Analysis of Research Data Quantitative and Qualitative

Nasir[1], Sukmawati[2]

[1] *(Prodi Teknologi Pendidikan, Univeristas Muhammadiyah Makassar, Indonesia).*
[2]*(Pendidikan, Universitas Muhammadiyah Makassar, Indonesia).*

* Corresponding Author. E-mail: [1]nasir@unismuh.ac.id

Abstrak

Analisis data menjadi bagian yang berguna pada masalah penelitian agar dapat memberikan suatu data yang memiliki arti dan makna sebagai informasi jawaban secara objektif. Penggunaan alat dalam analisis sangat ditentukan oleh ketajaman dan ketepatan yang akurat dalam menarik kesimpulan. Untuk itu, perlu ada wawasan dan pemahaman dalam berbagai teknik analisis. Teknik analisis data pada umumnya terbagi dalam dua bagian yaitu analisis data penelitian kuantitaif dan analisis data penelitian kualitatif. Teknik analisis data kuantitatif terdiri dari analisis deskriptif dan analisis inferensial. Bentu penyajian deskriptif dapat disajikan dalam bentuk diagram, tabel, modus, mean, median, simpang baku dan rentang pada sebuah nilai angka. Untuk analaisis inferensila terdiri dari uji korelasi, uji chi square, regresi linear dan pengujian komparatif. Sedangkan kualitatif yaitu interpretative approach, social anthropological approach dan collaborative social research approach. Uji keabsahan data dalam penelitian kualitatif meliputi uji credibility, transferability dependability dan confirmability.

Kata Kunci: *Analisis Data, Kuantitatif, Kualitatif*

Abstract

Data analysis is a useful part of research problems in order to provide data that has meaning and meaning as objective answer information. The use of tools in the analysis is largely determined by sharpness and accurate accuracy in drawing conclusions. For this reason, there needs to be insight and understanding in various analytical techniques. Data analysis techniques are generally divided into two parts, namely quantifiable research data analysis and qualitative research data analysis. Quantitative data analysis techniques consist of descriptive analysis and inferential analysis. Descriptive presentation can be presented in the form of diagrams, tables, modes, mean, median, standard intersections and ranges in a number value. For inferential analysis consists of correlation test, chi square test, linear regression and comparative testing. While qualitative, namely interpretative approach, social anthropological approach and collaborative social research approach. Testing the validity of data in qualitative research includes tests of credibility, transferability dependability and confirmability.

Keywords: *Data Analysis, Quantitative, Qualitative*

Introduction

One of the processes that can be carried out by researchers after all data is collected in order to solve problems or problems that are studied and have been processed completely is called data analysis. The use of tools in the analysis is largely determined by sharpness and accuracy in drawing conclusions. Therefore, the implementation of data analysis is something that should not be ignored in the research process. If there is an error in choosing and determining the analysis tool, it can be fatal to the conclusion results. Of course, this will have a bad impact on users in the application / findings of research results. For this reason, there needs to be insight and understanding in various analytical techniques needed for researchers, so as to be able to provide cont. for problem solving so that it can be

scientifically accounted for. Data analysis techniques are generally divided into two parts, namely quantifiable research data analysis and qualitative research data analysis. The difference in the technique lies in the type of data. Data whose type is qualitative, the analysis used is qualitative analysis. Meanwhile, quantitatively the data is quantified to be analyzed.

After data collection, it varies greatly as a form of follow-up to the researcher's activities that are adjusted to the grouping or organization of the collected data. The level of validity and credibility is the basis for research that is always discussed in data acquisition. This problem is an urgent part of the implementation of research, this is because the quality of data derived from measurements will be a determination of the quality of results and activities in research. On the other hand, the problem of generalization is a problem, so that the results or data acquisition are largely determined by the quality of the measuring instrument. If you want a research result whose quality level is adequate, then the absolute standard is the validity of the measuring instrument. Because measuring instruments are able to record well the data obtained with good quality, a good measuring instrument is also needed.

The form of follow-up to the results obtained by the measuring instrument is to conduct an analysis, so as to produce a reliable conclusion. Vice versa, if the measuring instrument is not analyzed, the data obtained has no meaning in a study. Based on this, it is necessary to follow up on the collected data so that it can have the meaning that researchers expect in their research activities so that they can find objective answers.

