

Integrating South Sumatera's local wisdom context into statistical literacy education: An exploration study

Rahma Siska Utari, Ratu Ilma Indra Putri*, Zulkardi, Hapizah

Universitas Sriwijaya, Sumatera Selatan, Indonesia

*Correspondence: ratuilm@unsri.ac.id

Received: 26 June 2024 | Revised: 4 July 2024 | Accepted: 20 July 2024 | Published: 1 August 2024

© The Authors 2024

Abstract

Statistical literacy is an essential skill for prospective teachers, as it equips them to become effective educators in an increasingly complex and multicultural society. However, many prospective teachers currently exhibit insufficient proficiency in this area. To address this issue, it is imperative to develop educational programs that prioritize statistical literacy to prepare students to be informed global citizens. This study explores the integration of South Sumatra's local wisdom into statistical literacy education, providing a culturally relevant context for enhancing these skills. The research employs a descriptive qualitative approach consisting of four key stages: problem identification, inductive theorizing, hypothesis testing through observational data, and the processes of replication and refinement. Data collection methods included interviews and observations, which were analyzed qualitatively using triangulation techniques. The findings suggest that incorporating South Sumatra's local wisdom into statistical literacy education is feasible, provided the context meets specific criteria, such as it is rooted in the local wisdom of South Sumatra, it is meaningful and relevant to students, it holds significance for the student's learning experience, it actively engages students in classroom activities, it fosters students' abilities to articulate opinions on civic statistics and their social implications, and it involves statistical scenarios that can be effectively integrated into educational activities. This exploratory study contributes to the theoretical development of statistical literacy education by integrating local wisdom, specifically from South Sumatra, and by introducing these cultural elements to both national and international audiences.

Keywords: exploratory study, local wisdom of South Sumatera, qualitative, statistical literacy

Introduction

The rapid advancement of information in the digital age has amplified the importance of understanding and analyzing data-driven content. Statistical literacy, defined as the ability to comprehend and analyze statistical data, is crucial for navigating this information-rich environment (Callingham & Watson, 2017). According to Sharma (2017), statistical literacy involves an individual's ability to understand, evaluate, and apply data-derived information to make informed decisions. Gal (2019) further refines this concept, describing statistical literacy as the capacity and inclination to effectively access, comprehend, analyze, interpret, critically assess, and, when appropriate, articulate thoughts on statistical communication and data-based arguments. This comprehensive definition is supported by extensive research over the years. Guven et al. (2021) also emphasize that statistical literacy encompasses the ability to interpret tables and graphs, draw conclusions from data, make sound decisions, critically evaluate information, understand fundamental statistical concepts, use statistical terminology, and interpret key contextual information.

For students and prospective teachers, statistical literacy is vital for making informed and logical decisions in their daily lives, particularly as future educators (Callingham & Watson, 2017; Muñiz-Rodríguez et al., 2020). Statistical literacy enables students to recognize trends, patterns, and correlations in data, facilitating decision-making based on a thorough understanding (Tiro, 2018a). Moreover, it fosters critical thinking skills and plays a significant role in decision-making across various sectors, including health, social, economic, political, and educational domains (Weiland, 2017). Ben-Zvi (2020) argues that statistical literacy has the potential to improve learning processes within the education sector. By acquiring statistical literacy, students are better equipped to avoid the misinterpretation and manipulation of data, which can adversely impact decision-making (Gal, 2019; Rumsey, 2002). Despite its importance, the statistical literacy skills of prospective mathematics teachers, who are future mathematics educators, remain suboptimal.

Research indicates that prospective teachers generally exhibit low levels of statistical literacy. Guven et al. (2021) report that their post-test scores are often worse than their pre-test scores, reflecting difficulties in forming interpretations and inferences during evaluations. Another study by Forgasz et al. (2022) found that while many aspiring educators could correctly answer multiple-choice questions, they struggled with providing proficient analysis at the collegiate level. In Indonesia, 52% of students pursuing mathematics education were found to have inadequate statistical literacy skills, particularly in utilizing relevant information derived from statistical concepts and in interpreting and drawing conclusions from statistical problems (Khaerunnisa & Pamungkas, 2017). Additionally, Andriatna et al. (2021) revealed that 46.67% of potential mathematics teachers had suboptimal statistical literacy abilities in understanding fundamental statistical concepts, leading to difficulties in accurately justifying and comprehending data. Furthermore, Andriatna and Kurniawati (2021) reported that only 19% of prospective teacher students reached level 4 out of 6 levels of statistical literacy skills, characterized by a consistent yet non-critical approach, lacking critical thinking in the application of different terminologies, contexts, and statistical skills related to concepts such as

data concentration measures, probabilities, and data presentation (Callingham & Watson, 2017).

The importance of statistical literacy has not been fully reflected in Indonesia's national curriculum, which lacks specific and integrated statistical literacy competencies from primary through higher education (Tiro, 2018b). Setiawan (2021) found that the national curriculum does not adequately emphasize the stages of the statistical problem-solving process, particularly the ability to answer questions and solve problems using data. To address the challenges of the digital age, the curriculum needs to be optimally developed to incorporate the statistical literacy competencies required by students. Aziz and Rosli (2021) highlighted four primary aspects that influence the advancement of statistical literacy among students: the educational environment, student dispositions, learning methodologies, and students' prior knowledge. On the other hand, two essential strategies to enhance students' statistical literacy: designing learning experiences that are personally relevant to students and providing targeted interventions to foster critical thinking skills in statistical contexts (Callingham & Watson, 2017; Weiland, 2017).

Most research on statistical literacy in Indonesia focuses on assessing students' abilities through the resolution of statistical literacy-level questions (Andriatna et al., 2021; Andriatna & Kurniawati, 2021; Chasanah et al., 2020; Habibie & Hidayat, 2022; Jatisunda et al., 2020; Retnawati & Hidayati, 2023; Setiani & Suyitno, 2021; Takaria & Talakua, 2018). However, few studies have explored the potential of contextual situations or conditions for designing educational content that enhances the statistical literacy abilities of prospective teachers. Gal (2019) posits that context serves as a motivation for questions that guide statistical instruction, with answers based on the given data. When teaching statistical literacy, it is important to consider several key aspects related to context, such as using meaningful and significant contexts that are valuable for teaching statistical literacy, introducing meaningful context in the classroom to ensure comprehension, and carefully selecting relevant and significant questions or tasks that align with the given context for classroom presentation.

Exploring the local wisdom of Indonesia, particularly that of South Sumatra, can serve as an effective intervention in the process of learning statistical literacy (Ikhwanudin, 2018; Pingge, 2017). Indonesia, a multicultural country with diverse local wisdom, including that of South Sumatra (Taufan et al., 2023), provides a rich context for such educational approaches. Various studies have explored the use of South Sumatra's local wisdom in learning mathematics, supporting students' understanding of geometry (Komar et al., 2022; Ostian et al., 2023; Sari & Putri, 2021), algebra (Fitrisyah et al., 2023; Hauda et al., 2023), and number theory (Muslimin et al., 2022; Syaifudin et al., 2023; Utari et al., 2015), with positive impacts on students' mathematical skills. These findings demonstrate that integrating South Sumatra's local wisdom into mathematics education has a positive effect on the recognition of indigenous knowledge at both national and global levels, enriching the social and cultural life of South Sumatra and Indonesia by preserving and transmitting inherent values to future generations (Widyani, 2021). Additionally, this approach has the potential to enhance students' mathematical proficiency (Idris, 2021). It is widely acknowledged that implementing statistical literacy education within the context of local wisdom can support the development of statistical

literacy skills among prospective teachers (Jamil et al., 2021; Sohilit & Abdurrachman, 2022; Utari et al., 2024).

