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Students Perceptions of Operations Research Learning During the Covid-19 Pandemic with Realistic Mathematics Educations Approach

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ABSTRACT

Operations Research is a quantitative decision–making course, which is formed in a mathematical model by allocating limited resources, so that the goal is optimal. The purpose of this study was to determine students' perceptions of Operations Research learning during the covid–19 pandemic in order to apply the Realistic Mathematics Educations approach in developing Operations Research teaching materials. The research method was conducted by questionnaire with the number of respondents as many as 91 college students. The results showed that the students' perceptions of Operations Research learning with indicators of feeling of pleasure, feeling of interest, general impact, and motivation, were in the high category with percentages of 42,86%, 62,64%, 42,86%, and 51,65%. Based on the results of the study, this can increase resources, both qualified lecturers and students and the realization of quality higher education to produce graduates who are knowledgeable, educated, and skilled. Thus, there are several factors that must be improved, such as the availability of facilities, lecturers, learning materials presented using video as an application of the model in the real life, and field studies.

Keywords: Operations Research, Perceptions, Realistic Mathematics Educations

JEL Classification: A23, C02, C44

INTRODUCTION

Learning has always been a very interesting topic of conversation, especially among teachers, which is something that is natural because every teacher has the best wishes for their students for the future as the nation's next generation. This is in accordance with the vision of Kementerian Riset, Teknologi, dan Pendidikan Tinggi in 2015–2019, namely the realization of quality higher education to produce graduates who are knowledgeable, educated and skilled, as well as science and technology and innovation capabilities to support the nation's competitiveness.

Private Universities compete to improve the quality of their education. Each has a reference in the teaching and learning process. Especially for the Operations Research course, it is a course related to decision making, also called a quantitative method course or management science which cannot be separated from numbers or applied mathematics. These courses are generally used in all faculties of Economics, especially the Management and Development Economics Study program. From the results of observations, specifically in the social and economic sciences, it is known that the weak ability of students in the lecture process with manual data processing, especially the Operations Research course, which is a quantitative decision–making course so that students who take this course better understand the direction and the purpose of attending lectures, it is hoped that research will be carried out in such a way as to be able to select and design a combination of learning models and teaching materials. It is necessary to strive for designing teaching, providing the greatest opportunity for students to learn by building their own knowledge, so that better achievements can be obtained.
The Realistic Mathematics Education (RME) approach is used with the hope that students find it easier to use mathematics in economic applications. Lecturers who function as teaching providers need the development of science and technology so that lecturers and students are active as well as the existence of technology tools for the Operations Research application program that can facilitate understanding and solutions faced by students in every subject in Operations Research. This can solve problems related to the teaching and learning process of Operations Research, provide benefits for each Study Program at Private Universities in Medan City, can create graduates who are competent in policy analysis, especially Economics, and increase competitiveness in order to achieve sustainable competitive advantage, which excels in building the nation's civilization by developing science, technology, and human resources.

LITERATURE REVIEW

Perception

Rakhmat (2003) defines perception as observations about objects, events or relationships obtained by inferring information and interpreting messages. The perception of each individual can be very different even though the things observed are really the same. According to Desideranto (in Rakhmat, 2003), perception is the interpretation of an object, event or information based on the life experience of someone who interprets it. It can also be said that perception is the result of one's thoughts from a certain situation. In line with this, Walgito (2002) suggests that perception is the organization and interpretation of the stimulus received by the organism or individual so that it is something meaningful and is an integrated activity within the individual. Nurhayati et al. (2021) also suggest that perception is one of the psychological aspects which are important for human being in order to respond to various aspects and symptoms occurring in their surrounding area. Students will have different perceptions of learning, even though the objects observed are the same. Perceptions that will arise can be in the form of positive perceptions or negative perceptions. Krech & Cructfield (in Rakhmat, 2003) divide the factors that determine perception into two. First, functional

factors, namely factors that come from needs, past experiences and other things that include what we call personal factors. Second, structural factors, namely factors that originate solely from the nature of the physical stimulus to the nervous effects caused on the individual's nervous system. Based on some of the opinions above, it can be concluded that perception is the observation of an object or event which will then be obtained from the interpretation of the object or event.

