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Integration of Validity, Reliability, Trustworthiness, and Authenticity Concepts in Maintaining the Quality of Scientific Research

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Abstract

Research requires a strong methodological foundation to ensure the resulting process and findings have quality, validity, and credibility that can be scientifically accounted for. This study aims to integrate the concepts of validation, reliability, trustworthiness, and authenticity in maintaining the quality of scientific research, both in quantitative and qualitative approaches. These four concepts play an essential role in ensuring the accuracy, consistency, credibility, and originality of research data findings. This study uses a literature study method by analyzing various literature related to relevant research methodologies. The results show that validity and reliability are the main foundations or important pillars in quantitative research to ensure the precision, accuracy, and consistency of instruments, as well as measurement consistency. Conversely, trustworthiness and authenticity are very important indicators in qualitative research because they are useful for assessing credibility, transferability, dependability, confirmability, and the authenticity of participant experiences. The integration of these four concepts can be realized through a mixed methods approach that combines empirical strength with reflective depth to increase the accuracy and honesty of data representation and not only improve the quality of findings but also strengthen the transparency and integrity of the research process. Thus, validity, reliability, trustworthiness, and authenticity must not only be understood as technical procedures, but also as an ethical basis for ensuring the integrity and credibility of scientific research.

Keywords: validity; reliability; trustworthiness; research quality

INTRODUCTION

Literally, a research method is defined as a scientific activity that is planned, structured, and systematic, with specific practical and theoretical objectives. One of the stages is data collection. In scientific research, the quality of data and research results is largely determined by the extent to which the instrument (Alfansyur & M, 2020) and the research process can be accounted for. In quantitative approaches, research quality is often assessed in terms of validity (the instrument's accuracy in measuring what it is supposed to measure) and reliability (the consistency of measurement results under relatively similar conditions). Meanwhile, in qualitative

research, the quality of research results places greater emphasis on trustworthiness (the degree of trust in the data obtained (Brink & W, 2020) through credibility, transferability, dependability, and confirmability, and authenticity (the research's ability to authenticate the voices, perspectives, and experiences of participants) (Mekarisce, 2020).

Data is crucial in research, and therefore, the collected data must meet the requirements for data validity checks (Susanto, 2023). Collecting and processing data in research is not an easy task. Likewise, if you obtain data that does not meet the requirements for validity (trustworthiness), it will result in data repetition.

The main problem that arises is that many studies still emphasize only one aspect of quality without considering the integrity of validity, reliability, trustworthiness, and authenticity according to the approach used. As a result, research results are potentially weak in terms of generalizability, credibility, and representation of participant experiences (Suryabrata, 2020). Therefore, a thorough understanding of these four concepts is crucial for research, both quantitative and qualitative, to have a strong methodological foundation and provide a credible scientific contribution.

In quantitative research, if valid and reliable data are obtained, the research instrument is tested. In qualitative research, however, the data is tested. Analytical rigor in research presents data that does not necessarily make the researcher's findings accurate and credible. Every research aims to discover or develop knowledge, so researchers who want to explore these aspects to be able to publish professionally must learn data validity checking techniques.

RESEARCH METHODS

This study uses a qualitative method, which is a method in which data is collected in the form of words and images rather than numbers (Sugiyono, 2018). This study uses a qualitative descriptive approach with a literature study research design. This will examine previous findings related to research ethics and their explanations. The focus of this study is the analysis and integration of theoretical concepts related to validity, reliability, trustworthiness, and authenticity in scientific research (Afrizal, 2014). The data sources in this study are secondary data derived from books, scientific journals, and credible online publications that discuss research methodology from both quantitative and qualitative perspectives. The data collection technique used is documentation, namely by identifying and reviewing relevant literature from various academic sources. The data obtained is then analyzed using content analysis or qualitative descriptive analysis that aims to interpret meaning, compare perspectives, and draw comprehensive conclusions regarding the relationship between the four indicators of research quality (Moleong, 2017). The analysis process is carried out systematically by classifying information based on each concept—validity, reliability, trustworthiness, and authenticity—and then synthesizing it into a single integrated framework that describes how these four concepts can be integrated to maintain the integrity and quality of scientific research.