In finding an objective answer to a problem that occurs in humans, it can be done through scientific procedures, namely planned research (Tri Wahyulis, 2010). To find an answer, a step or process is needed, namely data analysis with the aim of analyzing the collected data. But on the other hand, there are data that are not analyzed but the data collected is called raw data. The pada of the activity is expected to provide interpretations or be findings if analyzed. Therefore, analyzing the data in the study has a very important role to provide information. What is done in the data analysis process is to organize, group or organize, provide code, and finally categorize.

The activity is a step aimed at finding work themes and hypotheses. So that data analysis becomes a useful part of research problems in order to provide data that has meaning and meaning as objective answer information.

Metode (15%)

The research was carried out using literature research using literature studies. The translation of sources in this literature research is in the form of journals, books, dictionaries, documents, magazines and other sources without conducting field research The techniques used in data collection in this study use secunder data, namely by collecting data indirectly by examining the object concerned. Furthermore, the collected data is then analyzed using descriptive qualitative analysis through literature studies.

Hasil dan Pembahasan (70%)

Data Analysis Techniques

The process of organizing the order of data, organizing them into patterns, categories and units of basic description (Paton, 1980; Moleong, 2012). Bogdan and Tylor (1975) in Moleong (2021) define data analysis as a process that details formal efforts to find themes and formulate ideas. If you examine the two definitions, then the first definition emphasizes data organization. While the second emphasizes the purpose and purpose of data analysis. In the description of the definition above, it is concluded that data analysis is the process of organizing in sorting data into patterns, categories, and units of basic description so that themes can be found and work hypotheses can be formulated (Moleong: 2012). From this description, it gives an idea of how important this data analysis position is in terms of research objectives.

The work of data analysis in this case is to organize, sort, group, provide code, and categorize them. The organization and management of data aims to find themes and work hypotheses that are eventually raised into substantive theory therefore, data analysis is a very important part because with analysis, data can be given meaning and meaning that is useful for research problems.

Based on the objectives of data analysis, there are common groups in data analysis methods, namely: text and language analysis, themes and culture analysis methods, and individual work and experience analysis methods and situation behavior (Alwasilah, 2017).

In general, in quantitative and qualitative research, there are several general steps that researchers need to take in analyzing data. Herman Wasito (1996) steps in data analysis in general can be seen below:

1. Data processing, the data that has been collected by the researcher is first processed with the aim of being able to destroy the

collected data and then presented in a systematic arrangement.

2. Data analysis, this stepis the purpose of making the data easier to analyze and interpret. The data includes quantitative data in the form of numbers, while qualitative data is made in the form of language or symbols.

3. Interpretation of the results of the analysis, the data that is finished being analyzed then interpreting the objectives obtained by presenting conclusions to what it gets with the results of the analysis meets the requirements of validity or validity.

Quantitative Research Data Analysis

Data analysis techniques in quantitative research using statistics (Sugiyono, 2017). There are several kinds of statistics used in quantitative research, namely *descriptive* statistics and *inferential* statistics including parametric statistics and *non-parametric statistics).* Data numeric is one of the quantitative data that can be analyzed accurately (Sidik and Denok 2021). It is called analysis because the analyzed data is data quantified by mathematical methods. It is said to be statistical analysis because generally the data is analyzed using statistical methods, while statistical tests are shown to test hypotheses, especially in research with correlation study designs.

Quantitative data analysis consists of descriptive analysis and inferential analysis. Descriptive analysis is carried out with the aim of obtaining and seeing a conclusion. Meanwhile, inferential analysis is used as a basis for making conclusions in general (generalization).

