Learning Statistics Using Universitas Padjadjaran Statistical Analysis Series

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Abstract. The role of computer technology in learning the statistics is very important. UNPAD SAS (Universitas Padjadjaran Statistical Analysis Series) is a computer software that can be used for doing a statistical analysis. UNPAD SAS will be able to overcome the weaknesses found in the existing Statistical analysis software and will also be the solution for the high-priced Statistical analysis software. This research would like to see how is the students reaction when learning Statistics using UNPAD SAS. This research was conducted using cross sectional exploratory study. The study sample consisted of 77 students of the Psychology Faculty from 3 universities in West Java. The result shows that UNPAD SAS is the right and "user friendly" software that can be used in learning the Statistics.

1. Introduction

The role of computer technology in learning the Statistics is very important. Computers provide us with the opportunity to create entirely new learning environments for our students. Computers can be used in statistics education in many ways. They can be used as an illustration component in lectures, as a computation tool, as an electronic interactive textbook, as a research tool, and as a medium for thinking (Schuyten and Dekeyser, 1996). Reform of statistics education has advocated the move towards “more data and concepts, less theory and few recipes” (GAISE, 2005) for introductory statistics courses. In response to this reform, the use of technology in statistics courses has been increasing (Garfield, Hogg, Schau, & Whittinghill, 2002).

One of the Statistical analysis software which is frequently used in Psychology and Social studies is the SPSS. SPSS (Statistical Package for the Social Sciences) is a software that is used for doing Statistical analysis which is developed by SPSS Inc. which then acquired by IBM in 2009. 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, data miners, and others (KDnuggets, 2013).

The research conducted by Jatnika & Abidin (2013) and Jatnika (2015) showed that there was a significant increase of positive attitude in the cognitive aspects after learning Statistics using SPSS in comparison with before using SPSS. Various Statistical analysis is available in SPSS menu to be used by students and researchers of Psychology and Social studies to process the research data. However, there are still many Statistical analysis which frequently used by students and researchers that were not included yet in the SPSS, such as Theta, Eta and Jaspen correlations, as well as further tests for Kruskal Wallis and Friedman methods and also for minimum sample size calculations, etc. The
importance of these methods in Psychology and Social studies research, attracted the interest of researchers to develop a software that can do the Statistical data analysis.

SPSS software for single user price ranges from 1,170 USD to 7,820 USD or equivalent about 16 million rupiah up to 100 million rupiah. The high price of SPSS is causing pirated piracy against existing software. Therefore, this condition is increasingly encouraging the interest of researchers to develop statistical data analysis software which is cheap, precise, and comprehensive for researchers in the field of Psychology and other social sciences.

Jatnika & Haffas (2016) developed UNPAD SAS (Universitas Padjadjaran Statistical Analysis Series) which is a software for doing Statistical analysis that are not included in the SPSS. The making of UNPAD SAS was done using C++ programming language and SDLC (Software Development Life Cycle) method. SDLC is a series of steps or phases that provides models to manage the development and life cycle of an application or a software. This method is consist of these phases: Planning, Analysis, Design, Implementation, Testing, Maintenance (Lewis, 2012). Methodologies in the SDLC process may vary across industries and organizations, but in general are as follows:

- Planning is the planning stage of the system. This stage emphasizes the aspect of system development feasibility.
- Analysis is a purification step to formulate the necessary functions and operations in the application.
- Design is a stage to describe desirable features and detailed operations, including screen layout, business rules, process diagrams, pseudo and other documentation.
- Implementation is the stage of implementing the design from the previous stages and test.
- Testing is the stage of testing the system that has been made.
- Maintenance is the stage of system operation by users, including maintenance and feedback from users.

Jatnika, Haffas and Agustiani (2017) finished UNPAD SAS which is already included with a core system completed with database management and equipped with various series of Statistical analysis such as: Descriptive Statistics, Minimum Sample Size Calculation, and Correlation Analysis (including Eta, Theta, Jaspen correlations).

![UNPAD SAS](image)

**Figure 1.** Display of UNPAD SAS
UNPAD SAS will be able to overcome the weaknesses found in the existing Statistical analysis software and will also be the solution for the high-priced Statistical analysis software. UNPAD SAS needs to be evaluated so it can be the right and “user friendly” software that can be used in learning the course of Statistics. Therefore this research would like to see how is the reaction of the students when learning Statistics using UNPAD SAS?

2. Methods
This research was conducted using cross sectional exploratory study to see the students reaction when learning Statistics using UNPAD SAS. UNPAD SAS is a Statistics data processing software that contains menus like:

- Database Management
- Descriptive Statistics
- Correlation Analysis
- Minimal Sample Size

UNPAD SAS was tested on 77 Psychology Faculty students from 3 universities in West Java. The students reaction when learning Statistics using UNPAD SAS were measured by these research variables:

- Installation
- Database
- Data Filing
- Data Input
- Data Editing
- Data Import and Export
- Data Analysis
- Data Output
- Data Display
- Program Manual

**Figure 2. Menus of UNPAD SAS**
The variables were measured using questionnaires with scoring values as follows: 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree. The data obtained was processed using descriptive statistics to describe the students reaction when learning Statistics using UNPAD SAS.

3. Result and Discussion
The data processing gives the following result:

| Variables                                      | Means  | Standard Deviation |
|------------------------------------------------|--------|--------------------|
| 1. Program installation process is easy to do | 3.1212 | .48639             |
| 2. Preparing database is easy to do            | 2.9481 | .61014             |
| 3. Data filing is easy to do                   | 2.7857 | .58730             |
| 4. Data input process is easy to do            | 2.5584 | .67849             |
| 5. Data editing process is easy to do          | 2.5325 | .69933             |
| 6. Data import and export process are easy to do| 2.4156 | .65596             |
| 7. Data analysis process is easy to do         | 3.0519 | .47530             |
| 8. Data output is easy to understand           | 3.0455 | .47422             |
| 9. Data display is attractive                  | 2.5584 | .52549             |
| 10. The program manual is easy to understand   | 3.0455 | .47422             |

Based on Table 1 and Figure 3 it is visible that program installation and data analysis process using UNPAD SAS are easy to do. The result also shows that the output of UNPAD SAS is easy to understand. This is reinforced by an easy-to-understand manual. However, the result shows that the process data filing should still be simplified, as well as the process of data input and editing. The import and export aspects of data should be perfected too because the students still feel difficult to do
them. In addition, the display of the data output should also need to be improved in order to have an attractive appearance.

Based on the data processing it can be concluded that the UNPAD SAS is the right software to calculate descriptive statistics, correlation analysis and minimum sample size. UNPAD SAS needs to be more developed especially on the data import and export process and improvement also need to be done on the output display so it can be a user-friendly software.

As previously explained, the making of UNPAD SAS was done using C++ programming language and SDLC (Software Development Life Cycle) method. SDLC method is consist of these phases: Planning, Analysis, Design, Implementation, Testing, Maintenance. The results of this study will be part of the phase testing, which is the stage of testing UNPAD SAS to users.

UNPAD SAS is expected to be an alternative software that can be used to help teaching statistics in Indonesia especially in the Faculty of Psychology Universitas Padjadjaran. UNPAD SAS is expected to reduce the occurrence of software piracy due to expensive software prices. Finaly UNPAD SAS is expected to reduce students' anxiety when learning statistics and improve their learning achievement.

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