RESULTS AND DISCUSSION

A. Validity Test

1. Understanding Validity Tests

Instrument validity in quantitative research is a concept explained by research methods experts as "the extent to which a measuring instrument can measure what it is supposed to measure" (Holbrook & Bourke, 2005; Manning & Don Munro, 2006; Pallant, 2010; Sugiyono, 2010). This means that research validity indicates how well a researcher can measure what is truly intended. Validity in quantitative research is based on the principles of empiricism, which emphasizes evidence, objectivity, truth, deduction, logical thinking, facts, and numerical data

(Golafshani, 2003). Frequently used measurement tools are questionnaires and tests. In this context, questionnaires must be structured appropriately so that they can be used as tools for collecting, discovering, describing, exploring, and/or comparing various information, topics, and variables under study. The following explains the various types of validity of quantitative research instruments, namely questionnaires and tests (Sugeng, 2014).

Quantitative methods are called traditional methods because they have been used for a long time, becoming a tradition in research. This method is also called the positivist method because it is based on the philosophy of positivism. This method is considered a scientific method because it adheres to scientific principles such as concreteness, empiricalness, objectivity, measurability, rationality, and systematicity. This method is called the discovery method because it allows for the discovery and development of various new scientific disciplines. This method is called the quantitative method because the data used are in the form of numbers and the analysis is carried out using statistics. (Sugiyono, 2020).

Validity testing is a method for verifying whether a research measuring instrument is truly valid. In this context, validity refers to the instrument's ability to measure what it is supposed to measure and its level of accuracy. An instrument is considered valid if it produces accurate data that corresponds to the variables being studied. (Azizah & Chaimatusadiah, n.d.)

2. Uses of Validity Tests
    a. Here are some uses of validity, including: (Widodo et al., 2023)
    b. Avoid asking questions with unclear sentences.
    c. Avoid using words that are too difficult or could raise doubts.
    d. Correct unclear questions.
    e. Add necessary questions or remove irrelevant ones.
    f. Ensure the questionnaire is valid.
3. Types of Validity Tests

The validity of research instruments is divided into three types, namely content validity, criterion-related validity, and construct validity:

a. Content Validity (Validitas Isi)
   Content validity is the level of accuracy of each question or statement in a questionnaire or test, ensuring it covers all the indicators to be measured. For example, if we want to examine student responses to lecturers' teaching performance, we first need to conduct a literature review to achieve our research objectives. The results of this literature review are then used as the basis for developing a questionnaire or research instrument. If several competencies are to be measured, such as pedagogical, professional, personality, and social competencies, the questions or statements within each competency are structured based on each lecturer's competency. This ensures that each question or statement represents the entire theoretical basis of the research topic, namely, lecturers' teaching performance. (Soesana et al., 2023).
b. Construct validity is a type of validity that assesses how well the questions in a research instrument are able to measure the concepts or definitions that have been established by the researcher.
c. Criterion validity is validity that is based on certain criteria, then tested on respondents who will be the research subjects.
d. Face validity is validity based on surface observations, because a measuring instrument is considered valid if it appears to have met the requirements. Therefore, face validity is often referred to as the lowest type of validity test. (This book was written by a lecturer at the University of Medan Area. Copyright is protected by law. It has been deposited into the UMA repository on January 27, 2022, 2022)

B. Reliability Test

1) Understanding Reliability Testing

Reliability means something that can be trusted. The word "reliability" comes from the word "reliable." Reliability is also often defined as consistency, constancy, accuracy, stability, and dependability. A research instrument is said to have high reliability if its results are consistent when measuring something. For example, when using a meter to measure a person's height, even if the measurements are taken at different places and times, the results remain the same. This occurs because the meter has high reliability. So, no matter when, where, or how many times a reliable instrument is used, the results are always the same. (Machali, 2021).

