

Application of Aiken's V Method for Validating Research Instruments in an Ethnomathematics Study of Data and Probability Concepts

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Abstract. Ethnomathematics research requires research instruments that can accurately describe cultural phenomena while generating valid data. Instruments with insufficient validity may produce biased information and consequently affect the quality of research findings. This highlights content validity as a crucial stage before an instrument is used for data collection. This study aims to describe the application of Aiken's V method in assessing the content validity of research instruments developed for an ethnomathematics study on data and probability concepts in Buddhist temple tourism sites in Klaten Regency, Indonesia. This study employed a quantitative–qualitative approach in which the analyses were conducted sequentially and interpreted jointly. Quantitative data were analyzed using Aiken's V method, while qualitative data were analyzed through descriptive qualitative analysis. The research object consisted of four research instruments: an ethnomathematics interview guide, a data and probability interview guide, an ethnomathematics observation guide, and a data and probability observation guide. The instruments were evaluated by three expert validators with expertise in mathematics education, statistics, and ethnomathematics. The validation process used a five-point Likert scale covering relevance to the research objectives, alignment with the instrument blueprint, language appropriateness, clarity of wording, and suitability to the ethnomathematics context and the concepts of data and probability. Content validity was measured using Aiken's V index for each instrument item. In addition to the quantitative analysis, the validators' comments and suggestions were analyzed descriptively to provide a basis for revising the instruments. The application of Aiken's V method provided objective information regarding the validity level of each item and identified parts of the instruments that required refinement. The results showed that, overall, the research instruments achieved content validity ranging from valid to highly valid. The qualitative analysis further revealed that all three validators consistently recommended revising several abstract terms, such as acquisition, accumulation, epistemological, and historical, into more operational indicators that would be easier for informants to understand. Therefore, the validation results indicate that the research instruments are suitable for use in ethnomathematics research after refinement of the item wording, thereby improving data credibility and the quality of research findings.

Keywords: *Aiken's V, Content Validity, Research Instruments, Ethnomathematics, Data and Probability.*

A. INTRODUCTION

Ethnomathematics is an approach that examines mathematical practices within cultural contexts. This approach views mathematics as not only developing within academic settings but also emerging from social activities, traditions, art, architecture, craftsmanship, and local knowledge systems that have been transmitted across generations. Numerous studies have shown that an ethnomathematical approach can enhance the meaningfulness of learning because students learn mathematical concepts through cultural contexts that are closely related to their daily lives.

Indonesia possesses an exceptionally rich cultural diversity that contains considerable ethnomathematical potential which has not yet been extensively explored. One such cultural heritage is the complex of Buddhist temple sites in Klaten Regency, particularly Sojiwan Temple and Plaosan Temple. These sites exhibit various mathematical concepts, including

geometric patterns, symmetry, measurement, shape classification, and structural regularity. In addition, they contain numerous phenomena related to the concepts of data and probability, such as the number of visitors, variations in tourism activities, the frequency of ritual ceremonies, relief classifications, and patterns of event occurrence that can be analyzed using basic statistical methods. In this study, the mathematical concepts investigated are data and probability, which are understood not only in a formal mathematical sense but also through community practices and everyday life. This requires ethnomathematics research instruments capable of capturing the contextual and interpretive meanings of the phenomena being studied.

One of the major challenges in qualitative research is ensuring instrument validity. Validity is concerned not only with the accuracy of measurement objectives but also with the appropriateness of the cultural context and the meanings embedded in the instrument. In this regard, expert validation is a commonly used approach for establishing the validity of research instruments. Content validity refers to the degree of correspondence between each instrument item and the construct being measured. One technique that can be used to determine content validity is Aiken's V method, which assesses the extent to which each item in an instrument is relevant to the construct being measured. This method is widely used in quantitative research, whereas its application in qualitative research, particularly in ethnomathematics studies, remains relatively limited. This motivated the researchers to employ Aiken's V because it offers a simple, objective, and appropriate procedure for validating educational research instruments.

In this study, four research instruments used in an ethnomathematics investigation of data and probability concepts were validated: (1) an ethnomathematics interview guide, (2) a data and probability interview guide, (3) an ethnomathematics observation guide, and (4) a data and probability observation guide. Three expert validators evaluated each instrument item and provided comments and suggestions for improvement. The findings are expected to provide empirical evidence regarding the feasibility of the research instruments and to serve as a reference for other researchers in developing valid and reliable ethnomathematics research instruments. Accordingly, the objectives of this study are: (1) to describe the process of validating ethnomathematics research instruments using Aiken's V method; (2) to determine the level of instrument validity based on expert evaluations; and (3) to examine the relevance of Aiken's V method in qualitative research.

