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Systematic Literature Review: The Importance of Computational Thinking Abilities in the Era of Society 5.0 in Mathematics Learning

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ABSTRACT

This research aims to conduct a literature review regarding students' computational thinking abilities in facing the era of Society 5.0 in mathematics learning. The method used in the research is a Systematic Literature Review (SLR) which consists of the results of approximately 200 studies regarding students' computational thinking abilities, but only 10 research results were included. The sample consists of national and international indexed journals published in the period 2015 – 2023. Several studies regarding the meaning of computational thinking abilities, computational thinking in mathematics learning, indicators of computational thinking abilities, and theories about computational thinking abilities. The computational thinking capabilities used in mathematics learning are in line with the challenges of the Society 5.0 era, which emphasizes problem-solving and the application of technology. This helps students develop cognitive abilities to understand and solve mathematical problems. This ability helps students identify, formulate, and solve mathematical problems more effectively in the context of mathematics learning.

Keywords: Computational Thingking, Mathematics Learning, Society 5.0

1. Introduction

Computational Thinking (CT) skills have become extremely crucial in mathematics learning in the Society 5.0 age. CT is a problem-solving and analytical talent that entails identifying and applying relevant techniques and tools both digitally and in real life (Isharyadi & Juandi, 2023).

In an increasingly digital society, technical knowledge and abilities will become essential factors in the job development of today's pupils in an increasingly digital society (Isharyadi & Juandi, 2023). CT prepares students for future challenges by teaching them how to comprehend, evaluate, and solve complex problems.

Technology is quickly evolving in the Society 5.0 age. CT capabilities allow pupils to adapt to technological developments and effectively use them in math studies. Through modeling, simulation, and visualization, CT can assist students in understanding abstract mathematical concepts (Barcelos et al., 2018). Students can gain a better understanding of mathematical principles by applying them to real-world circumstances.

CT entails selecting and applying effective problem-solving strategies (S. Maharani et al., 2020). CT can assist students in identifying problems, developing problem-solving strategies, and evaluating the solutions that follow.

Mathematics learning with CT can be more engaging for students since it incorporates modeling, simulation, and problem-solving in real life (Barcelos et al., 2018). This can boost student interest and involvement in mathematics learning.

CT can be used in mathematics learning through a variety of activities such as mathematical modeling, programming, and the usage of educational games (Barcelos et al.,

2018). In the Society 5.0 age, the use of CT in mathematics learning can give considerable benefits for students, such as increased mathematical knowledge, problem-solving abilities, and student involvement in learning (Isharyadi & Juandi, 2023).

According to a study on CT-based mathematics learning in the Independent Learning Curriculum era, this learning strategy proved beneficial in assisting students in finding mathematical solutions (Ni et al., 2022). Then, Ni et al., (2022) evaluated the appropriateness of CT-based learning methods with the Independent Learning Curriculum, discovering that this learning approach fulfilled students' needs in the face of technological changes.

Maharani, A.). (2020). Because it incorporates modeling, simulation, and problem solving in real world, CT-based mathematics learning can be more engaging for children. It was discovered in a study on the use of CT for slow learners in solving arithmetic sequence problems found that this learning strategy can boost student interest in learning.

Several studies demonstrate that using CT can help students enhance their mathematics knowledge (Ye et al., 2023). More in-depth research, however, is required to demonstrate openly and clearly how CT can enhance mathematical learning. This study may aid in the development of more effective learning strategies for enhancing students' mathematical understanding.

Students sometimes experience obstacles while solving mathematical problems using programming due to the distinctions between two forms of thinking, namely computational thinking and mathematical thinking (Park, 2023). More study is needed to discover and address these obstacles so that CT can be used more effectively in mathematics learning.

Several studies in the literature discuss the development of learning tools and ways to integrate CT with mathematics (Chan et al., 2023). More research, however, is required to determine the most effective learning tools and methodologies for boosting students' CT abilities and mathematical knowledge.

Mathematics learning with CT can be more engaging for children since it incorporates modeling, simulation, and problem-solving in real life (Ye et al., 2023). More research is needed, however, to understand the elements that drive student participation in CT-based learning and how to improve it.

2. Literature Review and Hypothesis

2.1 Computational Capabilities

A range of skills and concepts that aid in problem-solving and data analysis are included in computational thinking abilities (Monalisa, 2023). Some of the capabilities associated with computational thinking are as follows (Nuvitalia et al., 2022):

1. **Decomposition:** The capacity to divide large issues into smaller, more manageable chunks. This helps in gaining a better understanding of the situation.
2. **Pattern Recognition** is the capacity to identify patterns or similarities in data or problems. Pattern recognition helps in the discovery of more efficient solutions.
3. **Abstraction:** The capacity to simplify problems by removing extraneous elements and focusing solely on the most relevant aspects. This helps in the development of simpler and more efficient solutions.
4. **Algorithmic Design:** The capacity to create systematic methods or algorithms for issue

solving. This involves step-by-step reasoning.

5. **Debugging and Error Handling:** The capacity to find and fixing mistakes in algorithms or computer code. Fault detection is an essential aspect of developing computational solutions.
6. **Iteration** is the ability to repeat problem-solving processes or actions in order to refine and optimize solutions.
7. **Algorithmic Efficiency:** The capacity to evaluate and improve the efficiency of algorithms. This includes minimizing the waste of time and resources.
8. **Logical Thinking:** The ability to construct solutions rationally and methodically. Understanding logical and mathematical ideas is required.
9. **Problem-solving:** the ability to identify issues, devise solutions, and carry out the activities required to achieve objectives.
10. **Data analysis:** the ability to acquire, analyze, and evaluate data in order to make informed decisions.

This computational thinking capacity is applicable not only in the realm of programming or computer science, but also in many other fields such as physics, mathematics, engineering, economics, and others. It assists individuals in dealing with difficult problems and making better decisions based on a greater grasp of the issue at hand.

2.2 Computational Thinking Ability in Mathematics Learning

Computational thinking skills can be quite beneficial when learning mathematics. Here are some examples of how computational thinking skills might be used in mathematics learning (Kamil, 2021):

1. **Mathematical Problem Solving:** When faced with a complex mathematical problem, students can utilize computational thinking to solve it by breaking it down into smaller parts and inventing algorithms to solve it.
2. -
3. **Data Analysis:** In mathematics, data analysis is frequently required. Computational thinking requires the capacity to acquire data, analyze it, and recognize patterns or links in the data.
3. **Use of Mathematical Software:** Students can perform complex calculations and data analysis using mathematical software and spreadsheets. Computational thinking assists individuals in making efficient use of these tools.
4. **Mathematical Models:** Students must employ abstraction and conceptualization while modeling real-world problems in mathematics. Computational thinking abilities aid in the creation of accurate models.
5. **Algorithm Development:** When students encounter mathematical issues involving action sequences, they can apply computational thinking abilities to build systematic algorithms to solve the problem.
6. **Computational thinking** can assist students in managing measurement and statistical data, such as computing the mean, median, or standard deviation.
7. **Pattern Recognition:** Computational thinking can be used by students to spot patterns in a series of numbers, sequences, or mathematical formulas. It aids in the comprehension of

mathematical concepts.

8. Computational thinking can be used to solve mathematical games and puzzles, where students design methods based on mathematical patterns and logic.
9. Independent Learning: Computational thinking allows students to build independent mathematical problem-solving skills and gain confidence in addressing complicated mathematical problems.

Computational thinking in mathematics learning assists students in better understanding mathematical topics, improving problem-solving abilities, and integrating mathematics with modern technologies. This is also important in meeting the expectations of a more connected and data-driven world.

4. Research and methods

The SLR (Systematic Literature Review) method was employed in this study. They use this strategy by identifying, examining, evaluating, and interpreting all available research. Researchers use this strategy to systematically review and identify publications, with each procedure following predetermined steps (Triandini et al., 2019).

The research method employed was a Systematic Literature Review (SLR), which included the findings of about 200 studies on students' computational thinking ability but was decreased by 10 research findings. The sample includes national and international indexed journals published between 2015-2023. Several studies have been conducted on the meaning of computational thinking abilities, computational thinking in mathematics learning, computational thinking ability indicators, and computational thinking ability theories.

5. Result and Discussion

SLR demonstrates that CT is a critical skill in the Society 5.0 age. This epoch is defined by the advancement of digital technology, artificial intelligence, robotics, and general digital transformation. In dealing with these developments, the capacity to think computationally is becoming increasingly vital (Chahyadi et al., 2021).

The SLR findings also show that CT can play a crucial role in enhancing mathematics comprehension. CT assists students in better understanding abstract and difficult mathematical subjects through modeling, simulation, and visualization (Augie et al., 2023).

CT entails identifying and putting into action relevant problem-solving techniques. This ability helps students more effectively identify, formulate, and solve mathematical issues in the context of mathematics study (Ngaeni & Saefudin, 2017).

The SLR results suggest that CT is particularly relevant to mathematics learning objectives, such as problem-solving ability, conceptual comprehension, and applying mathematics in the context of everyday life (Anggrasari, 2021).

According to the literature, there are obstacles in integrating CT into mathematics learning. One of the most difficult issues is the distinction between computational and mathematical thinking, which necessitates the appropriate strategy to merge the two (Arzaki et al., 2023).

The importance of Computational Thinking (CT) skills in mathematics learning cannot be overstated in the Society 5.0 era. With rapid improvements in technology and digital

transformation, students must be prepared to face future challenges with CT skills. CT helps children better understand mathematics, develop problem-solving skills, and connect mathematical concepts to the real world.

However, the use of CT in mathematics education is fraught with difficulties. It is critical for educators and curriculum authors to understand the distinctions between computational and mathematical thinking and how to effectively combine them in the classroom.

Furthermore, there is a lot of untapped research potential, such as the relationship between CT and in-depth mathematical comprehension, the development of effective learning tools and methodologies, and how to promote student involvement in CT-based learning.

The findings of this SLR contribute to a deeper understanding of the role of CT in mathematics learning in the Society 5.0 age, as well as a foundation for designing better learning strategies for incorporating CT into the mathematics curriculum.

Several literature sources include the following indications of Computational Thinking (CT) aptitude in mathematics learning:

- Decomposition is the ability to divide difficult issues into smaller, easier-to-solve portions (Astuti et al., 2023)
- Pattern recognition is the ability to recognize patterns and extract useful information from difficult challenges (Fikriyah, 2022).
- Abstraction is the ability to portray problems in an abstract manner through the use of models or simulations (Megawati et al., 2023).
- Algorithms are the capacity to design solutions using algorithms and computational steps (Ramanda et al., 2022).
- Generalization: The ability to apply solutions to a wide range of issues.
- Critical thinking: The ability to examine the resulting answer and, if required, modify it.
- Collaboration: The ability to collaborate with others to overcome difficult situations.
- Logical thinking is defined as the ability to solve problems in a systematic and logical manner (Christi & Rajiman, 2023).

These indicators can help teachers build CT-based mathematics learning and assist students in acquiring CT abilities. Several studies have found that improving pupils' CT abilities can enhance their mathematical understanding and problem-solving skills.

