EFFECT OF PRACTICAL SPSS TRAINING ON STUDENTS' RESEARCH COMPETENCE; A SURVEY OF JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY MOMBASA CAMPUS POSTGRADUATE STUDENTS

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Effect of Practical SPSS Training on Students' Research Competence; A Survey of Jomo Kenyatta University of Agriculture and Technology Mombasa Campus Postgraduate Students

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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.

Methodology: An explanatory research design was used to establish the relationship between practical SPSS training and research competence of students. The population was 38 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 DVC academic affairs can consider supporting the training financially or the students to be requested to pay a token fee to make the training sustainable. 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

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.

Experiential learning is one of few learning methods that can have a significance impact on the participant's mindset. Moving beyond theory to the actual act of "learning by doing,' enables the trainee gets a first-hand experience of practicing what has been taught. This plays a crucial role in retaining concepts and ideas (Peterson, 2017)

Several studies have shown that there is a positive correlation between practical lessons and performance even though there are no specific studies on the specific effects of practical lessons on research students' academic performance. Muli (2014) in his study on determinants of Students Performance in Biology in KCSE found out that practical sessions played a significance role in enhancing the performance of biology students. Mwangi (2016) also established that the frequency in which chemistry practicals were used in teaching and learning positively influenced the students' performance in chemistry. Other studies; Patton, Marlow & Hannon (2000) and Feltrinelli, Gabriele & Trento (2017) established that there was a significant improvement on performance of employees who attended training.

Moreover, according to the constructivism theory of learning, individuals acquire knowledge and learn differently. The theory further suggests that humans significantly construct knowledge and meaning from their experiences. Hands on training therefore allows students encounter the technical problems they are likely to face when carrying out their academic research and hence expected to enhance research proficiency.

2.0 METHODOLOGY

A formal request was sent by the trainers (Finstock Consulting) to the director of JKUAT Mombasa campus to organize for the attendance and venue. The Director successfully organized for the event and the student attendance was quite impressive given the pre-registration (38 students). The event began at 9 am on Saturday 27th 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.

3.0 REPORT ON PRE TRAINING EVALUATION

It also requested them 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.
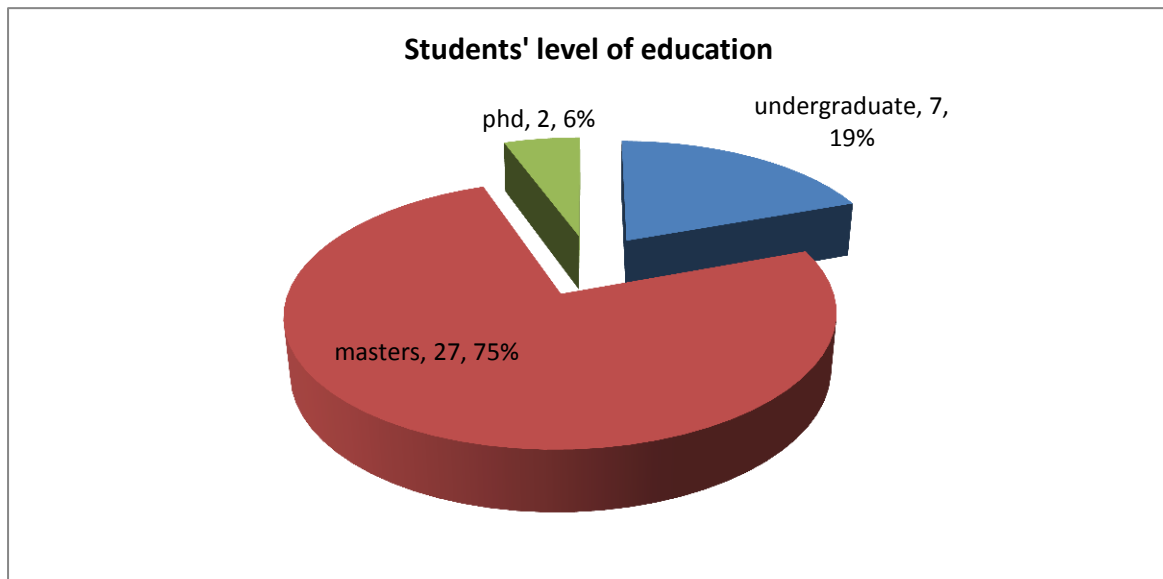
Figure1: Students level of education