B. METHOD

This study employed a quantitative–qualitative research design, in which the analysis began with a quantitative assessment using Aiken's V method on the instrument items and was followed by a descriptive qualitative analysis of the written comments provided by the validators. Four research instruments were validated in this study:

1. Ethnomathematics Interview Guide (20 items)
2. Data and Probability Interview Guide (12 items)
3. Ethnomathematics Observation Guide (20 items)
4. Data and Probability Observation Guide (12 items)

All instruments were developed based on an instrument blueprint aligned with the main objectives of the study, namely to explore ethnomathematical elements and identify data and probability concepts at Sojiwan Temple and Plaosan Temple.

The validation process involved three expert validators with expertise in mathematics education, statistics, ethnomathematics research, and educational assessment. The validators were: Validator 1 (SI) from Universitas Negeri Yogyakarta (UNY), Validator 2 (AP) from Universitas Mahasaraswati Denpasar, and Validator 3 (RM) from UIN Sunan Kudus. Each validator assessed every instrument item using a five-point Likert scale.

The aspects evaluated included (1) alignment with the research objectives, (2) consistency with the instrument blueprint, (3) the appropriateness of language use in accordance with standard Indonesian spelling conventions, (4) sentence clarity, and (5) the relevance of the ethnomathematics context or the concepts of data and probability. In addition to assigning scores, the validators also provided comments and revision recommendations to improve the quality of the instrument.

C. RESULTS AND DISCUSSION

1. Data Analysis

Content validity was analyzed using the Aiken's V index with the following formula:

$$V = \frac{\sum s}{n(c - 1)}$$

where:

V : Aiken's validity index

$s = r - l_0$

r : skor yang diberikan validator

l_0 : lowest score (1)

c : highest score (5)

n : number of validators

The Aiken's V value ranges from 0 to 1. The closer the Aiken's V value is to 1, the higher the content validity of an item. In this study, the interpretation of the Aiken's V values refers to the following categories:

Table 1. Criteria for Research Instrument Validation Based on Aiken's V Values

Aiken's V Value	Interpretation
$\geq 0,80$	Highly Valid
0,60-0,79	Valid
0,40-0,59	Moderately Valid
$< 0,40$	Less Valid

The results of this study present an analysis of the content validity of four research instruments using the Aiken's V method based on assessments by three expert validators. The four validated instruments consisted of an interview guide for the ethnomathematics study, an interview guide for data and probability concepts, an observation guide for the ethnomathematics study, and an observation guide for data and probability concepts. The assessment was conducted based on five aspects, namely (1) alignment with the research objectives, (2) consistency with the instrument blueprint, (3) appropriateness of language use according to standard Indonesian spelling conventions, (4) sentence clarity, and (5) relevance of the ethnomathematics context or the concepts of data and probability. The validity index was calculated using the Aiken's formula for all instrument items based on the scores provided by the three validators.

The following presents a recapitulation of the Aiken's V values obtained from the validation of the interview guide for the ethnomathematics study, the interview guide for data and probability concepts, the observation guide for the ethnomathematics study, and the observation guide for data and probability concepts.

Table 2. Recapitulation of Aiken's V Values for the Ethnomathematics Study Interview Guide

Assessment Aspect	Aiken's V Value Range	Dominant Category
Alignment with the research objectives	0,667-0,833	Valid–Highly Valid
Consistency with the instrument blueprint	0,667-0,833	Valid–Highly Valid
Compliance with standard Indonesian spelling conventions	0,667-0,917	Highly Valid
Ease of understanding of the sentences	0,500-0,833	Moderately Valid–Highly Valid
Ethnomathematics context	0,583-0,833	Moderately Valid–Highly Valid

Based on the Aiken's V computation for all items, most indicators obtained values ranging from 0.667 to 0.833, indicating that the instrument has good content validity. The language aspect, namely compliance with standard Indonesian spelling conventions, obtained the highest value of 0.917. Meanwhile, the sentence clarity aspect showed relatively low values in several initial items, ranging from approximately 0.500–0.833, indicating the need for refinement of the wording. These results are consistent with the validators' comments, which stated that the instrument was in accordance with the research objectives but still used overly abstract terms, such as acquisition, accumulation, epistemological, and historical, which therefore needed to be changed into more operational questions that could be easily understood by field informants. In general, the ethnomathematics study interview guide was declared suitable for use after editorial revisions were made to several question items.

