MATEMATHICS EDUCATION STUDENTS' MISCONCEPTION ON THE CONCEPT OF RESEARCH METHODS

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Abstract

This study was aimed at identifying the misconception of Mathematics Education students in the formulation of research methods in their proposals. This study was descriptive quantitative. The population consisted of 195 students of Mathematics Education Department, year 2014, Sarjanawiyata Tamansiswa University. The sample was collected using exhaustive sampling on the entire research population. Data were collected by documentation and closed-option questionnaires. The data were analyzed by descriptive statistical analysis. Analysis of Certainty of Response Index (CRI) was used to find out errors and misconceptions. The results show that most of the students have good understanding in the concepts of research methods. The other have misconceptions and limited understanding. The student misconceptions occur in the aspects of population, research variables, operational definitions and instrument reliability. The students do not explain fully and clearly the operational definition of the variables studied. On the aspect if reliability, errors are made by the students in the unexplained explanation of the reliability test used for the test instrument.
Keywords: *misconception, mathematics education student, certainty of response index (CRI)*

MISKONSEPSI MAHASISWA PENDIDIKAN MATEMATIKA PADA KONSEP METODE PENELITIAN

Abstrak

Penelitian ini bertujuan untuk mengidentifikasi kesalahan penyusunan metode penelitian dalam penulisan proposal. Penelitian ini merupakan penelitian deskriptif kuantitatif. Sampel penelitian ini yaitu mahasiswa Jurusan Pendidikan Matematika Angkatan 2014 Universitas Sarjanawiyata Tamansiswa Yogyakarta sebanyak 195 orang. Sampel penelitian diambil menggunakan teknik *sampling* jenuh yaitu keseluruhan populasi penelitian dijadikan sampel. Instrumen yang digunakan dalam penelitian yaitu kuesioner. Teknik pengumpulan data menggunakan teknik dokumentasi dan angket. Teknik analisis data yang digunakan dalam penelitian adalah analisis statistik desktiptif. Analisis *Certainty of Response Index (CRI)* digunakan untuk mengetahui kesalahan dan miskonsepsi yang dialami mahasiswa pada konsep metode penelitian. Hasil analisis menunjukkan bahwa sebagian besar mahasiswa sudah memiliki pemahaman yang baik dan sebagian kecil tidak paham konsep. Miskonsepsi mahasiswa banyak terjadi pada aspek populasi, variabel penelitian, definisi operasional, dan reliabilitas instrumen. Mahasiswa tidak menjelaskan secara lengkap dan jelas definisi operasional dari variabel yang diteliti. Pada asepk reliabilitas, kesalahan yang dibuat mahasiswa yakni dengan tidak tercantumnya penjelasan uji reliabilitas yang digunakan untuk uji instrumen penelitiannya.
Kata kunci: *miskonsepsi, mahasiswa pendidikan matematika, certainty of response index (CRI)*

INTRODUCTION

Anyone can do research, especially in the field of education. In the field of education, research is usually done by teachers, lecturers, or students. Research conducted by teachers and lecturers is usually related to the development of science in their respective fields. Research can also be used to improve the professionalism and competence of teachers and lecturers. For students, research is done while doing the final project, such as thesis, thesis or dissertation, in order to complete the graduation requirements. The purpose of the research is to study relationships, cause and effect, and to examine a phenomenon as it is (Ary, Jacobs, & Soresen, 2010, p. 25). A research in the world of education is usually carried out by a student as the final college assignment, in the form of undergraduate thesis, graduate thesis or dissertation in order to complete the graduation requirements.

In completing the final assignment, students will be provided with knowledge, especially on the preparation of research reports. The preparation of research reports is generally not much different, as in Sarjanawiyata Tamansiswa University (UST) Yogyakarta. UST Yogyakarta has a guideline for writing a research proposal until it becomes a complete final project. This is due to the guidance given according to the undergraduate level and it is different for students of Mathematics Education Department.

Common researches conducted by students, including students of Mathematics Education Department, are those of quantitative research, qualitative research, experimental research, R & D research or developing learning media, as well as classroom action research. The quantitative research is usually done by student's ie associative, causal, or descriptive research. The research can be a test of influence or relationship between independent variables with dependent variable, or research to describe attitude or learning outcomes owned by a group. The qualitative research is usually done by students in the form of case study research, which is peeling or reviewing a case that occurred in an institution or educational institution, as well as a group. The experimental research used by students is to test a method, model or learning media more effectively to optimize the attitude, behavior, motivation and student learning outcomes of a group learning to be better. The research and development that is usually done by students is the development of learning media that is more interesting and can attract students' interest, motivation, attitude, behavior and learning result. The media is usually made by following the characteristics of the students, so the results can be used and applied not only to one group of learners, but also to other groups of the same level. Educational research that is often done by students in action research is almost the same as experimental research, only in this action study treatment is given in several cycles, where if the results obtained in one cycle is not maximized, it will be evaluated and re-action based on evaluation result which has been done in previous cycles, to get targeted results.

