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STATISTICAL ANALYSIS IN VALUE MEASUREMENT OF THE PROCESS OF LEARNING MATHEMATICS DISKRIT STUDY CASE:ENGINEERING STUDY PROGRAM INFORMATICS STIKOM BANYUWANGI INDONESIA

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ABSTRACT

To determine the final value of a value requires accuracy to see the curve and all the conclusions of the results. Statistical calculations using Minitab make it easier and more complete for processing the value data produced by a lecturer. The method used in quantitative research using literature and documentation by taking the volume value data. To make a conclusion based on the statistical value of the test and the results obtained become a conclusion. With analysis of variance and statistical calculations using this mini tab produces an analysis of measuring the value of learning. The result obtained by the lecturer is by using Minitab statistical calculations to make it easier to process value data and to find out the value statistics easily and accurately.

Keywords : Statistics, Minitab, and learning

INTRODUCTION

course is one of the basic courses which is a prerequisite course for other subjects, this can be seen from the KBK which is in the Informatics Engineering study program at STIKOM PGRI Banyuwangi. In the eyes of the mathematics logic in the UTS and UAS examination results at STIKOM PGRI Banyuwangi, the results of the scores are still below the average. Here it is necessary to have a variety of Ayang's efforts to stimulate and increase the value of learning (Riski: 2013).

Each year there is an increase and decrease in value. The development of statistical values achieved by students each year requires statistical calculations. Statistical calculations in logic courses are needed for teachers to know the progress of the value each year, one week the teacher can take action when the statistical calculation value drops (Maria:2020). Statistical calculations and data testing on the results to be achieved will not be known with certainty unless we examine all populations , it would require random sampling of the population to decide and see the results of the hypothesis, taking decisions based on the results of statistical tests to conclude the results obtained.

Data analysis using statistical techniques is better known for quantitative data are often found in research science exact sciences such as field economics, agriculture, biology and other quantitative fields. In other quantitative science research. In social science research, qualitative data is often used as a reflection of concepts that are abstract or cannot be measured directly (Jackson:2020). Therefore, parametic analysis is very rarely using

parametic analysis, such as research in several developed sciences and there are many uses of quantitative analysis. Although the variables are qualitative, even though the

variables are qualitative, one of the analyzes currently developing ispath analysis (waryannto:2006).

Some hypothesis testing can be done in various ways, one of which is using population testing or hypothesis sampling with Minitab. Minitab's advantage over other statistical computation programs, Minitab provides multiple data processing to perform regression analysis, create ANOVA, design factorialexperiments and response andanalysis multivariate.

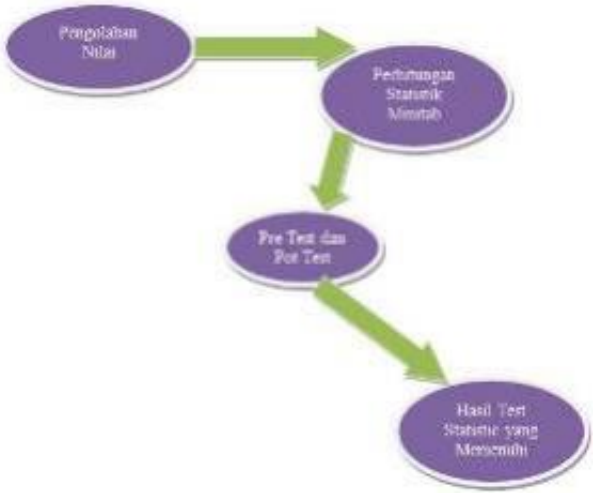

Figure 1 Framework

a. Calculation ofStatistics

Datais a description of facts, the meaning of instructions that can be conveyed and processed by humans or machines. Data processing is a form of processing data to make the data useful according to the desired results so that it can be used. .