The second instrument consisted of 12 questions designed to explore the concepts of data and probability emerging from cultural tourism activities at Sojiwan Temple/Plaosan Temple. The following presents the recapitulation of the Aiken's V values for the data and probability concepts interview guide.

Table 3. Recapitulation of Aiken's V Values for the Data and Probability Concepts Interview Guide

Assessment Aspect	Aiken's V Value Range	Dominant Category
Alignment with the research objectives	0,583-0,0,833	Moderately Valid–Highly Valid
Consistency with the instrument blueprint	0,667-0,833	Valid–Highly Valid
Compliance with standard Indonesian spelling conventions	0,750-0,917	Valid–Highly Valid
Sentence clarity	0,583-0,833	Moderately Valid–Highly Valid
Data and probability context	0,667-0,833	Valid–Highly Valid

The analysis results showed that all question items obtained Aiken's V values of no less than 0.583, indicating that all indicators fell within the moderately valid to highly valid categories. The language aspect, namely compliance with standard Indonesian spelling conventions, was the component with the highest level of validity. Nevertheless, the validators provided several important comments, including that some questions were considered too long, tended to explain the concept beforehand, and had the potential to lead respondents' answers. Therefore, the questions were recommended to be made more concise, exploratory, and based

on the informants' actual experiences. Overall, the data and probability concepts interview guide demonstrated a very good level of content validity and only required minor revisions to the wording of several questions.

The ethnomathematics study observation guide consisted of 20 observation indicators used to identify ethnomathematical elements in the Sojiwan/Plaosan Temple tourism sites.

Table 4. Recapitulation of Aiken's V Values for the Ethnomathematics Study Observation Guide

Assessment Aspect	Aiken's V Value Range	Dominant Category
Alignment with the research objectives	0,667-0,833	Valid–Highly Valid
Consistency with the instrument blueprint	0,667-0,833	Valid–Highly Valid
Compliance with standard Indonesian spelling conventions	0,750-0,917	Valid–Highly Valid
Ease of understanding of the sentences	0,583-0,833	Moderately Valid–Highly Valid
Ethnomathematics context	0,583-0,833	Moderately Valid–Highly Valid

The Aiken's V values indicated that most observation indicators met the valid category. However, several indicators, particularly those related to sentence clarity and the ethnomathematics context, obtained values of approximately 0.583, indicating moderate validity. Furthermore, the validators explained that several indicators could not yet be directly observed because they were still expressed as abstract concepts, such as the acquisition of mathematical knowledge and epistemology. The indicators needed to be transformed into objects that could actually be observed, such as reliefs, building forms, patterns of stone arrangement, visitor activities, symbols, or cultural artifacts. Therefore, with these recommendations, the observation guide is expected to produce objective and consistent data among observers.

The second observation instrument consisted of 12 indicators designed to observe data and probability phenomena in the research objects.

Table 5. Recapitulation of Aiken's V Values for the Data and Probability Concepts Observation Guide

Assessment Aspect	Aiken's V Value Range	Dominant Category
Alignment with the research objectives	0,583-0,833	Moderately Valid–Highly Valid
Consistency with the instrument blueprint	0,583-0,833	Moderately Valid–Highly Valid
Compliance with standard Indonesian spelling conventions	0,833-0,917	Highly Valid
Sentence clarity	0,583-0,833	Moderately Valid–Highly Valid
Data and probability context	0,583-0,833	Moderately Valid–Highly Valid

All indicators in the data and probability concepts observation instrument obtained Aiken's V values of no less than 0.583, indicating that they met the criteria for moderate validity. The highest value was obtained for the language use aspect, with a value of 0.917, indicating high validity. Nevertheless, the validators recommended that the observation indicators should not use phrases such as "elaboration of the concept" or "elaboration of the definition" because such aspects are difficult to observe directly. Instead, the indicators should

be directed toward concrete objects, such as the number of visitors, types of activities, frequency of events, visit patterns, or variations in forms that can be recorded during observation.