Descriptive and *Inferential* Statistics

1. Descriptive Statistics

The data collected in correlational, comparative or experimental research is processed with statistical formulas that have been provided both manually and by using the komputer application. Descriptive statistics that researchers use to describe data without intending to draw generalized conclusions. In descriptive statistics, it can also be searched for weak relationships between variables through correlation, making comparisons by comparing the average to the population (Adon Nasrullah J, 2018). Descriptive statistics are also called deductive statistics or simple statistics where the way to do it includes averaging composing, connecting, and providing a concise and clear picture of a situation at a symptom through the analysis of managed number data then presented (Dicki and Sri, 2019). Shater & Zhang (2012),

descriptive statistics are part of statistics in which there is an explanation of data, organization, and appearance. In descriptive systematic analysis, there is a frequency distribution, centering analysis and standard deviation.

The purpose of descriptive statistics is to provide an overview and description of an object without drawing conclusions in generalization on the object under study. In the presentation of descriptive data, it can be presented in the form of diagrams, tables, modes, mean, median, standard intersections and ranges on a number value. Somantri (2006) argues that descriptive statistics discusses how to collect data, simplify observations obtained through numbers, take measurements and disseminate data in understanding information better. Furqon (1999) states that the data in hand provides an overview or size of the data. Meanwhile, Pasaribu (1975) states that descriptive statistics is a part that talks about the results of compiling data into tables, graphs, and others. So it can be concluded that descriptive statistics is something that reviews the collection, presentation, processing and calculation of values in a data depicted in tables and digrams without any connection in drawing conclusions.

2. *Inferential* Statistics

Statistical science that includes explanations on conclusions in obtaining samples taken from populations is the scope of statistical science (Shater & Zhang, 2012). Inferential statistics include tests: correlation, chi square, linear regression and comparative testing (Dicki and Sri, 2019). Statistics inferential have the objective of drawing a conclusion. However, before take the conclusion, first process the data to obtain descriptive statistical results. According to Sudijono (2008), inferential statistics is statistics that provide rules or ways that can be used as a tool in order to try to draw general conclusions, from a set of data that has been compiled and processed. Subana (2000) suggests that inferential statistics is statistics that deal with drawing conclusions of a general nature from data that has been compiled and processed. So inferential statistics are statistics that study how decision-making is done.

Validation Test and Reliability Test on Quantification Research
Validity Test

Validity is a measuring instrument used to show the extent to which a measuring instrument measures what will be measured. Cooper & Schindler (in Zulganef, 2006) states that validity becomes a measure to indicate the measured variable really wants to be studied. In relation to research, validity becomes a measure of the researcher's measuring instrument in carrying out the research that is actually measured. Validity has a relationship with changers to measure what will actually be measured (Sugiharto and Sitinjak, 2006). So that the validity test has the purpose of knowing the validity of a measure or validity of the questionnaire.

The validity of the research instrument must be carried out in the study to protect the integrity of the instrument from exposure to defects. In addition, the validity of the instrument aims to make the data obtained in accordance with reality on the ground so that the findings can be trusted and do not become a problem in the future (Sun et al., 2018). If the validity of the instrument is more accurate when the data obtained is also of high value, it will produce research that has good quality (Abbas, 2016). According to Franekel (1996), validity is the rigor and correctness directed at the data. According to Bazelais (2018), validity means measuring and ensuring that a measure used corresponds to the concept of research and all items to be measured for the official determination of the findings of a study (Creswell, 2014). The instruments used in this study are said to have high reliability if the ability to measure what should be measured is high (Majid, 2005).

In general, the quality of instrument validity is in line with the acquisition of good research data and in accordance with reality so that it can be said that the validity of the instrument used is high. The purpose of instrument validity in a study is to guarantee the validity of each research item so that 1) it can be maintained: the research findings will be accurate and useful, 2) accurate: the research questions entered can be answered, 3) appropriate: relevant to the research objectives that have been made before and 4) usefulness: the results obtained can help make decisions related to what is sought.

Reliability Test

Reliability is a questionnaire measuring instrument that is part of the indicator of structure or change (Ghozali, 2009). In Sugiharto & Situnjak (2006) states that instruments have a function to obtain information and are used as a tool in data collection, so that the information can show the truth. Reliability analysis is carried out to determine the level of consistency and stability of a measurement or measuring instrument in measuring a construct.