In calculating data or statistics, apart from being calculated manually, it can also be calculated with the help of software. One software that is capable of performing statistical calculations is Minitab. Minitab is a computer program designed to perform data processing. Minitab combines the ease of use of Microsoft Excel with the ability to perform complex statistical analyzes.

b. Computing statistics

Statistics and Computing is a science that includes the introduction of basic statistical techniques and their applications for making experimental designs, data collection, and data analysis as well as communicating orally or in writing. The use of simple statistical software packages for data management and interpretation. Some of the materials that will be discussed in the Statistics and Computing course include general knowledge of the importance of statistics, standard deviation, median, mean, mode, frequency, binmial distribution, ultinomial, poisson, confidence interval, steps for taking and testing samples, hypotheses, etc.

Statistics is a science that is always related to data.

The more data obtained, the easier it will be to do a job. Therefore statistics are also very influential with quality improvement. Why is that? As has been said before, the more data collected, or the better the hypothesis obtained previously, the easier it will be to improve or improve the quality of a product. Likewise in planning a product (product planning), of course planning a product will be easier to do if we already have data that can support the product planning (Rizki Noor:2020). The same is the case if we want to make predictions (forecasting), for example the market share of a certain product. In making predictions, of course, data that can help us determine hypotheses is needed. Or a simpler example, namely 'forecasting' the weight of a cow with known length and height.

Forecasting the weight of the cow can be done because there is data that shows the height and length of the cow, however, if the data cannot be obtained, then how can we predict the weight of the cow? That is why statistics are considered important in making yearly reports, personnel management, and market research. Because statistics discuss the management, collection, and interpretation of the data.

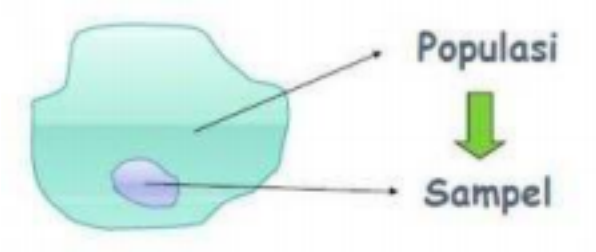

Figure 2 Population and Sample

The terms contained in statistics and very mandatory to understand are Population and Sample as depicted in Figure 2. Population is the whole object of research / investigation target. An observation or survey of all members of the population is called a census. However, it is very rare for an observer to observe the entire population because a population can contain such a large amount of data that it is very difficult to carry out an assessment of all of these data, therefore only the sample is used. The sample is data taken from part of the population. A good sample is a representative sample. Namely a sample that can represent the population. To get a sample with these criteria, the correct sampling technique must be used. One of the sampling techniques is the Simple Random Sample or random sample in which each population object has an equal chance of being selected as a sample (Ryan:2001).

c. Hypothesis Testing The

term hypothesis is actually a compound word consisting of the words hypo and thesa, hipo comes from the Greek word which means under, less or weak. Meanwhile, tesa which means theory or proportion presented as evidence. So a hypothesis is a statement that is still weak and still needs to be proven. A hypothesis will be accepted if the investigation material justifies the statement (Danang:2011).

d. ANOVA

Analysisof variance(ANOVA) is a statistical analysis method that belongs to the branch of reference statistics. In Indonesian literature this method will be known by various other names, such as analysis of variance, variance analysis, and analysis of variation. It is an extension of the Behrens - Fisher problem, so that the F test is also used in decision making. analysis of variance is Relativeeasy to modify and can be developed for more complex experimental forms. In addition, this analysis also has a relationship with regression analysis. As a result, its use is widespread in various fields, ranging from eksperimen laboratorium to experimentp,eriklananpsikologiand society. (http://id.wikipedia.org/wiki/Analisis_varians) Basic Assumptions in ANOVA:

- Normality
  Each price in the sample comes from a normal distribution, so the distribution of the sample scores in the group should be normal. Normality can be overcome by increasing the number of samples in the group, because the more, the distribution will be closer to normal. If the sample of each group is small and it cannot be solved by doing a transformation.
- Similarity of Variance
  Each group should come from a population that has the same variance. For the same sample in each group, the variance similarity is negligible. However, if the number of samples in each group is not the same, then the similarity of population variance is very necessary.
- free observations
  Samplesshould be taken randomly (random), so that each observation is free information.