2) Types of Reliability

One of the requirements for a test's measurement results to be reliable is that the test must have sufficient reliability. Reliability is divided into two types: response consistency reliability and combined item consistency reliability. Response consistency reliability questions whether the respondents' or objects' responses to the test are sound and consistent. In this case, if a test is used to measure a particular object and then measured again under the same conditions, will the results remain the same as the first measurement? If the results of the second measurement are inconsistent, then the results do not reflect the actual state of the object. To determine whether respondents' responses to a test are stable, consistent, or uncertain, this can be done by administering the same test repeatedly (twice) to the same respondents.

Conducting two tests is a minimum requirement to determine whether respondents' responses to the test are consistent. There are several methods for conducting two tests, one of which is the split-half technique. This technique involves dividing the test into two equal groups of items and administering them simultaneously. Since each group of items represents half of the entire test, typically the first group consists of odd-numbered items, while the second group consists of even-numbered items. It's important to note that reliability using this technique is relative, as it depends on the numbering and grouping of the items chosen. In this technique, measurements are taken using two equivalent tests administered to respondents at the same time. Scores from both groups of items are correlated to determine the test's reliability. (Suhirman & Yusuf, 2019).

3) Reliability Testing Techniques

Instruments Reliability testing of instruments can be done in various ways, including: test-retest, split-half, Spearman-Brown, Kuder Richardson-20 (KR-20), KR-21, ANOVA, Hoyt, and Alpha.(Supriadi, 2021).

a) Test-retest technique: Testing the reliability of a research instrument involves administering the test repeatedly to the same respondents. The instrument remains the same, and the respondents are the same, but the testing time varies. To determine reliability, we look at the correlation between the scores on the first test and the scores on subsequent tests. If the correlation is positive and significant, the instrument is considered reliable. This technique is often referred to as stability. Reliability analysis using this technique involves correlating the total score from the first test with the total score from subsequent tests.

b) The Split-Half Test-Retest technique requires researchers to administer the test twice, while the Split-Half Test only requires one test. This technique works by dividing the test into two parts and then correlating the scores from the two parts. It should be noted that the correlation between the two parts only covers half of the test. To determine the overall reliability of the test, we need to use the Spearman-Brown formula.

c) The Kuder Richardson-20 (KR-20) technique is used to determine the reliability of the entire test, especially for questions that require correct (Yes) or incorrect (No) answers. If a correct answer is worth 1 and an incorrect answer is worth 0, then this method is suitable for use. The KR-21 method is another alternative for determining reliability, with the same function as the KR-20, but using a different formula..

C. Trustworthiness (Kepercayaan)

1. Understanding Trustworthiness

Trustworthiness is a form of confidence in a product that aligns with the endorser's image. Shimp explains that trustworthiness refers to the extent to which a source is believed to be honest, authentic, and trustworthy. Trustworthiness refers to "brand ambassadors" who are able to convince their audience to believe what they say. If the endorser is a professional, trustworthiness depends heavily on that professional's ability to instill confidence or belief in the product in consumers. (Arifin, 2020).

Trust is a behavior displayed by a person based on an inner belief or expectation, regardless of the individual's control over the product. Thus, trust is a crucial factor in interpersonal communication. (Rifka Alkhilyatul Ma'rifat, I Made Suraharta, 2024)

2. Factor Trustworthiness

a) Credibility and Trust

Credibility asks, "How congruent are the findings with reality?" As mentioned earlier, this is a highly subjective question, dependent on individual judgment. One seeks to understand how reported findings "fit together," meaning that the ideas must be related to one another. One method for enhancing credibility is through various processes of triangulation. Broadly speaking, triangulation means using multiple sources of information or procedures from the field to repeatedly establish identifiable patterns. Recognizing similar results repeatedly across multiple data sources is a different phenomenon from replication in a priori empirical studies.

b) Transferabilitas dalam Kepercayaan

Qualitative researchers argue that patterns and descriptions from one context may apply to reflexive analysis, and the parenthetical comments reflect a different process within the research act. Part of the parenthetical process involves researchers using their biases as they exist within their interpretive repertoire. Researchers' biases and assumptions are always present in the research process.