Operations Research Learning

Learning is a process that is carried out in a certain way or model. Arikunto (2010) suggests that the learning model is a conceptual framework that is used as a guide in conducting learning. According to Kuncoro (2003), the learning model is basically a form of learning that is illustrated from beginning to end which is presented specifically by the teacher. In other words, the learning model is a frame of an approach or learning technique that is described from beginning to end and is presented specifically by the teacher or lecturer.

Student interest in learning is important. According to Djaali (2007), interest can be expressed through statements indicating that students prefer one thing to another, it can also be manifested through participation in an activity. Interest in learning can be seen from various indicators. First, feeling of pleasure. Ahmadi (2002) says that feeling is a function of the soul to be able to consider and measure something according to pleasure or displeasure. According to the KBBI in 2021, happy can be interpreted as being satisfied and relieved, without feeling difficult and disappointed, and so on. Second, the feeling of attraction. This feeling is closely related to other mental symptoms that are internal to a person. The word interested according to the KBBI 2021 is to take interest (attention) in someone or another object. Third, general impact. Sukardi (1993) said that in line with the measurement of interest that someone who has an interest in a particular object the impact can be known from the disclosures/speech and actions/deeds. Fourth, motivation. According to Syah (2011) motive is an impulse or will that cause a kind of power in a person to act and behave. While motivation is an impulse within a person in an effort to fulfill desires, intentions, and goals.

According to logic, in general, a person is interested in studying something diligently if he sees the benefits of what he learns in his life, it can be in the form of the possibility of increasing his welfare, self–esteem, satisfaction and so on. In other words, a person's perception of something also influences his attitude towards that thing (Arikunto, 2010). Likewise with Operations Research learning, a student will be interested in learning Operations Research if they know the benefits, and this is explained at the first meeting of the lecture. Operations Research is basically the use of reality and the environment that students understand to facilitate the learning process better. The main discussion of Operations Research learning is to relate it to reality in human activities that can be coupled with the Realistic Mathematics Education approach.

Realistic Mathematics Education (RME)

Barnes (2004) says that the main idea of the Realistic Mathematics Education approach is that someone who studies statistical mathematics should be given the opportunity to rediscover ideas and concepts about a problem with adult guidance. Efforts to rediscover these ideas and concepts are carried out by utilizing reality and the environment close to the person (Sudrajat, 2008). According to Hafni (2015) suggests that the Realistic Mathematics Education approach given aims to improve students' abilities in making mathematical models and solving problems that arise in the mathematical model, as an illustration in economic applications.

According to Gravemeijer (in Arrifadah, 2004) the basic characteristics of Realistic Mathematics Education approach are using contextual problems, models, student contributions in problem solving, and there is a link between parts of the subject matter. Meanwhile, Wijaya (2012) describes the process of solving realistic problems in the application of Realistic Mathematics Education approach, starting with real life problems. b) Identifying mathematical concepts that are relevant to the problem, then organizing problems according to mathematical concepts, gradually leave the real-life situation through the process of formulating assumptions, generalizations, and formalization. This process aims to translate real life problems into representative mathematical problems. Next, solve mathematical problems (occurs in the world of mathematics) and retranslate the mathematical model into a real solution.

