

APPLICATION OF SPSS SOFTWARE IN STATISTICAL LEARNING TO IMPROVE STUDENT LEARNING OUTCOMES

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Abstract. The use of the SPSS 21 (Statistical Product and Service Solution) program in learning can assist students in conducting statistical data analysis. This research aims to find out the application of SPSS 21 program as a data processor in improving student learning outcomes in statistics material class XI SMK Muhammadiyah Ambon. This type of research uses Classroom Action Research, with the number of subjects used in the study amounting to 31 people. The instruments used in this study used tests and observations. Observation is used to find out the condition of the student learning process using the SPSS 21 program and test questions are used to find out the student learning results obtained after carrying out learning using the SPSS 21 program. The results of data analysis are known that learning using SPSS 21 is better when compared to the classical learning process. Student test results experienced an increase in learning results, namely on the initial test the average score obtained by students was 49.84 with a completion percentage of 16.13%, and increased in the implementation of cycle I tests where the learning process was carried out using SPSS 21 with an average score of 61.85 and a completion percentage of 61.29%, and increased again in the implementation of cycle II tests with an average score of 79.03 with a completion percentage of 90.32%.

Keywords: SPSS 21, Learning Outcomes, Statistics

Abstrak. Penggunaan program SPSS 21 (*Statistical Product and Service Solution*) dalam pembelajaran dapat membantu siswa dalam melakukan analisis data statistik. Penelitian ini bertujuan untuk mengetahui penerapan program SPSS 21 sebagai pengolah data dalam meningkatkan hasil belajar siswa pada materi statistik kelas XI SMK Muhammadiyah Ambon. Jenis penelitian ini yaitu menggunakan Penelitian Tindakan Kelas (PTK), dengan jumlah subjek yang digunakan dalam penelitian ini berjumlah 31 orang. Instrumen yang digunakan dalam penelitian ini yakni menggunakan tes dan observasi. Observasi digunakan untuk mengetahui kondisi proses pembelajaran siswa dengan menggunakan program SPSS 21 dan soal tes digunakan untuk mengetahui hasil belajar siswa yang diperoleh setelah melaksanakan pembelajaran dengan menggunakan program SPSS 21. Hasil analisis data diketahui bahwa pembelajaran dengan menggunakan SPSS 21 lebih baik jika dibandingkan dengan proses pembelajaran yang dilaksanakan secara klasik. Hasil tes siswa mengalami peningkatan hasil belajar yaitu pada tes awal nilai rata-rata yang diperoleh siswa yakni 49,84 dengan persentase keberhasilan sebesar 16,13%, dan meningkat pada pelaksanaan tes siklus I di mana proses pembelajaran dilakukan dengan menggunakan SPSS 21 dengan nilai rata-rata sebesar 61,85 dan persentase keberhasilan sebesar 61,29%, dan meningkat lagi pada pelaksanaan tes siklus II yakni dengan nilai rata-rata sebesar 79,03 dengan persentase keberhasilan sebesar 90,32%.

Kata Kunci: SPSS 21, Hasil Belajar, Statistika

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INTRODUCTION

Information and communication technology is evolving along with the rapidly increasing globalization, so that the interaction and delivery of information will take place quickly (Li et al., 2015). Competition that occurs in this era of globalization fosters competition between nations, thus demanding the development of human resources. The development of technology and information in the world of education can not be separated from the role of computers as a medium of learning by teachers in carrying out their learning in the classroom. This is because the use of computers in the field of education has been very widespread and reaches various interests. Among its uses is for the benefit of learning, namely to help teachers in improving the quality of learning (Zaenap et al., 2021).

Learning as part of the education process should be well carried out by all teachers. (Çakır, 2020; Tumurun et al., 2016). Teaching in the context of the standard educational process is not only conveying the subject matter, but also interpreted as the process of regulating the environment so that students learn (Zagoto, 2018). Mathematics as one of the very fundamental and very basic disciplines needs to be conveyed or taught by teachers well, so that the slogan that has been developing in mathematics that "mathematics is a difficult and difficult science to learn" can be updated into mathematics is fun and fun material (Claudia et al., 2020).