Previous research has utilized South Sumatra's local expertise, such as the Musi Bridge (*Jembatan Musi*) as a heritage site, to develop mathematical models (Riyanto et al., 2019). Similarly, regional dances from South Sumatra have been employed to enhance geometry teaching (Rawani et al., 2023), and the use of Songket, a traditional cloth from South Sumatra, has been explored as a means to facilitate learning in geometry (Sari & Putri, 2021). The context of Pempek, a traditional dish, has also been used to support students' proportional reasoning (Utari, 2017; Utari et al., 2015). This study aims to investigate the previously unexplored context of Bekarang Iwak, a traditional practice and part of South Sumatra's local wisdom, contributing original insights to the existing research. The novelty of this research lies in its focus on the specific context of South Sumatra's local wisdom in statistical literacy learning, an area that has not been extensively studied. The research question guiding this study is: What are the characteristics of South Sumatra's local wisdom that fulfill the requirements to be utilized as a framework for context in statistical literacy education?

Methods

This research utilizes an exploratory study with a descriptive qualitative approach as a preliminary investigation to generate concepts regarding the characteristics of local wisdom in South Sumatra that could be integrated into the teaching of statistical literacy. The foundational ideas for this study are derived from theories on the development of statistical literacy and a comprehensive literature review concerning South Sumatra's local wisdom.

According to Stebbins (2012), an exploratory study aims to explore, examine, analyze, develop, or investigate specific phenomena. In this context, the exploratory study seeks to generate new ideas on how South Sumatra's local wisdom can be effectively incorporated into statistical literacy education.

The exploration undertaken in this research is categorized as an informal exploratory study, or pre-study, aimed at concept development. The methodology employed is the research cycle heuristic (Lieberman, 2020; Swedberg, 2020), which is commonly used in social sciences, including education. The research cycle heuristic is particularly valuable in guiding, facilitating, and enhancing the quality and effectiveness of research. It helps researchers maintain focus, avoid common pitfalls, and optimize the research process to achieve their objectives. Figure 1 illustrates the stages of the research cycle. It presents the stages of the exploratory study utilizing the research cycle heuristic. This research comprises four key stages: problem identification, inductive theorizing, hypothesis testing with observational data, and replication and refinement.

In the problem identification stage, a thorough literature review is conducted to ascertain the state of the art and to identify the limitations of previous studies. Building upon the findings from the literature review and identifying the research's novelty, the inductive theorizing stage is initiated. This stage primarily employs the theories of Realistic Mathematics Education (RME) (Heuvel-Panhuizen et al., 2014), *Pendidikan Matematika Realistik Indonesia* (PMRI)

(Zulkardi, 2002; Zulkardi et al., 2020), and Statistical Literacy in context (Gal, 2019). At this point, the researcher formulates the hypothesis that the local wisdom of South Sumatra, specifically the *Bekarang Iwak* tradition, can serve as an effective context in statistical literacy education.

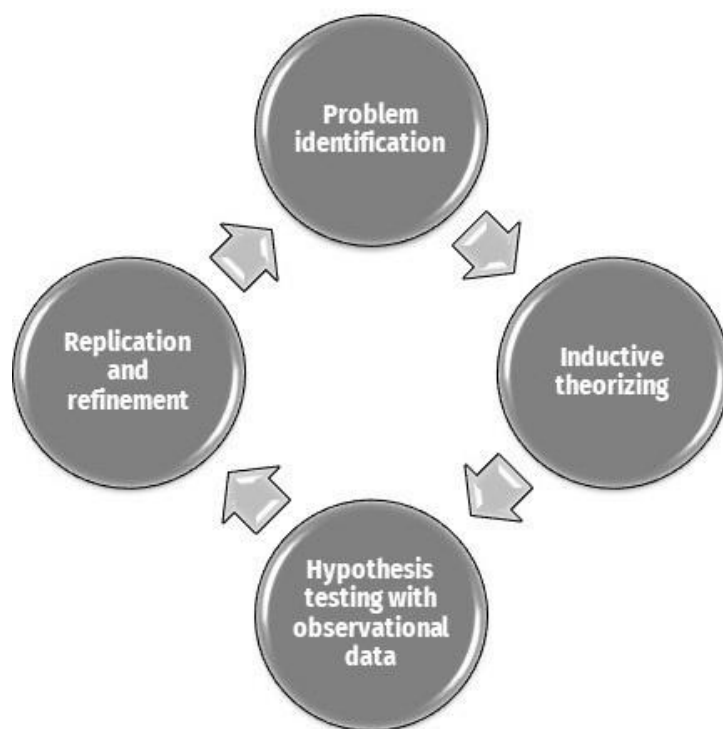


Figure 1. Research cycle heuristic modified by Lieberman (2020)

This hypothesis is not derived from intuition or unfounded assumptions; rather, it is grounded in a detailed examination of the *Bekarang Iwak* tradition through documentation studies. The researcher reviewed various sources, including newspapers, national television news, cultural centers, and museums within the South Sumatra Provincial Government. Additionally, the researcher explored several other local wisdom contexts in South Sumatra that were initially considered. However, guided by the preliminary instrument connected to observational data, the *Bekarang Iwak* tradition was determined to meet the criteria for facilitating statistical literacy. Figure 2 provides an illustration of the *Bekarang Iwak* tradition, which is prevalent in several regions across South Sumatra. It illustrates the *Bekarang Iwak* tradition as practiced in various regions across South Sumatra, where it is known by slightly different names but retains the same core practices. *Bekarang Iwak* represents a form of local wisdom that has been passed down through generations within the community.

To test the formulated hypothesis, data were gathered through interviews and observational studies. Interviews were conducted with local neighborhood leaders in Pulo Kerto village to obtain comprehensive insights into the *Bekarang Iwak* tradition. Additionally, observational data were collected to identify the specific characteristics of the *Bekarang Iwak* tradition that align with the contexts of statistical literacy, PMRI, and RME.

The Tradition of Bekarang Iwak (Catching Fish) in South Sumatra



Figure 2. The tradition of *Bekarang Iwak* in South Sumatra

Table 1 presents the observational data used to assess the alignment of the *Bekarang Iwak* tradition with the characteristics of a statistical literacy context. It demonstrates that the *Bekarang Iwak*, as a form of local wisdom in South Sumatra, can be effectively integrated into statistical literacy education if all six statements and questions from the observation criteria are met. During the hypothesis testing stage, which involved observational data, a Focus Group Discussion (FGD) was conducted with the participation of three lecturers and six students from the mathematics education study program. At this stage, the researchers also developed and presented an initial design during the FGD. This design was informed by the inductive theorizing stage and was further refined based on interviews conducted with neighborhood leaders or traditional elders in Pulo Kerto village, who are custodians of the *Bekarang Iwak* tradition.

