Journal of Culture, Society and Development
ISSN 2422-8400 An International Peer-reviewed Journal
Vol.69, 2023

Action Research on Enhancing SPSS Software Skill for Third Year Statistics Students at Mekdela Amba University

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Abstract
The role of Statistics plays in our daily lives are so vital such that it is important for every educator and learner to understand and know how to use and interpret it. Statistical software allows researchers/students/educators to avoid tedious mathematical mistakes and produce accurate figures in their work if they input all data correctly. The Research has been identified as one of the most important duties of students. The main objective of the research was enhancing skills of students regarding to basic data handling, organization, presentation and analyzing statistical data using SPSS statistical software for Mekdela Amba University third year Statistics students. Hence the total population is small we take the whole population as a sample. Students performance before and after the training were recorded. The recorded data were analyzed qualitatively and the result shows that the mean of student performance after the training is higher than before the training. Before the training 9 (31%), 8 (27.6%), 7 (24.1%) and 6 (20.7%) of students were score below 50% in the first, second, third and fourth categories respectively and after the training 29 (100%), 29 (100%), 27 (93.1%) and 26 (89.7%) of students were scored above 50 % in the first, second, third and fourth categories. The proposed actions for increasing the performance of students in SPSS were focuses on enhancing basic data handling, organization, presentation and analyzing statistical data using SPSS statistical software.
Keywords: Skill, SPSS, Performance, Statistical Software
DOI: 10.7176/JCSD/69-03
Publication date: January 31st 2023

1. STATEMENT OF THE PROBLEM

Decision making concerned on refinement or extension of knowledge is supported through doing different researches. Research are difficult or even impossible to implement without the aid of appropriate software due to their technical problems (Levesque, 2007). SPSS is an appropriate and power full software to solve the technical problems that arise in data related activities. Hence, Knowledge on research methods and Statistical software plays dominant role in research activities.

The role of Statistics plays in our daily lives is so vital such that it is important for every educator and learner to understand and know how to use and interpret it. Statistical methods of analysis help in data collection, presentation, interpretation, analysis and drawing conclusion for and piece of research. The emergence of statistical software has absolutely contributed extremely to the development in research studies in this 21st century. Statistical Software is a vital tool for research analysis, data validation and findings (Abatan and Olayemi, 2014).

Statistical software allows researchers/students/educators to avoid tedious mathematical mistakes and produce accurate figures in their work if they input all data correctly. Research has been identified as one of the most important duties of students (Abatan and Olayemi, 2014). This has led many students to look for different means of ensuring their work is given excellent analysis with Statistical Packages. Development of statistical software allows educators to conduct more quantitative studies easily (Adluru et al., 2009). Many students, researchers, professionals, scientists and business managers also can clearly present accurately prediction of the future using statistical software for Statistical Analysis. Any quantitative research cannot be done effectively without statistical software. Moreover, it enables students to present research data for easy presentation. It helps professionals to interact with data thereby paving way for creativity and innovation (Armstrong, 2001).

After analyzing the field data to a very large extent, that statistical software has contributed vastly to research. This was achieved by using a scientific approach to solve fundamental problems in research which is data analysis. Although some other factors contributed to the quality of research work such as literature review, methodology and findings, it is quite clear that the impact of statistical software packages on analysis and findings of research can be overestimated (Deeks et al., 2001).

Statistical software packages have been recognized to have contributed immensely to research analysis by helping to minimizing human and experimental errors in data analysis. It has been discovered that some analysis such complex analysis in time series, regression and variance analysis cannot be calculated manually effectively without statistical software packages (Yu, 1977).

The application of Statistics using Statistical software is importance for educator, school leadership and government to adopt technology oriented method that will effectively assist learner to cope with statistical methods hence improve their understanding and interest. Having in mind the difficulty of students in understanding Statistics is a great worry to all educators. This has pushed educator into dilemma on how to improve the academic achievement of students and their interest in understanding statistical methods. Integration of Technology in teaching and learning of statistics is the way out to help educators out of this problem. The study is very important in providing university leader and manager of institution the needed strategies to develop policies towards academic staff development on their intention to use statistical software packages in their students (Díaz Andrade, 2009).

The point that initiate us to conduct this research is, in different project and seminars we have seen that our students use inappropriate statistical analysis with adding irrelevant output. Another problem that we have observed from our students is improper utilization of SPSS and even inappropriate interpretation of its output. Even, some students know statistical analysis using SPSS. Most students are not talented at:

- Opening SPSS, exiting SPSS, data entry, saving data
- Manage research data using software (Coding data, editing of data, Imputing missing data and Treatment of outliers)
- Exploring descriptive statistics (Measure of central tendency (mean, median, mode), measure of variation, frequency, percentage, graph etc.).
- Performing inferential statistics using SPSS (test of association, linear regression, logistic regression like binary, multinomial and ordinal).

In line with the above problems, we motivate to launch this short term training for third year statistics students, since they have no detail Skill on SPSS software and Advanced statistical analysis. Therefore, the aim of this study is to offer better training on SPSS and research methods with effective and efficient way of managing raw data including its basic skill on analysis.