In math learning teachers should be able to convey the material introducing directly to the world around, so that what is explained can be accepted by students (Putri & Rakhmawati, 2018), not only memorizing the material, but also students can implement the material in daily activities (Safitri, 2017). Oleh karena itu, pembelajaran komputer yang berlangsung di kelas haruslah dapat berorientasi pada siswa dan keaktifan siswa, sehingga materi yang dipelajari dapat dipahami sepenuhnya oleh siswa (Aybek & Demirtasli, 2017).

The problem faced by students in SMK Muhammadiyah Ambon is the results of unfinished mathematics learning that has not reached the minimum level of absorption that has been determined. One of the factors in the learning of mathematics teachers more lectured, so students become quickly bored and cause low math learning achievement. Teachers have not lived the nature of mathematics because learning in school only emphasizes products. This is reinforced by the student's opinion that math learning is considered difficult so that it does not interest students to learn which has an impact on the low achievement obtained by students from formative tests and summative tests (Nursiddik et al., 2017). This is due to students who lack understanding of concepts in mathematics

learning. They consider math lessons difficult to understand, children will more clearly gain an understanding of a concept (Nuraini et al., 2020).

SPSS (Statistical Product and Service Solution) is a package of computer application programs to analyze data, especially for the social sciences. However, with SPSS can create tabulating reports, charts (charts), plots (diagrams), descriptive statistics and complex statistical analysis. Because SPSS is a program package to process and analyze data, then to run this program must first be prepared the data to be processed and analyzed. SPSS for windows uses 6 types of windows, namely SPSS Data Editor, Output Window, Syntax Window, Chart Carousel, Chart Window, and Help Window. The purpose of this research is to find out the application of THE SPSS 21 (Statistical Product and Service Solution) program as a data processor in improving student learning outcomes in statistics material class XI SMK Muhammadiyah Ambon.

METHOD

The type of research used is class action research. Classroom action research is an discernment of learning activities in the form of an action, which is deliberately raised and occurs in a class together (Arikunto, 2012). Class Action research includes four stages, namely the stages of planning, implementation of actions, observation, and reflection.

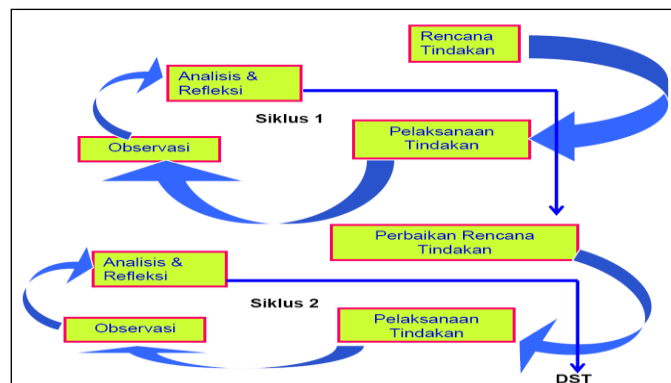


Figure 1. Class Action Research Stages

Research begins with an action plan, where the researcher makes a plan for the implementation of research actions by preparing various learning instruments and tools needed, then entering into the implementation of actions, where students are given treatment in the form of learning by implementing the SPSS program, at the time of learning is observed to the activities of teachers and students to be used as reflection material. A sample is part of the number and characteristics that the population has (Sugiyono, 2014). The

sampling technique in this study used Random Sampling, where the sampling process was randomized between classes XI¹, XI², XI³. The results of the sample determination were obtained by class XI² with a total of 30 students.

The instruments in this study consist of tests and observations. Tests are used to find out the extent of a student's ability to understand the material being taught and to know the student's learning outcomes. Tests were conducted on all students who were sampled in the study. The form of test used is an essay-shaped test. Observation is carried out by observing various learning activities carried out by teachers and students during the learning process by applying SPSS to the learning process. This study is declared successful if the student's learning results have reached the Minimum Completion Criteria individually, which is 60 at intervals 0-100 and classically the percentage of student completion has reached 75%.