Table 1. Observation statements

No	Statements	Yes	No
1	The context is part of local wisdom of South Sumatra.		
2	The context is meaningful for students.		
3	The context is important for students.		
4	The context is involving in the classroom.		
5	The context can develop students' abilities to express opinion about civic statistics and their social implication.		
No	Question		
6	What are the tasks or statement should be asked in statistics in context?		

modified by Gal (2019) and Heuvel-panhuizen et al. (2014)

Following the FGD, the design entered the replication and refinement stage, incorporating feedback from the observational data provided by both the lecturers and students involved in the mathematics education study program. After completing all four stages of the research cycle, the study yielded a comprehensive exploration of the integration of local wisdom into statistical literacy education.

Results and Discussion

This results section presents the findings from each stage of the research process, which includes problem identification and inductive theorizing, hypothesis testing with observational data, and replication and refinement. The problem identification and inductive theorizing stages were integrated to create a more comprehensive and cohesive research process. The findings are systematically described according to each stage, as follows.

Problem Identification and Inductive Theorizing Stage

At this stage, problem identification and inductive theorizing are executed sequentially to develop a comprehensive conceptual framework. The problem is clearly defined based on insights from previous research in related fields. To bridge the gap between problem identification and inductive theory development, a literature review is conducted to uncover the underlying causes of the problems and to explore existing problem-solving strategies from the theoretical background. This review also provides valuable information on previous work and identifies potential research gaps.

The literature review guided the researchers towards approaches and problem-solving strategies pertinent to addressing the low statistical literacy skills of prospective mathematics education teachers in Indonesia. The theoretical studies and preliminary research results were used to formulate alternative solutions or problem-solving strategies. After analyzing these strategies from the theoretical perspective, the findings were synthesized into an inductive theory grounded in the contexts of PMRI, RME, and statistical literacy. This process aims to produce insights that can inform subsequent stages of the research.

Figure 3 illustrates the conceptual framework developed during the problem identification and inductive theorizing stages. It illustrates the findings of the conceptual framework developed during the problem identification and inductive theorizing stages. The initial step involved identifying the problem, which highlighted the critical need for enhancing statistical literacy skills among prospective teachers. Despite the recognized importance, it was found that statistical literacy skills among prospective teachers in Indonesia are suboptimal.

Following the problem identification, a literature review was conducted. The review of prior studies revealed that the suboptimal statistical literacy skills of prospective teachers are due to the lack of integration of statistical literacy content within the curriculum. As a result, prospective teachers lack the necessary knowledge and skills related to statistical literacy, which impedes their ability to analyze and apply statistical concepts effectively.

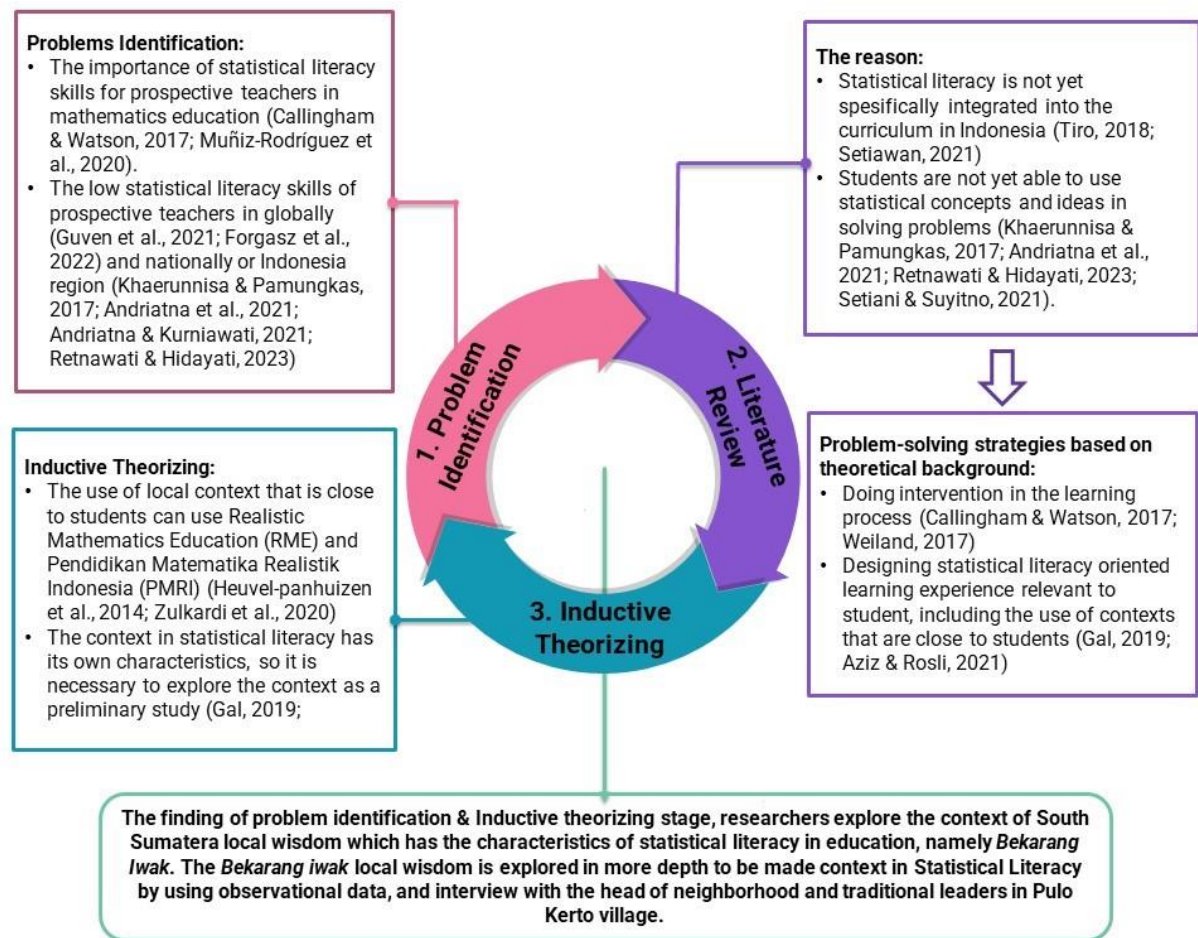


Figure 3. The finding in problem identification & Inductive Theorizing Stage

During the literature review phase, alternative solutions for addressing the identified problem were explored based on the theoretical background. One proposed solution involves intervening in the learning process by designing statistical literacy instruction that leverages the experiences of prospective teachers, such as incorporating contextual problems. The literature review findings support the use of context, including local contexts, to enhance the literacy and numeracy skills of prospective teachers. This approach aligns with learning theories such as RME and PMRI, which emphasize the use of contextual problems as a foundation for learning.