The following presents a recapitulation of the validity results of the research instruments (interview and observation guides) based on the Aiken's V method.

Table 6. Recapitulation of the Validity Results of the Interview and Observation Guides

Instrument	Number of Items	Aiken's V Value Range	Category
Ethnomathematics Study Interview Guide	20	0,500-917	Moderately Valid– Highly Valid
Data and Probability Concepts Interview Guide	12	0,583-0,917	Moderately Valid– Highly Valid
Ethnomathematics Study Observation Guide	20	0,583-0,917	Moderately Valid– Highly Valid
Data and Probability Concepts Observation Guide	12	0,583-0,917	Moderately Valid– Highly Valid

Overall, the computation results showed that the instrument items had Aiken's V values of no less than 0.667, indicating that the instruments met the criteria for content validity. Items that obtained values lower than 0.667 were related to aspects of language clarity and the operationalization of indicators rather than the alignment of the research constructs. Thus, these computational findings can be used as evidence that the research instruments can be used, provided that improvements are made to the clarity of the language. This finding is reinforced by the consistency of the comments provided by the validators. These comments indicated that further refinement of the research instruments was necessary through simplification of the language, replacement of overly conceptual terms, and formulation of indicators that are more contextual and easier to observe in the field.

The results of the study showed that all research instruments developed had good content validity based on analysis using the Aiken's V method. Most items were categorized as valid to highly valid, while several other items were categorized as moderately valid and required editorial refinement before being used for data collection at the research site. These findings indicate that expert validation is a crucial stage in the assessment of research instruments, particularly in ethnomathematics research that integrates cultural and mathematical concepts.

2. Application of the Aiken's V Method in Research Instrument Validation

Content validity refers to the degree of correspondence between instrument items and the construct or concept intended to be measured. In this study, content validity was analyzed using the Aiken's V index, which is one of the most frequently used quantitative methods for measuring expert agreement on the relevance of each instrument item (Aiken, 1985). The advantage of the Aiken's V method lies in its ability to transform experts' subjective assessments into an objective numerical index, allowing the quality of each item to be systematically evaluated. Thus, decisions to retain, revise, or remove an item are not based solely on the individual opinions of validators but are also supported by statistical values representing the level of agreement among experts.

In this study, the three validators came from the fields of mathematics education and statistics and had experience conducting ethnomathematics research. The involvement of validators with different academic backgrounds provided more comprehensive perspectives on the quality of the research instruments. This is consistent with Lynn (1986), who stated that

content validity becomes stronger when several experts who understand the construct being measured are involved. Therefore, the content validity of the research instruments in this study was assessed by appropriately selected validators.

In general, all research instruments obtained Aiken's V values within the valid to highly valid categories. These findings indicate that the research instrument blueprints were able to represent the research objectives, both in exploring ethnomathematical elements and identifying data and probability concepts in the research objects. Therefore, the research instruments demonstrated a high level of conceptual alignment with the research focus.

These findings are consistent with the study conducted by Yusup (2018), which showed that the Aiken's V method can provide quantitative evidence of the content validity of educational instruments in a simple and easily interpretable manner. Similarly, Azwar (2017) explained that a high content validity index indicates that the indicators developed adequately represent the construct intended to be measured.

3. Level of Content Validity in Each Assessment Aspect

The validation results showed that the aspects of alignment with the research objectives and consistency with the instrument blueprint obtained relatively high Aiken's V values across all research instruments. This indicates that the indicators developed were consistent with the research objectives, namely exploring ethnomathematical elements at Sojiwan Temple and Plaosan Temple and identifying the data and probability concepts contained therein. The high Aiken's V values for these aspects indicate that the instrument blueprints were systematically developed based on the research objectives. Each indicator, both in the interview and observation guides, had a clear relationship with the research focus, enabling the data collection process to be guided in a more structured manner.

According to Haynes, Richard, and Kubany (1995), good content validity depends not only on the quality of individual items but also on the extent to which all items represent the entire domain of the construct being studied. In this study, the relationship among the research objectives, instrument blueprint, and instrument indicators demonstrates that the research instrument development process followed this principle. This finding also reinforces the results of Zamanzadeh et al. (2015), who stated that construct-based blueprint development is a key factor in producing instruments with high content validity.