According to Jean Piaget's theory, computational thinking (CT) theory in mathematics learning focuses on improving human cognitive abilities through internal motivation and interaction with the environment (S. Maharani et al., 2020). Learning mathematics through a CT approach can help pupils develop cognitive structures for comprehending and solving mathematical problems. Moreover, the hybrid learning model, based on hybrid learning theory, integrates traditional and technological approaches in the learning process (Helsa et al., 2023). The CT technique can be combined with the hybrid learning model in the context of mathematics learning to improve students' knowledge of mathematical ideas and problem-solving skills.

6. Conclusion

The SLR identifies CT as a crucial ability for dealing with difficulties and changes in the Society 5.0 age. This epoch is defined by rapid digital change, the advancement of echnology

such as artificial intelligence and robots, and overall digital transformation. The capacity to think computationally is critical in educating pupils for an increasingly linked and technologically-based world. SLR also demonstrates that CT can effectively aid in the understanding of complicated and difficult mathematical ideas. CT helps students grasp and absorb mathematical concepts by using modeling, simulation, and visualization. One of the most noteworthy discoveries from SLR is that CT assists pupils in developing problem-solving skills. It tests students' ability to design mathematical problems, select appropriate procedures, and assess the solutions. The integration of CT into mathematics education aligns with the objectives of mathematics education, which aim to enhance understanding of mathematical concepts, problem-solving ability, and mathematical skills that can be applied in daily life. Although crucial, incorporating CT into mathematics learning poses a number of obstacles. One of The most difficult issues is the distinction between computational and mathematical thinking, which necessitates a thorough and organized approach to be successfully incorporated into the mathematics curriculum. the importance of adding CT elements in mathematics study is to equip students with abilities relevant to the Society 5.0 age. The use of CT can help students better grasp mathematics, improve problem-solving skills, and prepare them for a more digital and connected future. However, for CT-based mathematics learning to be effective, implementation obstacles must be acknowledged and overcome.

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The analysis of Students' Misconceptions Using Certainty of Response Index (CRI) on Derivative Materials

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ABSTRACT

This study aimed to identify the extent of misconceptions and factors experienced by students at SMA Negeri 7 Lhokseumawe in derived materials. Students' misconception was identified by using a test noting students' ability to understand mathematical concepts. The test was equipped with a Certainty of Response Index (CRI) showing the level of student confidence, the results of which were analyzed to investigate students' misconceptions. This study was designed using a qualitative research method. The subjects were a number of 6 students, selected purposively. The data were collected through tests, interviews, and documentation. The emerging results of students' misconceptions and factors influencing their learning were analyzed through data reduction, presentation, and drawing conclusions. The results indicated that the number of misconceptions that occurred in students was 32.34%, while the number of those who did not understand the concept was 67.08%. The number of students who did not understand the concept was higher than those who were capable of. The students' misconceptions per se were triggered by their associative thinking, incomplete reasoning, learning interest, and teacher teaching methods.

Keywords: Certainty of Response Index (CRI), Misconceptions, Derivatives.

1. Introduction

Understanding concepts is a mastery of a number of learning materials. Students do not just learn to know but are able to re-express the concepts in a form that is easier to understand and applicable for them. Learning mathematical concepts and their principles is an initial requirement for the success of mathematics learning leading to a higher stage, because in mathematics, simple concepts are connected to more complex ones. When students are unable to restate what they have learned and fail to classify objects based on particular criteria, it causes misconceptions (Kilpatrick et al., 2002; Rosmawati, 2008; Ceran & Ates, 2010).

Misconceptions are descriptions of concepts in a statement that are not in accordance with general understanding, so they cannot be accepted. Misconceptions are formed as a result of someone's preconceptions that do not comply with natural concepts and go against an understanding that has been agreed upon by experts in a field of knowledge. They can occur due to an inaccurate understanding of a concept received by students, along with the use of the wrong concept and confusion of different concepts (Omrod, 2009; Dahar, 2011; Suparno, 2013; Sarlina, 2016).

Studies have shown that there is a possibility that occurs from the answers given by students, which is known as the incomplete understanding of the derivative concept or misconceptions.

Thus, identifying students' misconceptions using the Certainty of Response Index (CRI) technique is truly necessary. According to Ulfah (2017), the technique is used to distinguish students who have misconceptions by measuring their level of confidence or certainty. The level of certainty of answers is reflected in the Certainty of Response Index (CRI) scale along with responses. A mathematical misconception can be corrected.

Simply by comparing whether the answer to a question is correct or not, adjusted in line with the level of certainty index on the Certainty of Response Index (CRI) scale (Tayubi, 2005). Fadillah (2016) affirms that the inquiry process provides an overview of students' misconceptions in solving problems on comparative material using the Certainty of Response Index (CRI).

The purpose of this study was to investigate mathematical misconceptions as well as factors influencing students' learning, which was conducted on class XI students using the Certainty of Response Index (CRI) on derived materials. A study conducted by Hasan (2015) showed that when students lagged behind in accepting the described materials, teachers often teachers forward their teaching to the next material. This happened because they assumed that their students had understood the taught concepts. This condition caused students to be incorrect in using the concept incorrectly and develop mathematical misconceptions. Therefore, this study identified the misconceptions of seventh-grade junior high school students' on the whole number material using the Certainty of Response Index (CRI).

2. Review of Related Literature

Educational activities are one aspect of national development in educating the nation's life, exerted by professional teaching staff. According to Asbar (2017), education refers to a process of changing the attitudes and behavior of a person or group of people in an effort to mature humans through teaching and training. It is also known as a conscious and planned attempt to create a learning atmosphere and process so that students can actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and state (Ministry for Education Affairs, 2006).

Education is a teaching process that everyone is obliged to undergo. In a narrow sense, teaching is an activity to formally deliver subject matter so that students master the teaching material. One of the teaching materials in schools is mathematics. Mathematics is one of the fields that has an important role in education. This can be seen by the stipulation of mathematics as one of the compulsory subjects in every National Examination (NE) (Ministry for Education Affairs, 2006). Mathematics is taught starting from the concrete stage, semi-concrete, to the abstract. It is also instructed from simple to complex concepts. Ernest (2004) states that mathematics is a hierarchical subject, where one topic is related to another. The aspects require students to have a good understanding of a concept in order to learn the others. If one concept is not understood, it will affect the understanding of the other concepts as they are interrelated. This means that mathematics is essential in figuring out the basic concepts so that later it will be easier to comprehend the subsequent concepts.

Umar (2004) states that "the concept is a number of theories related to an object, which are constructed by classifying and grouping the certain equal characteristics objects." According to Estavina (2019), the concept is a basis for thinking, describing a regularity or relationship with a group of factors which are indicated by some symbols or signs. The concepts play an important role in mathematics due to the fact that they are concerned with the abstract ideas that are hierarchically arranged and deductively reasoned. Therefore, it is important for teachers to pay attention to students' understanding of concepts so that misconceptions can be narrowed. Fadllan (2011) and Suparno (2013) argue that a misconception or a wrong concept refers to a theoretical basis that is not in accordance with the scientific understanding accepted by experts in the field of knowledge, such as initial concepts, errors, and incorrect relationships between one concept and another. Meanwhile, Fowler (as cited in Sarlina, 2016) views misconceptions as an inaccurate or incorrect understanding and use of concepts, wrong classification of examples, confusion of different concepts, and incorrect hierarchical relationships of concepts.

From some of the definitions above, mathematical misconceptions can be defined as an inaccurate interpretation of certain concepts that are not in line with the generally accepted understanding. If misconceptions are not immediately addressed, they will become integrated (unified) in the cognitive process. structure related to) students. The existence of misconceptions will hinder students' mastery of a concept, which then causes their low learning achievement.

Based on the results of interviews conducted on January 24th, 2022, it was discovered that a number of students was identified to have low grades and needed to take further remedial classes, especially in learning the derived materials. Similarly, students were unable to apply derived concepts dealing with derived material. According to the mathematics teacher at SMA Negeri 7 Lhokseumawe, the inconvenient performances were caused by the fact that the students' initial concepts were not investigated. When working on the problem, students were confused in determining the derivative concept. A large number of students were also found to be incapable of answering the given questions. In short, it was found that only 37 or 12.83 % of students understood the mathematical concept, while a percentage of 77.70% of students were unable to comprehend the concept. Additionally, 9.46% of students were found to have experienced misconceptions in learning the comparative material. This means that there were fewer students who understood the concept than those who did not.

3. Research Methods

The qualitative approach was used in this study. Creswell (2012) notes that a qualitative approach is useful for revealing and unearthing a problem in detail. The type of research used in this study was a descriptive research design. Similarly, it was conducted to determine the value of independent variables, either one or more variables without connecting with other variables (Sugiyono, 2019).

The research subjects were selected by purposive sampling, a technique carried out under certain considerations and goals (Sugiyono, 2019). Students who took the test were those in the selected class. They were given questions along with a Certainty of Response Index (CRI) scale in which they would choose

based on their level of confidence. There were a number of 6 students selected to be the subject of the interview based on different criteria of students' answers.

Table 1. Certainty of Response Index (CRI) Criteria and its Provision

Certainty of Response Index (CRI)	Criteria	Low Certainty of Response Index (<2,5)	High Certainty of Response Index (>2,5)	Answer Criteria
0	Totally Gussed Answer	Correct answer but low CRI means not knowing the concept (Lucky guess).	Correct and high CRI means mastering the concept well.	Correct answer
1	Almost Guess			
2	Not Sure			
3	Sure	Wrong answer and low CRI means not knowing the draft.	Wrong answer but high CRI means misconception happened.	Wrong answer
4	Almost Certain			
5	Certain			

Source: Hasan, et al (1999)

The Certainty of Response Index (CRI) technique identified not only students' misconceptions, but also it can distinguish students who know the concept, while those who do not. It can be seen from the answers and the confidence scale given by the students as shown in the table below. The following shows four possible combinations of answers (true or false) and a high or low Certainty of Response Index (CRI) for each individual respondent in answering questions (questions). The criteria for assessing the ability to understand mathematical concepts were outweighed by several thematic performances such as the indication of restating a concept, the classification of objects, the presentation of concepts, and the application of concepts (Mawaddah, 2014).

There were three stages of procedures used to investigate students' misconceptions in learning the mathematical concept of derivative material, three the preparation, planning, implementation, and data analysis. The determination and thorough analysis of research setting was mainly done in the research setting. The planning stage in this research was to carry out several activities including reviewing theories about misconceptions, making indicators that would be used in research according to the material, and compiling research instruments, including written tests as well as the interview guidelines.

The implementation was the core stage of the research. A test was performed on derived materials with several questions, and an interview was conducted. The results of written test were then analyzed based on the indicators, and the level of student confidence was measured by the Certainty of Response Index (CRI) scale. The last stage, the data conclusion, was conducted to describe or explain the research results regarding the misconceptions, followed by drawing conclusions in the form of a written report. In this study, the information or data was obtained through a test projecting the indicators of the ability to understand mathematical concepts, equipped with a Certainty of Response Index (CRI) scale.

