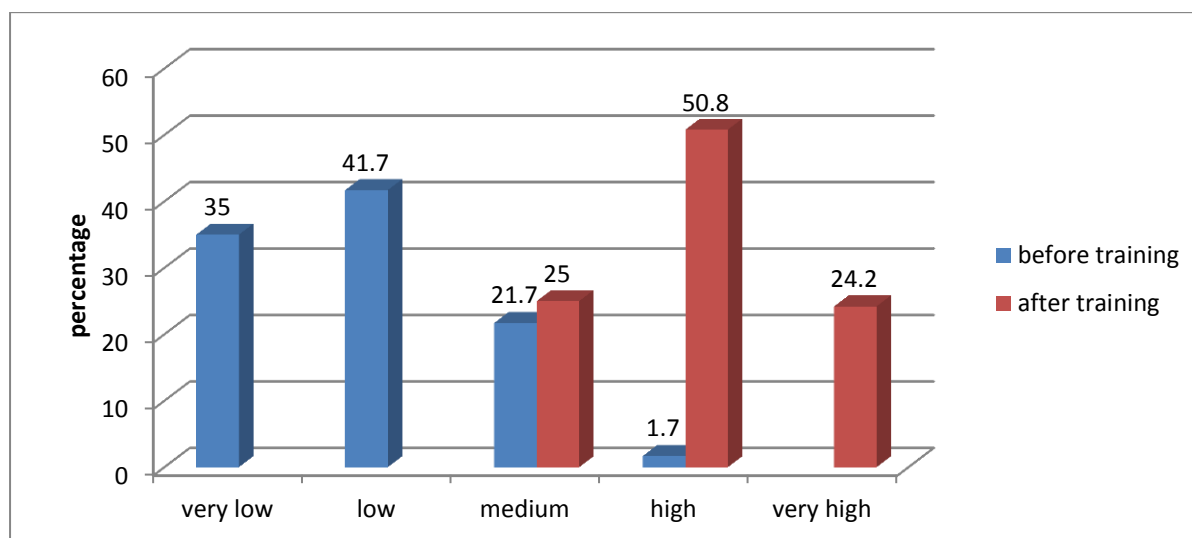


Figure 5: Understanding and knowledge of descriptive statistics before and after training

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 ($t = -23.011$, $p = 0.000$).

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	1.90	0.783	-2.092	-23.011	0.000	There is a significant difference in knowledge of descriptive statistics before and after training This implies that the training was effective
Ability to do descriptive statistics- After Training	3.99	0.704				

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

The results presented in the figure indicated that 80.4% (44.2% + 36.2%) of the workshop attendants had low or very low knowledge of regression and correlation before training. However, after training, 81.7% (66.7% + 15%) of the respondents indicated that they had high knowledge of regression and correlation. These findings imply that the training was effective.