South Sumatra is rich in local wisdom, encompassing both rural and urban areas. Researchers examined several cultural traditions in South Sumatra through documentation from cultural centers and museums affiliated with the South Sumatra Provincial Government. Among these traditions, the *Bekarang Iwak* was identified as having relevance to statistical literacy. Specifically, in Pulo Kerto village, Gandus Subdistrict, Palembang City, the *Bekarang Iwak* tradition involves activities where the community catches a significant quantity of fish. To validate this information, researchers conducted interviews with the head of the Pulo Kerto village neighborhood. [Transcript 1](#) presents the interview between the researchers (R) and the head of the Pulo Kerto village neighborhood (H).

Transcript 1. Interview between researcher and head the head of village neighborhood



Figure 4. Documentation of interview

R : *"Can you explain Mom, what is the Bekarang Iwak tradition?"*

H : *"Bekarang Iwak is a tradition that has become entrenched in the Lacak River. This culture is a fishing activity, where the people of Pulo Kerto village gather at the river on a predetermined day. With a command from the traditional elders, fishing activities began. Bekarang Iwak is done once a year."*

R : *"How many fish are caught in this Bekarang Iwak activity, from year to year?"*

H : *"Regarding the catch from the Bekarang Iwak activity, several years ago the number of catches can reach 5-7 tons. However, due to current conditions, results have decreased in several years. For 2023 the catch will be less than 1 ton."*

[Transcript 1](#) provides an excerpt from an interview with the head of the Pulo Kerto village neighborhood. During the interview, the researcher inquired about the *Bekarang Iwak* tradition, which is described as an annual fish-catching event in the Lacak River conducted by the residents of Pulo Kerto village. The researcher also sought information regarding the quantity of fish caught each year. The village head indicated that typically, the fish catch ranged between 5 to 7 tons annually. However, for the year 2023, the catch was reported to be less than 1 ton. Due to the village head's uncertainty regarding the exact figures, the researchers reviewed the village documentation in the village head's office. Following the interview, the researchers recorded the fish catch data from 2016 to 2023 based on the village records. This information was used to formulate a hypothesis for subsequent stages of the research.

Hypothesis Testing with Observational Data Stage

The findings from interviews and fish catch reports related to the *Bekarang Iwak* tradition, spanning from 2016 to 2023, led the researchers to hypothesize that this tradition embodies scenarios and conditions relevant to statistical literacy that can be utilized as a context for teaching statistical literacy. These conditions are explored using real data, such as the historical data on fish catches over the years. This data was obtained from the *Bekarang Iwak* catch reports available at the Pulo Kerto village head's office, following the interview with the village head. The results of the interview were presented in a narrative format to highlight the connection between the *Bekarang Iwak* tradition and statistical information. [Figure 5](#) illustrates the findings derived from the interview with the head of the Pulo Kerto village neighborhood, providing insights into the tradition and its statistical context.

Bekarang Iwak, Local wisdom of South Sumatra

Bekarang Iwak is a tradition of catching fish together carried out by the village community. One of these traditions is carried out by people in Pulo Kerto village, Gandus Palembang. This tradition is carried out in the Lacak River. Bekarang Iwak has been carried out from generation to generation by residents. Bekarang Iwak is a tradition of harvesting fish. Residents gather at the Lacak River on a day that has been agreed upon by the customary leader.

The process of bekarang Iwak is carried out by going down to the river together, with residents going upstream and downstream. Then the community makes movements that make the fish drunk, and the fish are herded to the center. After the fish gather in the center, the community catches the fish together. The tools used to catch fish still use traditional tools. The bekarang Iwak tradition is carried out once a year, based on the weather and river water level.

The catch of fish is differentiated based on the size of large fish and small fish. Small fish are distributed to residents and large fish are sold by customary leaders, and the money from the sale is used for public purposes such as building roads and bridges. The fish caught are also relatively large and suitable for sale, such as gabus, catfish and tilapia. The Bekarang Iwak tradition combines cultural elements, traditional ceremonies, and fish catches, providing happiness and prosperity for the people of Pulo Kerto. The following is table of fish yield from the bekarang Iwak tradition in Pulo Kerto.

Table of fish yield from the bekarang Iwak tradition in Pulo Kerto

Year	The fish yield (kg)
2016	759
2017	839
2018	2033
2019	1730
2020	1098
2021	651
2022	1275
2023	878



Figure A. Tradition Bekarang Iwak

Figure B. Interviews

Figure 5. The description of interview results related to *Bekarang Iwak* in Pulo Kerto village (Source: Figure A. Tradition Bekarang Iwak, Figure B. Researcher's personal documentation, Table of fish yield from the report of head office)

Figure 5 presents information from interviews and reports on the *Bekarang Iwak* tradition, formatted as descriptive narratives. This figure highlights the *Bekarang Iwak* tradition's alignment with national values such as "*Gotong Royong*" or Community Mutual Cooperation. It also includes statistical data on fish catches from the *Bekarang Iwak* tradition, with yields often exceeding 2 tons. Notably, the data reveals a significant decrease in fish catches in 2021 compared to previous years, indicating fluctuations in fish yields over the past eight years.

Another statistical aspect emerging from the *Bekarang Iwak* tradition is the didactic phenomenology related to the concept of averages. In the tradition, small fish are distributed among the community, which can be analyzed through the concept of averages. According to Bakker (2004), the concept of the average historically developed from traditions of fair distribution. Bakker notes that in ancient maritime trade, such as during the first millennium AD, averages were used to determine fair compensation for lost cargo based on Rhodian law. This law involved calculating compensation proportionally to the value of cargo saved and lost. For example, if two individuals had merchandise worth 20,000 each, and one lost 10,000, fair

distribution would require proportional compensation. This historical perspective underscores the role of proportion in the concept of averages.

In the late sixteenth century, Tycho Brahe employed the average to combine observations, and the concept of the median emerged as an alternative measure of central tendency, as explained by Bakker (2004). The median is often used alongside the average to provide a measure of central location.

The findings from the interviews with the village head were utilized to design initial tasks related to statistical literacy for observational data collection. Integrating South Sumatra's local wisdom, specifically the *Bekarang Iwak* tradition, into the learning process allows for the inclusion of cultural values, traditions, language, and perspectives. Researchers achieved this integration by conducting interviews to gather community insights and designing statistical activities that respect local cultural contexts. These activities linked statistical problems to local cultural issues.

This approach was further explored in a Focus Group Discussion (FGD) involving three lecturers and six prospective teachers from the mathematics education program. The FGD served as a platform for evaluating the hypothesis of incorporating *Bekarang Iwak* local wisdom into statistical literacy education. Figure 6 depicts the FGD process at this stage.