Reliability refers to the ability to obtain similar values when the same measurement is repeated (Chua, 2014). Instrument reliability analysis was performed on respondents from pilot studies conducted prior to the actual study. The results of the pilot study aimed to measure the reliability of the questionnaires used in the actual study. Reliability testing can use Cronbach's Alpha performed with the help of SPSS on questionnaire instruments. Cronbach's Alpha oefficient by Creswell (2017) is used as a reference. Reliability analysis is carried out on each of the factors and will be described in the form of statistics and descriptions.

Qualitative Research Data Analysis

In quantitative research, data can be obtained from various sources, using various data collection techniques (triangulation), and carried out continuously until the data is saturated. In terms of qualitative data analysis, Bogdan in Sugiono (2018) states that "*Data analysis is the process of systematically searching and arragging the interview transcript, field notes, and other materials that you accumulate to increase your own understanding of the man to enable you present what you have discovered to others*". Data analysis is carried out by grouping data, describing it into units, conducting systematics, compiling into patterns, choosing which ones are important and which ones to learn, and making conclusions that can be told to others.

The prosen of analysis qualitative data (Seiddel, 1982) namely: 1) recording which produces field records; 2) collect, sort, classify, distort, make an overview, and index them; and 3) thinking. Furthermore, Janice McDrury put forward several stages in qualitative data analysis, namely: reading data, marking key words, learning key words, writing down models, and coding that has been done.

Data analysis in qualitative research is carried out from before entering the field, while in the field, and after completion in the field (Sugiyono: 2018). Analysis of qualitative research data is carried out before the researcher plunges into carrying out the research. The analysis is carried out on preliminary study results data or secondary data that will be used to determine the focus of the study. In this case, the focus of research is still temporary, and will be carried out after the researcher has jumped in and during the field.

Qualitative Data Analysis Process

In the process of qualitative research is the process of finding and compilingsystematicdata obtained in the field through in-depth interviews,

field notes and other materials, so that it is easy to understand. Qualitative research analysis is carried out before entering the field, in time brackets (process in the field), and until it is completed in the field. According to Nasution in Sugiono (2018) stated that the analysis has begun since formulating and explaining the problem, before going into the field, and lasts continuously until the writing of the research results. The following outlines the process of collecting qualitative analysis data during the process:

Analysis Before the field

Before the implementation of qualitative research, first practice data analysis. The analysis was carried out on preliminary study results data (secondary data), as preliminary data to be able to determine the focus of the study. So that the results of the data are still in the temporary data and will develop after the researcher enters and during the field.

Data Analysis in the field Miles and Humberman Models

Milles and Humberman (1984), suggest that the activity in the analysis of quality data f is carried out in an interactive way and takes place continuously until it is complete, so that the data is saturated. Activity in qualitative data analysis can be performed rarely-step analysis as follows:

a. Data *Collection*

In this case, it is carried out as the main activity in each study, namely data collection. In kuantitative research, generally data collection uses questionnaires and closed tests. From these data, statistical analysis is then carried out. Meanwhile, in qualitative research, data can be obtained through observation, in-depth interviews, and documentation when combined the three data are called incapacities.

b. Data *Reduction*

Cracking down on data means summarizing, choosing the main things, focusing on the important things, and looking for themes and patterns. Thus, the data that has been reduced will provide a clearer picture, thus making it easier for researchers to carry out the next data collection. Data reduction is a sensitive thinking process that requires intelligence and breadth as well as high depth of knowledge and insight.

c. Data Presentation (*Data Display*)

In qualitative research, data presentation can be done in the form of brief descriptions, charts, relationships between categories, *flowcharts* and the like. By presenting data, it is hoped that it will help researchers in understanding and facilitating what is happening and planning the next activity. Based on the data collected and the data analyzed, the next step is to create a category of things that affect a resulting workpiece.

d. Concluasion Drawing/Verification

The final step on the analysis activitys data according to Milles and Humberman is to make conclusions and verification. Theinitial conclusions are still temporary and subject to change if no solid evidence is found to support subsequent data collection.