From the results, 75% of the students were masters students, 6% were PhD students while 19% 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.
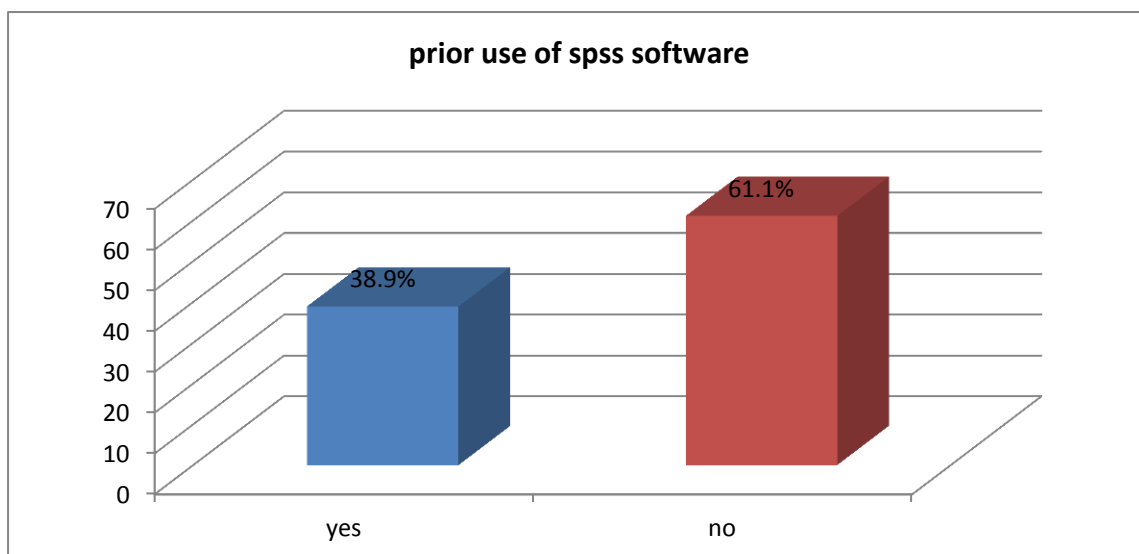

Figure 2: Prior use of SPSS software

The results reveal that the majority (61.1%) of students revealed had not used the spss software previously. Only 38.9% 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.
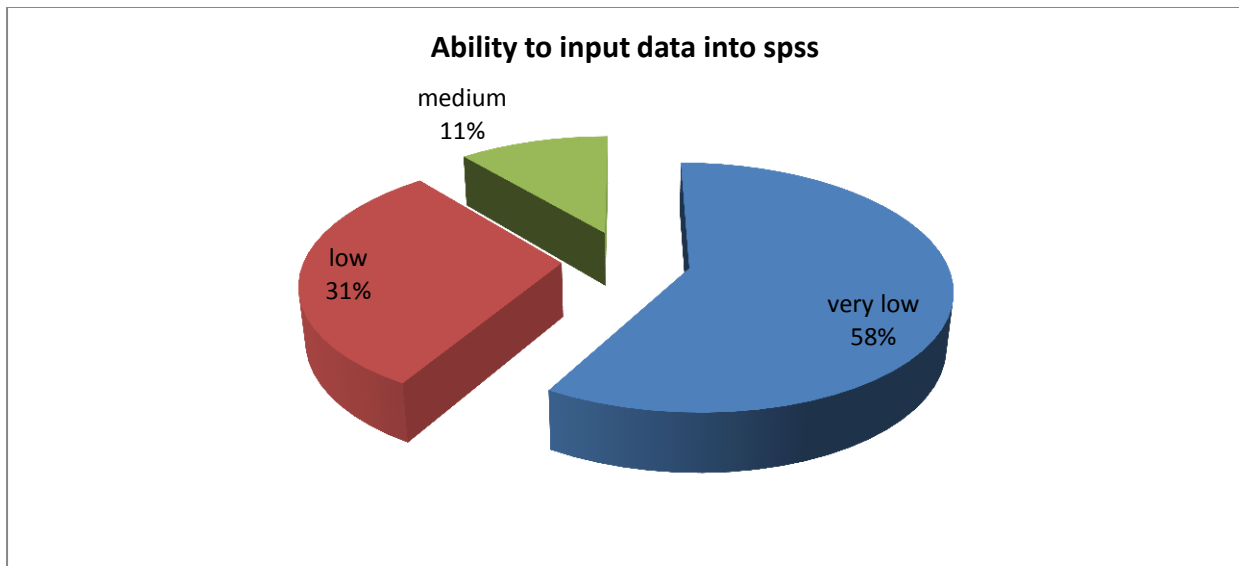