Quantitatively, all instruments were categorized as valid; however, the three validators provided several important recommendations regarding instrument refinement. One consistent finding was the use of overly conceptual terms, such as acquisition, accumulation, epistemological, historical, and political, which were considered less appropriate when addressed to managers or visitors of Sojiwan Temple and Plaosan Temple. The validators considered that the research informants were not mathematics experts but rather cultural actors who possessed empirical experiences related to temple tourism. Therefore, the research instruments should be directed toward exploring actual experiences, while mathematical analysis should be conducted by the researchers. This view is consistent with the ethnographic research paradigm proposed by Spradley (2016), in which informants function to explain cultural meanings based on their own experiences, while researchers are responsible for conducting scientific interpretations of the data obtained.

The comments provided by the validators demonstrate that the validation process did not merely produce numerical scores. Rather, the validators' comments provided important qualitative information for refining the instruments. Therefore, content validation should not be understood merely as a process of calculating a validity index but also as a reflective process for substantively improving the quality of the instruments.

The validation assessment aspect that obtained relatively lower values than the other aspects was sentence clarity. Although it remained within the valid category, several items obtained lower scores because the sentences were considered too long, used academic terminology, or tended to lead informants toward particular answers. This finding indicates that language quality is an important factor in research. A good instrument must not only be theoretically sound but also understandable to respondents so that it can generate authentic data.

According to Creswell and Poth (2018), effective interviews in qualitative research use open-ended, simple questions that do not lead respondents toward particular answers. The validators' recommendation to simplify the wording of the questions was therefore an appropriate step toward improving instrument quality. The results of this study are also consistent with Boateng et al. (2018), who noted that wording revisions are a stage that is almost always conducted following expert validation because discrepancies are often found between academic language and the language understood by research respondents.

Another interesting finding in this study concerned the observation instruments. The validators stated that several observation indicators were still too abstract and therefore difficult to observe directly in the field. For example, indicators such as "acquisition of mathematical knowledge" or "elaboration of probability concepts" were considered insufficiently operational when used as observation indicators. Instead, the validators recommended transforming these indicators into objects that could be directly observed, such as reliefs, architectural patterns, cultural symbols, the number of visitors, tourism activities, and the frequency of particular events. This recommendation demonstrates that observation in ethnomathematics research should be oriented toward empirical phenomena rather than theoretical concepts. This approach is consistent with D'Ambrosio (1985), who viewed ethnomathematics as the study of mathematical practices embedded in cultural artifacts, activity patterns, and social practices that can be directly observed. Furthermore, transforming the indicators into more operational forms will improve consistency among observers (inter-observer agreement), thereby making observation data more reliable and easier to verify.

4. Implications of the Content Validity of Research Instruments for Ethnomathematics Research on Data and Probability Concepts

The instrument validation results have important implications for the main study entitled "Data and Probability Concepts: An Ethnomathematics Study of Buddhist Religious Temple Tourism in Klaten." Instruments that have undergone a validation process enable researchers to obtain data that are more accurate, credible, and consistent with the cultural phenomena being investigated. In addition to improving research quality, valid instruments also strengthen the process of identifying mathematical concepts that naturally emerge within local culture. This is important because data and probability concepts often emerge in the form of community activities, tourist visit patterns, artifact classification, relief distribution, or variations in ritual activities that have not been extensively examined in previous ethnomathematics research.

The results of this study provide not only a methodological contribution through the application of the Aiken's V method in instrument validation but also a practical contribution to the development of ethnomathematics research in Indonesia. The validated instruments can serve as references for similar studies in other cultural contexts, thereby supporting the development of contextual mathematics learning based on local wisdom.

Based on the overall analysis results, it can be concluded that the application of the Aiken's V method successfully provided quantitative evidence of the content validity of the instruments. Furthermore, the validators' comments in the form of qualitative feedback served

as a means for researchers to refine the instruments. The combination of quantitative and qualitative analyses resulted in instruments that not only met the requirements of content validity but were also more operational, communicative, and appropriate to the characteristics of informants in ethnomathematics research.

The findings of this study reinforce the theories of content validity proposed by Aiken (1985), Lynn (1986), Haynes et al. (1995), Azwar (2017), and Zamanzadeh et al. (2015), which emphasize that instrument validity results from the integration of expert assessment, construct representation, and continuous refinement of indicators. In the context of ethnomathematics research, this approach is particularly important because the objects studied are complex cultural phenomena. Therefore, instruments must be capable of accurately capturing empirical realities without disregarding the conceptual foundations of mathematics. Consequently, the resulting instruments have the potential to support credible data collection and generate more meaningful research findings.