Setiyaningsih, Rahardi, and Juningsih (2014) in their research found that errors are often done by students in research, such as syntax errors, use of words, and use of spelling. The usual mistake students make is the use of non-standard words, not putting punctuation correctly so that it can confuse the reader, as well as the compilation of words that do not meet the Indonesian standards are good and true. Pertiwi and Weganofa (2015) shows that students still have difficulty

in writing research articles which employ qualitative approach. The errors found among other aspects of research settings, data sources, and informants used in the study. In addition, errors are also associated with the understanding of researchers as the main instrument of research, because in qualitative research, researchers act directly to obtain the necessary data, either through interviews or field observation. The errors in qualitative research also occurred in the failure in exploring the materials or theories used as guidelines in research conducted.

Difficulties experienced by many students are mostly in identifying research instruments, data sources, and relevant research sources that support their research. Various errors are experienced by many students of Mathematics Education Department in UST Yogyakarta. Such mistakes are due to students' lack of understanding on the concept of material, or students' misconceptions on the preparation of research methods. Therefore it is necessary to do an analysis to find out the gap and misconception experienced by the students. The analysis to be applied is Certainty of Response Index (CRI). Mustaqim, Zulfiani, and Herlanti (2014) in his research applies CRI to identify student's misconceptions. The importance of measuring misconceptions by making the right instuments has been done by Salirawati dan Wiyarsi (2012). Therefore, it is necessary to analyze misconception using CRI method to identify the level of the students' misconception majoring in Mathematics Education in UST, so that the lecturers of the research method subjects are able to improve the misconception by giving more precise teaching.

Research not only includes information gathering, but also covers the analysis, interpretation and understanding of the phenomena studied (Sekaran & Bougie, 2016, p. 353). Research applies several approaches, because research can also be carried out on many things, such as economic, social and educational issues. Research approach is divided into three, i.e. quantitative approach, qualitative approach and mix method (Cresswell, 2009, p. 16). Educational research has several types, namely: *Naturalistic and Ethnographic; Historical and Documentary Research; Surveys, Longitudinal, Cross-Sectional and Trend Studies; Internet-based Research and Computer; Case Study, Ex Post Facto Research; Experiments, Quasi-Experiment, Single Case Research dan Meta Analysis; dan Action Research* (Sekaran & Bougie, 2016, p. 97; Ary *et al*., 2010, p. 26).

Ethnographic research is more about research involving methods of inquiry, ie results and records of the results of the investigation. The study was conducted to create a concept or the making of a theory.

Historical research involves identifying and limiting problems or areas of study, sometimes requiring hypothesis formulation, and writing research reports, whose results lead to a new understanding of the past and its relevance to the present and the data. When associated with the field of education, this historical study may be related to individuals, groups, movements, ideas or institutions. The subject of historical research should be those that have a linkage or contribution to an idea, movement or an institution at a particular time and place.

Survey research is conducted to describe or identify existing conditions and/or determine existing relationships without providing a treatment of the subject or object under investigation. Internet-based research in the form of research conducted through the use of the Internet,

such as the delivery of research instruments via email. In a case study study, it can be known cause and effect, observing the effects in the real context. Ex post facto research is used to find out the cause of an event and not to control or manipulate the variables, while in experimental study; it is given treatment to see the difference or influence from before and after given treatment to its dependent variable. In action research, this research is conducted with the aim to change attitudes or a group that is less good to be better by giving an action.

Research method is one important element in preparing research proposal. Method refers to the way applied by the researcher to carry out research. Sekaran and Bougie (2016, p. 95) explain that research methods at least include research design, population and sample, operational definition of research variables, instruments and data collection techniques, validity and reliability tests of research instruments, and data analysis techniques. However, each type or research design has different research methods, from instruments to data analysis techniques. This is because each research design has its own technique in data collection and data analysis.

It is known that there are still some errors (misconception) in writing research methods undertaken by students in the final assignment. Arslan, Cigdemoglu, & Moseley (2012) states that misconception is a person's discrepancy with the scientific view. Misconception refers to misunderstanding and misinterpretation based on lack of understanding (Ojose, 2015). Such errors can occur because of a discrepancy between the real understandable, so that what is delivered is not right or wrong. These misconceptions can be measured using the Certainty of Response Index (CRI).