Actually one-way ANOVA analysis can be used to deal with cases of more than one independent variable. It's just that the analysis is carried out one by one, so there will be many cases (more N). By doing a two-way

ANOVA noise will also be avoided (a possibility that states there is an effect due to the mixing of a data analysis). This noise can be avoided in a two-way ANOVA because the analysis here involves a contor to the difference (catagorical) of the independent variables. The interaction of a togetherness between the factors in influencing the independent variables, by itself the influence of the factors independently has been eliminated. If there is an interaction, it means that the effect of one factor on the said variable has a line that is not parallel to the effect of other factors on the dependent variable which is parallel (intersecting), then the factors have no interaction (Trihendradi:2012).

Two-way ANOVA is used by researchers to overcome the difference in the value of the dependent variable which is categorized based on the large number of independent variations and each variable consists of several groups. Two-way Anova is a one-way ANova improvement. Two-way anova is more efficient than one-way anova, because:

- fewer cases are encountered, namely a number of samples.
- noise can be eliminated.
- It can be seen the elements of togetherness of the independent variables in influencing the dependent variable.

One-Way Anova

For variance homogeneity. These steps are as follows:

- Formulating a hypothesis
- Testing the homogeneity of three or more variances
- Analysis of Variance (ANOVA)
- Testing the hypothesis (Rizki Noor Prasetyono:2020).

RESEARCH METHOD

Research

Materials

This research was conducted on 75 second semester students of the Informatics Engineering Study Program at the PGRI College of Computer Science, Banyuwangi

Thistool

researchuses MINITAB software to analyze statistics related

to all data on discrete mathematics courses.

Research Steps The

data collection method was using the incoming discrete ma thematical values. The data was processed using Minitab.

Table 1. List of Class SP 1.1

Value List	
Discrete Mathematics (SP1.1)	
S1 - INFORMATICS ENGINEERING	
HIGH SCHOOL OF COMPUTER SCIENCE (STIKOM) BANYUWANGI	
Code MK	**PP111702**
Lecturer Code	**3**
Years of Doctrine	**2019-2020**
NIM	Total
1119101688	92.8
1119101695	66
1119101697	76.7
1119101699	63.6
1119101700	36.8
1119101701	60.8
1119101702	67.1
1119101703	69.5
1119101717	69
1119101718	75.5
1119101723	75.7
1119101727	80.4

1119101729	61
1119101730	85.3
1119101734	58.1
1119101740	62.6
1119101741	87.9
1119101746	90.3
1119101747	91.5
1119101748	90.3
1119101749	94
1119101750	75.3
1119101753	65.6
1119101754	70.3
1119101760	66.5
1119101762	74
1119101763	65.7
1119101767	69.3
1119101776	76.5
1119101785	79.2
1119101786	68
1119101794	85.3
1119101796	79
1119101800	71.8
1119101806	74
1119101807	75.3
1119101809	77.8
1119101811	54.2
1119101820	6.3
1119101824	72.6
1119101826	60.6

Table 2. List of Class Values SP 1.3

ListValues	
of Discrete Mathematical(SP1.3)	
S1 - ENGINEERING INFORMATICS	
HIGH SCHOOL OF COMPUTER SCIENCE (STIKOM) BANYUWANGI	
MK code	PP111702
CodeLecturer Code	3
Years Teachings	2019-2020
NIM	**Total**
1119101713	83.9
1119101719	67.8
1119101725	83
1119101726	80.3
1119101735	72.6
1119101736	64.9
1119101738	81.5
1119101739	70.3
1119101743	86.7
1119101744	69
1119101751	85.3
1119101752	18.1
1119101755	62.6
1119101759	84.2
1119101769	69.9
1119101773	3.94
1119101779	47.5
1119101780	53.7
1119101781	71.3
1119101783	64
1119101784	75.3
1119101788	75.3
1119101789	66.7
1119101790	67.5
1119101792	63.8
1119101793	73
1119101795	62.7
1119101798	72.7
1119101801	71.4
1119101805	48.9
1119101812	3.15
1119101817	52
1119101827	62.9
1119101828	56.2