Hypothesis testing with observational data

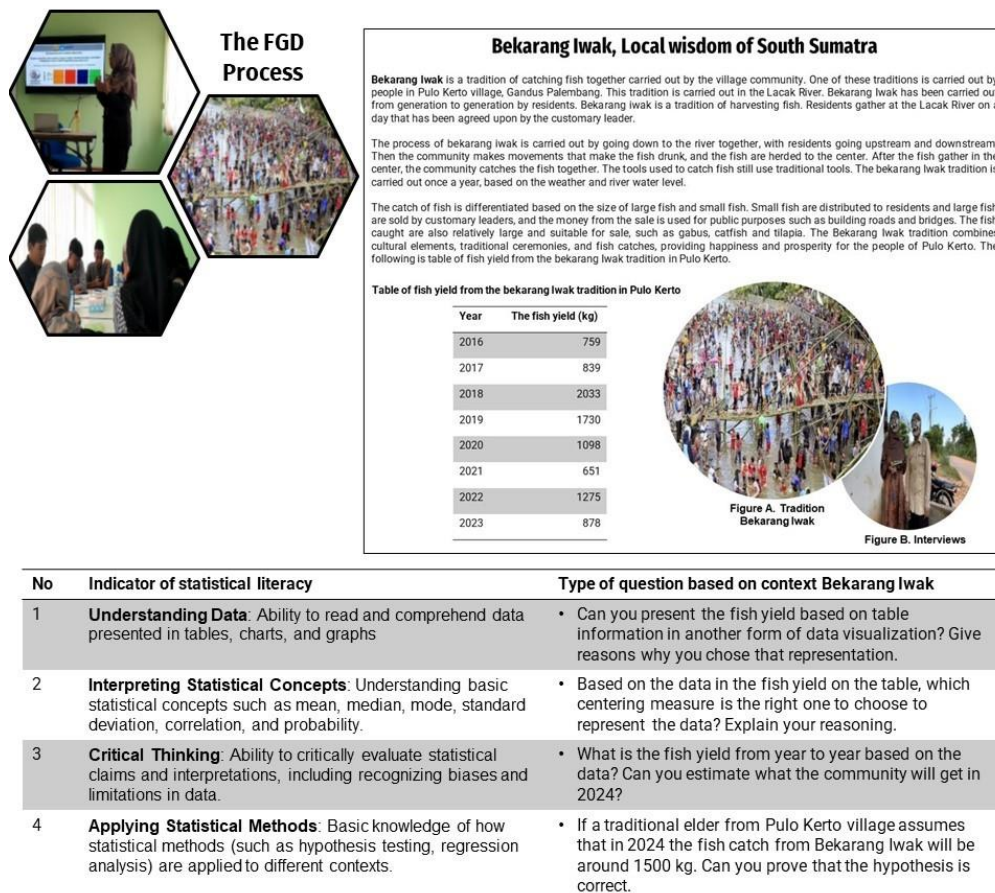


Figure 6. The FGD process in hypothesis testing with observational data stage

Figure 6 illustrates the FGD process used to test hypotheses based on observational data. During this FGD, the researcher presented the findings of the exploration and hypotheses concerning the *Bekarang Iwak* context to the participating subjects. The hypothesis testing involved evaluating the context against several criteria listed in Table 1. These criteria include the context as a component of South Sumatra's local wisdom, the context's relevance and meaningfulness for students, the context's importance for students, the context's engagement potential in the classroom, and the context's ability to enhance students' capacity to discuss civic statistics and their social implications. These criteria were used to assess whether the *Bekarang Iwak* tradition effectively supports statistical literacy learning in a meaningful and relevant manner.

Furthermore, Figure 7 illustrates that 100% of respondents agreed that the *Bekarang Iwak* context represents a form of local wisdom in South Sumatra containing relevant statistical information. Additionally, 89% of respondents found the context meaningful and effective in developing students' abilities to discuss civic statistics and their social implications. Conversely, approximately 67% of respondents agreed that the *Bekarang Iwak* context is important and engaging for students in learning statistics, while 33% felt that it was not particularly relevant or engaging in students' lives.

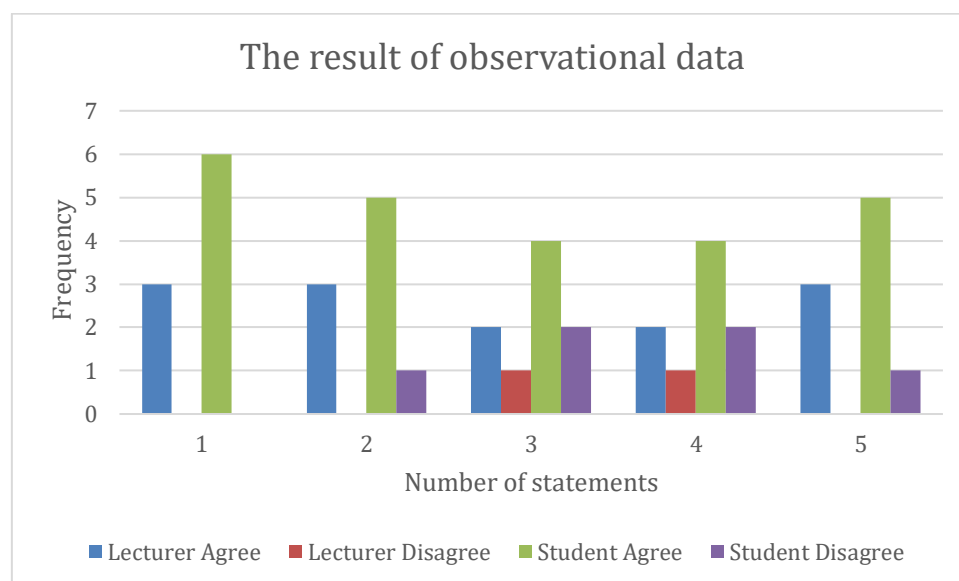


Figure 7. The result of observational data

During the discussion, it was highlighted that the *Bekarang Iwak* tradition is closely related to environmental preservation and sustainability, which are significant issues impacting students' lives. This connection underscores the importance of integrating such traditions into statistical literacy education.

Regarding question number 6, which pertains to the indicators and relevant tasks or statements for statistical context, respondents generally agreed with the proposed questions. These questions align with statistical literacy indicators used for developing questions.

However, feedback suggested that questions related to critical thinking indicators could be further specialized. The findings suggest that while the *Bekarang Iwak* tradition is a promising context for teaching statistical literacy, some adjustments to the questions are needed to enhance their effectiveness for prospective teachers.

Replication and Refinement Stage

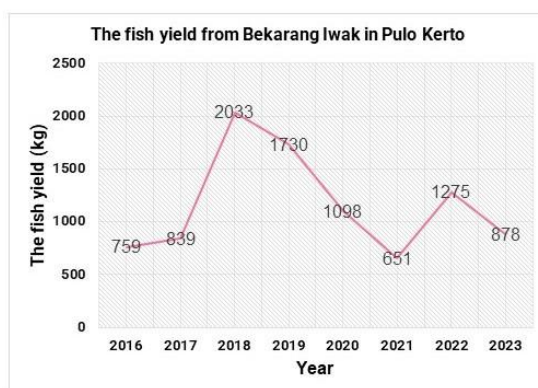
During the replication and refinement stage, the researcher undertook several key actions, such as evaluating the preliminary stages of the research, including the methods, procedures, and contextual factors related to *Bekarang Iwak*, enhancing the contextual appropriateness, and validating the findings through peer review. In the evaluation phase, the researcher assessed the initial stages of the study, noting that qualitative data analysis can be subjective and influenced by the perspectives of the participants. Consequently, during the FGD, the researcher sought dual perspectives from both lecturers and prospective teachers. This approach facilitated two-way feedback from the viewpoint of the teaching and learning process, which was believed to enhance the accuracy of the statistical analysis.