CRI is usually indicated in an index or scale with a range of 0-5. The scale shows a person's level of confidence in answering a question or statement. A person's level of understanding as measured by CRI can result in four categories, that are understand the concept, misconception, do not understand the concept, and lucky guess (Hakim, Liliasari, & Kadarohman (2012). Understand the concept: it means someone with a high level of confidence and can answer questions correctly. Misconception means someone with a high level of confidence but can not answer the question correctly. Do not understand the concept it means someone with a low level of confidence and can not answer pertnyaan appropriately. Lucky guess means someone with a low level of confidence but can question correctly.

METHOD

The population used in this research was all students of the Department of Mathematics Education, Batch 2014, Universitas Sarjanawiyata Tamansiswa Yogyakarta, with the total of 195 students. Sampling was done by applying saturated sampling technique, i.e. the entire research population used as the research samples. The design of this research was quantitative descriptive research.

The instrument applied in this research was questionnaire. The questionnaire in this study contained several question items related to the level of respondents' concept of the research methods which have been prepared in research proposals. The indicators used to measure the level of students' concept were: the type of research selected (1 item), population and sample research (2 items), variable and operational definition of variables (2 items), instruments and data collection techniques (2 items) validity and instrument reliability

test (3 items), and data analysis techniques (3 items). This instrument employed Likert scale with a range between 0-5 (Hakim, *et al*. (2012).

Data collection techniques were carried out by applying documentation and questionnaire techniques. This research applied descriptive statistical data analysis. Descriptive statistical analysis was conducted in the form of scoring, and calculating the average score obtained from each aspect of the assessment and determining the criteria of understanding therespondents' concept. The criteria for conceptual understanding are listed in Table 1.

FINDINGS AND DISCUSSION

Characteristics in this research referred to gender and type of research conducted. The respondent characteristics are shown in Table 2.

Table 2 shows that among 195 respondents, the majority of female was as many as 150 respondents or equal to 76.90%, while the rest of 45 respondents or equal to 23.10% was male. The majority of respondents chose to conduct R & D research, i.e. as many as 109 respondents or by 55.90%. A total of 51 respondents or 26.20% conducted qualitative research, and as many as 35 respondents or 17.90% carried out quantitative research. The

Table 1
Conceptual Understanding Criteria

	Low CRI (<2,5)	*High* CRI (>2,5)
Correct answer	The answer is correct and CRI score is low, meaning: lack of knowledge (lucky guess) (*Lucky guess*)	The answer is correct and CRI score is high, meaning: knowledge of correct concepts
Wrong answer	The answer is incorrect and CRI score is low, meaning: lack of knowledge	The answer is wrong and CRI score is low, meaning: misconception

Resource: Hakim, *et al*. (2012)

Table 2
Respondent Characteristics

Characteristic	Frequency	Percentage
Gender		
a. Male	45	23.10%
b. Female	150	76.90%
Total	195	100.00%
Research type		
a. R&D	109	55.90%
b. Quantitative	35	17.90%
c. Qualitatitive	51	26.20%
Total	195	100.00%

Resource: primary data, modified 2017

majority did R & D research because the research was a product development. The developed product was used to facilitate the teacher in delivering the subject matter as well as to improve the activity and results learn from students. A teacher is required to be able to create interesting learning activities, fun and can make students become more familiar with the material provided. Therefore, students who are prospective teachers, especially in mathematics education students, are required to be able to innovate through product development or an interesting learning media, in order to reduce students' difficulties in understanding math materials considered quite difficult. The research data were obtained from the documentation of research proposals submitted by students, and the questionnaire in the form of CRI. The result of the documentation analysis is shown in Table 3.

Based on Table 3, it is known as a whole, the respondents who can put the research method on the proposal correctly as much as 63.9%, ranging from aspects of research design, data collection techniques, instruments, validity, flow/research procedures, data analysis techniques, product testing, products and samples. The most correct aspect in the preparation of research methods of research design is 97.4%. This means that students already know and understand the structure of the concept of research design that will be carried out according to the guidelines of writing research methods in the final project proposal. Sekaran and Bougie (2016, p. 108) states that the research design is one aspect that needs to be written in the research method on the proposal. Research design is a research conceptual structure or outline of the research to be conducted.

Table 3
Data on The Analysis of Proposal Documentation

No	Measured aspect	Percentage (%)	
		Correct	Incorrect
1.	Research design	97.4	2.6
2.	Research population	17.9	82.1
3.	Research variable	15.4	84.6
4.	Operational definition	13.8	86.2
5.	Data gathering technique	92.8	7.2
6.	Instrument	59.5	40.5
7.	Validity	93.3	6.7
8.	Reliability	20.5	79.5
9.	Research flow/procedure	78.5	21.5
10.	Data analysis technique	85.1	14.9
11.	Product testing (R&D)	89.9	10.1
12.	Product (R&D)	74.3	25.7
13.	Sample (qualitative & quantitative)	91.9	8.1
	Average	63.9	36.1

A research is a systematic inquiry to find answers to a problem in the field of science as well as the social one (Yeasmin & Rahman, 2012). Before doing any research, a researcher first prepares a proposal. The proposal provides the background of the problems, objectives and benefits of the research, theories and literature review used, and the methods used in the research. Aspects observed in the methods in the students' research proposals are as many as 13 aspects.