Data from this study is analyzed descriptively, explaining the facts, phenomena and symptoms found in the field together with collaboration partners (teachers and colleagues).

$$NP = \frac{R}{SM} \times 100$$

Information:

- NP = Sought or expected acquisition value
 R = Scores obtained by students
 SM = Ideal maximum score of the test
 100 = Constant (Purwanto, 2012).

RESULTS

Pre-Test Results

The research was conducted on students of class XI IPA³ SMK Muhammadiyah Ambon. Before taking action in the study, researchers conducted a pre-test. Pre-test results obtained initial ability or student learning results are still low and many students who obtain the obtained grades do not reach 62 or do not reach the Classical Minimum Completion Criteria.

Table 1. Completion of student learning on pre-test

No	Test Scores	Mastery Level	Frequency	Mean	Percentage Completion
1	≥ 62	Not Succeeded (in the exam)	5	49,84	16,13%
2	< 62	Succeeded (in the exam)	26		83,87%

The success rate of learning on the initial test was only achieved by 5 students who were the subject of research from the overall number of students, namely 31 people with a success percentage of 16.13% and the number of students who had not achieved learning success,

which was 26 people with a percentage of 83.87%. Preliminary test results show that the learning results achieved by students are still relatively low. That is, there are still many students who have not been completed in studying statistical system materials, so researchers need to provide slowly in the form of using different methods, namely the use of the SPSS 21 program in studying statistical materials.

Results of Cycle I Research

Activities carried out in cycle 1 include 4 stages, namely: planning, implementation of actions, observation, and reflection. Each of these stages will be spelled out as follows.

Action Planning in Cycle I

Activities planned before carrying out learning using the SPSS 21 program in cycle I, namely (1) ensuring every computer that will be used in the learning process has been installed SPSS 21 program, (2) prepare a learning implementation plan that is in accordance with the material to be taught by the teacher using the SPSS 21 program, (3) prepare observation sheets or observations of teachers and students, (4) arrange training problems that are in accordance with the material taught, (5) coordinate with math subject teachers with peers in the observation process using the SPSS 21 program, (6) carry out pre-tests to see the improvement of students.

Implementation of Actions in Cycle I

The execution of actions is carried out by researchers, while math teachers act as observers. At this stage, learning activities using the SPSS 21 program are carried out in accordance with the RPP compiled. Before learning begins the teacher conveys the Competency Standards, Basic Competencies and Indicators to be achieved. The teacher provides a stimulus, then asks questions orally to find out the extent of the student's level of knowledge according to the material taught. The teacher conveys to the students about the material to be studied.

Before the teaching and learning process, researchers provide an overview of the SPSS 21 program as introductory material to students. Researchers also provide basic materials about the SPSS 21 program as well as steps to solve problems orally so that students do not feel confused when learning using the SPSS 21 program. After carrying out learning using the SPSS 21 program, to find out the extent of students' understanding of statistical material, tests were carried out on all students who were subjects in this study.

Table 2. Student learning success on cycle I tests

No	Test Scores	Mastery Level	Frequency	Mean	Percentage Completion
1	≥ 62	Not Succeeded (in the exam)	19	61,85	61,29%
2	< 62	Succeeded (in the exam)	12		38,71%

The success rate of learning on the cycle I test was achieved by 19 students who were the subject of research from the overall number of students, namely 31 people with a success percentage of 61.29% and the number of students who had not achieved learning success was 12 people with a percentage of 38.71%. Based on the results achieved in cycle I, it can be known that the learning results achieved by students in cycle I, look to increase when compared to the results achieved in the initial test implementation. This is seen from the percentage of student success, namely in the initial test the number of completed students by 16.13% while in cycle I increased to 61.29%. But because the percentage of student success only reached 61.29% and has not reached the percentage of student success classically set in the study which is 75%, then researchers continued this research process in cycle II, by first reflecting on various activities carried out in cycle I.

