Perception analysis of students' level of understanding in statistics course

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Abstract *Statistical courses are mandatory for students to take to assist in solving research problems. The purpose of this study was to determine student perceptions of the level of understanding of all statistical material indicators after attending statistics lectures and to prove that the average student perception was not in the low category. The research method used is quantitative research. The sample used was 31 samples from students of Early Childhood Education Teacher Education, Universitas Negeri Medan in 2021. The data collection technique used a questionnaire technique. Data were analyzed using descriptive statistics and one sample t-test. The results showed that Student perceptions of mastery of statistical lecture indicators fall into two categories, namely the high category of 61% and the medium category of 39%. The perception of the sample's ability to master the lecture indicators is divided into four categories, namely the very high category of 19%, the high category of 42%, the medium category of 32%, and the low category of 7%. The mean score of perceived mastery of statistical indicators is greater than 31.5, which means that students' perceptions of ability are not in the Low category.* **[PERCEPTION ANALYSIS OF STUDENTS' LEVEL OF UNDERSTANDING IN STATISTICS COURSE]** ***(J. Math. Nat. Sci., 1(2): 46 - 51, 2021)***

Introduction

Statistics is one branch knowledge from mathematics in principle is learn about data collection, data processing, data analysis, and withdrawal conclusion. Statistics is a science that deals with data (Bina, 2020). Statistics examines related statistics.

Statistics are data, information, or results application algorithm statistics on a data that can be divided into two, namely inferential statistics and descriptive statistics . Inferential statistics are statistics that place more emphasis on the results or conclusions obtained (Eldanto et al., 2018). Descriptive statistics are statistics that are presented in a simple form to explain a situation, symptom or problem (Nasution, 2017).

Statistics many applied in various discipline good knowledge, science or social. Statistics are also used in government for various type destination like census resident. Application statistics other is procedure poll opinion as well as count quickly in a general election. The demand for data is increasing for the needs of the government or other sectors (Tajulfitri, 2019). Statistics on field computing could applied in introduction pattern nor intelligence artificial . Researchers may need statistical support in conducting data analysis.

Statistics could make it easy researcher for conclude is something difference or obtained relationship truly different or there is connection by significant. Is conclusions drawn enough representative for give accurate information on the symptoms and phenomena that occur, so that statistics need to be studied in higher education. Education in College At high there is always a Statistics course , because statistics required for help solve problem in research related to statistical analysis (Nurizzati, 2017).

College tall as institution education tall from formal education carries important role in state administration something nation. Education something nation environment centered college high. Change process role student from school medium to college very significant height. student no again only focused on

education only, but how they develop knowledge is also very calculated in college higher education in implementing the Tri dharma of higher education.

Tri Dharma College tall covers three Thing important thing to do developed by students, namely education, research, and service to society. Student role in tri dharma college actualization height is necessary. Because student expected for Becomes more students motivated and aware that students have an important role in educate nation. Research which is one of the from tri dharma college tall is form implementation from knowledge acquired knowledge during the educational process in college high.

Student through research will increase skilled in discipline knowledge, as well will Becomes the more understand. Students through research later will find various something new, so could enrich mastery the science . Research results that, later will be very useful for development discipline the science. Statistics have an important role in research, help answer problem research .

Students in the research process still have problems basic . Student problems are not related to students' perceptions of statistics courses, because they do not affect their learning outcomes (Afifiah and Wicaksana, 2014). However, it is less attractive to students. Statistical learning motivation has a negative effect on student learning achievement. However, interest has a positive effect on learning outcomes (Purwaningrum and Sari, 2019). However, students have not mastered ability base college student to statistics such as weak basic statistical concepts, process skill errors and misunderstandings about questions (Firmansyah, 2017). The error was motivated by several reasons.

There are several reason why statistics not enough Interested by students is as following. Statistics courses deal with formulas and numbers. The difficulties experienced generally lie in being less careful or less careful in counting when answering questions (Nelliraharti and Suri, 2020).

Students look at Statistics course is a very difficult subject, boring, confusing, scary, even scary so that many student who is trying avoid studying that. This thing caused bad for development education statistics. Apart from that, other things are also necessary implanted when study in progress especially at the beginning study is change thoughts and feelings. Thoughts and feelings that last this negative to statistics (assume difficult, scary, and so on) must changed. Becomes thoughts and feelings positive.

Statistics is courses that must be taken college student several study programs, including study programs Early Childhood Education Teacher Education, Universitas Negeri Medan. Statistics urgent in the study program Teacher education for early childhood education, because statistics too needed in education.