The aspects being observed are research design, research population, research variables, operational definition, data collection techniques, instruments, validity, reliability, research flow/ procedures, data analysis techniques, product testing, products and samples (Sekaran & Bougie, 2016, p. 96); Creswell, 2009, p. 155). The research design indicates the type of research to be conducted, ie descriptive research, case study, educational survey, correlation study, experimental research, action research, and research and development (R & D) (Direktorat Tenaga Kependidikan, 2008, p. 37). After determining the design of the research to be conducted, then determine the population and sample. The population is very important in the study, because population making up a group of interest in a study (Garson, 2012, p. 5), while the sample is part of the population used in the study.

Furthermore, researchers also need to determine the variables used. This variable describes the object or object under study. Research variables have several types, including independent variables and dependent variables, active variables and attributes, continuous variables, discrete and categorical, foreign variables and demographic variables (Kaur, 2013). Each variable used must have a clear definition and in accordance with what will be studied, so it can facilitate the determination of data collection techniques and research instruments used to obtain research data.

Instruments are tools used to collect data, while data collection techniques are the means used to collect data. Instruments that have been compiled are not directly used for the retrieval of research data, but need to through the first instrument test in order to obtain a valid and reliable instrument. Validity is an important key in conducting effective research, because validity means that the processes of collecting data accurately reflect the aspects that they are meant to measure (Newby, 2014, p. 129). Testing the validity and reliability of this instrument must also be adjusted with the instrument used. If an instrument used in the form of questionnaires, the validity test required in the form of product moment correlation and reliability test with cronbach alpha. But if the instrument used in the form of an observation sheet or interview guide, validity test can be done by using the validity of the construct or the validity of the contents.

In R & D research, a description of product and product development procedures is also required. The procedure is structured so that the developed product can actually be used to optimize attitudes, behaviors, interests, motivations and student learning outcomes. The last part of the research method is the data analysis technique that is the technique used to process the data that has been obtained to show the results that can answer formulation, question or research hypothesis.

Overall, the respondents who still make mistakes in preparing the research method on the proposal amounted to 36.1%, with most aspects there are many errors that

is writing operational definition, research variables, research population and reliability of 86.2% each; 84.6%, 82.1%; and 79.5% respectively. The high level of errors in the preparation of proposals, especially on aspects of the study population will greatly affect the understanding of mathematics education students in preparing the final task of college. The errors in concepts (misconceptions) that are not immediately corrected can have an impact on their work. In this case, the result that dimasksud is penyususnan research method in research proposal final assignment of college students of mathematics education UST Yogyakarta.

Data were also collected with CRI questionnaire to find out the respondent's level of belief in the research method he compiled in the proposal. The results of CRI questionnaire analysis that has been done can be seen in Table 4.

The results of CRI questionnaire ana-lysis on the respondents in Table 4 shows that most respondents already have a high level of confidence in all aspects of research methods that he prepared in research proposals, including research design, population determination, data collection techniques, and data analysis techniques. Overall, a high level of confidence is owned by 64.2% of respondents. That is, the majority of students have a strong belief in the concept or understanding related to the writing aspects of product testing, products and samples on research methods, meaning that the majority of students who do research R & D, feel confident that preparation aspect of product and product testing that will be developed has presented well, true and complete. Thus, can be said that CRI method is able to measure the level of understanding of students on the preparation of research methods in the final project proposal. These results are in line with the results of the Colclough, Lock,

Table 4
Data from CRI Questionnaire Analysis

No	Measured aspect	Percentage (%)	
		Low CRI	High CRI
1.	Research design	44.6	55.4
2.	Research population	46.7	53.3
3.	Research variable	44.6	55.4
4.	Operational definition	46.2	53.8
5.	Data gathering technique	44.6	55.4
6.	Instrument	45.1	54.9
7.	Validity	45.6	54.4
8.	Reliability	44.6	55.4
9.	Research flow/procedure	46.7	53.3
10.	Data analysis technique	44.6	55.4
11.	Product testing (R&D)	3.7	96.3
12.	Product (R&D)	0.9	99.1
13.	Sample (qualitative & quantitative)	7.0	93.0
	Rerata	35.8	64.2

& Soares (2011) that CRI can be used to determine the level of one's understanding of a matter or thing that has been learned.