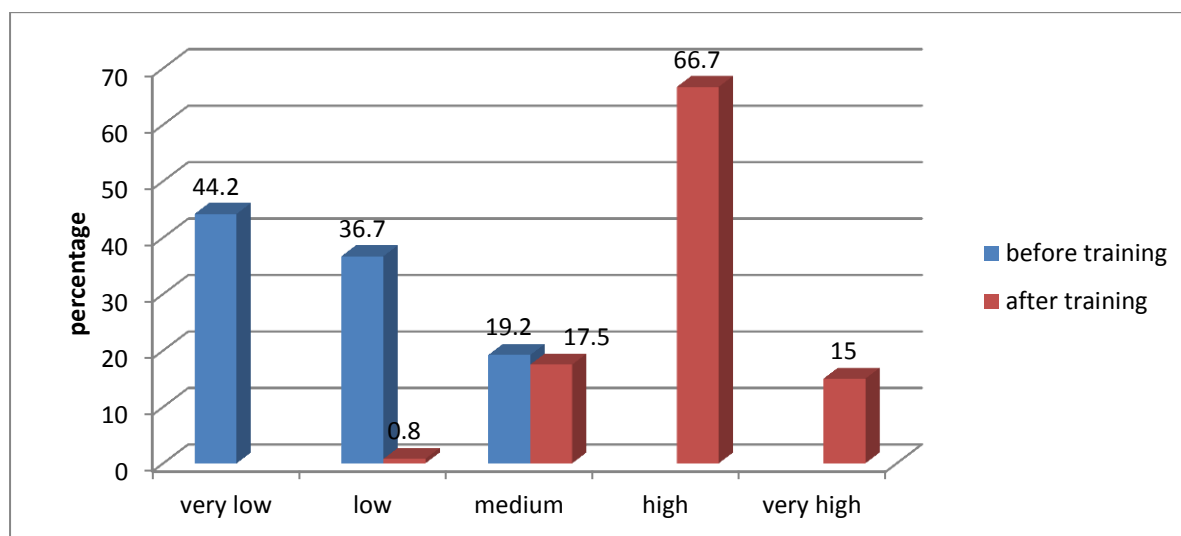


Figure 6: Understanding and knowledge of regression and correlation analysis before and after training

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 ($t = -26.686$, $p = 0.000$).

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	1.75	0.759	-2.208	-26.686	0.000	There is a significant difference in knowledge of regression and correlation before and after training This implies that the training was effective
Ability to do regression and correlation-After Training	3.96	0.600				

4.4 Understanding of Parametric and Non-parametric tests before and after Training

The results presented in figure 7 indicated that 92.5% (60.8% + 31.7%) of the workshop attendants had low or very low knowledge of parametric and non-parametric tests before the training. However, after training, 85.8% (60%+25.8%) reported to have high knowledge of parametric and non-parametric tests. These findings imply that the training was effective.

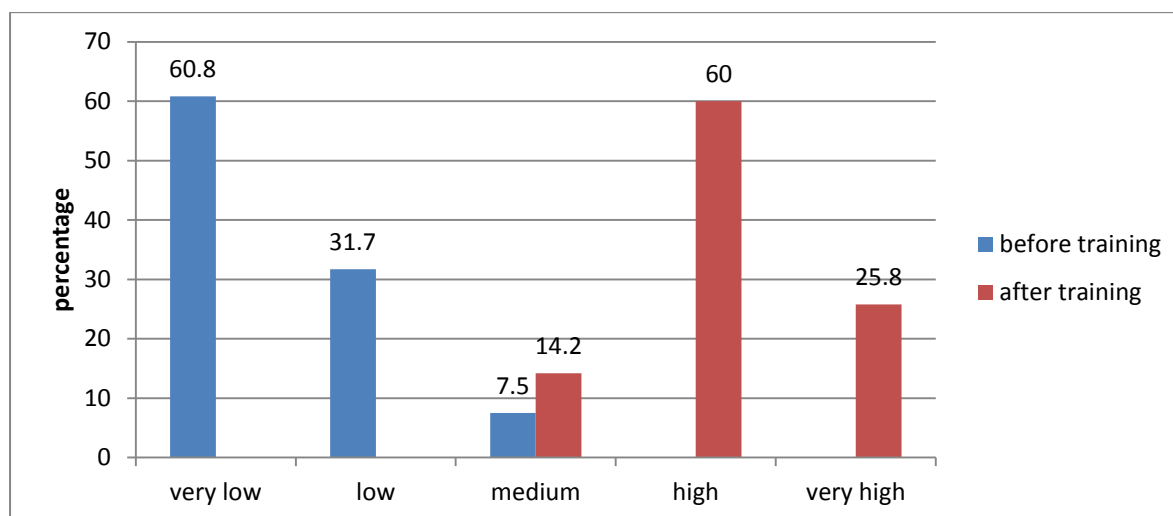


Figure 7: Understanding of parametric and non-parametric tests before and after training

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 ($t = -33.142$, $p = 0.000$).