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Calculations Using Minitab

The statistical calculation used is to use Minitab for testing hypothesis samples with Minitab.

RESEARCH RESULTS AND DISCUSSION

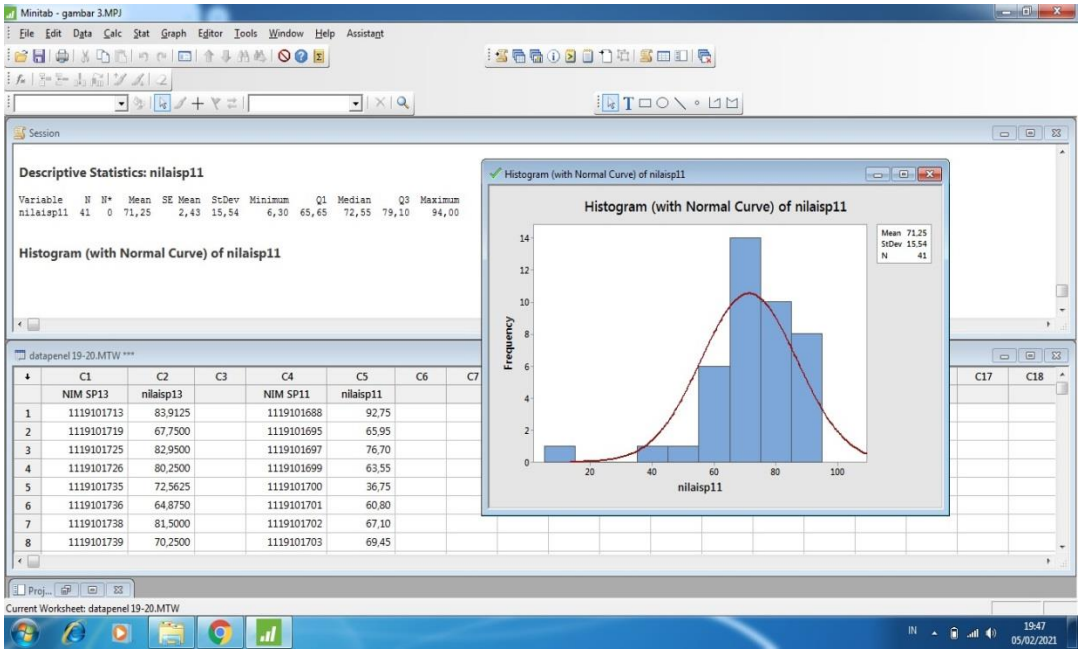

Figure 3 Descriptive Statistic SP1.1

Statistical descriptions are used to see the MEAN, Minimum, Median results. Hypothesis testing in this study is a statistical hypothesis, because this research deals with quantitative data. A statistical hypothesis is made to state that there is a similarity about the thing in question. If there is a difference in something, then an alternative hypothesis (Ha) is used as a possible rejection of the statistical hypothesis (Ho). As illustrated in Figure 4