Figure 3: Ability to input data into Spss

Resulsts in figure 3 reveal that 58% of the students had very low skills, 31% had low skills bringing to a total of 89% of those who had low skills. Eleven percent (11%) 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
- ❖ 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 4 indicated that 58.3% of the workshop attendants had low or very low ability to input data into SPSS before the training. However, 80.6% (66.7%+ 13.9%) reported a high ability to input data after the training. These findings imply that the training on data entry was effective.
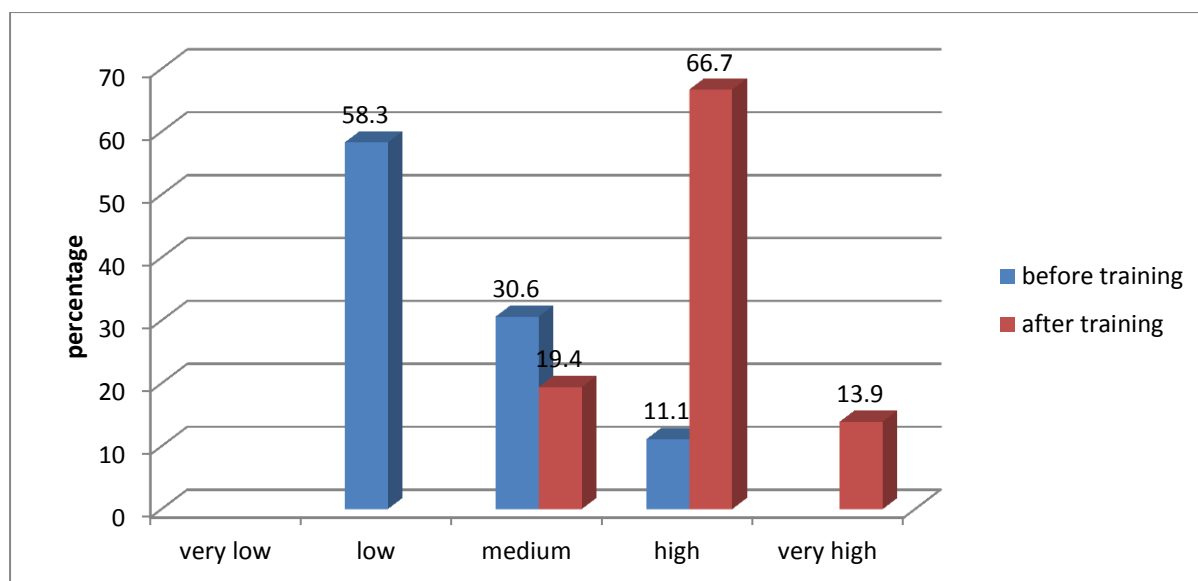
Figure 4: Understanding and knowledge of Data entry before and after training

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.

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	1.53	0.696	-2.417	-17.985	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	3.94	0.583				

4.2 Understanding and Knowledge of Descriptive Statistics before and after Training

The results presented in the figure 5 indicated that 80.6% (55.6% + 22.2%) of the workshop attendants had low or very low knowledge of descriptive statistics before training. However, after training, 77.8% (55.6%+22.2%) of the respondents indicated that they had high knowledge of descriptive statistics. These findings imply that the training was effective.
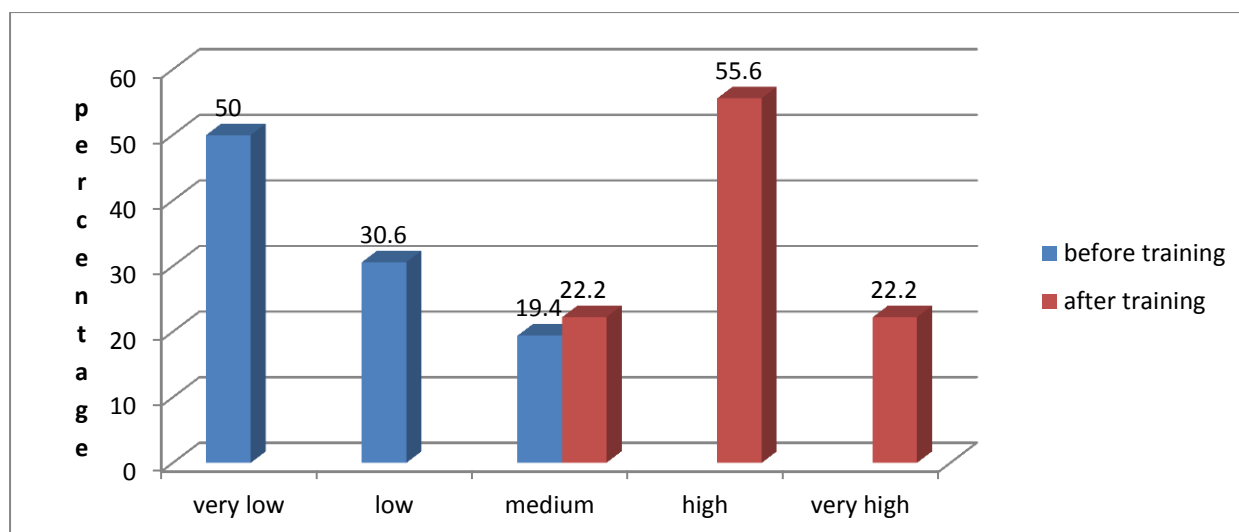
Figure 5: Understanding and knowledge of descriptive statistics before and after training