On the other hand, respondents still have a low understanding of the concept on several aspects such as research population and the flow/research procedure shown with CRI value of 46.7% each. Low CRI values indicate that students have low confidence in the concept of these aspects, meaning that there are still many students who do not have a strong belief in the concepts in the methods set out in the proposal is true. The preparation is done based on a proposal ever made by previous researchers, just follow his friends. The results of Fitria's research (2014) suggest that low CRI signifies the conceptual uncertainty in the respondent's self in answering a question.

The analysis of concept understanding was carried out by comparing data from CRI documentatin. The results of the overall understanding of the concept of respondents are summarized in Table 5.

Based on Table 5, it is known that from 13 items observed, most respondents, that is equal to 41.2% have a good understanding related to the preparation of Chapter Research Methods in respondent research proposal, consisting of research design, population, variables, operational definition, data collection techniques, instruments, validity, reliability, flow/research procedures, data analysis techniques, product testing

Tabel 5
The Result of Misconseption on the Concept of Research Methods

No	Measured Aspect	Percentage			
		K	M	LK	LG
1.	Research design	53.8	1.5	1.0	43.6
2.	Research population	1.0	52.3	29.7	16.9
3.	Research variable	0.5	54.9	29.7	14.9
4.	Operational definition	0.5	53.3	32.8	13.3
5.	Data gathering technique	48.2	7.2	0.0	44.6
6.	Instrument	40.5	14.4	26.2	19.0
7.	Validity	50.3	4.1	2.6	43.1
8.	Reliability	5.1	50.3	29.2	15.4
9.	Research flow/procedure	49.2	4.1	17.4	29.2
10.	Data analysis technique	40.5	14.9	0.0	44.6
11.	Product testing (R&D)	87.2	9.2	0.9	2.8
12.	Product (R&D)	73.4	25.7	0.0	0.9
13.	Sample (qualitative & quantitative)	84.9	8.1	0.0	7.0
	Rerata	41.2	23.1	13.0	22.7

Resouce: primary data, modified 2017
Remarks:
K : knowledge of correct concepts (correct answer – high CRI)
M : misconception (wrong answer – high CRI)
LK : lack of knowledge (wrong answer – low CRI)
LG : *Lucky Guess*/ lack of knowledge at all (correct answer – low CRI)

(R & D), product (R & D), and samples (Qualitative & Quantitative). The level of understanding of the respondents is good to the preparation of research methods is also shown with the results of answers to questions that are correct, so that it can be said that the respondent has had full confidence in the truth of knowledge about research methods.

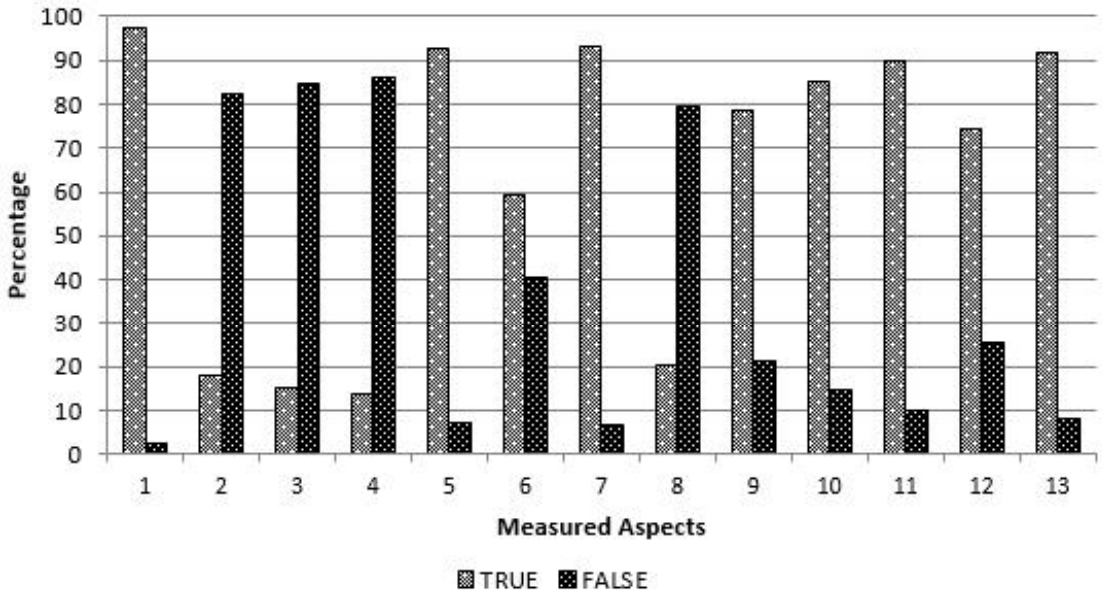
When viewed from the CRI analysis also shows that as much as 23.1% of respondents experiencing misconceptions and by 35.7% did not understand the correct concept in preparing research methods on the proposal. A respondent can be said to have misconception because the respondent has a high CRI, but the answer given is still wrong. This means there is still a concept error in the respondents related to several aspects of research methods. The results of this study are in line with Fitria's research (2014). The study also used CRI in assessing the level of students' understanding of the concepts studied. The results show that a potent CRI is used to differentiate students who have misconceptions with students who have not understood the concept. Subayani (2016) suggests that if the answer is false, it indicates a misconception of the knowledge of a subject matter it possesses, and may be an indicator of the occurrence of misconception.