Observations in Cycle I

The observation process is carried out by the observer that has been determined in the planning stage. The observation process is focused on the activities of teachers and students in accordance with the observation sheet that has been compiled. The conclusion of the observation process conducted by the Observer is as follows.

- a. Observation of the teacher; (1) the learning device prepared by the researcher is very good, (2) the teacher has mastered well the material taught, (3) the use of learning methods in this case the use of SPSS 21 program has not been maximal, (4) the teacher has not given reinforcement to students in the learning process, (5) The teacher has not used the time well and maximally, (6) giving questions to students is good, (7) the management of classes by teachers is good, (8) the use of computer media in the learning process is good, (9) the management of the learning process using the SPSS 21 program has not been maximal, and (10) the provision of motivation by teachers to students is good.

- b. Observation of students; (1) students have not prepared well when participating in learning activities, (2) students have known the material to be studied well, (3) students use the SPSS program well in the learning process, (4) students feel guided when the learning process takes place, (5) the interaction that is built between students has not been maximal, (6) students have not been able to express their opinions in the learning process properly, (7) Students have not been able to present their work well, (8) students have done tasks in accordance with the direction of the teacher, (9) students can convey questions in the learning process well, (10) data management using SPSS by students is good.

Reflections on Cycle I

The results of reflection on learning in cycle I, namely (1) researchers have not been able to do the stages well in using SPSS and in the division of time is not yet appropriate so it needs to be more effective again, (2) researchers must be able to guide students in learning well, (3) students in working using SPSS programs are also not maximal because they are not used to it, this can be seen from cycle I so that researchers must maximize students when learning.

Learning Outcomes in Cycle II

Planning for Cycle II

In cycle II the planning is structured based on the reflection of cycle I which is (1) ensures every computer that will be used in the learning process has an SPSS 21 program and has been in a state of booth by (has been turned on), (2) prepares rpp that is in accordance with the learning material, (3) arranges the training problem in accordance with the material taught, (4) prepares the teacher and student observation sheet.

Implementation of Actions in Cycle II

Starting the meeting on this cycle, the researcher and the teacher enter the class and then the students greet before the lesson begins the researcher first pays attention to the student. After that the researcher read out the absence to check the presence of students and convey Basic Competencies and indicators. The implementation of actions in cycle II begins with an understanding of statistics that have been given before and provides motivation to students so that in the next learning students become understood. After giving an explanation, in this

activity direct research begins learning with statistical concepts using the SPSS 21 program which is then done post tests to find out the success of student learning in this cycle.

Table 3. Student learning success on cycle II test

No	Test Scores	Mastery Level	Frequency	Mean	Percentage Completion
1	≥ 62	Not Succeeded (in the exam)	28	79,03	90,32%
2	< 62	Succeeded (in the exam)	3		9,68%

The study success rate on the cycle I test was achieved by 28 students who were the subject of research from the overall number of students, namely 31 people with a success percentage of 90.32% and the number of students who had not achieved learning success, which was 4 people with a percentage of 9.68%. Student test results achieved in cycle II see that the learning results achieved by students look very good, and have met the minimum success criteria classically which is 75%. Thus it can be concluded that the learning process by using the SPSS program as a statistical data processor has been said to be successful.

Observations in Cycle II

Researchers make observations by filling in instruments that have been prepared for the implementation of learning in cycle II, the condition of the class is well organized and students learn with pleasure. In cycle II, researchers provide more guidance in learning and more attention to students who are embarrassed in the learning process by using the SPSS 21 program. In cycle II, there are still three students who have difficulty. This is because of the rush in solving problems because there is a lack of understanding and thoroughness in doing the problem. Thus, the activities performed on statistical material end in cycle II.