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.

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	1.694	0.786	-2.306	-16.832	0.000	There is a significant difference in knowledge of descriptive statistics before and after training
Ability to do descriptive statistics- After Training	4.000	0.676				This implies that the training was effective

4.3 Understanding and knowledge of regression and correlation analysis before and after training

The results presented in the figure indicated that 86.1% (44.4% + 41.7%) of the workshop attendants had low or very low knowledge of regression and correlation before training. However, after training, 83.3% (69.4% + 13.9%) of the respondents indicated that they had high knowledge of regression and correlation. These findings imply that the training was effective.
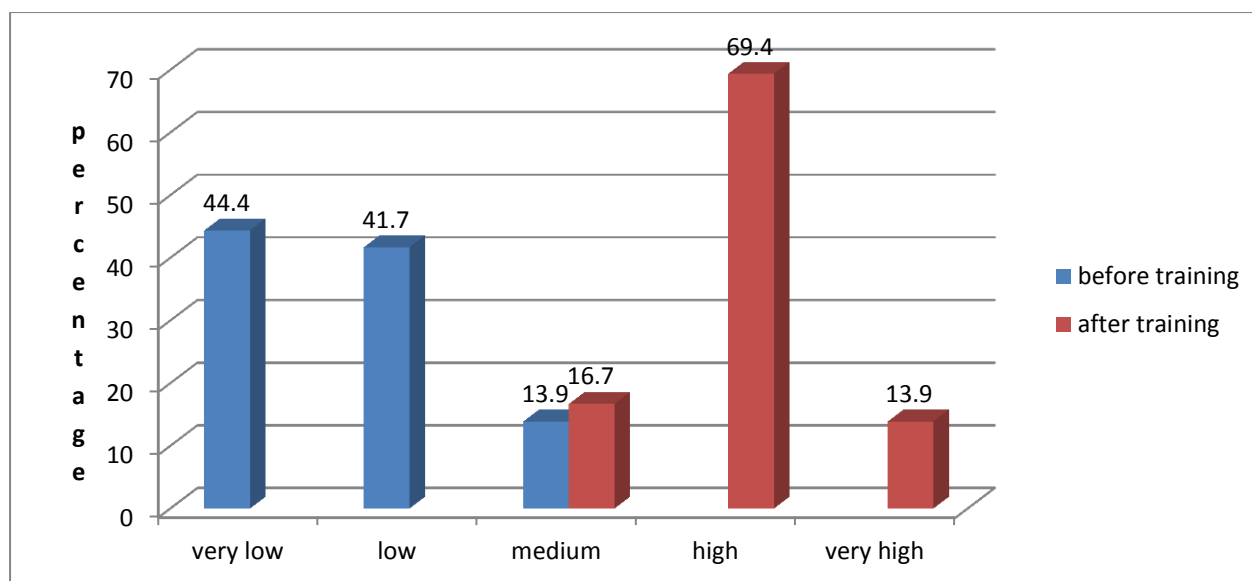
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Figure 6: Understanding and knowledge of regression and correlation analysis before and after training

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.