Uncomprehending concepts found in students/potential teachers of mathematics can occur because of differences in understanding the initial concept related to the preparation of research methods. Understanding the initial concept of an object owned by students is not impossible to be different from the concept being taught. Conceptual misconceptions will not occur if students have a correct understanding of concepts related to the preparation of research proposal method. Understanding the true concept is the foundation that allows for a correct understanding of other related concepts or more complex concepts (Jannah, Ningsih, & Ratman, 2016), because with the correct understanding of concepts, students can develop correct and appropriate research methods, so as to facilitate it in real research. Therefore, the lecturers who teach the subjects of research methods can provide learning with more appropriate methods and can improve students' understanding related to the preparation of good research methods.

Based on the data obtained, it is acknowledged that the majority of aspects incorrectly composed by students are in the four aspects, namely: aspects of population, variables, operational definitions, and reliability. A number of mistakes made by students lies in the incompleteness of population composition, such as not mentioning the population of research respondents clearly and the number of population/subject studied. The misunderstanding that lies in the composition of the population can be caused by a lack of student knowledge. Fitria (2014) states that a lack of knowledge about an object is directly related to misconception. A true - false percentage of errors in the research methods compiled by student can be seen in Figure 1.

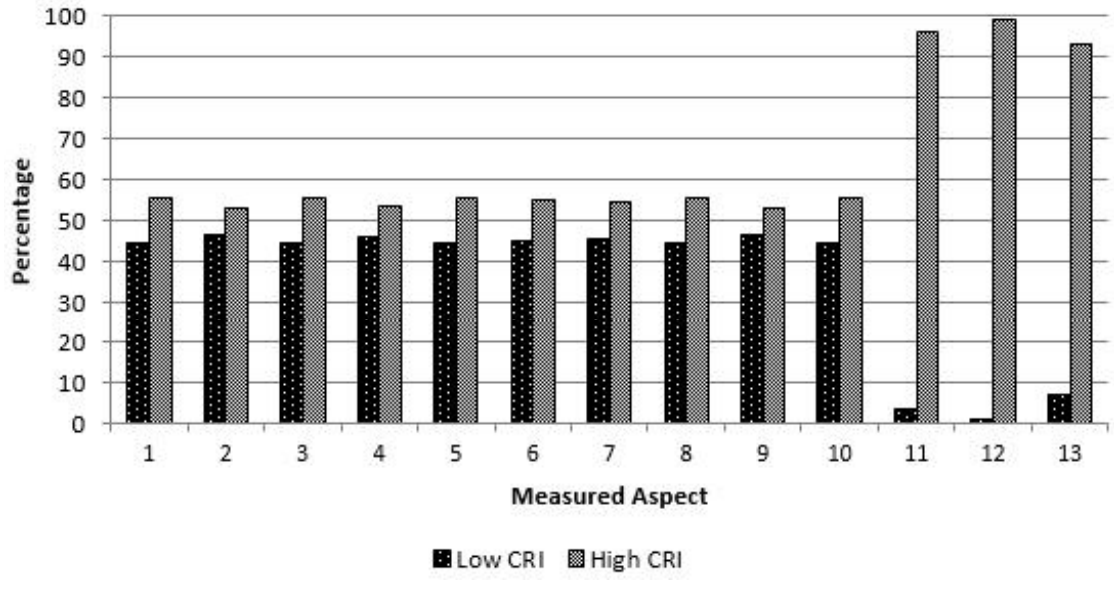
The majority of errors made by students is in the preparation of research variables. Errors are found in the placement of variable aspects that should be in research method chapter, but they are placed in the literature review chapter. Although the content of the aspect of the variable is true and complete, but if the placement is wrong, then the student has not fully had a good understanding related to the preparation of research methods. The errors also occur in the aspect of operational definition. Students do not explain fully

Figure 1. True - False Percentage of Research Method Compiled by Students



and clearly the operational definition of the variables studied, because the definitions described are still general. In the aspect of reliability, errors are made in that students do not include and explain the reliability test used for test instrument research. The majority only explains the validity test used (93.3%). CRI percentage on the preparation of research methods compiled by students can be seen in Figure 2.