4. Result and Discussion

Based on the results of grouping the level of understanding of students' mathematical concepts, it was discovered that there were students who did not understand the concept. It was also found that the level of understanding of students' mathematical concepts, especially on derived material, was relatively low.

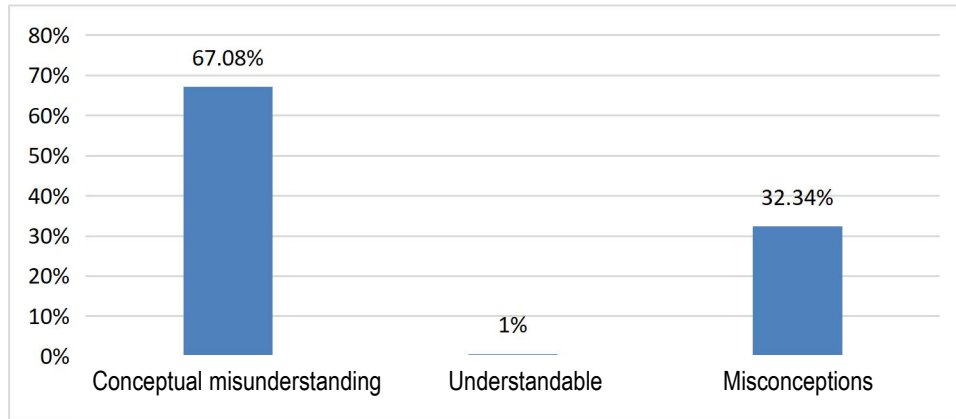


Figure 1. Level of students' mathematical concepts

Figure 1 notes that the total number of students who experienced misconceptions was 32.34%. This result was much lower than those who misunderstood the concept, assessed as much as 67.08%. This shows that the level of understanding of students' mathematical concepts, especially on derived material, was still very low. This statement can be seen from the percentage, which shows that only 1% of students understand the concept.

Table 2. Percentage of students' level of understanding on Each Item

Question Number	Total Don't Understand Concept	Percentage	Total Understanding of Concepts	Percentage	Total of Misconceptions	Percentage
1	5	14,7%	0	0%	29	85,3%
2	14	41,2%	1	2,9%	19	55,9%
3	29	85,3%	0	0%	5	14,7%
4	33	97,1%	0	0%	1	2,9%
5	33	97,1%	0	0%	1	2,9%

From the results of the students' ability to understand mathematical concepts, the results of the grouping of students' understanding levels on each item was obtained. The following is a graph of the level of student understanding on each item.

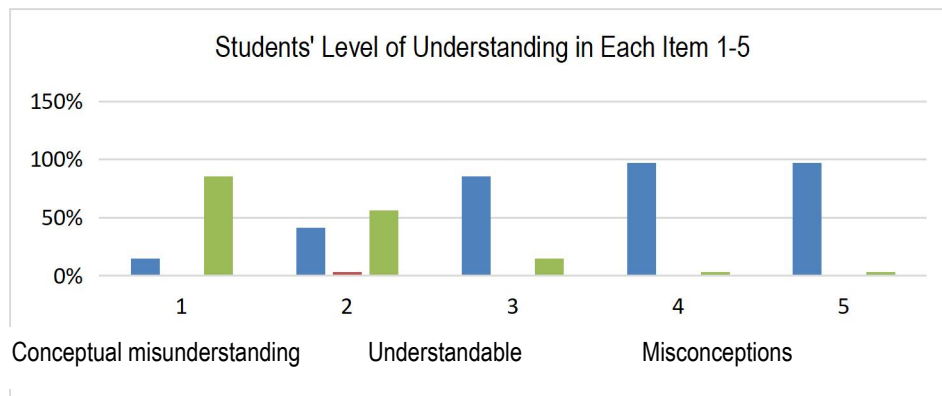


Figure 2. Students' Level of Understanding of Each Item

Based on Figure 2, in Question Number 1 with indicators of restating a concept, the percentage of answers in the category of not understanding the concept was 14.7%, the percentage in the category of understanding concepts was 0%, and the percentage of student answers in the misconception category was very high, i.e., 85.3%. In Question Number 2, with indicators classifying objects according to certain properties and concepts, the percentage of students' answers who did not understand the concept was 41.2%, the percentage of answers who understood the concept was 2.9%, while those who experienced misconceptions were 55.9%.

In Question Number 3, with indicators giving examples and not examples of a concept, the percentage of answers found to be 85.3% in the category of not understanding the concept, 0% in the category of understanding the concept, and 14.7% misconceptions. In this number, the highest percentage was in the category of not understanding the concept. In Number 4, presenting concepts in various forms of mathematical representation, there were 97.1% of students' answers in the category of not understanding the concept, 0% of understanding concepts, and 2.9% of misconceptions. While in Question Number 5, using and utilizing and choosing certain procedures or operations, the percentage of answers in the category of not understanding the concept was 97.1%, the category of understanding the concept was 0%, and the category of answers experiencing misconceptions was 2.9%.

Table 3. Data on Student Test Results for Class XI-IPA 1

No.	Initials	Question 1	CRI	Question 2	CRI	Question 3	CRI	Question 4	CRI	Question 5	CRI
1	S1	3	4	3	5	0	-	0	-	0	-
2	S2	3	3	2	3	0	-	0	-	0	-
3	S3	2	5	3	3	0	-	0	-	0	-
4	S4	0	-	3	4	0	-	0	-	0	-
5	S5	3	3	2	4	0	-	0	-	0	-
6	S6	2	3	2	4	0	-	0	-	0	-
7	S7	0	-	3	5	0	-	0	-	0	-

8	S8	2	2	2	5	0	-	0	-	0	-
9	S9	2	5	2	5	0	-	0	-	0	-
10	S10	3	5	3	5	0	-	0	-	0	-
11	S11	2	4	2	3	0	-	0	-	0	-
12	S12	2	3	3	3	0	-	0	-	0	-
13	S13	3	5	3	5	0	-	0	-	0	-
14	S14	2	5	2	5	0	-	0	-	0	-
15	S15	3	4	2	3	0	-	0	-	0	-
16	S16	3	4	2	4	0	-	0	-	0	-
17	S17	3	3	2	3	2	3	3	3	0	-

Table 4. Data on Student Test Results for Class XI-IPA 2

No.	Initials	Question 1	CRI	Question 2	CRI	Question 3	CRI	Question 4	CRI	Question 5	CRI
1	S18	2	3	4	2	2	2	0	-	0	-
2	S19	3	5	0	0	2	5	0	0	0	0
3	S20	3	5	0	0	1	5	0	0	0	0
4	S21	0	-	0	-	3	2	0	-	0	-
5	S22	2	4	1	3	0	-	0	-	0	-
6	S23	2	4	0	0	2	-	0	-	0	-
7	S24	3	5	0	0	0	0	0	0	0	0
8	S25	2	5	0	0	3	0	0	0	0	0
9	S26	2	4	0	0	2	1	0	0	0	-
10	S27	2	4	3	4	1	2	0	-	0	-
11	S28	3	3	0	0	3	-	0	-	0	-
12	S29	3	5	0	0	0	0	0	0	0	0
13	S30	1	1	2	2	2	1	0	0	0	0
14	S31	3	5	1	-	0	-	0	-	2	4
15	S32	2	5	4	5	2	5	0	-	0	-
16	S33	3	5	0	0	0	0	0	0	0	0
17	S34	3	5	0	0	2	5	0	0	0	0

In question number 1, the value of Certainty of Response Index (CRI) between the range of 3 to 5 was owned by 29 students while the range 0-2 was only owned by 5 students. This means that the level of confidence that students have in answering the questions on this number had a fairly high confidence, even though the answers given were not correct. This indicated that there was a misconception among students in answering the questions.

Question number 2, the number of students indicated to have misconceptions was 26. This can be seen from the high level of Certainty of Response Index (CRI), but the answers given were still wrong.

The high level of confidence ranges from 3 to 5, while students who had a confidence level between 0 and 2 numbered 7. However, there was 1 student who had a high level of confidence, namely 5 with the correct answer. This means that there were students who understood the concepts in the problem. The number of misconceptions in this number was much higher than the number of students who did not understand the concept.

Question number 3, the value of the Certainty of Response Index (CRI) with a range of 0-2, while owned by 27 students, in the range of 3-5, there were 7 students. This difference could be seen very far, where students who did not understand the concept were more than those with misconceptions. In number 3, many students left their answers blank or did not fill in the answers to the questions. The students also did not fill in the confidence level that had been provided. This indicates that students who did not answer were students who did not understand the concept.

In question number 4, there was only 1 student with a confidence level of 3, which means 'sure', with the answer. However, in reality, the answers given by these students were still incorrect. In this question, 29 of them who chose the Certainty of Response Index (CRI) in the range of 0-2, and 4 students selected the range of 3-5 with empty answers. This indicates that students did not understand the concept, and therefore, were unable to answer the questions given.

In question number 5, the same as the previous question, there was only 1 student who answered the question with a confidence level of 4 (almost correct). Students who did not answer the questions were in a number of 30 with a Certainty of Response Index (CRI) range between 0-2, and 3 of them had confidence levels ranging from 3-5. Based on this data, it can be said that there were more students who did not understand the concept than students who experienced misconceptions. This was shown in their answer appeared left empty as they did not choose the level of confidence in answering the questions.

From the interview excerpts of the interview, students already understood the concept of the problem being worked on. It's just that there were some operations that students underwent misconceptions. This can be seen from the multiplication of x times Δx equals Δx^2 . During the interview, students confirmed that $2\Delta x$ was correct, this also showed that students had misconceptions. Additionally, in Question 2, they still experienced errors in algebraic operations. In this section students wrote $2x(2x) = 2x^2$. This result was incorrect. Their confidence level of students' confidence in this answer was high, indicating that it could be concluded that they had misconceptions.

In question 3, students wrote the derivative of the function given in the question with a value of $6x$, which was incorrect. The student stated that he had to guess in answering this question, because he was confused. However, in the Certainty of Response Index (CRI) table, the confidence level of the selected answer was 3, which meant that they were 'sure' with the answer. Furthermore, the student also experienced an error in number 4, they gave wrong result. The error lied in the operation $\left(\frac{1}{2}\right)(3) = 3$. The level of confidence in this answer was the same as before worth 3. Therefore, it can be concluded that the students

had misconceptions. It can be seen from their answers which were wrong although they had a fairly high level of confidence.

The ability test students' mathematical concept understanding was equipped with the Certainty of Response Index (CRI) method was useful for measuring the level of student confidence in answering questions. In analyzing misconceptions, the themes had been classified into several categories, namely understanding concepts, not understanding concepts and misconceptions. The causes of misconceptions were not only from students, it could be from teachers, teaching methods, books and also the context (Liliawati, 2008). The test results of the test showed that a large number of students had been dealt with misconceptions and did not understand the mathematical concept, while only a few students did understand it. It was also discovered that more students did not understand the concept than those who were capable of understanding it.

Based on the level of student understanding, as many as 67.08% of them were included in the category of not understanding the concept, 1% of students understood the category of understanding the concept, and as many as 32.34% of students in the category of misconceptions. This was a significant difference between students who understood the concept and those who did not. Their misunderstanding of the concept could lead to misconceptions. This statement is in line with Ozkan's (Kusaeri, 2012), which suggests that students can provide or conclude their own concepts due to a lack of understanding, leading to misconceptions.