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	1.694	0.710	-2.278	-18.441	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	3.972	0.560				This implies that the training was effective

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

The results presented in figure 7 indicated that 63.9% (30.6% + 33.3%) of the workshop attendants had low or very low knowledge of parametric and non-parametric tests before the training. However, after training, 94.4% (11.1%+83.3%) reported to have high knowledge of parametric and non-parametric tests. These findings imply that the training was effective.
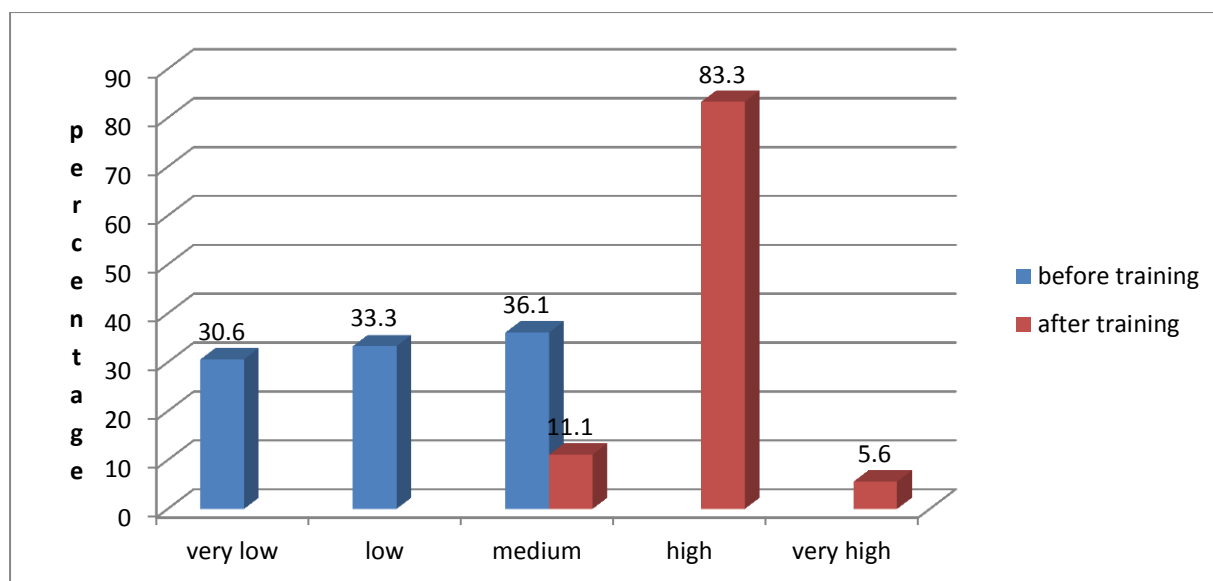
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Figure 7: Understanding of parametric and non-parametric tests before and after training

Inferential statistics were conducted to support the descriptive results. In particular, a paired t-test was employed. Table 4.4 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.

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	2.056	0.826				There is a significant difference in knowledge of parametric and non parametric analysis before and after training
			-1.889	-11.936	0.000	
Overall knowledge of the parametric and non parametric tests in this training-After Training	3.944	0.410				This implies that the training was effective

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

The results presented in the figure indicated that 91.7% (36.1% + 55.6%) of the workshop attendants had low or very low knowledge of journal article extraction and publication before the training. However, after training, 91.6% (72.2%+19.4%) reported to have high knowledge of journal article extraction and publication. These findings imply that the training was effective.
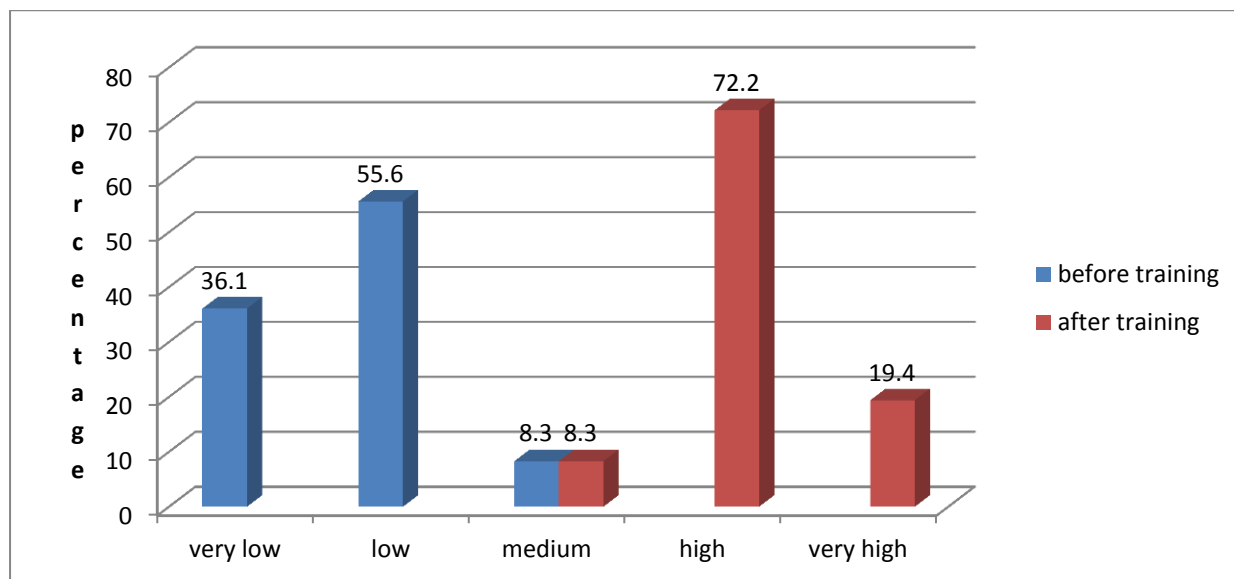
Figure 8: Understanding of journal article extraction and publication before and after training