Sparadley Model Data Analysis

In his writings Sparadley (1980) divided data analysis in qualitative research based on stages in qualitative research. In this model, the research process after entering the field, begins with the preparation of key informants who are able to provide information to researchers to enter the research. After that, the researcher conducts an interview with the predetermined informant and records the results of the interview. Furthermore, on the object of study, the researcher begins to ask descriptive questions, and continues to analyze the interview. Based on these results, researchers then conduct a domain analysis. In the next step based on the results of domain analysis, taxonomic analysis is continued with a contrasting question form, which is continued with a componental analysis. From these results, researchers then found cultural themes. Based on these findings, the researchers then wrote an ethnographic research report.

Creswell Model Data Analysis

The approach model of John W. Creswell (2017) qualitative data analysis can be described in the following steps:

a. Prepare and process data for analysis. In the initial activity involves transcripts of interviews, moving material, writing down from what was obtained from information sources.

b. Read the entirety of the data. This activity writes down specific parts of the idea on the data found.

c. *Coding* all the data. This is done to group data by collecting data parts as well as writing down categories within boundaries (Rosman & Rallis, 2012).

d. Set a coding proese to describe the setting, people, categories, and themes to be analyzed. Researchers can create codes to describe all the information, and then analyze it for case study, ethnographic, or narrative research projects.

e. Shows the results of descriptions and themes to be presented in the form of qualitative narratives/reports. Because the most popular approach is to apply a narrative approach in conveying the results of the analysis.

f. Make interpretations in qualitative research or eat data.

Nasution Circular Model

In this model, qualitative analysis mentions three procedures in the study according to Nasution in Satori and Komariah (2017), namely data reduction, data display, and drawing conclusions and verification.

Model Lexi J Maleong

The data analysis model proposed by Janice McDurrry in Moleoeng (2006) said that the stages in analyzing data are reading and studying data, studying key words, writing down findings and coding that has been done.

Qualitative Data Analysis Approach

In qualitative research, data tends to be voluminous and poorly structured. So that the data requires proper planning and strategy in processing and analysing it. Some of the main approaches used in analyzing qualitative data are interpretative approach, social *anthropological* approach and *collaborative social research approach* (Milles and Humberman, in Djaman and Aan: 2017). *Interpretative* approach: this approach, social and human activity is applied as a text, in other words human activity is seen as a collection of symbols and expresses meaning. In this approach helps to find a practical understanding of the meaning and sanctions. *Social anthropological* approach: this approach, often used in diverse case study activities to collect data. In achieving this data, it is necessary to consider the time required in the field in a community or individual. *Collaborative social research approach:* This approach works with subjects with specific settings to obtain changes in the activities that occur. Analysis data collection in this collaborative study through the participation of subjects that researchers see

as stakeholders. Furthermore, in some references there are four data analysis techniques generally used in qualitative research, namely: *coding, hermeneutic, semiotics, and narative analysis*.

Validity and Reliability in qualitative research

The test of the validity of data in qualitative researchincludes *tests of credibility* (internal validity), *transferability* (external validias), *dependability* (reliability), and *confirmability* (objectivity) in Sugiono (2019). In qualitative research, validity does not have the same connotations as quantitative research nor is it parallel to reliability as a test of stability or with generalisability. Qualitative validity is an effort to check the accuracy of research results based on established procedures, while qualitative reliability shows that the application of the approach consistently used by researchers in the implementation of different studies applied by other researchers. Validity is a qualitative researcher's strength based on the determination of findings obtained accurately from the point of view of the researcher, reader or participant (Creswell & Miller, 2000). Literatur qualitatively explains about validity has been widely found, such as trust, authenticity, and credibility (Creswell & Miller,2000), and topics that are widely discussed (Lincolin, Lynham, & Guba, 2011). For data credibility testing, it can be done through extension of observations, increasing persistence, triangulation, peer persecution, negative case analysis, and member checks.

In research, reliability tests are carried out by conducting an audit of the entire research process. But if the researcher is unable to show his field activity then the reliability of his research is doubtful (Sanafih Faisal,1990). Generalizations are used in qualitative because the term generalization is more widely applied to quantitative research. The purpose of generalization in qualitative research itself is not to generalize the results of individual discoveries, locations. (Gibs, 2007). In Yin (2009) that the results of qualitative case studies can be generalized to a number of broader theories. To repeat and replicate the results of case study research in a new case setting, researchers need to do good documentation of qualitative procedures.