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	1.47	0.634				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	4.12	0.624	-2.650	-33.142	0.000	

4.5 Training Applicability and Relevance to Students' Courses

Students were asked to indicate the extent to which the training was applicable and relevant to their courses. Options ranged from very low extent, low extent, medium extent, large extent to very large extent. These findings in table 5 reveal that the majority, 85.8% (38.3%+47.5%) 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 5: Training applicability and relevance to students' courses

Statement	Frequency	Percent
Low extent	2	1.7
medium extent	15	12.5
large extent	46	38.3
very large extent	57	47.5
Total	120	100

4.6 Recommendation for Further Training

A question was posed on whether the workshop participants would recommend further similar training in future. Results in Figure 8, revealed that majority of the respondents (83%) indicated that they recommended further similar trainings whereas 17% 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.

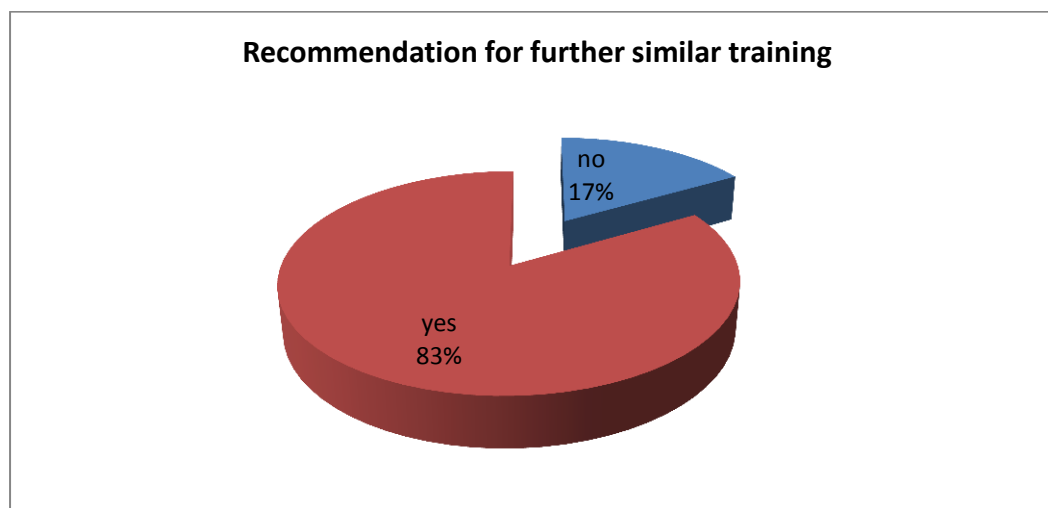


Figure 8: Recommendation for further training

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 postgraduate students to learn how to analyze data by use of SPSS software. Descriptive results show that majority of respondents (61.7%) had no prior knowledge of SPSS. In addition, majority (76%) 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 (85.8%) indicated that the training was relevant to their course work. The majority of the respondents (83%) 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

We therefore recommend to the campus director that frequent trainings be organized at the convenience of the campus.

5.3.2 Recommendation for Policy

We recommend that the university can consider; that for the sustainability of the trainings, either the campus director is supported financially by the campus so that she/he can be giving a token of appreciation to the trainers after training 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. Furthermore, any financial burden to the university and to students can be avoided if the consultant requests for funding from the National Research Fund to facilitate the practical trainings.

It is also recommended that the training can be made compulsory for all students undertaking Business Research Methods and points should accrue once they attend the training. This will be similar to points that accrue for CPD hours when accountants attend trainings or when points accrue when students go for attachments. This will ensure maximum attendance by students.

5.3.3 Recommendation for Theory Building

We recommend that the trainings workshops can be used to test pedagogical theories which establish the right mix of training techniques. That is, the right mix of theoretical and hands on data analysis training approaches. As noted in literature, the mix of both theory and practice in learning improves the learning experience.

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