2. OBJECTIVE OF THE STUDY

2.1. GENERAL OBJECTIVE

The major objective of the study was enhancing SPSS software skill for third year statistics students at Mekdela Amba University

2.2. SPECIFIC OBJECTIVES

The specific objectives of the study were;

- ✓ To enhance students, understand on SPSS interface and features.
- ✓ To increase students` skills in performing simple to complex data management tasks using SPSS.
- ✓ To increases students' skill in performing inferential statistics using SPSS.

3. DESCRIPTION OF TARGET POPULATION

This action research was conducted in Mekdela Amba University College of Natural and Computational Science, third year Statistics department students. Because students' lakes data handling, data organization, data management and data analysis using statistical software efficiently. To be efficient with statistical software it takes training and practice using SPSS. Therefore, this action research was implement on the mentioned

department so as to fill this gap. The total number of active students were 29. Among them, 23 were male and 6 females at the department in 2013 E.C

4. PLANNED ACTION

From the beginning, the major concern of the study was enhancing or improving Mekdela Amba University third year Statistics student's skill of using SPSS software in handling data, organizing, presenting and analyzing statistical data while conducting researches or projects after & before they have graduated.

After collecting information from questionnaire survey, interview and our observation, already confirmed the presence of the problem. Respondents forwarded some basic suggestions on the way to enhance SPSS software skill of the target population in the selected department. After all, on the bases of the above information, the researchers designed the action plans into the following categories/parts:

Table 1: Description of action plan categories flow

Categories	Descriptions of the category	Activities in each category	Problem solved	Time frame	Remarks
Category one	**Provide training on how to start SPSS for windows**	Introduction, Opening SPSS, Exiting SPSS, creating a data file, Data entry, importing and Export data from excel	Opening SPSS, exiting SPSS, data entry, saving data	First day training (6/12/2013 E.C)	
Category two	**Increasing Data management skill using SPSS**	Inserting new cases/ variables, labeling variables and values, deleting cases/ variables, Select and Sort cases, cleaning data using SPSS, splitting files, merging data and files, transforming variables (Recode in same variables, recode in different variable, Computing variables), Creating indictor variables, Weighting variables, Aggregate data files	Manage research data using software (Coding data, editing of data, Imputing missing data and Treatment of outliers)	Second day training (7/12/2013 E.C)	
Category three	**Build up the skill of making descriptive statistics analysis using SPSS**	Summary statistics or Measures of central tendency (mean, median, sum….), Measures of variations, using different types of graph, Relationship between categorical variables (Cross-tabulation, Chi-squared test), Multiple response.	Exploring descriptive statistics measure of variation, frequency, percentage	Third day training (8/12/2013 E.C)	
Category four	**Improve their skill on inferential Statistics**	Association between numerical variables (correlation), t-test, none parametric test, Analysis of variances, Linear regression, Binary Logistic regression model , Multinomial logistic regression model, Ordinal logistic regression,	Performing inferential statistics using SPSS (test of association, linear regression, logistic regression like binary, multinomial and ordinal)	Fourth day training (9/12/2013 E.C)	

5. IMPLEMENTATION OF INTERVENTIONS

To enhance basic data handling, organization, presentation and analyzing statistical data using SPSS statistical software for Mekdela Amba University third year Statistics students, the following actions were taken into consideration. The possible solution of this action research was to facilitate and intensively assisted for various interventions for enhancing student's software skills like data handling, data organization, presentation, and analyzing of statistical data. Therefore, this study was conducted for four days to implement the actions effectively.

Table 2: Checklist of implementation of actions

Categories	Provide training on how to start SPSS for windows	Time frame	Responsible person	Remark
Category 1	Introduction, Opening SPSS, Exiting SPSS, creating a data file, Data entry, importing and Export data from excel	First day training (6/12/13)	Researcher	
	Increasing Data management skill using SPSS			
Category 2	Inserting new cases/ variables, labeling variables and values, deleting cases/ variables, Select and Sort cases, cleaning data using SPSS, splitting files, merging data and files, transforming variables (Recode in same variables, recode in different variable, Computing variables), Creating indictor variables, Weighting variables, Aggregate data files	Second day training (7/12/13)	Researcher	
	Build up the skill of making descriptive statistics analysis using SPSS			
Category 3	Summary statistics or Measures of central tendency (mean, median, sum, quartiles….), Measures of variations, using different types of graph (histogram, bar chart….), Relationship between categorical variables (Cross-tabulation, Chi-squared test),	Third day training (8/12/13)	Researcher	
	Improve their skill on inferential Statistics			
Category 4	Association between numerical variables (correlation), t-test, none parametric test, Analysis of variances, Linear regression, Binary Logistic regression model , Multinomial logistic regression model, Ordinal logistic regression,	Fourth day training (9/12/13)	Researcher	

6. DATA ANALYSIS AND INTERPRETATION

First the data were organized and managed based on the action research objectives and were entered and analyzed using SPSS version 27. Quantitative data analysis techniques were applied. The quantitative data was including frequency, percentage and paired sample t-test. Results were presented using tables.