Figure 2. CRI Percentage on The Preparation of Research Methods Compiled by Students

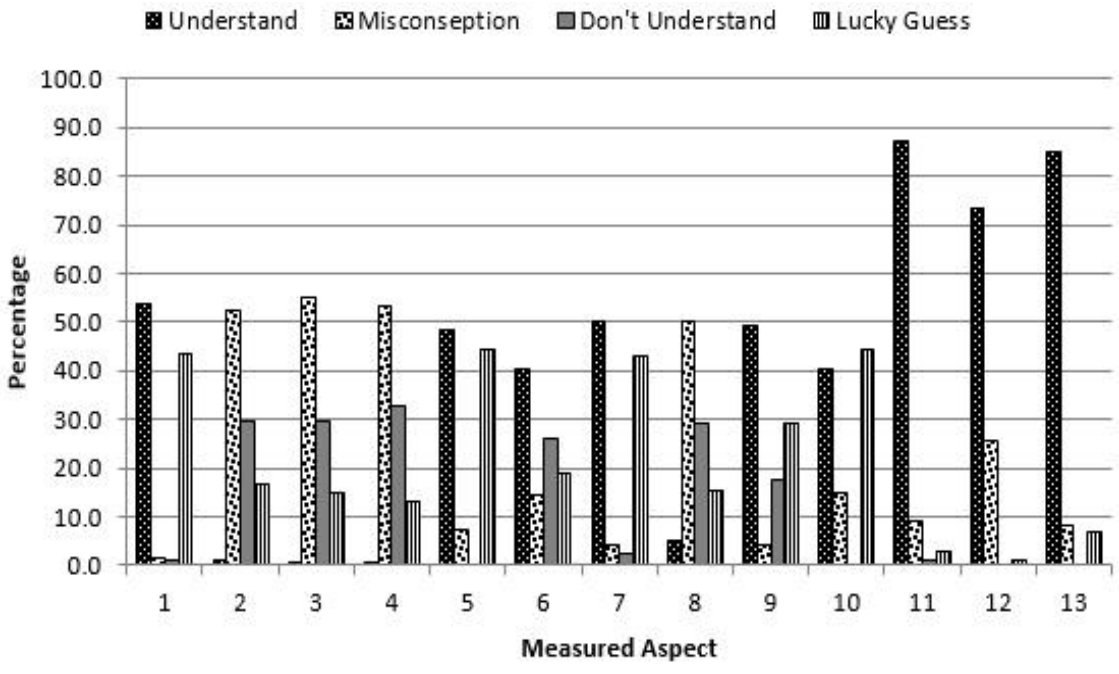


Furthermore, based on CRI data, it is known that most students have a high degree of concept in the research methods being developed in their research proposals. This indicates that most of the students have a strong belief that the method they have set is correct and in accordance with the preparation system of research methods in the proposal. The highest level of concept lies in aspects of product and product testing where these aspects are part of R & D research, meaning that the majority of students do R & D research, and feel confident that the preparation of product and product testing aspects to be developed are well presented, correct and complete. The results of the knowledge and misconception level analysis can be seen in Figure 3.

Based on the analysis result, the majority of students have understood how to write and determination of research design to be conducted. The research design is applied in accordance with the title and purpose of the research being conducted. However, in some aspects which are also assessed, it is known that most students experience misconception, especially in the preparation of population aspects, variables, operational definitions and reliability test. In the population aspect, students who experienced misconception were 52.3%. This occurs because students prepae the aspects of the population incorrectly, but have high level of true belief.

In the aspect of research variables, 54.9% of students experienced mis-conception. This occurs because the research variables are not written in Research Method chapter, but misplaced in another chapter. Such errors can also occur because students ask questions or see the wrong example, such as seeing posts from friends who are also not true. It also occurs in the operational definition aspect. In this aspect, 53.3% of students experience