Simpulan (5%)

Insight and understanding in various data analysis techniques are generally divided into two parts, namely quantifiable research data analysis and qualitative research data analysis. Quantitative data analysis techniques consist of *descriptive* analysis and *inferential analysis*. While qualitative, namely *interpretative approach, social anthropological* approach and *collaborative social research approach*.

Daftar Pustaka

[1] Alwasilah, Chaedar A. 2017. Anyway, qualitative. Bandung : Dunia Pustaka Jaya

[2] Arikunto, Suharsimi. 2014. Research Procedures a Practical Approach. Rineka Cipta: Jakarta

[3] Creswell, John W. 2016. Research Design Qualitative, and Mixed Method Approaches. Learning Library: Yogyakarta

[4] Creswell, J.W. and Miller, D.L. 2000. Determining Validity in Qualitative Inquiry.Theory into Practice, 39, 124-130.

[5] Djamam Satori and Aan Komariah, 2017. Qualitative Research Methodology, Bandung: Alfabeta Publishers

[6] Douglas S. Shater & Zhiyi Zhang. 2012. Beginning Statistics. Creative Cosmos

[7] Faisal, Sanapiah. 1990. Qualitative Research (basics and applications). Malang: Yayasan Asih Asah Asuh (YA3) Malang

[8] Furqon. 1999. Applied Statistics for Research. Afabeta: Bandung

[9] Gibbs, G.R. 2007. Thematic Coding and Categorizing, Analyzing Qualitative Data . London: SAGE Publications Ltd.,

[10] Hartanato Dicki and Yuliani Sri. 2019. Education Research Statistics. Paradise Light: Pekanbaru

[11] Herman Wasito, 1996. Introduction to Research Methodology, Jakarta: PT. Gramedia Main Library

[12] Lincoln, Y. S., Lynham, S. A., & Guba, E. G. 2011. Paradigmatic controversies, contradictions, and emerging confluences, revisited. *The Sage handbook of qualitative research*, *4*(2), 97-128.

[13] Moleong, Lexy J. 2012. Qualitative Research Methodology. Juvenile Rosdakarya: Bandung

[14] Pasaribu, Amudi. 1975. Introduction to Statistics. Gahlia Indonesia: Jakarta

[15] Priadana Sidik and Sunarsi Denok. 2021. Quantitative Research Methods. Pascal Books: Tangerang

[16] Setyowati, Tri Wahyulis et al. 2010. Data Analysis. Yogyakarta: Faculty of Education, Yogyakarta State University

[17] Somantri, Ating and Sambas Ali Muhidin. 2006. Application of statistics in Research. cheerful library: Bandung

[18] Subana,et al. 2000. Education Statistics. Pustaka Setia:Bandung

[19] Sudijono, Anas. 2008. Introduction to Education Statistics. Raja Grafindo Persada:Jakarta

[20] Sugiarto, Sitinjak. 2006. Lisrel. First Edition. First Printing of Yogyakarta: Graha Ilmu Publishers.

[21] Sugiyono. 2017. Quantitative, Qualitative, and R&D. Alfabeta Research Methods: Bandung

[22] Sugiyono. 2018. Qualitative Research Methods. Alfabeta: Bandung

[23] Sugiyono. 2019. Quantitative, Qualitative, and R&D. Alfabeta Research Methods: Bandung

[24] Trijono, Rachmat. 2015. Quantitative Research Methodology. Papas Sinar Sinanti: East Depok

[25] Yin, R. K. 2009. Case study research: Design and methods (4th Ed.). Thousand Oaks, CA: Sage.

[26] Zulganef. 2006. Modeling Structural Equations & Their Applications Using Amos 5. Bandung: Bibliography.

Profil Penulis

Nasir, Lahir pada tanggal 11 Februari 1988. Pendidikan S1 Kurikulum dan Teknologi Pendidikan lulus pada tahun 2012, S2 Teknologi Pembelajaran Lulus pada tahun 2015. Saat ini penulis sebagai tenaga pengajar di Program Studi Teknologi Pendidikan FKIP Unismuh Makassar sejak tahun 2016.