Fadllan (2011) defines misconceptions as conceptual errors that do not align with the general or expert understanding accepted by professionals in the field. In a study by Mujib (2017), it was found that many students experienced misconceptions, particularly in calculus II courses. The results of his research revealed that as many as 53.4% did not understand concepts, and 46% had misconceptions. The number of misconceptions was higher than those who understood the concept. These findings were consistent with previous studies on students' ability to understand mathematical concepts, particularly derived material, and the prevalence of misconception students.

There were several factors that caused misconceptions in students, such as teaching mechanisms, the presentation of textbooks that were difficult-to understand. It can also come from the students themselves. This is in line with the statement of Suparno's (2005) that misconceptions can be influenced by students themselves, teaching methods, learning contexts, textbooks, and teaching. Similarly, Lusiana (2015) and Ornaty (2017) suggest that misconceptions can be caused by the students themselves.

Students' associative thinking was another root of misconceptions. According to Marshall (Suparno, 2013) associative thinking was an understanding or words that were interpreted differently between teachers and students. The study found that misinterpretations made by students during interview activities. This was supported by the answers of students who were still making mistakes in writing algebraic operations and mentioning what was known in the problem. This was in line with research conducted by Hidayat, et al (2020), which that misconceptions could be caused by students' own thinking. The high level of misconceptions was caused by students building their own knowledge. In the previous study, 76.92% of students experienced misconceptions due to their associative thinking. Students often did students interpret differently from what was explained by their teacher.

Furthermore, in this study, the knowledge possessed by students was still relatively low which was supported by the understanding of their concepts that were still lacking as they were unable to answer the given questions. In addition, students were unable to describe the answers they had worked on before, and their inability to give reasons for their answers indicated that they were experiencing incomplete reasoning. This compelling factor was one of the factors that caused misconceptions. This statement was in line with research conducted by Fakhruddin et al. (2012) regarding incomplete reasoning. Incomplete reasoning can also be said to be a partial misconception, which means that students give incomplete reasons or generalize a concept incompletely, causing misconceptions. In a previous study, 12% of students had misconceptions about this factor.

Learning interests can also affect students' understanding of mathematical concepts. Student misconceptions were caused by low interest in learning mathematics; they needed attention to the teacher's explanation. Fakhruddin et al. (2012) found that high interest in learning must be more robust to keep students from misconceptions. In addition, some students choose to ask their friends instead of asking the teacher when they do not understand the concept being studied. This can trigger misconceptions. The partially true knowledge of one student was shared with others, which caused misconceptions.

The other factor contributing to the misconceptions was the students' intuition. Wrong intuition could lead to misconceptions. Intuition is a feeling in a person who expresses his attitude or idea about something before being examined objectively (Suparno, 2013). Their statements indicated the wrong intuition of students during interview activities. It was revealed that the answers obtained by students were seen by their friends without knowing the truth and the concepts used in answering the questions. This showed that students only examined the answers after writing them down. The answers. Feelings of students who believed in other students' answers could lead to misconceptions. Factors causing this misconception also occurred in a study by Fakhruddin et al. (2012). He stated that 86% of students had experienced misconceptions due to wrong intuition.

In addition, the teaching and learning process has been taking place conventionally using the lecturing method. Using inappropriate and non-interactive strategies causes students to feel bored and unable to capture the material properly and correctly. According to Suparno (2013), teaching methods are also one of the factors causing misconceptions in students. This finding is akin to that of Latifah et al. (2020), who state that the factors that cause misconceptions could arise from the teachers' teaching methods. Teaching methods that are not varied and the lack of use of learning media cause misconceptions in students.

5. CONCLUSION

Model for investigating students' problems in learning derivative material using the Certainty of Response Index (CRI) revealed an ongoing mathematical misconception among students in the classroom. Our findings indicate that the occurred misconceptions were found 32.34%, while the number of students who did not understand the concept was 67.08%.

The number of students who did not understand the concept was higher than those who did. The misconceptions were attributable to a number of factors which emerged from students' associative thinking, incomplete reasoning, wrong intuition, and learning interest to teachers' teaching methods that were used in classroom.

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Self-Efficacy of Pre-service Mathematics Teachers in Online Learning Based on Video Conference

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ABSTRACT

Self-efficacy is defined as an individual's belief in their ability to achieve specific goals. For pre-service mathematics teachers, their primary role in the learning process demands a high level of self-efficacy to effectively adapt in the context of online learning based on video conference platforms. Therefore, the purpose of this research is to find out the self-efficacy of pre-service mathematics teachers in online learning based on video conferences. This research is a descriptive quantitative study with the population of all pre-service mathematics teachers of Malikussaleh University for the 2020/2021 academic year. The sample was selected using purposive sampling techniques which amounted to 41 pre-service mathematics teachers. The instrument used is a self-efficacy questionnaire containing 25 statements that have been tested and analyzed for validation. The questionnaire was given after 4 meetings were conducted online video conference-based learning. The results showed that through online learning based on video conference, 24.4% of pre-service mathematics teachers have high self-efficacy, 56.1% of pre-service mathematics teachers have moderate self-efficacy, and 19.5% of pre-service mathematics teachers have low self-efficacy. The implications of these findings can be utilized as a foundation for the development of more effective strategies and approaches in online learning contexts. This research makes a significant contribution to understanding the factors influencing the self-efficacy of pre-service mathematics teachers in facing the challenges of online learning.

Keywords: Online Learning; Self-efficacy; Video Conference.

1. Introduction

The improvement of information technology has advocated the emergence of various innovations in the field of education. One step harnessing network technology and information technology for the development of learning systems in higher education is the online learning system. The implementation of online learning, according to Mustofa et al. (2019), provides benefits, including: 1) the existence of a graph showing an increase in the quality of higher education and the quality of graduates, 2) the formation of unlimited knowledge-sharing communities not confined to one location, 3) increased intensive communication between lecturers and students, 4) unlimited learning resources, and 5) the improvement in the quality of lecturers is due to the ease of obtaining information. Various online learning systems implemented within the campus include the use of applications such as E-Learning, Google Classroom, Zoom, Google Meet, WhatsApp, and other applications. The success of online learning systems depends significantly on several components, including students, lecturers, learning resources, and also information technology. Ideally, each of these components should be integrated to

produce high-quality graduates as well.

Video conferencing-based platforms (such as Zoom, Google Meet, or Microsoft Teams) are used as supporting tools for distance learning. Video conferencing is a service that provides facilities to bring together two or more parties using a broadband internet network (Fonna et al., 2022). Essentially, the concept of video conference involves converting voice through a microphone into audio signals, and images through a camera into visual signals. Both signals are then compressed using a device called a codec. The compressed signals can be disseminated over the internet network, in this case using IP, making it possible to transmit and receive them according to the desired objectives. In this research, online learning assisted by video conference is conducted using the Zoom platform.

In online learning, the beliefs and perceptions of pre-service teacher students regarding the courses being studied are important and are thought to affect student achievement in learning. Self-efficacy is a person's belief in their ability to perform a task, and Schunk (2012) states that it is not the same as knowing what needs to be done. Self-efficacy refers to a person's view of their ability to perform a specific action, while outcome expectation is more related to beliefs about the results that will be obtained from that action.

According to research by Siswanto et al. (2022), which had 616 subjects from various schools and universities during the Covid-19 pandemic, the average self-efficacy of the respondents was in the moderate category. Students who will be able to do enough to do tasks that are considered feasible and avoid situations and behaviors that are beyond their capabilities. In line with Meika et al. (2023), the result also showed that student teachers' mathematics self-efficacy is at a moderate level. The use of video conference is strongly suggested in learning to develop self-efficacy (Fitriyana et al., 2021).

In this study, self-efficacy of pre-service teacher students in mathematics refers to students' self-confidence in their ability to solve problems, complete tasks without comparing themselves to others, thus achieving success in learning mathematics with confidence in the efforts made, predetermined choices, and perseverance. The observed indicators of self-efficacy include belief in one's own abilities, the feeling of being able to solve mathematical problems, the feeling of being able to perform tasks, the feeling of being able to achieve learning achievement targets, and confidence in the efforts made.

Subaidi (2016) stated that difficulties in solving mathematical problems are indicated by the behavior of giving up when encountering difficulties in learning or solving problems. This behavior also arises when students receive information about a subject, indicating that the material is difficult, and students tend to lack confidence in their ability to learn or even solve problems related to that subject. Prospective teacher students may be able to read mathematical material directly from a book but may not understand what they are reading. This is compounded by the fact that the learning process is not conducted face-to-face. Based on the description above, the purpose of this study is to determine

the self-efficacy of pre-service mathematics teachers through online learning using video conferencing.

2. Research and Method

This research uses a survey method with a descriptive quantitative approach. The instrument used is a self-efficacy questionnaire given through Google Form. The questionnaire is given after four meetings of online learning based on video conference (using the Zoom platform).

The population of this study is all students of the Mathematics Education Study Program of Malikussaleh University for the 2020/2021 academic year. The sample was taken by purposive sampling of 41 pre-service mathematics teachers. The procedures in this study include the following stages: (1) development of research instruments, (2) validation of research instruments, (3) instrument revision, (4) research implementation, and (5) descriptive data analysis.

The instrument used is in the form of a questionnaire to measure the self-efficacy of pre-service teachers. This questionnaire is based on indicators adapted from Novferma (2016), including: 1) Confidence in your own abilities, 2) Feelings of being able to solve mathematical problems, 3) Feelings of being able to carry out the tasks at hand, 4) Feelings of being able to achieve learning achievement targets, and 5) having strong beliefs in the efforts made.

In order to obtain a good questionnaire, self-efficacy questionnaires that use this Likert scale are first tested on pre-service mathematics teachers in their fifth semester, and then the results are analyzed for validity. Of the 25 statements consisting of 12 positive statements and 13 negative statements, it was found that all 25 statements were valid and could be used in research. For every positive statement, a "Very Agreed" response (SS) is given a score of 4, an "Agree" response (S) is given a score of 3, a "Disagree" response (TS) is given a score of 2, and a "Strongly Disagreed" response (STS) is given a score of 1. As for negative statements, the score is the opposite.

The data obtained is then used to analyze the self-efficacy of pre-service mathematics teachers towards video conferencing-based online learning. Then the grouping of self-efficacy data into three categories, namely the high, medium, and low, as shown in Table 1 (Arikunto, 2012).

Table 1. The self-efficacy score grouping

Score (X)	Category
$X \geq (\mu + 1,0\sigma)$	High
$(\mu - 1,0\sigma) \leq X < (\mu + 1,0\sigma)$	Medium
$X < (\mu - 1,0\sigma)$	Low

3. Result and Discussion

The self-efficacy measured represents five indicators: confidence in one's appearance of oneself owned, feelings of being able to solve mathematical problems, feelings of being able to carry out tasks, feelings of being able to achieve learning targets, and confidence in one's efforts. Furthermore, the

results of the self-efficacy results of pre-service mathematics teachers will be explained in online learning based on video conferencing per indicator. The descriptive results of the first indicator, confidence in their self-appearance, can be seen in Table 2.