Qualitative research requires researchers' values and passions to be engaged in the research. However, researchers also need to monitor the influence of their values and passions. Reflexive auditing, or describing the researcher's involvement in the decisions made in the research process, is a hallmark of post-positive research and, indeed, a fundamental requirement for an acceptable dissertation, research paper, or technical report. Authenticity. (Norman et al., n.d.).

D. Autenticity (Keaslian)

1. Understanding Authenticity)

Since MacCannell's introduction in 1973, the concept of authenticity has sparked a long and intense debate among researchers. Authenticity is a public perspective that can change due to perceptions and interpretations of places, situations, other individuals, or objects. Authenticity is considered more relevant to the experience felt during travel in understanding authenticity. (Xiang, 2018).

DISCUSSION

From a critical perspective, quantitative approaches are often criticized for their potential to reduce social reality to overly structured numbers and variables, thus ignoring the human context and dynamics in the field. Conversely, qualitative research, with its emphasis on trustworthiness, offers a more reflective alternative, although its replicability and generalizability are often questioned (Creswell & Poth, 2018). Therefore, integrating the two approaches is crucial: quantitative research can enhance validity through variable control, while qualitative research strengthens credibility and confirmability through in-depth engagement and researcher reflexivity.

Furthermore, authenticity holds a unique position in qualitative research because it focuses not only on the accuracy of the data but also on the honest representation of participants' experiences. Lincoln and Guba (1985) distinguish several dimensions of authenticity: fairness (fairness in presenting the perspectives of various parties), ontological authenticity (deep understanding of the participants themselves), educative authenticity (increasing social awareness of both researchers and participants), catalytic authenticity (the research's ability to foster social change), and tactical authenticity (participant empowerment). Thus, authenticity not only measures genuineness but also assesses the ethical and transformative impact of the research itself (Guba & Lincoln, 1989).

In practice, a balance between validity-reliability and trustworthiness-authenticity can be achieved through a mixed methods approach. For example, quantitative survey results can be validated through in-depth interviews or qualitative data triangulation. This approach not only enriches interpretation but also increases trust in the research results (Tashakkori & Teddlie, 2010). Thus, good research is not merely statistically valid but also authentic in depicting complex social realities.

In the context of research methodology, the four concepts—validity, reliability, trustworthiness, and authenticity—actually fall within a spectrum of scientific quality rooted in different paradigms. Validity and reliability emerge from the positivistic paradigm, which emphasizes objectivity, measurement, and generalizability of results. In contrast, trustworthiness and authenticity are rooted in the constructivist or naturalistic paradigm, which emphasizes the authenticity of the researcher's experiences, meanings, and subjective involvement (Lincoln & Guba, 1985).

CONCLUSION

Validity, reliability, trustworthiness, and authenticity are four key pillars that ensure the quality, integrity, and credibility of research. In quantitative research, validity ensures the accuracy of the instrument, while reliability ensures the consistency of measurement results. In qualitative research, trustworthiness affirms confidence in the process and results through credibility, transferability, dependability, and confirmability, while authenticity emphasizes the authenticity of participants' voices and experiences. These four concepts complement each other in maintaining research quality, both from an empirical and interpretive perspective.

Based on this understanding, future research is recommended to implement quality improvement strategies appropriate to the approach used. Quantitative researchers need to ensure that instruments are adequately tested for validity and reliability using appropriate statistical procedures. Qualitative researchers need to strengthen trustworthiness through triangulation, participant checking, audit trails, and authentic representation of participants' voices. For academics and practitioners, these four concepts should be viewed not merely as technical requirements but as ethical standards that must be applied from the planning stage through to the reporting of research results. By applying these principles, research is expected to produce findings that are trustworthy, relevant, and provide meaningful scientific contributions.

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