7. EVALUATION OF INTERVENTIONS AND REFLECTION

The remedial action that would be taken was training on SPSS software with practical practice. Once they have taken the training, we assess the skill of the students by giving different statistical data to analyze with appropriate statistical methods. Finally, the researchers compared the skill of students before and after training.

7.1. ACTION EVALUATION

The researchers prepared a pre-test and post-test questions for students and the result were recorded and analyzed before and after addressing SPSS training. After training, their skill of data analysis was improved. Before the training 9 (31%), 8 (27.6%), 7 (24.1%) and 6 (20.7%) of students were score below 50% in the first, second, third and fourth categories respectively and after the training 29 (100%), 29 (100%), 27 (93.1%) and 26 (89.7%) of students were scored above 50 % in the first, second, third and fourth categories. The researcher also compares student's skill before and after the training using paired sample t-test, the result shows that the mean score difference after and before the training is negative. The paired t-test is significant at 0.05 level of significance this indicates that students' skill increased significantly after the training.

Table: 4.1 Individual Students' result before training and after training from 50%

Id	Result Before training					After training					
	Category					Category					
	A (10%)	B (10%)	C (15%)	D (15%)	Total result	A (10%)	B (10%)	C (15%)	D (15%)	Total result	Difference
1	8	10	14	13	45	10	10	15	15	50	5
2	4	6	9	11	30	6	7	10	12	35	5
3	6	8	12	9	35	6	8	11	10	35	0
4	7	7	11	15	40	10	10	15	15	50	10
5	4	4	8	9	25	6	7	10	12	35	10
6	4	3	4	4	15	6	7	5	7	25	10
7	6	7	10	8	40	9	9	13	14	45	5
8	4	4	6	6	20	7	8	12	13	40	20
9	9	10	12	14	45	10	10	15	15	50	5
10	10	9	12	14	45	10	10	15	15	50	5
11	8	8	11	13	40	10	10	15	15	50	10
12	9	7	12	12	40	10	8	11	11	40	0
13	9	8	10	13	40	9	9	13	14	45	5
14	4	6	7	8	25	9	10	12	14	45	20
15	2	2	3	3	10	5	6	8	6	25	15
16	8	8	15	14	45	10	10	15	15	50	5
17	7	7	12	14	40	9	8	14	14	45	5
18	5	4	5	6	20	6	6	6	7	25	5
19	9	8	14	14	45	10	10	15	15	50	5
20	2	3	5	4	15	6	7	8	9	30	15
21	7	10	12	11	40	10	10	15	15	50	10
22	6	7	9	13	35	9	9	13	14	45	10
23	2	1	6	6	15	6	8	8	8	30	15
24	6	5	9	10	30	8	10	14	13	45	15
25	4	4	8	9	25	6	7	10	12	35	10
26	9	10	12	14	45	10	10	15	15	50	5
27	10	9	14	12	45	10	10	15	15	50	5
28	6	6	9	9	30	7	7	10	11	35	5
29	9	10	13	13	45	10	9	13	13	45	0

Table 4.2 Summary result of Students before and after the training

Before training					After training			
Categories					Categories			
	1	2	3	4	1	2	3	4
Below 50%	9 (31)	8 (27.6)	7 (24.1)	6 (20.7)	-	-	2 (6.9)	3 (10.3)
Above 50%	20 (69)	21 (72.4)	22 (75.9)	23 (79.3)	29 (100)	29 (100)	27 (93.1)	26 (89.7)

Table 4.3 Recorded results from pre-test and posttests

Item	Mean	Mean difference	Paired correlation	Paired t-test
Before	33.49	-8.10	0.885 (<0.001)*	-8.06 (<0.001)*
After	41.55			
Values in the bracket are p-value and * indicates significant at 0.01 level of significance.				

7.2. Effectiveness of the Action

After accompanied this action research, the researchers were see a difference in students' performance before the training and after the training. Before the training, we observed that students were not open and exit SPSS, manage data, perform descriptive and inferential statistics with SPSS properly, but after the training, we observed that students were open and exit SPSS, manage data, perform descriptive and inferential statistics with SPSS properly. In this regard, students' skill towards opening and exiting SPSS, manage data, perform descriptive and inferential statistics with SPSS were increased. In such circumstances, students' can accomplish simple to complex data analysis with SPSS.

7.3. Difficulties Encountered

There are many challenges that we faced while conducting this action research. Among these, the followings are the main challenges were encountered.

- The training room is unfurnished, have not internet connection to download packages that are integrated with SPSS and light disruption.
- Lack of time to meet with students due to unusual academic semester in different reasons.

7.4. Lesson Learnt

After successful completion of this study, the researchers learnt very important lesson. The most important learned lessons are pointed below.

- The students training in the used of statistical software packages has significant effect on students' intension to use statistical software packages implying that most students are trained in the use of statistical software packages the higher their intension to use statistical software packages.
- Students can perform simple to complex data analysis using SPSS after the training. This indicates that training SPSS can reach-up students' performance to accomplished simple to complex data management and perform complex data analysis method using SPSS.

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APPENDIX

Sample training photo