Bekarang Iwak, Local wisdom of South Sumatra

Bekarang Iwak is a tradition of catching fish together carried out by the village community. One of these traditions is carried out by people in Pulo Kerto village, Gandus Palembang. This tradition is carried out in the Lacak River. *Bekarang Iwak* has been carried out from generation to generation by residents. *Bekarang iwak* is a tradition of harvesting fish. Residents gather at the Lacak River on a day that has been agreed upon by the customary leader.

The process of *Bekarang iwak* is carried out by going down to the river together, with residents going upstream and downstream. Then the community makes movements that make the fish drunk, and the fish are herded to the center. After the fish gather in the center, the community catches the fish together. The tools used to catch fish still use traditional tools. The *Bekarang Iwak* tradition is carried out once a year, based on the weather and river water level.

The catch of fish is differentiated based on the size of large fish and small fish. Small fish are distributed to residents and large fish are sold by customary leaders, and the money from the sale is used for public purposes such as building roads and bridges. The fish caught are also relatively large and suitable for sale, such as gabus, catfish and tilapia. The *Bekarang Iwak* tradition combines cultural elements, traditional ceremonies, and fish catches, providing happiness and prosperity for the people of Pulo Kerto. The following is graph of fish yield from the *Bekarang Iwak* tradition in Pulo Kerto.



Indicator of statistical literacy

Interpreting Statistical Concepts: Understanding basic statistical concepts such as mean, median, mode, standard deviation, correlation, and probability.

Question

Based on information from the text and images from the graph of fish catches in the *Bekarang Iwak* tradition, all of the statements below are true except...

- There was a significant decrease in fish yield from 2019 to 2021.
- The biggest increase in fish yield in the graph from 2021 to 2022 is 96%.
- The biggest increase in fish yield in the graph from 2017 to 2018 is 142%.
- The total fish yield from *Bekarang Iwak* in 2016 to 2023 is more than 9.2 tons.

Figure 8. Expanding the findings of *Bekarang Iwak* context

Regarding the enhancement of contextual appropriateness, the researcher observed that the findings were reproducible and could be consistently applied to the *Bekarang Iwak* context for evaluating statistical literacy indicators. Figure 7 illustrates the integration of the *Bekarang Iwak* context through a set of multiple-choice questions designed to support the development of statistical literacy skills among prospective teachers. Compared to Figure 6, which featured descriptive questions provided during the FGD, Figure 8 presents multiple-choice questions and data visualization in graphical form. In this format, prospective teachers are required to interpret the graph and statistical statements to select the correct answer, applying statistical concepts and principles to ensure accurate interpretation.

In the peer review phase, the researcher solicited feedback from two lecturers in the mathematics education program to revalidate the new findings, specifically the multiple-choice questions. Peer review played a crucial role in affirming the validity and impact of the improvements made, with reviewers confirming that the questions were valid in terms of content, construct, and language.

The researcher acknowledges that this exploratory study represents preliminary research with a general scope, necessitating further refinement. Subsequent research will employ a design-based validation study to advance the initial design. Feedback from the FGD process will be integrated into the development of student statistical literacy learning activities. These activities will be derived from a Hypothetical Learning Trajectory (HLT) tested with students and refined into a Local Instructional Theory (LIT). The design and development of the LIT will be detailed in future studies.

Discussion

The integration of statistical literacy content with local wisdom in exploratory studies is a relatively novel approach, as evidenced by the literature review. Previous research in Indonesia has predominantly focused on ethnomathematics within an ethnographic framework (Permita et al., 2022; Khasanah et al., 2023; Amaliyah, 2024; Deda & Disnawati, 2024). Although both exploratory studies and ethnographic research aim to understand and elucidate social phenomena, they employ different methodological approaches. This study treats context exploration as preliminary research that will inform subsequent investigations. It employs exploratory methods based on grounded theory to test presumed hypotheses. Exploratory research, widely utilized in social sciences and education, aligns with Swedberg's (2020) characterization of informal exploratory studies (pre-studies) aimed at generating novel ideas. In this research, the novel idea developed is the application of the *Bekarang Iwak* local wisdom context to enhance statistical literacy education.

In the problem identification and inductive theorizing stages, the researcher employed a systematic literature review. This approach facilitates a focused examination of existing research, aiding in problem identification and providing solutions to address research gaps. The systematic review approach, as advocated by Xiao and Watson (2019), assists in mapping research to uncover solutions and identify research novelty.

During the hypothesis testing phase, which involved observational data, statistical methods for quantitative data were not employed. Instead, qualitative research approaches were used to explore and descriptively describe hypotheses, rather than formally testing them through statistical techniques (Stebbins, 2012; Swedberg, 2020). The study utilized grounded theory analysis and triangulation. Grounded Theory Analysis facilitates the development of theory from existing data, including hypothesis formulation and testing based on emerging field findings. Triangulation, involving data collection and analysis from multiple sources or methods, was employed to validate findings and strengthen proposed hypotheses. It is crucial to recognize that qualitative research primarily aims to understand and explain phenomena rather than to formally test hypotheses as in quantitative research (Stebbins, 2012).

Conclusion

To ensure that a situation or condition of local wisdom aligns with the characteristics of statistical literacy, six key criteria must be met, namely the context is a component of South Sumatra's local wisdom, the context is meaningful to students, the context is significant to students, the context actively engages students in the classroom, the context enhances students' ability to articulate opinions about civic statistics and their social implications, and the context incorporates statistical scenarios that can be integrated into learning activities. This research serves as a preliminary exploration into the cultural context of South Sumatra, specifically aimed at integrating the region's local wisdom into statistical literacy education. The study emphasizes the involvement of prospective teachers in facilitating meaningful learning experiences and empowering them to appreciate, understand, and apply local wisdom from South Sumatra. This approach is intended to bolster the statistical literacy skills of prospective teachers.

The research employs qualitative data. Future exploratory studies might utilize a mixed-methods approach, combining qualitative and quantitative data. Additionally, given Indonesia's diverse cultural landscape, there is potential for researchers to investigate other forms of local wisdom in relation to statistical literacy.