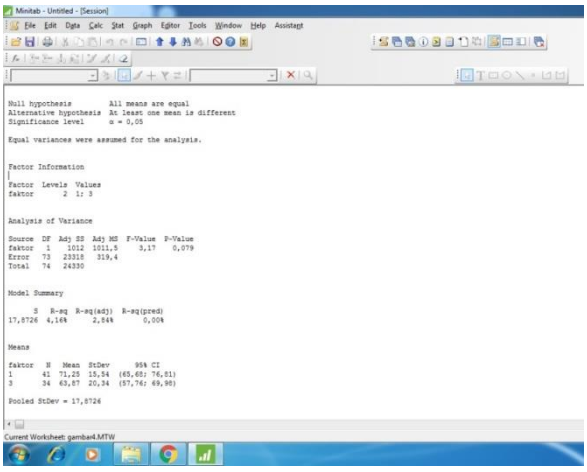

Figure 4 One Way Anova SP 1.1, SP 1.3

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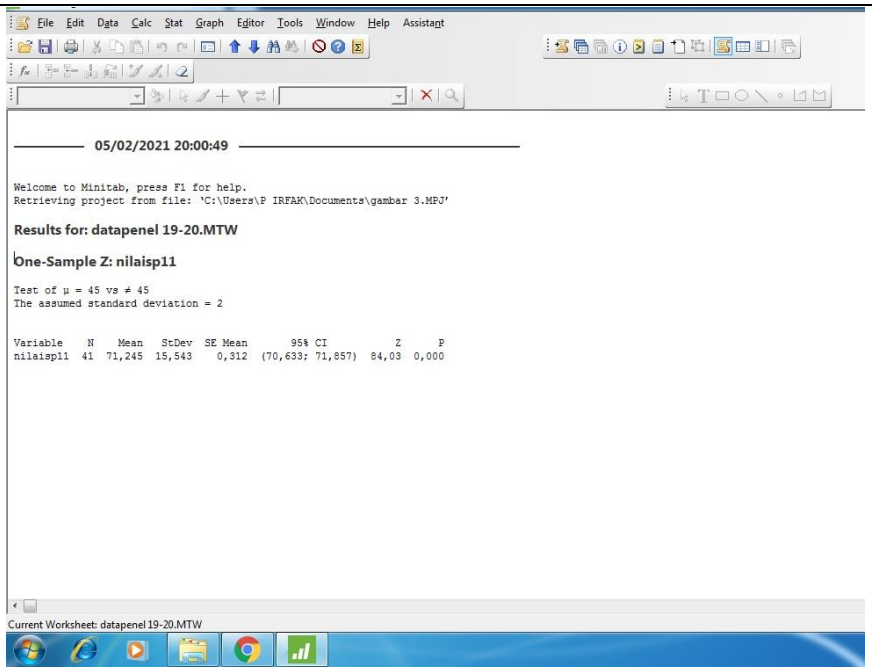

Figure 5 One Sample Z: Pretest and Postest

The difference from One-Way with O ne - W ay (U nstacked) is if the data consists of several columns, we use One-Way (Unstacked), but if we have compiled the data down one by one, then we use One-Way. But if we are going to do a multiple t-test, it will be more practical to use some special methods. This is illustrated in Figure 5