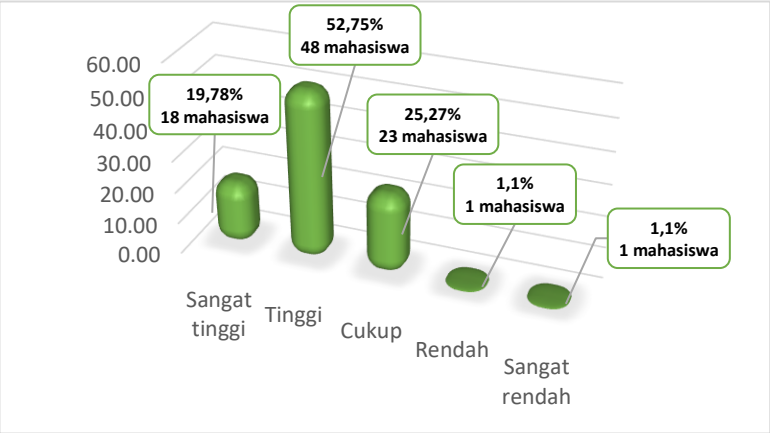
RESEARCH METHOD

The method used in this research is descriptive data method. According to Sugiyono (2012), descriptive analysis is a statistic used to analyze data by describing or describing the data that has been collected as it is without intending to make conclusions that apply to the public or generalizations. Methods of data collection by using a questionnaire. Questionnaire is a data collection technique that is done by giving a set of written statements to respondents to answer (Sugiyono, 2012). Data were analyzed using Microsoft Excel 2013 and IBM SPSS statistics 24.0 program for windows program. Questionnaire on Students Perceptions of Operations Research Learning consists of indicators of feeling of pleasure, feeling of interest, general impact, and motivation, with a total of 13 items and 4 alternative answers, namely strongly agree, agree, disagree, and strongly disagree. The data is presented in the form of categorization. The number of respondents data using non-probability sampling as many as 91 respondents. Characteristics of respondents are college students who have taken Operations Research courses.

RESULTS

The results of the study on students' perceptions of Operations Research learning are known that the respondents came from various study programs, namely Management, Development Economics, and Agribusiness at different universities, namely USU, STIE Graha Kirana, UNPRI, UISU, UMA, and UMSU, which were obtained as many as 91 respondents. Based on data analysis using Microsoft Excel 2013 and IBM SPSS statistics 24.0 program for windows program, it is known that the lowest score of student perceptions of Research operations learning is 22, the highest score is 51, the mean is 38,24, the median is 38, the mode is 38, and the standard deviation is 5,35. From data processing, the following chart can be presented:

Figure 1. Bar Chart of Students Perceptions of Operations Research Learning

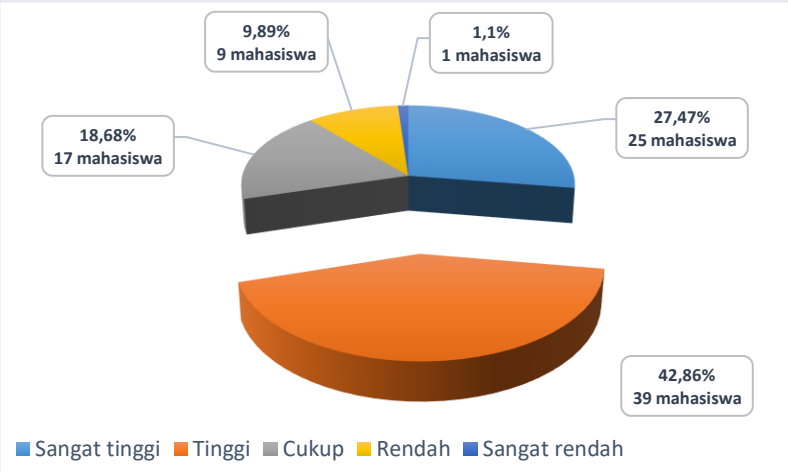


Based on the chart above, it is known that students' perceptions of Operations Research learning, with a very high category of 19,78% or as many as 18 people, a high category of 52,75% or 48 people, a moderate category of 25,27% or 23 people, the low and very low categories are 1,1% each. Thus, it can be concluded that the majority of students have a high perception of Operations Research learning. The analysis of student perceptions of Operations Research learning when viewed from each indicator can be explained as follows:

Feeling of Pleasure

Feeling of Pleasure in students' perceptions of Operations Research learning consist of 5 statement items located at numbers 1, 2, 3, 4 and 5 on the research questionnaire. Based on calculations using Microsoft Excel 2013 and IBM SPSS statistics 24.0 program for windows program, it is known that the lowest score of feeling of pleasure in students' perceptions of Operations Research learning is 5, the highest score is 20, the mean is 14,43, the median is 15, the mode is 15, and the standard deviation is 2,7. From data processing, the following chart can be presented:

Figure 2. Pie Chart of Feeling of Pleasure in Students Perceptions of Operations Research Learning