References

- Amaliyah, Y. (2024). Ethnomathematical analysis of student activities in associating quadrilateral and triangle concepts. *Journal of Honai Math*, 7(1), 57–70. <https://doi.org/10.30862/jhm.v7i1.444>
- Andriatna, R., & Kurniawati, I. (2021). Analisis Level Literasi Statistik Mahasiswa Calon Guru Matematika. *Jurnal Pendidikan Matematika dan Matematika*, 5(2), 619–632. <https://doi.org/10.36526/tr.v%vi%i.1497>
- Andriatna, R., Kurniawati, I., & Wulandari, A. N. (2021). Profil kemampuan literasi statistik mahasiswa calon guru matematika. *FIBONACCI: jurnal Pendidikan Matematika dan Matematika*, 7(1), 19–28. <https://dx.doi.org/10.24853/fbc.7.1.19-28>

- Aziz, A. M., & Rosli, R. (2021). A systematic literature review on developing students' statistical literacy skills. *Journal of Physics: Conference Series*, 1806(012102), 1–6. <https://doi.org/10.1088/1742-6596/1806/1/012102>
- Bakker, A. (2004). *Design Research in Statistics Education: On Symbolizing and Computer Tools*. CD-β Press, Center for Science and Mathematics Education.
- Ben-Zvi, D. (2020). Data Handling and Statistics Teaching and Learning. In S. Lerman (Ed.), *Encyclopedia of Mathematics Education* (2nd Editio, pp. 177–180). Springer. <https://doi.org/10.1007/978-3-030-15789-0>
- Callingham, R., & Watson, J. M. (2017). The Development of Statistical Literacy at School. *Statistics Education Research Journal*, 16(1), 181–201. <http://iase-web.org/Publications.php?p=SERJ>
- Chasanah, A. N., Wicaksono, A. B., Nurtsaniyah, S., & Utami, R. N. (2020). Analisis Kemampuan Literasi Matematika Mahasiswa pada Mata Kuliah Statistika Inferensial Ditinjau dari Gaya Belajar. *Edumatica: Jurnal Pendidikan Matematika*, 10(2), 45-56. <https://doi.org/10.22437/edumatica.v10i2.10621>
- Deda, Y. N., & Disnawati, H. (2024). Ethnomathematical investigation of traditional games for cultural preservation in the Indonesia-Timor Leste border region. *Journal of Honai Math*, 7(1), 19–36. <https://doi.org/10.30862/jhm.v7i1.512>
- Fitrisyah, M. A., Susanti, E., & Zulkardi. (2023). Analisis kemampuan representasi matematis peserta didik materi sistem persamaan linear pada soal konteks kuliner Palembang. *Jurnal Pembelajaran Matematika Inovatif*, 6(1), 179–188. <https://doi.org/10.22460/jpmi.v6i1.14570>
- Forgasz, H., Hall, J., & Robinson, T. (2022). Evaluating Pre-service Teachers' Statistical Literacy Capabilities. *Mathematics Education Research Journal*. <https://doi.org/10.1007/s13394-022-00438-6>
- Gal, I. (2019). Understanding statistical literacy: About knowledge of contexts and models. *Actas Del Tercer Congreso Internacional Virtual de Educación Estadística*, 1–15. <https://www.ugr.es/~fqm126/civeest/ponencias/gal.pdf>
- Guyen, B., Baki, A., Uzun, N., Ozmen, Z. M., & Arslan, Z. (2021). Evaluating the Statistics Courses in Terms of the Statistical Literacy: Didactic Pathways of Pre-Service Mathematics Teachers. *International Electronic Journal of Mathematics Education*, 16(2), 1–15. <https://doi.org/10.29333/iejme/9769>
- Habibie, Z. R., & Hidayat, P. W. (2022). Analisis peningkatan literasi statistik mahasiswa pada mata kuliah statistika pendidikan berbasis The Statistical Process. *Jurnal Muara Pendidikan*, 7(1), 156–164. <https://doi.org/10.52060/mp.v7i1.788>
- Hauda, N., Zulkardi, Z., & Susanti, E. (2023). Kemampuan Pemodelan Matematika Siswa pada Topik Program Linear Konteks Palembang Lamonde. *Indiktika : Jurnal Inovasi Pendidikan Matematika*, 6(1), 44–56. <https://doi.org/10.31851/indiktika.v6i1.13116>

- Heuvel-panhuizen, M. Van Den, Drijvers, P., Education, M., Sciences, B., & Goffree, F. (2014). Realistic Mathematics Education. In *Encyclopedia of Mathematics Education* (pp. 521–532). <https://doi.org/10.1007/978-94-007-4978-8>
- Idris, K. (2021). Rancangan Materi Statistika Terintegrasi Nilai dan Budaya Keislaman: Sebuah Kerangka Konseptual. *Al-Khwarizmi: Jurnal Pendidikan Matematika Dan Ilmu Pengetahuan Alam*, 9(1), 29–56. <https://doi.org/10.24256/jpmipa.v9i1.1656>
- Ikhwanudin, T. (2018). Kearifan lokal dalam pembelajaran matematika. *Union: Jurnal Pendidikan Matematika*, 6(1), 11–18. Retrieved from: <https://jurnal.uns.ac.id/jpm/article/view/26054/18268>
- Jamil, A. F., Cahyono, H., & Ayu, M. S. (2021). Pengembangan Handout Matematika Bercirikan Kearifan Lokal untuk Meningkatkan Kemampuan Literasi Matematis. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 10(1), 48. <https://doi.org/10.24127/ajpm.v10i1.3260>
- Jatisunda, M. G., Nahdi, D. S., & Suciawati, V. (2020). Kemampuan literasi statistika mahasiswa administrasi publik. *SJME (Supremum Journal of Mathematics Education)*, 4(2), 134–146. Retrieved from: https://www.researchgate.net/profile/Mohamad-Jatisunda-2/publication/343965357_Literasi_Statistika_Mahasiswa_Administrasi_Publik/links/5f9702b892851c14bce7e1a9/Literasi-Statistika-Mahasiswa-Administrasi-Publik.pdf?origin=journalDetail&_tp=eyJwYWdlIjoiam91cm5hbERldGFpbCJ9
- Khaerunnisa, E., & Pamungkas, A. S. (2017). Profil Kemampuan Literasi Statistis Mahasiswa Jurusan Pendidikan Matematika Universitas Sultan Ageng Tirtayasa. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 6(2), 246. <https://doi.org/10.24127/ajpm.v6i2.970>
- Khasanah, M., Khalil, I. A., & Prahmana, R. C. I. (2023). An inquiry into ethnomathematics within the framework of the traditional game of Congklak. *Journal of Honai Math*, 6(2), 175-188. <https://doi.org/10.30862/jhm.v6i2.553>
- Komar, S., Mulyono, B., & Hapizah, H. (2022). Desain Aplikasi Pembelajaran Matematika Berbasis Geogebra pada Materi Transformasi dengan Konteks Kearifan Lokal Palembang. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 11(4), 3139. <https://doi.org/10.24127/ajpm.v11i4.6170>
- Lieberman, E. (2020). Research Cycles. In C. Elman, J. Gerring, & J. Mahoney (Eds.), *The Production of Knowledge: Enhancing Progress in Social Science*, 1, 42–60. Cambridge University Press. <https://doi.org/10.1017/9781108762519>
- Muñiz-Rodríguez, L., Rodríguez-Muñiz, L. J., & Alsina, Á. (2020). Deficits in the statistical and probabilistic literacy of citizens: Effects in a world in crisis. *Mathematics*, 8(11), 1–20. <https://doi.org/10.3390/math8111872>
- Muslimin, M., Antari, L., Khasanah, R., & Hirza, B. (2022). Konteks Kuliner Tradisional Sumatera Selatan dalam LKPD PMRI Berbasis Masalah Open Ended di Sekolah Dasar.