Table 2. Descriptive Results of Self-Efficacy of Pre-service Mathematics Teacher

Indicators	Statement	Average	St. Dev	Average Per Indicator	Category
Confidence in the abilities of oneself possessed	In every given task, I am not sure that I can complete it.	3,02	0,69	2,81	Medium
	I am confident that I can understand the material taught with online video conferencing learning.	2,88	0,44		
	I am very enthusiastic about working on mathematics assignments given through online video conference learning.	2,88	0,6		
	I feel less confident in the abilities I have.	2,43	0,7		
	I can be calm when given difficult questions because I believe I have the ability to answer them.	2,81	0,66		
The feeling of being able to solve mathematical problems	I can make a mathematical model of a given daily life-related problem.	2,95	0,46	2,72	Low
	I was confused about determining the first step in solving the problem.	2,52	0,71		
	I am waiting for a friend's help when it is difficult to solve a math problem.	2,67	0,67		
	I can remember the math material well so that I don't encounter any difficulties in solving the problem.	2,74	0,55		
Feelings of being able to carry out the task at hand.	I feel pessimistic about doing tasks when I see that others are faster at completing their tasks.	2,36	0,59	3,09	Medium
	I consider every assignment given through online video conferencing learning to be a challenge.	3,38	0,51		
	I avoid difficult math tasks	2,98	0,77		
	I consider challenges to be part of the process that must be passed	3,69	0,5		
	I was only able to complete the tasks individually	2,93	0,53		
	I was able to find the best alternative in every difficulty of the task	3,19	0,49		
Feeling able to achieve learning achievement targets,	I tend to procrastinate on tasks given online	3,24	0,61	3,24	High
	I have goals to achieve in doing the task.	3,71	0,49		
	I feel unmotivated to participate in online learning through video conferencing	3,24	0,71		
	I am always waiting for the teacher to help me solve problems that I have not	3,07	0,65		

	been able to work on				
Confident in the effort made,	I will achieve what I want as long as it is accompanied by great effort	3,93	0,5		
	I was able to persevere in solving difficult problems when others gave up solving the problem	3,17	0,59		
	I doubt myself when I see a friend's answer that is different from mine.	2,81	0,66		
	I am afraid to ask the lecturer when I don't understand the material being taught	3,21	0,71	3,17	High
	I feel embarrassed if I cannot answer questions from lecturers during online video conference	2,33	0,56		
	I always have a way of dealing with stress when bored in learning in video conferencing-based online learning	3,57	0,5		

From Table 2, it can be seen that the statement that obtained the highest average score was 3.93 with a standard deviation of 0.5, namely 'I will get what I want as long as it is accompanied by great effort'. This shows that even though online students are very motivated and try to gain understanding and solve mathematical problems. This is also due to the role of lecturers in motivating students by interacting directly through video conference platforms.

While the statement that obtained the lowest average score of 2.33 with a standard deviation of 0.56 was 'I am ashamed that I cannot answer questions from lecturers during online video conferences'. The majority of the students agreed that they were afraid of being wrong in answering questions asked by lecturers in online learning through video conferences. Students feel uneasy and timid when responding. Here the role of educators is very large in cultivating their self-confidence to be confident in their abilities. Regarding each indicator's average, the comparison is more evident when observing Figure 1.

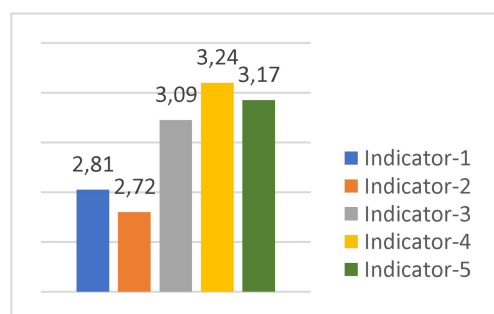


Figure 1. Average Self-Efficacy Per Indicator

In Figure 1, it can be seen that the average score for the first indicator, confidence in one's own abilities, was 2.81 and this is classified as moderate. The second indicator, the feeling of being able to

solve mathematical problems, obtained an average of 2.72, classified as low. The third indicator obtained an average score of 3.09, classified obtained with a moderate, towards the feeling of being able to carry out the task at hand. In the next indicator, namely the feeling of being able to achieve the learning achievement target, obtained an average of 3.24, classified as high. The last indicator, having strong confidence in the effort made, obtained an average of 3.17, classified as high. The overall average was 3.03, classified as moderate. Then, the tudents' self-efficacy into three categories. The Table 3.

Table 3. Self-efficacy score grouping

Category	The Number of Pre-service Teacher
High	10
Medium	23
Low	8

The Table 3 show that the self-efficacy of pre-service teachers towards online learning based on video conferencing is dominated by the moderate level, which reaches 56.1% of the total sample. While at a high level as much as 24.4% and 19.5% have a low level.

The self-efficacy indicator that obtained the highest score was the feeling of being able to achieve learning achievement targets. Here it can be seen that through online learning assisted by video conferencing, pre-service students have targets that must be achieved in doing the tasks given and have high motivation in the learning process, which can have a positive influence on the learning outcomes obtained (Mustakim, 2020; Zahro & Surjanti, 2021). The lowest indicator refers to the feeling of being able to solve mathematical problems. This is due to learning which is usually done face-to-face but turns into face-to-face online. Students are constrained from discussing together when solving problems, whereas they can usually directly discuss together in class. This change has an impact on the self-efficacy of students in solving mathematical problems. This is because the self-confidence in the ability to solve problems owned by pre-service teachers is able to affect their thinking ability (Widyastuti & Nuriadin, 2021).

The self-efficacy of 10 pre-service mathematics teachers is at a high level, which means that they have a strong belief in their ability to face video conference-based online learning, both in terms of solving problems (Marhami et al., 2020) and completing the tasks given. Those who have a high level of self-efficacy can set higher and more challenging goals and often work harder to achieve them (Schunk et al., 2006). Likewise, 23 pre-service mathematics teachers are at a moderate level, which in this case dominates this study. Self-confidence in the ability to be at this level means they will still try and not quickly despair when learning (Herizal, 2021). In addition, the degree of anxiety or calmness they experience when maintaining tasks is at the level of not being too anxious or too optimistic or

confident but still in a state of calm (Sunaryo, 2017). The remaining 8 pre-service math teachers have low self-efficacy. With low self-efficacy, the eight students are more concerned with reducing their efforts and giving up faster in carrying out online learning assisted by video conferencing and carrying out the learning tasks given. Students' views at this level of learning tasks are considered as threats that must be avoided due to a lack of self-ability in carrying out and doing learning tasks (Ferdiansyah et al., 2020).

In general, 80% of pre-service mathematics teachers have good self-efficacy for online learning assisted by video conferencing, using in this study used the Zoom platform. These results provide an illustration that online learning with video conferencing positively affects the self-efficacy. The higher an individual's self-efficacy of an individual, the more cognitively demanding problems to be solved (Pajares et al., 1999). This is consistent with the findings of Fitriyana et al. (2021), Listyawati et al. (2021), and Widayastuti & Nuriadin (2021), which show that the use of video conferencing in learning greatly affects student self-efficacy in a positive way. Additionally, with the help of distance learning with video conferences occur more interactively so as to provide opportunities for students to be more active and motivated in their learning (Candarli & Yuksel, 2012; Permatasari, 2018).

4. Conclusion

Self-efficacy is a level of confidence in one's own ability to complete a task. The results showed that through online learning based on video conference obtained 24.4% of pre-service mathematics teachers obtained high self-efficacy, while 56.1% of pre-service mathematics teachers with moderate self-efficacy, and 19.5% were at a low level.

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Community Governance Research Trend: A Bibliometric Analysis

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ABSTRACT

Community governance is a collaboration between the public, private, and nonprofit sectors to achieve desired outcomes in a jurisdiction, whether it is a neighborhood or an entire municipality. It is government exercised at the community level, where all decisions are made with and by the community, and the outcomes achieved are also aimed at the community. Many researchers have studied community governance an increasingly evolving topic. This research aims to determine the development of publication trends regarding community governance. This research uses quantitative methods with bibliometric analysis techniques. The data analyzed are the most productive countries and organizations in publication, co-authorship, and co-occurrence. The results show that the publication in community governance from 1954-2023 has increased year by year with different issues. America and Europe are the most productive countries in publication, with the most productive affiliations are universities in Australia. The analysis of co-authorship results in multiple researchers indicating their level of publication productivity based on their activity in producing publications as sole authors or in collaboration with other authors. The latest topics related to community governance and becoming trends are health and environmental issues. The next research can focus on the dynamics of public policy in community governance.

Keywords: community governance, bibliometric

1. Introduction

The existence of community governance, which legal professionals also referred to as legal community units, has a long history in Europe. In European countries, autonomous municipalities have various names, including "community council" in Spain, "Commune" in Italy, and "Parish" in England (Natsir, 2016). *The community governance model*, which is becoming increasingly popular in the public and municipal sectors is community governance. The concept typically refers to community involvement, participation, and decision-making in public affairs, and is associated with terms such as local governance, social governance, network governance, and participatory governance (Totikidis *et al*, 2005). Community governance is about the true collaboration of the public, private, and nonprofit sectors to achieve the goals and desired outcomes of a jurisdiction, whether in a neighborhood or an entire municipality (Pillora, 2011). The existence of community governance can be understood through some basic theories and the history of communities.

Like communities, the concept of community governance also gained popularity in the 1990s and beyond. Clark and Stewart are often cited on community theory in the field of government. In one of their previous works on the topic (Clarke & Stewart, 1994), stated that new patterns of community governance emerged primarily because of fragmentation at the local level of government. They note that local authorities (government) in England have always done the same thing alongside other organizations and institutions. However, the creation of specialized organizations and institutions with specific objectives (e.g., health, education, and housing) has led to fragmentation of responsibilities of local government departments. This fragmentation is further complicated in local government as a result of competitive tendering and contracting cultures, and with increased use of local authority services. There have been significant changes in recent years, and new patterns of community governance are emerging. These changes have occurred not only in the role and nature of local government but also in the disposition of other players in the system (Clarke & Stewart, 1998).

Community governance research has passed through the startup and growth stages and has entered a steady development stage. It is mainly reflected in the increase in the number of relevant literature. Community Governance is an expansion of the role of government apart from managing government affairs, which is not only at the central level (Banner, 2002). Meanwhile Community Governance is governance carried out at the community level where all decisions are made with the community, by the community, and the results obtained are also intended for the community (Totikidis *et al*, 2005). The existence of a community can run well when it has the capacity of community governance within it, and can run according to the capacity appropriate to its placement (Innes & Booher, 2002). Meanwhile, Robert J. Chaskin (2001) provides the view that each place tends to have different dimensions regarding the capacity possessed by a community. There are several communities whose main focus is different, such as focusing on organizations, individuals, affective relationships and shared values as well as the process of participation and involvement (Chaskin, 2001). In this context, it is of great theoretical and practical importance to strengthen the research on community governance.