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.

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	1.722	0.615	-2.389	-20.821	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	4.111	0.523				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 courses. Options ranged from very low extent, low extent, medium extent, large extent to very large extent. These findings in table 4.6 reveal that the majority, 88.9% (38.9%+50%) 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	4	11.1
large extent	14	38.9
very large extent	18	50
Total	**36**	**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 (86%) indicated that they recommended further similar trainings whereas 14% 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.
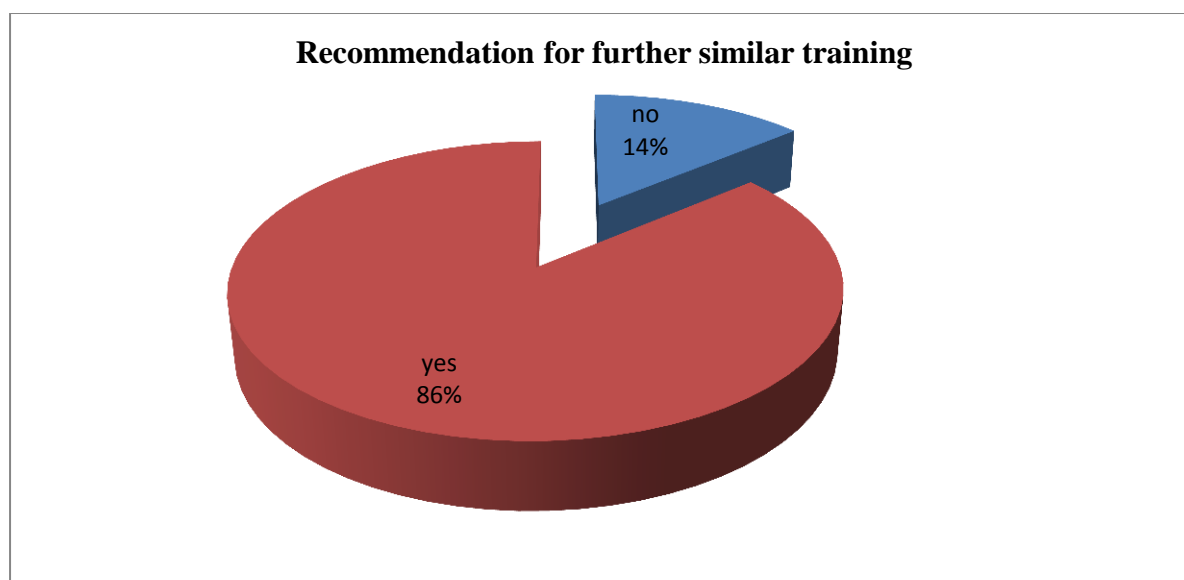

Figure 9: Recommendation for further training

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 (61%) had no prior knowledge of SPSS. In addition, majority (89%) 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 (88.9%) indicated that the training was relevant to their course work. The majority of the respondents (86%) 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 and 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. It was concluded that the training is relevant to students course work and students would attend future trainings if organized. Finally, 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 DVC academic affairs can consider; That for the sustainability of the trainings, either the director is supported financially by the campus so that she/he 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 latter 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.

That the training can 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.

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.

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Appendix 1: Pictorial representation of the training activity and participants