- AKSIOMA: Jurnal Program Studi Pendidikan Matematika, 11(4), 3412. <https://doi.org/10.24127/ajpm.v11i4.6173>
- Ostian, D., Zulkardi, Z., & Susanti, E. (2023). Kemampuan koneksi matematis siswa pada materi bangun datar dengan konteks wisata Palembang. *Indiktika : Jurnal Inovasi Pendidikan Matematika*, 5(2), 211–221. <https://doi.org/10.31851/indiktika.v5i2.11391>
- Permita, A. I., Nguyen, T. T., & Prahmana, R. C. I. (2022). Ethnomathematics on the Gringsing batik motifs in Javanese culture. *Journal of Honai Math*, 5(2), 95-108. <https://doi.org/10.30862/jhm.v5i2.265>
- Pingge, H. D. (2017). Kearifan lokal dan penerapannya di sekolah. *Jurnal Edukasi Sumba*. 1(2), 128-135. <https://doi.org/10.53395/jes.v1i2.27>
- Rawani, D., Putri, R. I. I., Zulkardi, & Susanti, E. (2023). RME-based local instructional theory for translation and reflection using of South Sumatra dance context. *Journal on Mathematics Education*, 14(3), 545–562. <https://doi.org/10.22342/jme.v14i3.pp545-562>
- Retnawati, H., & Hidayati, K. (2023). *Eksplorasi Tingkat Literasi Statistik Mahasiswa Sarjana Pendidikan Matematika dan Faktor-Faktor yang Mempengaruhinya*. <https://www.youtube.com/watch?v=nvfy2YrsKzo>
- Riyanto, B., Zulkardi, Putri, R. I. I., & Darmawijoyo. (2019). Learning mathematics through mathematical modeling approach using Jembatan Musi 2 context. *Journal of Physics: Conference Series*, 1315(1). <https://doi.org/10.1088/1742-6596/1315/1/012008>
- Rumsey, D. J. (2002). Statistical literacy as a goal for introductory statistics courses. *Journal of Statistics Education*, 10(3). <https://doi.org/10.1080/10691898.2002.11910678>
- Sari, A., & Putri, R. I. I. (2021). Inductive reasoning ability of students using the Palembang Songket Fabric context in rotational learning in grade IX. *Jurnal Pendidikan Matematika*, 16(1), 57–72. <https://doi.org/10.22342/jpm.16.1.14304.57-72>
- Setiani, N. W., & Suyitno, A. (2021). Kemampuan Membaca Data dan Rasa Ingin Tahu Siswa Terhadap Kemampuan Literasi Statistik. *QALAMUNA: Jurnal Pendidikan, Sosial, Dan Agama*, 13(2), 257–270. <https://doi.org/10.37680/qalamuna.v13i2.915>
- Setiawan, E. P. (2021). Statistical literacy in indonesia primary school mathematics curricula 2004-2020: Historical review and development. *Jurnal Pendidikan Dan Kebudayaan*, 6(1), 1–20. <https://doi.org/10.24832/jpnk.v6i1.1915>
- Sharma, S. (2017). Definitions and models of statistical literacy: A literature review. *Open Review of Educational Research*, 4(1), 118–133. <https://doi.org/10.1080/23265507.2017.1354313>
- Sohilait, E., & Abdurrachman, O. (2022). Modul kearifan lokal Maluku untuk meningkatkan kemampuan literasi matematis siswa. *Jurnal Pendidikan Matematika Indonesia (JPMI)*, 7(1), 36–40. Retrieved from: <https://core.ac.uk/download/pdf/521882729.pdf>
- Stebbins, R. (2012). Exploratory research in the social sciences. In *Exploratory Research in the Social Sciences*. SAGE Publications, Inc. <https://doi.org/10.4135/9781412984249>

- Swedberg, R. (2020). Exploratory research. In C. Elman, J. Gerring, & J. Mahoney (Eds.), *The Production of Knowledge: Enhancing Progress in Social Science*, 1, 18–41. Cambridge University Press. <https://doi.org/10.1017/9781108762519>
- Syaifudin, S., Hirza, B., Antari, L., & Mukharomah, E. (2023). LKPD PMRI dengan Konteks Makanan Khas Kota Palembang untuk Meningkatkan Hasil Belajar. *Prima Magistra: Jurnal Ilmiah Kependidikan*, 4(3), 336–343. <https://doi.org/10.37478/jpm.v4i3.2839>
- Takaria, J., & Talakua, M. (2018). Kemampuan literasi statistik mahasiswa calon guru ditinjau dari kemampuan awal matematika. *Jurnal Kependidikan*, 2(2), 395–408. <https://doi.org/10.21831/jk.v2i2.18768>
- Taufan, A., Nendissa, J. I., Sinurat, J., Bormasa, M. F., Tita, H. M. Y., Surya, A., Hehanussa, D. J., Ratri, W. S., Lewerissa, Y. A., & Nuraeni, A. (2023). *Kearifan Lokal (Local Wisdom) Indonesia* (1st Ed). Widina Media Utama. www.freepik.com
- Tiro, M. A. (2018a). National movement for statistical literacy in Indonesia: An idea. *Journal of Physics: Conference Series*, 1028(1). <https://doi.org/10.1088/1742-6596/1028/1/012216>
- Tiro, M. A. (2018b). Strategi aksi gerakan nasional literasi statistika di indonesia. *Seminar Nasional Variansi (Venue Artikulasi-Riset, Inovasi, Resonansi-Teori, dan Aplikasi Statistika)*, 2018, 1–21. <https://ojs.unm.ac.id/variansistatistika/article/view/7193>
- Utari, R. S. (2017). Desain pembelajaran materi perbandingan menggunakan konteks resep Empek-Empek Untuk. *RAFA: Jurnal Pendidikan Matematika*, 3(1), 103–121. <https://jurnal.radenfatah.ac.id/index.php/jpmrafa/article/view/1444>
- Utari, R. S., Putri, R. I. I., & Hartono, Y. (2015). Konteks kebudayaan Palembang untuk mendukung kemampuan bernalar siswa SMP pada materi perbandingan. *Jurnal Didaktik Matematika*, 2(2), 27–37. <https://jurnal.usk.ac.id/DM/article/view/2847/2710>
- Utari, R. S., Putri, R. I. I., & Zulkardi. (2024). Designing a Hypothetical Learning Trajectory using the local wisdom of South Sumatera as a context through hybrid learning. *Jurnal Pendidikan Matematika*, 18(1), 79–96. <https://doi.org/10.22342/jpm.v18i1.pp79-96>
- Weiland, T. (2017). Problematizing statistical literacy: An intersection of critical and statistical literacies. *Educational Studies in Mathematics*, 96(1), 33–47. <https://doi.org/10.1007/s10649-017-9764-5>
- Widyani, R. (2021). *Bumiku Indonesia: Bunga Rampai Kearifan Lokal*. Jakarta: LIPI Press. <https://doi.org/10.14203/press.293>
- Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. *Journal of Planning Education and Research*, 39(1), 93–112. <https://doi.org/10.1177/0739456X17723971>
- Zulkardi. (2002). *Developing A Learning Enviroment on Realistics Mathematics Education for Indonesian Students Theacers*. University of Twente.

Zulkardi, Z., Putri, R. I. I., & Wijaya, A. (2020). Two Decades of Realistic Mathematics Education in Indonesia. In *International Reflection on the Netherland Didactic of Mathematics* (pp. 325–340). https://doi.org/10.1007/978-3-030-20223-1_18