Statistics in education help in data collection and presentation arranged systematicall. Statistics in education help in regular arrangement of processed and unprocessed data processed. Statistics in Education makes the learning process teach more efficient in practice. Content taught in studying study program statistics Teacher education for early childhood education generally consist from difference statistics with statistics, functions statistics, types of data, mean, median, mode, formula solvency, reliability, validity, normality, homogeneity, correlation, regression and anova. Student Teacher education for early childhood education expected after learn studying statistics could dominate theory.

The researcher got a response from students of Early Childhood Education Teacher Education at the beginning of the Statistics course. Student responses assume that the statistics course will be a difficult subject to study. Lecturers try to teach statistics using applications to make it easier for students to apply statistical analysis to increase student interest in learning statistics. However, researchers do not yet know the students' perceptions of the abilities that have been obtained from studying statistics. This study

aims to determine students' perceptions of their statistical abilities based on statistics lecture indicators. Research will prove that students' perceptions of ability are not in the low category.

Materials and Methods

The research method used is quantitative research. The sample used in the study was 31 samples which were students of the Early Childhood Education Teacher Education study program at Universitas Negeri Medan in 2021 which were taken randomly. The data collection technique used is a questionnaire technique. The analytical technique used is descriptive statistical analysis, one sample t-test using the Jamovi application. The indicators measured were 18 which are indicators of the achievement of statistics courses.

1. Basic concepts of statistics;
2. Distinguish between statistics and statistics;
3. Data types;
4. Kinds of data presentation;
5. Statistical function;
6. Presenting data in the form of distribution tables;
7. Explain descriptive statistics;
8. Calculating descriptive statistics;
9. Counting samples;
10. Explain and perform validity test;
11. Explain and perform reliability tests;
12. Test data normality;
13. Testing homogeneity;
14. Doing Bartlet's test;
15. Analyze the correlation of a data;
16. Analyze the regression of a data;
17. Analyze different test;
18. Analyze Anova;

Results

The results in this study will show students' perceptions of mastery of statistical material. Students fill out a questionnaire as a self-assessment to measure the mastery of the statistical material that has been taught. The self-assessment chart for each indicator can be seen in figure 1.

Based on figure 1, it can be seen that the indicators that get the highest score are indicator 2 and indicator 6. Indicator 2 is the student's perception of his mastery of the material to distinguish statistics and statistics. Indicator 6 is

students' perception of their mastery of material related to data presentation in the form of distribution tables. However, the indicator that gets the lowest score is indicator 14 of 64. Indicator 14 is the student's perception of his ability to perform the Bartlet test. The analysis is continued to see the category of mastery of the material according to the indicators.
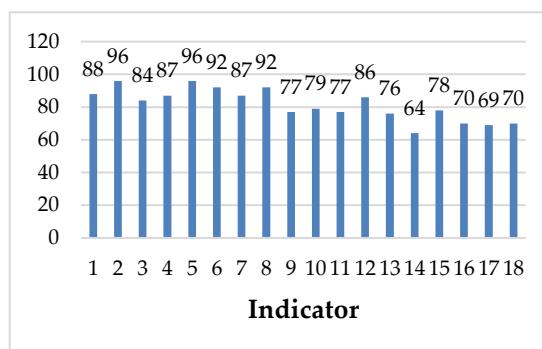

Figure 1. Scores of students' perception of understanding in Statistics material.
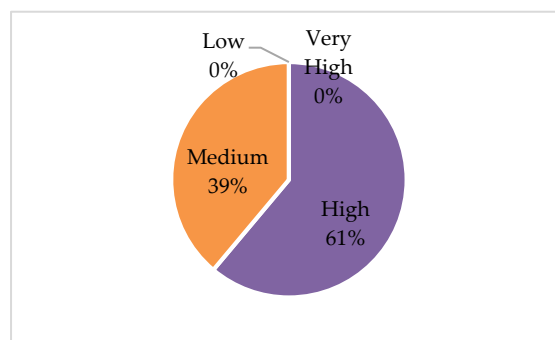

Figure 2. Percentage of indicator mastery criteria.

Based on figure 2, it is known that of the 18 indicators of statistical material that were asked to students, it was found that 61% of the indicators had been mastered by students in the High category. Students mastered 39% of other indicators in the medium category. None of the students mastered the material indicators in the Very High and Low categories.