Figure 3. Analysis Result of Knowledge and Misconception

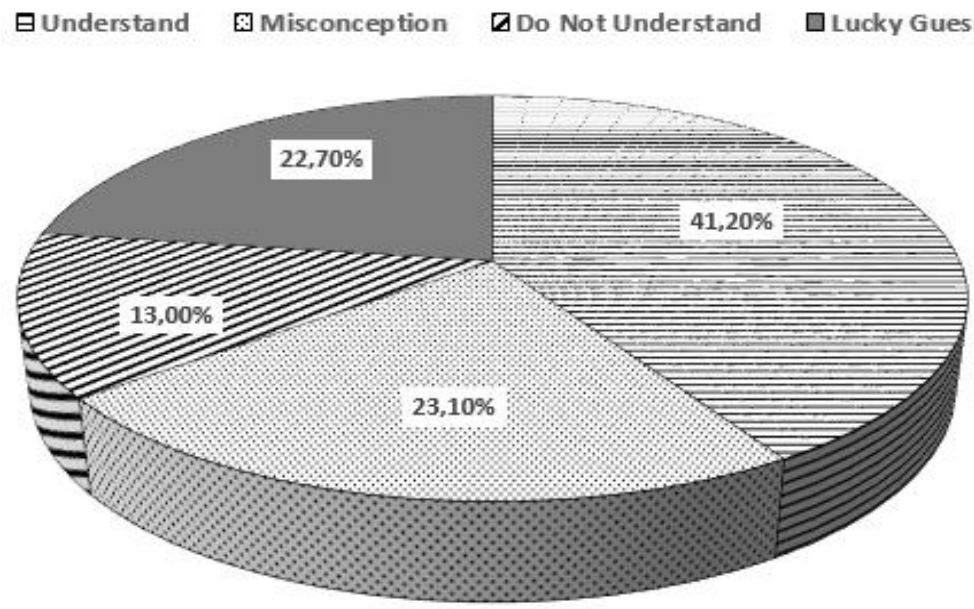


misconception. Pratiwi and Lepiyanto (2017) own misconceptions can actually be improved, namely by giving learning in the lectures using learning based on reason to help students to master the concept. In addition, misconceptions can also be altered by the way the student is accustomed to critical thinking.

Misconceptions also occur in the test reliability variable. 50.3% of students experience misconception in the test reliability variable. Misunderstanding occurs in the absence of reliability test in the research method of the final assignment. Based on the obtained data, only validity test is listed in the test instruments. This is possible because most of the final assignments compiled are R & D researches. Reliability tests are not only conducted in quantitative research in general, but also need to be done in qualitative research and R & D. In qualitative research reliability testing can be done by testing the instrument using internal reliability, i.e. repeating the test method (Bordens & Abbott, 2013, p. 156). to some respondents, and if the results obtained are not much different, then the instrument can be said reliable. Data on the student understanding level in preparing the research method of their final task assignment using CRI are presented in the Figure 4.

Based on the analysis results employing CRI, it is concluded that some Mathematics teacher candidates already have pertained good understanding in preparing the research methods of the final assignment. Nevertheless, there are candidates who have misconception in preparing the research method of the final assignment (23,1%), some do not comprehend the concept of compilation (13,0%), and some understand but have low confidence level (22.7%). The existence of student misconception in

Figure 4. Pie Diagram of Student Understanding Level in Preparing The Research Methods of The Final Assignment Employing CRI



preparing research method of final task caused by several factors. Fitria (2014) explains that in general, misconceptions caused by students, lecturers, end-task writing manuals, context, and teaching methods provided. Errors derived from students can be due to preconceptions, abilities and ways of thinking. As explained above, the existence of misconceptions in the writing of research methods can be a source of difficulty and hinder the process of preparing the final project.

Lucariello, Tine, and Ganley (2014) stated that misconceptions are generally also influenced by thinking ability. The ability to think is the ability to think critically, so that students can master and understand the concept of preparation of research methods in the final project proposal. Setiyaningish *et al.* (2014) argued that students' mistake in writing could be minimized by revising the learning. Wagiran (2007) stated that misconceptions on students can be decreased by implementing Problem-Based Learning. Application of Problem-Based Learning method in learning can improve students' understanding because the learning process is more emphasized on the application of techniques and procedures so as to facilitate the students to understand the concept and application (Muhson, 2009).

The results of the research indicate that the measurement of the students (mathematics teacher candidates) misconception can be done by using CRI. The results of the research are in line with the researches conducted by Mustaqim *et al*. (2014); Fitria (2014); Subayani (2016). Those researches apply CRI in measuring the respondents' level of understanding, by which the results are able to indicate the number of respondents who misconcept, understand, or those who do not understand the concept.

CONCLUSION

Based on the descriptive statistical analysis conducted in the research, it is concluded that in terms of the level of understanding Mathematics Education students, Batch 2014, Universitas Sarjanawiyata Tamansiswa Yogyakarta mostly have understood the aspects compiled in the research method of the research proposal (41.2%). Students experiencing misconception are 23.1%, students who do not understand the concept are as many as 13.0%, and students who understand the concept but have a low confidence level are as many as 22.7%. The most misconceptions experienced by the students occur in the aspects of population, research variables, operational definitions and instrument reliability. In the operational definition aspect, students do not explain fully and clearly the operational definition of the variables studied. On the aspect of reliability, errors are made ie students do not include and explain the reliability test used for test instrument research.

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