D. CONCLUSION

This study aimed to describe the application of the Aiken's V method in testing the content validity of research instruments for an ethnomathematics study of data and probability concepts in Buddhist temple tourism sites in Klaten Regency. The validation process was conducted on four research instruments, namely the ethnomathematics study interview guide, the data and probability concepts interview guide, the ethnomathematics study observation guide, and the data and probability concepts observation guide. The assessment was conducted by three expert validators from the fields of mathematics education, statistics, and ethnomathematics. The results of the analysis using the Aiken's V method showed that, in general, the research instruments had content validity levels ranging from valid to highly valid. The high Aiken's V values indicated that each instrument item was consistent with the research objectives, instrument blueprint, language use, and the ethnomathematics context as well as the data and probability concepts to be investigated. Therefore, the research instruments were considered suitable for use as data collection tools in the study.

The validation process was assessed not only quantitatively but also qualitatively by the three validators through suggestions and comments provided in the comment section. The analysis showed that the three validators consistently recommended that several abstract terms, such as acquisition, accumulation, epistemological, and historical, be changed into more operational indicators that could be easily understood by the informants. In addition, several observation indicators were recommended to focus on objects that could be directly observed, such as reliefs, architectural patterns, visitor activities, visitor numbers, variations in activities, and event patterns related to data and probability concepts. These refinements are expected to improve the clarity of the instruments and reduce potential subjectivity during the data collection process.

REFERENCES

- Aiken, L. R. (1985). Three coefficients for analyzing the reliability and validity of ratings. *Educational and Psychological Measurement*, 45(1), 131–142.
<https://doi.org/10.1177/0013164485451012>
- Azwar, S. (2017). *Reliabilitas dan Validitas*. Yogyakarta: Pustaka Pelajar.
- Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in Public Health*, 6, Article 149.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Sage Publications.

- D'Ambrosio, U. (1985). Ethnomathematics and its place in the history and pedagogy of mathematics. *For the Learning of Mathematics*, 5(1), 44–48.
- D'Ambrosio, U. (2001). *Ethnomathematics: Link between traditions and modernity*. Sense Publishers.
- Fajriyah, E. (2018). Peran etnomatematika terkait konsep matematika dalam mendukung literasi. *PRISMA, Prosiding Seminar Nasional Matematika*, 1, 114–119.
- Haynes, S. N., Richard, D. C. S., & Kubany, E. S. (1995). Content validity in psychological assessment: A functional approach to concepts and methods. *Psychological Assessment*, 7(3), 238–247.
- Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, 35(6), 382–385.
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2020). *Qualitative data analysis: A methods sourcebook*. Sage Publications.
- Moleong, L. J. (2021). *Metodologi Penelitian Kualitatif*. Bandung: Remaja Rosdakarya.
- NCTM. (2014). *Principles to actions: Ensuring mathematical success for all*. National Council of Teachers of Mathematics.
- OECD. (2023). *PISA 2022 assessment and analytical framework*. OECD Publishing.
- Permendikbudristek Republik Indonesia Nomor 12 Tahun 2024 tentang Kurikulum pada Pendidikan Anak Usia Dini, Jenjang Pendidikan Dasar, dan Jenjang Pendidikan Menengah.
- Rosa, M., & Orey, D. C. (2011). Ethnomathematics: The cultural aspects of mathematics. *Revista Latinoamericana de Etnomatemática*, 4(2), 32–54.
- Spradley, J. P. (2016). *The ethnographic interview*. Waveland Press.
- Sugiyono. (2023). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Bandung: Alfabeta.
- Taherdoost, H. (2016). Validity and reliability of the research instrument: How to test the validation of a questionnaire/survey in a research. *International Journal of Academic Research in Management*, 5(3), 28–36.
- Zamanzadeh, V., Ghahramanian, A., Rassouli, M., Abbaszadeh, A., Alavi-Majd, H., & Nikanfar, A. R. (2015). Design and implementation content validity study: Development of an instrument for measuring patient-centered communication. *Journal of Caring Sciences*, 4(2), 165–178.
- Zulkardi. (2006). *Formative evaluation: What, why, when, and how*. Universitas Sriwijaya