Based on Figure 3, it can be seen that the level of student understanding of all indicators is based on the sample used. 19% of the sample have the perception that students have mastered all statistical material indicators in the Very High category. 42% of the sample has a perception that students have mastered all statistical material indicators in the High category. 32% of the sample

has the perception that students have mastered all indicators in the Medium category. 7% of the sample has the perception that students have mastered all statistical material indicators in the Low category.
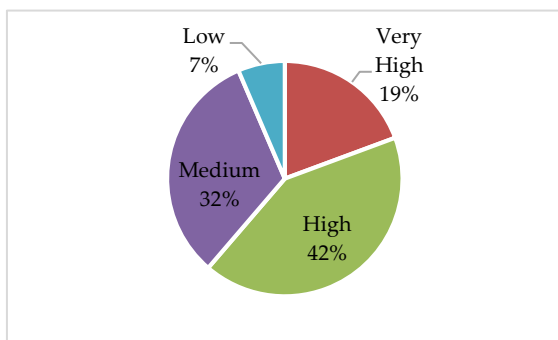

Figure 3. Percentage of students' perception of understanding criteria.

Table 1. Descriptive Analysis of Each Indicator.

	N	Mean	Median	SD	SE
Indicator 1	31	2.84	3	0.898	0.161
Indicator 2	31	3.10	3	0.908	0.163
Indicator 3	31	2.71	3	0.973	0.175
Indicator 4	31	2.81	3	0.946	0.170
Indicator 5	31	3.10	3	0.831	0.149
Indicator 6	31	2.97	3	0.912	0.164
Indicator 7	31	2.81	3	0.833	0.150
Indicator 8	31	2.97	3	0.836	0.150
Indicator 9	31	2.48	3	0.996	0.179
Indicator 10	31	2.55	3	1.091	0.196
Indicator 11	31	2.48	2	0.996	0.179
Indicator 12	31	2.77	3	0.762	0.137
Indicator 13	31	2.45	2	0.888	0.160
Indicator 14	31	2.06	2	0.929	0.167
Indicator 15	31	2.52	3	1.029	0.185
Indicator 16	31	2.26	2	0.930	0.167
Indicator 17	31	2.23	2	0.990	0.178
Indicator 18	31	2.26	2	0.965	0.173
Score Total	31	47.35	47	12.384	2.224

Based on descriptive statistical analysis of the data, it is known that from 31 samples related to perception in the mastery of statistical material indicators, the mean student perception for all indicators is 47.4 and the mean of all data is 47. The difference in scores for each indicator can be seen in Table 1.
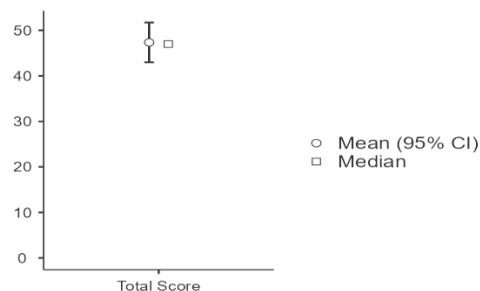

Figure 4. Mean and median plots.

The researcher continued the analysis to prove the assumption that the average student perception score in mastering 18 statistical material indicators with the one sample t-test test. Researchers suspect that the average student perception score is greater than 31.5. The researcher preceded the analysis to test the normality of the data as a prerequisite test before conducting the one sample t-test. The results of the normality test analysis can be seen in Table 2.

Table 2. Results of Normality Analysis and Comparative Test.

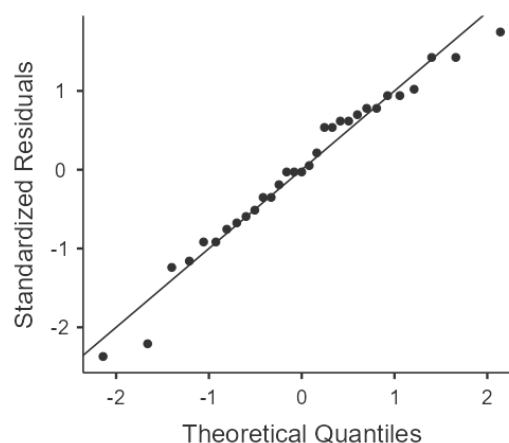| Test	Statistic	df	P
Test of Normality (Shapiro-Wilk)	0.968		0.470
Student's t (H_a μ > 31.5)	7.13	30.0	< .001

Figure 5. Normality of data.