Bibliometric studies on the community have only begun to emerge in recent years and are still relatively rare. Among them, Zhang *et al*. (2023) pointed out in a bibliometric method to conduct a quantitative review of the scientific literature concerning community management of National Parks (NPs) on a global scale. They analyzed data from published articles and

identified research hotspots and trends as well as the quantity, time, and country distribution of relevant research. Nath *et al.* In 2023, a bibliometric study to review the entire collection of Community Dentistry and Oral Epidemiology (CDOE) publications from 1973 to 2022, providing a comprehensive overview of the main publication characteristics. Mishra *et al.* (2021) used bibliometrics to analyze the trends and characteristics of research and development conducted on indigenous communities during 1979-2020 using the Scopus database.

The aim of this research is to use bibliometric analysis to examine the history of development, current situation, and research directions on community governance. At the same time, it will also provide a scientific basis for the practice of community governance. Therefore, this research not only encourages the progress of community governance research but also helps organizations contribute to the community governance of indigenous communities. To be clearer, this research focuses on:

1. What are the publication trends on community governance?
2. What is the analysis of co-authorship in community governance publications?
3. How is co-occurrence in community governance publications analyzed?

2. Literature review

Bibliometric analysis is a quantitative method used to analyze bibliographic data in articles or journals. This analysis is to investigate references to scientific articles cited in a journal, maps the scientific field of a journal, and is intended for grouping scientific articles according to a research field. The approach used in bibliometric analysis is the citation analysis approach to see one article that is cited by one other article, and the co-citation analysis approach to find 2 or more articles that are cited by 1 article. The scientific concepts contained in a document can be seen through the words (co-words) used. Co-word analysis is based on the analysis of the co-occurrence of words or keywords from two or more documents used to index documents.

The VOSViewer application has three visualization displays for bibliometric analysis, there are network, overlay, and density visualization. Network is used to show the network between visualized keywords. The overlay functions to display traces of research history, with darker visualization indicating longer research has been carried out. Meanwhile, brighter the color, the research carried out at the current time. Density functions as a display of research density. This visualization can be used to determine which parts of the research are still being carried out or have already been carried out a lot. From VOSViewer, we can also analyze co-authorship,

namely the collaboration of one author with another. And Co-Occurrence, which displays keyword networks in visual form.

3. Research Method

3.1. Document Types

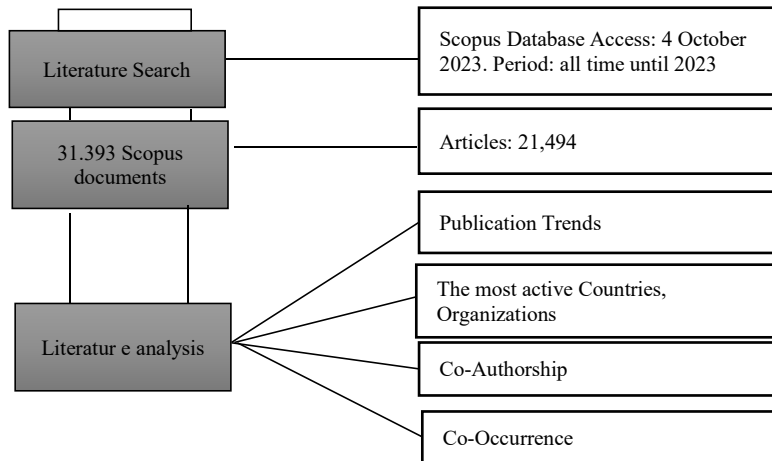
Table 3.1. Document Types of Scopus

No	Document Type	Quantity
1	Artikel	21.494
2	Book chapter	3.998
3.	Review	2.115
4	Conference Paper	1.971
5.	Book	1.142
6.	Note	196
7.	Editorial	189
8.	Conference Review	171
9	Short survey	62
10.	Erratum	25
11.	Letter	19
12.	Retracted	6
13.	Abstract report	3
14.	Data paper	2
Total		31,393

From Table 3.1 shows that the data collection used in this research is data from international article publications obtained from the Scopus database on October 4, 2023, using the keyword "community governance." The data from Scopus-indexed publications was chosen because these publications are widely used and serve as references in bibliometric analysis (Verma & Gustafsson, 2020). Data collection keywords (TITLE-ABS-KEY) "community governance." Search results from the Scopus database produced 31,393 documents. The results of this document start from 1954 to October 2023. In this research, the documents analyzed were 21,494 journal articles. This is because journal articles are assumed to develop more dynamically compared to other publications. Apart from that, there are tiered reviewers in the publication of journal articles, making the selection process more comprehensive and the publications of higher quality (Samsara, 2022).

3.2. Data Collection

Figure 3.2. Data Collection Flow



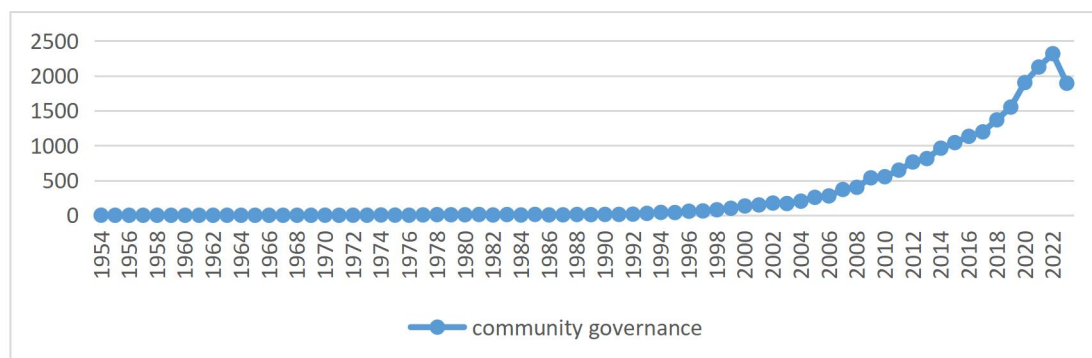
From Figure 3.2, data analysis and visualization were carried out to determine publication trends from the time of the first publication until 2023 using database analysis from Scopus. This analysis was conducted by reviewing annual publication charts with the keyword "community governance." Apart from that, it displays the countries and organizations that are most productive in the publication of community governance articles. Bibliometric analysis uses the VOSViewer application to map research trends in Community Governance studies. VOSViewer is software for building and visualizing bibliometric webs. VOSViewer is mainly used when working with small and large data sets; it displays data maps and various analytical analyses (Shah, 2020).

4. Results and Discussion

4.1. Community Governance Publication Trends

a. Publication Trend by Year

Figure 4.1. Article Publication Trends by Year



Based on Figure 4.1, the first publication of articles related to community governance was carried out in 1954. The focus of research in the first year was related to the management of community density, which is part of natural selection. After the first publication in 1954, 15 years later there were no publications related to community governance in Scopus. As time went by, research on community governance developed into other fields. This research tends to increase from year to year, although it experiences ups and downs in certain years.

b. Publication by Country

Figure 4.2. Article publication by Countries

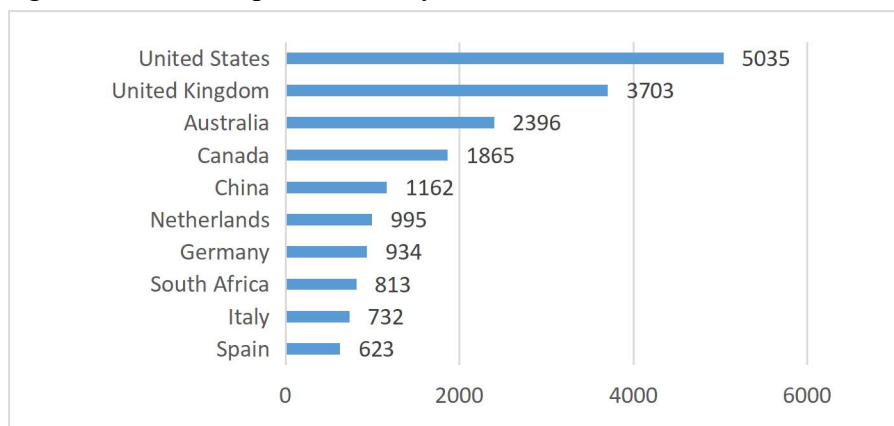


Figure 4.2 shows that research on community governance has also been carried out in several countries, especially in developed countries. The United States is still the country that pays great attention to research on community governance publications with research of 5,035 articles, followed by the United Kingdom with publications of 3,703 articles. China is the only Asian country in the top 10 in community governance research, with the publication of 1,162 articles. Currently, research on community governance is still widely carried out in American and European countries, while in other regions, it is still not an issue that is of interest to researchers in the field of state administration.

c. Publication by Organization/Affiliates

Table 4.1. Productive Affiliates/Organizations in Community Governance Publications

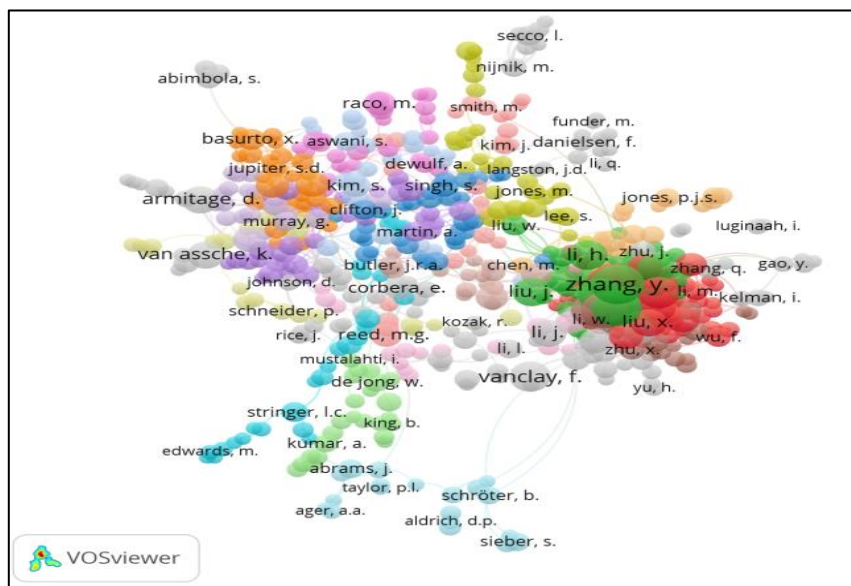
Organizations	Quantity
The University of Queensland	279
Wageningen University & Research	244
The University of British Columbia	232
University of Melbourne	214

The Australian National University	210
University of Oxford	207
The University of Sydney	196
University College London	181
University of Toronto	168
UNSW Sydney	158

From Table 4.1 shows the results of article publications from affiliates or organizations of the top 10 community governance publications sourced from the Scopus database. The most productive organization/affiliation in community governance publications are universities in Australia. The university with the most publications is The University of Queensland with 279 articles published. The organizations/universities that dominate community governance publications are located in Australia, including The University of Queensland, University of Melbourne, The Australian National University, The University of Sydney, and UNSW Sydney. The productivity of these organizations/universities also shows that Australia, America, and Europe still dominate as the largest contributors to the publication of community governance articles. However, in Asia and Africa, the issue of community governance is still not commonly studied.