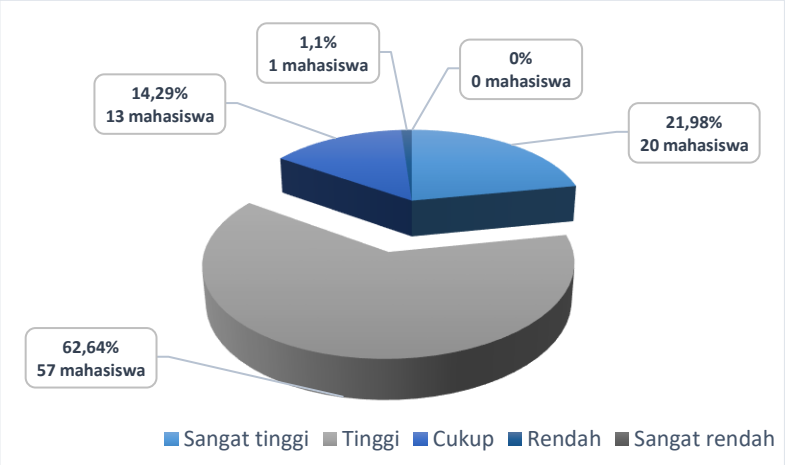


Based on chart above, it is known that the feeling of pleasure in students' perceptions of Operations Research learning, with a very high category of 27,47% or as many as 25 people, a high category of 42,86% or as many as 39 people, a moderate category of 18,68% or as many as 17 people, the low category of 9,89% or as many as 9 people, and the very low category of 1,1% as many as 1 person. It can be concluded that the majority of students based on feelings of pleasure in students' perceptions of Operations Research learning is in the high category.

Feeling of Interest

Feeling of interest in students' perceptions of Operations Research learning consist of 4 statement items located at numbers 6, 7, 8, and 9 on the research questionnaire. Based on calculations using Microsoft Excel 2013 and IBM SPSS statistics 24.0 program for windows program, it is known that the lowest score of feeling of interest in students' perceptions of Operations Research learning is 8, the highest score is 16, the mean is 11,88, the median is 12, the mode is 12, and the standard deviation is 1,5. From data processing, the following chart can be presented:

Figure 3. Pie Chart of Feeling of Interest in Students Perceptions of Operations Research Learning

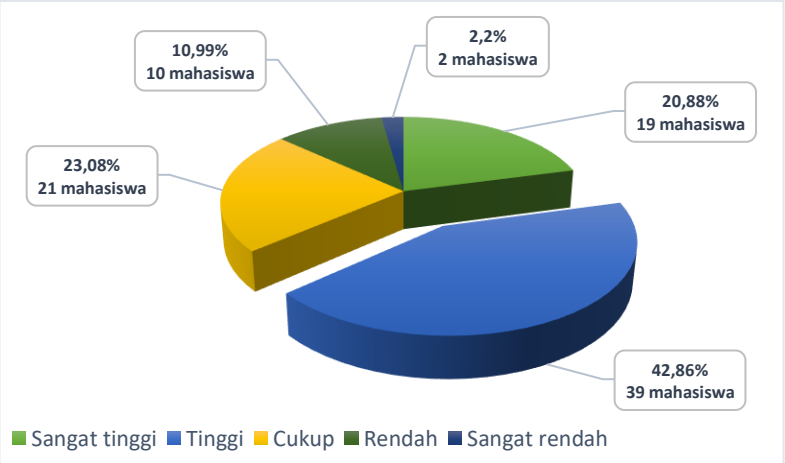


Based on chart above, it is known that the feeling of interest in students' perceptions of Operations Research learning, with a very high category of 21,98% or as many as 20 people, a high category of 62,64% or as many as 57 people, a moderate category of 14,29% or as many as 13 people, the low category of 1,1% as many as 1 person, and the very low category does not exist. Thus, it can be concluded that the majority of students based on feeling of interest in students' perceptions of Operations Research learning is in the high category.

General Impact

The general impact on students' perceptions of Operations Research learning consists of 2 statement items located at numbers 10 and 11 on the research questionnaire. Based on calculations using Microsoft Excel 2013 and IBM SPSS statistics 24.0 program for windows program, it is known that the lowest score of the general impact on students' perceptions of Operations Research learning is 2, the highest score is 8, the mean is 5,76, the median is 6, the mode is 6, and the standard deviation is 1,2. From data processing, the following chart can be presented:

Figure 4. Pie Chart of The General Impact on Students Perceptions of Operations Research Learning