Based on Table 2 and Figure 5. It can be seen that the results of the normality analysis of the data obtained a Shapiro-Wilk p-value of 0.470 > 0.05, so it can be concluded that the student's perception data in mastering 18 statistical material indicators is normally distributed and meets the requirements. One of the main requirements in parametric analysis is the fulfillment of data normality. The requirements for parametric statistical assumptions include that the sample data is obtained from a population that has a normal distribution, the sampled data is obtained by random determination, the measurement scale must be continuous, and the variance value must be the samea (Quraisy, 2020). Analysis for the one sample t-test can be performed. The results of the One sample t-test analysis can be seen in Table 2.

Based on Table 2, it is known that the results of the analysis of the one sample t-test to prove that the average score of the perception of students' abilities in mastering 18 indicators of statistical material is > 31.5. The p value of significance from the one sample test analysis was obtained 0.001 < from 0.05 so it can be concluded that the mean score is greater than 31.5.

Discussion

Statistics become a guide in the decision-making process, seeing the symptoms or phenomena that occur. Statistics is a discipline that continues to be developed. Statistical science must be understood in universities, not only related to material on how to collect data, present data and interpret data, sort data, determine mean, mode and so on. Students should also be introduced to the population and sample, the frequency of the preparation of the frequency distribution and probability.

Students have the perception that students have mastered the basic concepts of statistics. This statement is evidenced by the student's perception score on the indicators of differentiating statistics and statistics and understanding related to statistical functions getting the highest score. Obtaining a high score is also indicated by other indicators.

Indicators 1 to 8 are achievement indicators for understanding basic statistical concepts. However, students' perception of mastery of the material decreased in the type of analysis that requires mathematical ability. Mathematical ability is not only related to the ability to count, but also mathematical communication skills, mathematical connections, mathematical reasoning, mathematical problem solving, mathematical critical thinking and mathematical creative thinking (Ulya et al., 2019).

Problems related to student perceptions of material that need understanding related to mathematical abilities due to lack of initial knowledge. Initial knowledge has a significant effect on statistical learning outcomes (Ririen, 2019). Students still only rely on assistance from lecturers, and have not tried to study independently. Independent learning is a person's behavior in realizing his will or desire in a real way by not depending on others and is done affectively (Inah et al., 2017).

It is known from the measurement of data from the results of yesterday's mini-research, there are still many students who have the perception that they still have not mastered the ability to determine the number of samples, test reliability, test homogeneity, test regression, and test comparisons. Students have not been able to recognize data.

Students' weakness in recognizing statistical data is also shown by students being less creative in interpreting statistical data even though they are given problems in connection with previously studied concepts. To overcome these problems, they recommend that the study of statistics can lead students to work directly with statistical data. This is intended so that students can understand basic ideas and be creative in interpreting statistical data.

Statistical reasoning and thinking must be an explicit goal of learning if it is to be nurtured and developed. Statistical reasoning can be defined as a way of reasoning with statistical ideas and understanding statistical information (Yusuf, 2017). He also suggests that experiences in statistics classes focus more on activities that help students develop an in-depth understanding of processes and ideas rather than teaching calculations and procedures.

In an effort to encourage reasoning and statistical thinking, students must experience firsthand the process of data collection and data exploration. The experience should include a discussion of how the data were obtained, how and why statistical summaries were selected, and how conclusions can be drawn. Students also need to broaden the experience by recognizing implications and drawing conclusions to develop reasoning and statistical thinking (Garfield and Ben-Zvi, 2008a). From the results of the discussion, it can be seen that

there is a need for trainings that focus on developing students' statistical knowledge so that their ability to know learning about statistics increases.

Students in studying statistics have difficulties in understanding formulas, calculations that require high reasoning. This phenomenon is evidenced by the category of indicators that require understanding related to formulas, only in the Medium category. Students can overcome these problems through several things that can improve students' statistical abilities, namely: 1. Increasing interest in learning, 2. Learning attitudes Students in learning should listen, pay attention, listen and follow the explanations given by the lecturer.

Learning statistics through online learning is enough to provide challenges for students and lecturers. Many students when learning talk with their friends or are busy doing other things which of course will reduce the concentration of students in participating in learning. 3. Lecturers can use real problem-oriented learning in statistics lectures. Real problem-oriented learning can increase the average student learning outcomes and provide positive responses (Hartawan, 2017).

Conclusion

Student perceptions of mastery of statistical lecture indicators fall into two categories, namely the high category of 61% and the medium category of 39%. The perception of the sample's ability to master the lecture indicators is divided into four categories, namely the very high category of 19%, the high category of 42%, the medium category of 32%, and the low category of 7%. The mean score of perceived mastery of statistical indicators is greater than 31.5, which means that students' perceptions of ability are not in the Low category.

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