4.2. Analysis of Co-Authorship in Community Governance Publications:

Figure 4.3. Visualization of Co-Authorship



The Figure 4.2 is a visualization of VOSViewer based on Co-Authorship. Co-Authorship is an analysis to see the relationship between various research themes based on the articles that have been produced (Sidiq, 2019). Co-Authorship looks at the productivity of the writer as an

The figure 4.5 shows that previous research related to community governance around 2015 and 2018 mostly discussed local government, organization, management, decision-making and other keywords marked with dark purple circles. Meanwhile, from 2016 to 2018, publications that appeared used keywords including governance approach, human, decision-making and other keywords marked with dark green circles. For research from 2018 to 2020, research tends to use the keywords sustainability, human experiment, artificial intelligence, social media, and other keywords marked with light green circles. Meanwhile, currently, from 2001 to 2022, research still tends to discuss Covid, pandemic, global health, and keywords marked with yellow circles. Circles marked with a dark color indicate that the research has been carried out for a long time, while light or yellow colors indicate that the research is a recent research issue.

c. Density Visualization

Figure 4.6. Density Visualization



Figure 4.6 shows the analysis using density visualization. There are dense areas or high levels of density between one node and another. The level of saturation marked with yellow keywords means that the area is a topic that has been extensively researched before. Such as topics about governance approaches, human, governance, biodiversity, and local governance. Meanwhile, nodes marked in dark color indicate that these topics have not yet been widely researched, such as conservation of natural resources, biomedical research, public opinion, and communicable disease control. This provides opportunities for new research related to these topics.

From the bibliometric analysis about community governance publication trends, it shows

that the issue is developing, and future researchers can obtain novelty from the above analysis. Recommendations for further research are research on dynamic public policy on community governance.

5. Conclusion

Based on an analysis of community governance research trends, it appears that there has been a significant increase in article publications. In the last 10 years. According has been a very significant increase. From the Scopus database, it can be seen that American and European countries remain the most productive in publishing articles. Meanwhile, productive organizations in Australia, particularly universities, are Australia are productive organizations in the publication of community governance articles. The level of researcher productivity is shown in the VOSViewer application through co-authorship visualization. Several researchers have demonstrated their level of publication productivity as seen from their activeness in producing publications either as sole authors or in collaboration with other authors. The themes raised for community governance research are also increasingly developing, even for the most recent research in the 2000s, the theme of community governance was mostly related to the environment and health. By using VOSViewer analysis, new research in the field of community governance can be identified. So it can provide opportunities for future research to conduct studies related to community governance with the latest issues, such as the dynamics of public policy in community governance.

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Implementation of Gender Mainstreaming (PUG) in the Clean and Creative City Program in Lhokseumawe

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ABSTRACT

To promote and effectively implement gender mainstreaming in a coordinated manner, Presidential Instruction no. 9 of 2000 was issued. This instruction mandates the improvement of gender equality and justice in all aspects of human life through policies and programs that consider the experiences, aspirations, needs, and problems of both women and men. In the city of Lhokseumawe, the mayor's government has also issued regulations with Mayor Regulation Number 22 of 2018 concerning gender mainstreaming. The method used to complete this research is qualitative research with a sociological-empirical/juridical approach. Producing descriptive data in the form of written or spoken words or observed behavior, the stages of this research include collecting primary and secondary data through interviews determined by purposive sampling by selecting certain people who can represent the relevance of this research. The implementation of gender mainstreaming in the Clean and Creative City Program is to provide equal space for men and women, carry out monitoring, and program. Obstacles faced in implementing the Gender Mainstreaming model in the Clean and Creative City Program in Lhokseumawe City include: the lack of a sense of concern among individuals, which has become a habit since childhood, and ethics and morals are increasingly being eroded, there is no Standard Operating Procedure (SOP). A budget is not gender-responsive. Furthermore, as well as low human resources (HR). Meanwhile, efforts made in implementing gender mainstreaming in the Clean and Creative City Program in Lhokseumawe City include creating a website related to gender issues, starting from the program preparation stage, implementing activities, maintaining infrastructure, forming a women's community, and activating Friday clean-up activities that have long been abandoned. It is recommended that in drafting SOPs regarding the Implementation of Hygiene Programs and morals

Keywords: Implementation of Gender Mainstreaming (PUG), Clean and Creative City Program.

1. Introduction

This research is motivated by the Gender Mainstreaming Implementation Program (PUG) in the Clean and Creative City Program in Lhokseumawe City. Cleanliness is very important to pay attention to because with a clean city, city residents will always remain healthy and enthusiastic in carrying out their daily life activities. Everyone has the same rights and obligations to a clean and healthy environment. Based on estimates by the Lhokseumawe City Cleaning Service, annual waste production reaches 131,400 M3. Waste is one of the sources that causes a clean and healthy environment to not be created.

In implementing cleanliness management, which includes sweeping rubbish when necessary, collecting rubbish from residential areas / shops / offices / hotels and restaurants and other units to TPS (temporary disposal site), transporting rubbish to TPA (final disposal site), and other necessary activities, are the responsibility of the Cleaning Department. In accordance with the vision and Mission. The Mayor of Lhokseumawe is "Faithful and Creative, namely becoming the city clean, beautiful, comfortable, creative, and Innovative", so waste management must be carried out consciously, integrated, and directed between each individual, government, community, and all stakeholders or for short Draiver⁷.

Implementation of Gender Mainstreaming in the Program. This is very important to pay attention to, including the balanced involvement of men and women in development. However, in its implementation, due to social norms and gender structural inequality, women are often marginalized in access and governance of each program.

The definition of gender is closely related to social sex which differentiates men and women not based on biological differences, but based on socio-cultural relations which are influenced by the broader structure of society. Haspels and Suriyasarn (2005) define gender as a social variable that analyzes differences between men and women related to roles, responsibilities, needs as well as opportunities, and obstacles (Nasution & Marthalina, 2018). Gender Responsive Activities are planned by taking into account the condition of the gap in relations between men and women by accommodating different problems, experiences, aspirations, and needs between men and women, Lhokseumawe Mayor Regulation Number 12 of 2018 provides guidelines for implementing City Gender Mainstreaming Lhokseumawe. Gender Mainstreaming (PUG) is a strategy carried out rationally and systematically to achieve gender equality and justice in aspects of human life through policies and programs that take into account the experiences, aspirations, needs, and problems of women and men to empower women.

However, the fact is that women's involvement or gender mainstreaming is still felt to be very minimal. In its implementation, due to social norms and gender inequality, women are often marginalized in accessing and governing K3 programs, this results in the goal of achieving a clean and well-ordered city is not optimally implemented. In general, the success of an activity, program, or work plan should involve all levels of society, especially women. In the women's K3 program, it is hoped that it can increase success to the maximum, so that the government's goals in this case can be carried out well in accordance with what is mandated by

the government.

This research aims to analyze how Gender Mainstreaming (PUG) is implemented in the Clean and Creative City Program in Lhokseumawe City, as well as looking at the obstacles and efforts made in implementing Gender Mainstreaming (PUG) in the Clean and Creative City Program in Lhokseumawe City.

2. Literature Review and Hypothesis

The issue of gender equality and gender justice has become a world issue that is increasingly receiving attention and has become part of world agreements regarding human rights, because in reality, women have been discriminated against in violation of human rights and respect for women as human beings. . Until now, demands for women's representation in various decision-making institutions are still developing and are considered important. Due to the fact that various problems that arise in various fields and in various parts of the world cannot be separated from the problem of still dominant discriminatory treatment of women so that poverty, education, health, unemployment, and even various acts of violence are very vulnerable to making women victims of this discrimination.

According to Rahman (2002: 120), "Participation is determining the attitude and involvement of the desires of each individual in the situation and conditions of the organization, so that in the end it encourages the individual to participate in every shared responsibility. Participation is literally interpreted as taking part or joining (Echols, 1996:419). Jean-Jacques Rousseau in his book *The Social Contract* said that participation is very important for the self-development and independence of citizens."

This was also emphasized by John Stuart Mill in Miriam Budiarjo's (1982) work, that without participation, almost everyone would be swallowed up by personal interests and the personal needs of those in power. Here, participation, in other words, is a measure of the independence and maturity of individuals (citizens) in recognizing the boundaries between private and public interests. Public affairs have their own laws and values that cannot be confused with private affairs.

The word "gender" comes from English, which means sex. According to Oakley (1972) in Fakhri (2013: 71), gender is defined as differences in behavior between men and women that are socially constructed, namely differences that are not natural or God's provisions but are created by humans through long social and cultural processes. Meanwhile, according to Fakhri in *Gender Analysis and Social Transformation* (2013: 8) gender means a characteristic inherent in men and women that is socially and culturally constructed.

Soejipto (2010: 48) gender mainstreaming as a strategy to achieve gender equality and justice through policies and programs that take into account the experiences, aspirations, needs, and problems of women and men in the planning, implementation, monitoring, and evaluation of all policies and programs in various areas of life and development. Soejipto, in Gender Mainstreaming in parliament, studied the DPR and DPD (2010: 86) Gender equality refers to equal conditions for men and women to obtain opportunities and rights as human beings, so that they are able to play a role and participate in political, legal, economic, social, cultural, defense, and national security (HANKAMNAS) activities, as well as enjoying the results of development. The realization of gender equality is characterized by the absence of discrimination between women and men, providing thus they have access and opportunities to participate, control over development, and obtain equal and fair benefits in development. Access is an opportunity or opportunity to obtain or use certain resources (T. Yulianto et al., 2020)

Cleanliness is a crucial element in social life, starting from the family, community, village, city, and even the country. Cleanliness can be achieved if all components are aware of its importance, as it is always coupled with access and order. In order to realize the desired goals and objectives, efforts are needed to develop all these components and government officials, so that they can work professionally and implement public service management can be implemented effectively, efficiently, and accountably (Tanjung Djamaludin, 2004: 17).

Opinion from (Immanuel Kant; 2022), beauty is aesthetics that are not related to the object or object itself, but rather the feeling of pleasure felt when looking at the object.

The K3 program is a program to achieve targets or goals that have been set in terms of handling cleanliness, beauty, and order. Motivation so motivation is needed so that these goals are carried out effectively. According to French (1997:23.5), he defines motivation as a person's desire or willingness to increase efforts to achieve targets or results.

3. Research and Method

Research Methods The type of research used is juridical sociological research, also known as field research (Kartini Kartono, 21), which examines applicable legal provisions and real-life situations in society. This approach is used because this study will describe the strengthening of gender equality in the K3 program (Beauty, Cleanliness, and Order) in Lhokseumawe City. The data collection method involves primary and secondary data, including interviews with relevant agencies, the secondary data is obtained through literature materials. The primary legal material used is Lhokseumawe Mayor Regulation Number 22 of

2018 concerning Guidelines for the Implementation of Gender Mainstreaming in Lhokseumawe City. Secondary legal materials include books, journals, and other scientific writings that are in accordance with the research problem.