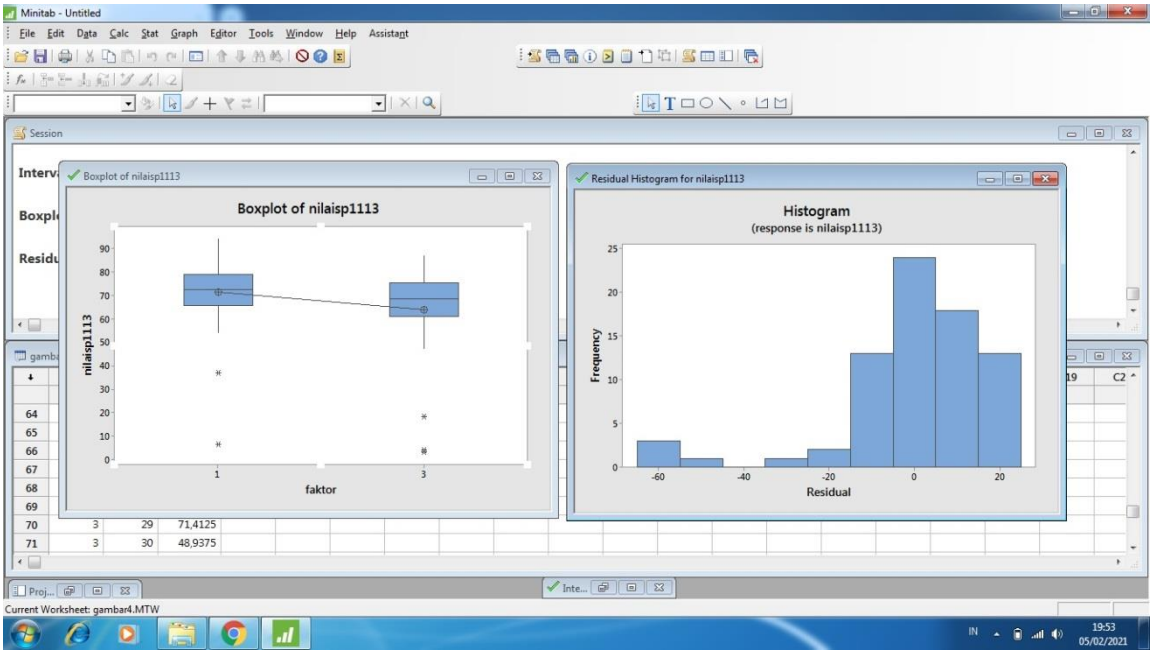

Figure 6 Boxplot and Histogram

The diagram of the use of Time Series Plot shows:

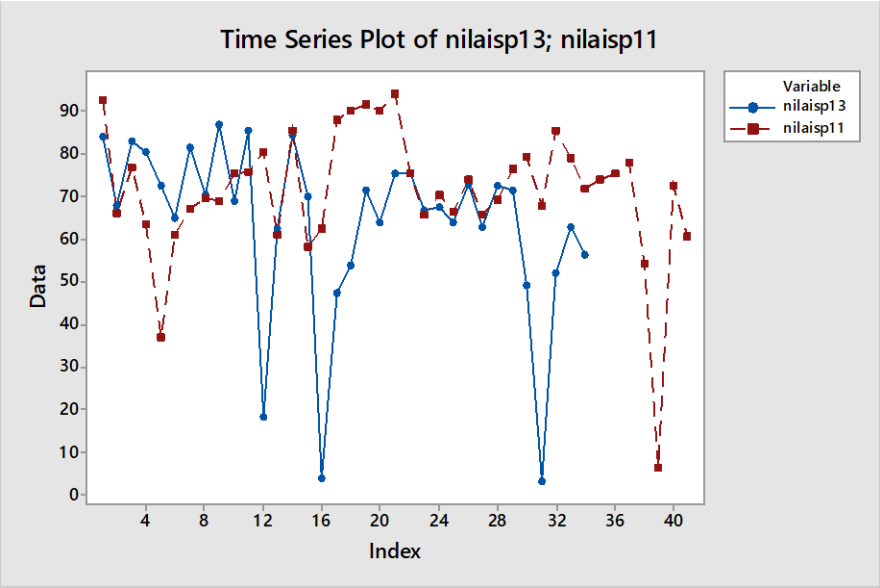

Figure 7 Time Series Plots SP 1.1, SP 1.3

CONCLUSION

The use of minitab in calculating discrete Mathematics values in the Informatics Engineering STIKOM PGRI Banyuwangi can meet all statistical needs. With these statistics, it is expected to be useful for increasing the value of each student, because seen from the difference in the scores of each semester, it cannot be concluded that the scores of students have decreased or increased. And more specifically, it is seen from the data per class, so we can find out the comparison of values between classes, namely in Figure 4 the p-value is 0.079 using alpha 0.05, it turns out that the initial hypothesis is accepted because the p value is greater than alpha, this means that the two classes There is no difference obtained.

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