Reflections on Learning in Cycle II

Reflection is done after the implementation of cycle II ends. From the results of reflections obtained the conclusion that researchers have been able to carry out the stages of learning by using the SPSS 21 program well, so that the learning process runs in accordance with the desired stages. This can be seen from the average value results at the end of cycle II, already meeting the specified KKM target.

DISCUSSION

The learning carried out in students of class XI IPA³ SMK Muhammadiyah Ambon on statistical materials using the SPSS 21 program as a statistical data processor obtained quite good results when compared to the learning process that took place using conventional methods, which are used by teachers in general. This is seen in the student learning results obtained on the initial test, the end of cycle I test, and the end of cycle II test. The results of the analysis of student work test results in cycle I showed that there were 19 students with a percentage (61.29%) who completed their studies or obtained grades ≥ 62 and 12 students with a percentage (38.71%) who were not completed or obtained grades < 65 . This shows that the implementation of cycle I improvement actions has not reached the criteria of success to be achieved, namely this study is said to be successful if $\geq 75\%$ of students achieve a grade of ≥ 65 . Reflection on cycle I shows there are still many problems and shortcomings that occur in this cycle. The deficiency is related to the learning process regarding teacher and student activities, namely, the implementation of learning activities carried out by teachers who have not been in accordance with the rpp designed, the use of SPSS 21 program has not been maximal, most students are less serious even they often laugh in doing learning.

Deficiencies that still occur in cycle I actions that have not met the indicators of success that have been established, then research continues on the action of cycle II. Things that must be improved in cycle II is expected that teachers can apply the SPSS 21 program well, when giving an explanation it is expected that teacher attention to students can be further improved. (da Costa et al., 2018), Teachers should be more controlling of students in learning and more assertive to inactive students (Warli & Fadiana, 2015). In addition, teachers are also expected to pay more attention and give instruction to students in the learning process (Hidayah Putri et al., 2019).

Analysis of student work test results in cycle II showed that there were 28 students with a percentage (90.32%) who completed their studies or obtained grades ≥ 65 and as many as 3 students with a percentage (9.68%) who were not completed or obtained grades < 65 . This means that the percentage gain in cycle II has reached the indicator of research success criteria, namely $\geq 75\%$ of students reach KKM ≥ 65 . In accordance with the results of reflection on cycle II, the implementation of actions on this cycle can be said to be going quite well. Deficiencies that occurred in the previous cycle can be corrected in this cycle. Teachers have implemented the SPSS 21 program well and carry out teaching and learning activities in accordance with RPP, the teacher's ability to condition the classroom and control each student also shows satisfactory results. This can be seen from the condition of the

classroom that can take place calmly and orderly in addition to the researchers have provided direction and guidance and regulate the circulation and course of the learning process, in addition students in playing their roles already have the ability to communicate well.

Based on the results of observations obtained from each cycle about how the improvement can occur, it is known that researchers must be able to manage teaching and learning activities well, able to use learning techniques or strategies (Arifin, 2012; Rista et al., 2019), know the characteristics of students, as well as weaknesses to follow up. Students should not be allowed to accept, but give responsibility to them, so that their activeness and motivation can be seen.

Learning using the SPSS program 21 students are encouraged to learn largely through their own involvement (Purwasih, 2015) with strategies at play and teachers encouraging students to have experience and conduct experiments that allow them to discover themselves (Abidin, 2015; Nasaruddin, 2018). Thus the use of SPSS 21 program in the learning process provides greater opportunities for better learning outcomes, because students themselves are trying to find and solve problems provided by teachers themselves. Therefore, mastery using the SPSS 21 program is an effective learning in an effort to improve student learning outcomes.

CONCLUSION

Based on the results of the study, it can be concluded that learning using the SPSS 21 program on statistical materials can improve student learning outcomes in class XI IPA³ SMK Muhammadiyah Ambon. This is shown by the increase in the average score of students, namely on the initial test of 49.48 with a success percentage of 16.13%, increasing in cycle I to 61.85 with a success percentage of 61.29%. While in the results of the cycle II test the average score of 79.03 with a success percentage of 90.32%.

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