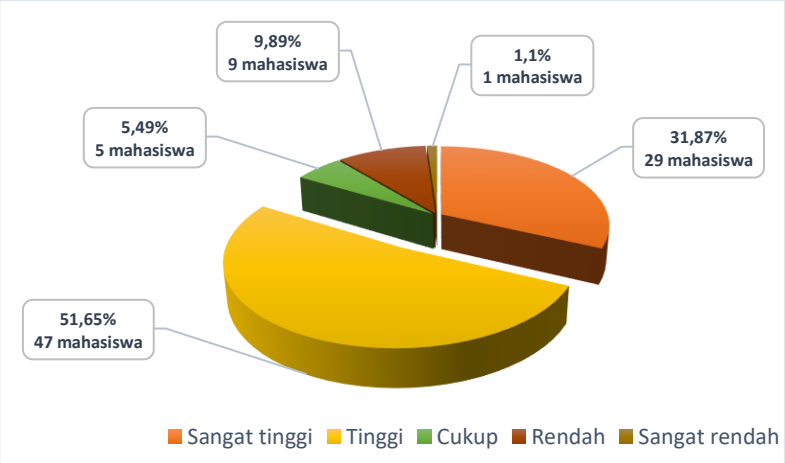


Based on chart above, it is known that the general impact on students' perceptions of Operations Research learning, with a very high category of 20,88% or as many as 19 people, a high category of 42,86% or as many as 39 people, a moderate category of 23,08% or as many as 21 people, the low category of 10,99% as many as 10 people, and the very low category of 2,2% as many as 2 people**.** Thus, it can be concluded that the majority of students based on the general impact on students' perceptions of Operations Research learning is in the high category.

Motivation

Motivation on students' perceptions of Operations Research learning consist of 2 statement items located at numbers 12 and 13 on the research questionnaire. Based on calculations using Microsoft Excel 2013 and IBM SPSS statistics 24.0 program for windows program, it is known that the lowest score of the motivation on students' perceptions of Operations Research learning is 2, the highest score is 8, the mean is 6,17, the median is 6, the mode is 6, and the standard deviation is 1,18. From data processing, the following chart can be presented:

Figure 5. Pie Chart of The Motivation on Students Perceptions of Operations Research Learning



Based on chart above, it is known that the motivation on students' perceptions of Operations Research learning, with a very high category of 31,87% or as many as 29 people, a high category of 51,65% or as many as 47 people, a moderate category of 5,49% or as many as 5 people, the low category of 9,89% as many as 9 people, and the very low category of 1,1% as many as 1 person**.** Thus, it can be concluded that the majority of students based on the motivation on students' perceptions of Operations Research learning is in the high category.

DISCUSSION

Based on the results of the study, students' perceptions of Operations Research learning, it is known that Operations Research courses in general, the models displayed from each subject do not accurately describe reality. Basically, in theory, research operations is a quantitative decision–making course, where decisions are taken as if the information given in the case, and by allocating limited resources so as to achieve optimal goals. The information provided is data in the form of numbers, which is also called quantitative data. From the data obtained, a model is formed using mathematical symbols, so that solutions are sought using methods that are in accordance with the model formed. The end of the process is decision making. From each of the indicators

of perception in learning, it provides the answers that students want in accordance with their expectations.

CONCLUSION

Students' perceptions of learning Research Operations during the covid–19 pandemic caused learning to be carried out with an online system and received many reactions, both from the students and lecturers. Student perceptions with indicators of feeling of pleasure are in the high category with a percentage of 42,86%, indicators of feelings of interest are in the high category 62,64%, indicators of general impact and motivation are respectively in the high category with a percentage of 42,86%, and 51,65%. There are several factors that must be improved, such as the availability of facilities, lecturer resources, learning materials that are presented in real terms and using videos from real cases as an application of descriptions of the models in the subject of Research Operations. In the Realistic Mathematics Educations approach in developing Operations Research teaching materials, lecturers must be able to make the best preparations, both in terms of material, media, content, interaction and flexibility, so that students do not experience difficulties in learning Operations Research.

LIMITATION

This study is limited to students' perceptions of Operations Research learning with indicators of feeling of pleasure, feeling of interest, general impact and motivation, and categorizing very high, high, moderate, low and very low, according to the results of students' answers.

ACKNOWLEDGMENT

This research will be able to increase resources, both qualified lecturers and students, and the realization of quality higher education to produce graduates who are knowledgeable, educated and skilled, as well as science and technology and innovation capabilities to support the nation's competitiveness.

DECLARATION OF CONFLICTING INTERESTS

With the initial stage of this research, it will be followed by learning more effective classroom actions in the process of achieving results, namely the strategy of using the software quantity method in learning operations research with the Realistic Mathematics Education approach.

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