4. Result and Discussion

Lhokseumawe becomes an Administrative City. With an official note from the Regent of the Regional Head of Kindergarten. II North Aceh Number 125/50/80 dated May 12 1980. Mahyiddin AR was appointed as Chair of the Lhokseumawe City Planning Team to become an Administrative City under the direction of the Regent of North Aceh Colonel H.Ali Basyah. On August 14 1986, the formation of the Lhokseumawe Administrative City (Kotif) was signed by President Soeharto, which was inaugurated by the Minister of Home Affairs Soeparjo Roestam on August 31 1987, with the first mayor, Drs. H. Mahyid. in AR, who was appointed by the Governor of the Special Region of Aceh Province, Prof. DR Ibrahim Hasan, MBA.

With the inauguration of the Mayor, Lhokseumawe has de facto become an Administrative City of Lhokseumawe City, consisting of 4 (four) Districts with 68 assisted Villages. The number of Improvement Subdistricts consists of 19 subdistricts, and Prevention Subdistricts are 49 subdistricts. Lhokseumawe City has an area of 18,106 Ha, with a population of 188,221 people, and a density of 1040/km. Lhoksemawe City is the second-largest city in Aceh Province, where the city center is located in the lowlands and close to the sea. 60% of city center settlements are located on the shores of the sea and rivers. Settlements along the seashore are growing rapidly and uncontrolled. Traces of land disputes from the expansion of North Aceh Regency have left a tendency for irregular settlements, and the level of beauty, cleanliness, and order needs to be handled in a comprehensive and integrated manner.

The Road Map for Implementing Gender Mainstreaming 2020-2024 is a reference for all leaders and ranks in the Ministry of Public Works and Public Housing at the Central and Regional levels in implementing gender mainstreaming as an inherent and inseparable part of infrastructure implementation activities to realize gender equality in development. With Regent's Decree Number 08/Renstra-PP, PA, PP& KB /2022 concerning the Department of Women's Empowerment, Child Protection, Population Control, and Family Planning in Lhokseumawe City.

The aim of gender mainstreaming is to ensure that women and men:

1. Obtain equal access to development resources;

2. Participate equally in the development process, including the decision-making process;
3. Have equal control over development resources;
4. Obtain the same benefits from development results.

Gender mainstreaming can be implemented inseparably from the existence of a Gender-Responsive Budget in each technical OPD. To ensure gender-responsive budgeting, it will be measured using the Gender Analysis Pathway (GAP) and Gender Budget Statement (GBS) in each technical agency. Providing gender and child disaggregated data is a crucial factor in efforts to improve community welfare. Having data available can make it easier to plan and budget according to needs.

Based on this, Lhokseumawe City Qanun Number 1 of 2014 concerning Lhokseumawe City Regional Spatial Planning, Article 67, states the implementation of spatial planning is carried out by the government by involving various elements such as the community, the private sector, the business world, professional groups, NGOs, hereinafter referred to as the role of the community, has rights and obligations in spatial planning, both at the stage of preparing spatial planning, space utilization, and the stage of controlling space utilization.

(Dahriana : 2023) The implementation model for gender mainstreaming in the K3 program in Lhokseumawe City is;

- a. Formulate and establish general policies and operational guidelines for implementing PUG in Lhokseumawe City;
- b. bridging the prerequisites and implementation of PUG in all sectors within the PD and Village/subdistrict Government;
- c. allocate a budget for implementing PUG as the government's commitment to monitoring PUG
- d. coordination and synchronize policies and programs with stakeholders related to PUG implementation; And
- e. Monitoring, evaluating the program.

One of the important points made by local governments in implementing gender mainstreaming is by carrying out supervision, both directly and indirectly. Direct supervision is supervision carried out directly by leaders or supervisors by observing, researching, investigating, checking themselves "in the workplace" and getting reports personally and from implementing gender-responsive development programs, and these gender responsive

programs continue to increase from year to year. to year. Indirect supervision is supervision carried out by authorized officials from a distance. This supervision is carried out through reports submitted by subordinates, namely by studying reports, both oral reports, and written reports relating to the implementation of equal involvement of men and women.

In this regard, the City Government is obliged to formulate gender-responsive development policies, programs, and activities as outlined in the RPJMD, SKPK Strategic Plan, RKPD, and SKPK Renja.

Gender mainstreaming in K3 programs varies, background is closely related to a person's individual characteristics. Such as the level of education, age, cosmopolitanism, and suitability of activities to needs. These factors can influence a person's participation in carrying out activities. Community involvement, either directly or indirectly, whether in the form of donations of energy, thoughts, or property they own, the results of which they will later enjoy for themselves in the environment where the brand is located.

The next thing to be done (Nurleli: 2023) is by means of intensive socialization in the implementation of the K3 program in the community and carrying out direct monitoring (control) of activities related to K3. From this control, a leader can see directly what has been implemented and what needs to be improved as material for program evaluation. (3) Providing rewards and sanctions. Leaders can give awards to the community by adding supporting facilities for the K3 program, such as providing rubbish bins, providing green trees, promoting cleanliness, and best effectiveness. Meanwhile, (M Nurdin: 2023) said that: "According to scientific studies, littering is not permitted, but because of the local community's habit of throwing rubbish in illegal places, rubbish containers/places are provided, so that when local people throw rubbish, they are expected to throw rubbish into the space that has been provided. also makes it easier for officers to transport rubbish and rubbish so that it doesn't get scattered." (Raslina: 2023).

Constraints and efforts of the Gender Mainstreaming Implementation Model in the K3 Program (Beauty, Cleanliness, and Order in Lhokseumawe City). One of the main tasks and functions of the relevant services that has not been implemented well in Lhokseumawe City, the latest findings, are the following obstacles:

1. have not been able to fully reinterpret, reactualize, and revitalize traditional cultural values related to gender equality and justice and spread them to all levels of society;
2. it has not been able to accommodate efforts to improve the quality of women's

- participation in all aspects of national and state life;
3. it has not been fully implemented to empower institutions managing women's progress to be more active, qualified, and independent in carrying out their roles;
 4. not yet able to mainstream gender as a strategy in planning, implementing, monitoring, and evaluating policies and programs in all development sectors

Cases of indiscriminate dumping of rubbish, which are increasing day by day in Lhokseumawe City, are very ironic in terms of values and morals. The increasing number of indiscriminate rubbish dumping will make local people accustomed to throwing rubbish in illegal rubbish dumps. Therefore, monitoring of careless rubbish dumping will continue to be carried out by involving all elements of society. However, the main obstacle currently is the problem of a budget that is not gender-responsive.

5. Conclusion

1. Implementation of Gender Mainstreaming (PUG) in the Clean and Creative City Program in Lhokseumawe City, in accordance with applicable laws and regulations, carrying out the preparation of the K3 program plan in a deliberative manner, the preparation of the K3 program in Lhokseumawe City involves men and women in equal numbers, although women's participation is very minimal in bookkeeping or financial duties, control or supervision, and evaluation of K3 programs, handling slum areas, and handling cleanliness and beauty
2. Meanwhile, the obstacle experienced is that we have not been able to fully reinterpret, reactualize, and revitalize traditional cultural values related to gender equality and justice for all levels of society; has not been able to accommodate efforts to improve the quality of women's participation in all aspects of national and state life. The lack of concern from individuals, due to character and habits, The absence of Standard Operating Procedures (SOP) which causes difficulties in monitoring littering, There are no shelters for beggars in the city of Lhokseumawe. Meanwhile, the efforts made in the Implementation of Gender Mainstreaming in the K3 Program (Beauty, Cleanliness, and Order in Lhokseumawe City) include creating a website relating to gender mainstreaming issues or programs to encourage the participation of the relevant community in activities from the program preparation stage, implementation of activities, infrastructure maintenance stages, forming a women's community so that there is a bargaining position so that women can take part in the K3 program, activating

Friday clean-up activities that have long been abandoned, and reducing slum cities to clean cities.

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The Moderating Effect of E-Shopping Experience on E-Customer Loyalty in Generation Z

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Abstract

The objective of this study is to explore the behavior of Generation Z (Gen-Z) in the post-pandemic era. The study will examine the impact of E-Shopping Experience (E-SE) on the relationship between E-Customer Satisfaction (E-CS) and E-Customer Loyalty (E-CL). Additionally, the study will investigate other factors that influence E-CL, such as Website Image (WI) and Innovativeness (IN). Statistical analysis is conducted using Structural Equation Modeling (AMOS-SEM) on up to 200 samples of Gen-Z online shoppers. The results found that WI factors have a significant impact on E-CL, but IN does not have a significant enough impact. E-CS partially mediates both lines of this relationship. The E-SE has a positive and significant moderation impact that can increase the impact of E-CS on E-CL. This research provides insights into creating better E-Shopping Experiences for Gen-Z users, improving E-CS and E-CL.

Keywords: *Website Image, Innovativeness, E-Shopping Experience, E-Satisfaction and E-Loyalty*

1. Introduction

Current technological advances have created a new marketplace through online media, so consumers can easily find products they want to buy, ranging from cosmetics, clothing, ticket booking, e-banking services, and others (Ling et al., 2010). Online shopping is a different platform from traditional shopping in modern life. In traditional shopping, consumers usually do not utilize all elements in the purchase process. In online stores, consumers can observe each sub-purchase process in detail before deciding on it (Ayuni, 2019). Consumers find it easier to find information about products without visiting the store, so they can spend as much time as they want in e-retail stores. To order goods, they only need to transfer the order money, which will be sent directly to the address (Sin et al., 2012). With the development of e-commerce, online shopping has now become a trend, so maintaining customer satisfaction and loyalty in the electronic market has become an important topic for researchers and marketing practitioners (Varadarajan et al., 2022; Omar et al., 2021); (Mofokeng, 2023). This causes e-commerce players in Indonesia to compete to strengthen competitiveness through innovations, the latest web features through discount offers, and the completeness of product choices to attract more users (Varadarajan et al., 2022).

The pandemic that has lasted for two years has made consumers more often do online activities. Nowadays, shopping online is not just a solution or the primary alternative that provides convenience; it has become part of people's lifestyles, as reported by [e-Conomy SEA 2022](#), which states that 80 percent of

internet users in Indonesia have shopped online at least once. The results of research conducted by Hootsuite, We Are Social, and Statista also show that Gen-Z currently dominates the number of active internet users with around 170 million users out of a total of 202.6 million internet users in Indonesia (<https://andi.link/hootsuite-we-are-social-indonesian-digital-report-2022/>).

Indonesia's population is dominated by Generation Z. Based on data from the Central Statistics Agency (BPS), around 27.94% of the population in the country comes from the generation born between 1997-2012 (Gen-Z). 25.87% are millennials, 21.88% are Gen X, 11.56% are baby boomers, and 10.88% are post Gen-Z. Gen-Z is a generation that can be categorized as a digital native generation, a term introduced by (2010) nickname for those born in the digital era when the development of technology such as computers, the internet, and social media (Djafarova & Bowes, 2021);(Priporas et al., 2017); (Ayuni, 2019).

In this study, we will examine the moderating impact of gen-z E-shopping experience on the relationship between E-customer satisfaction and E-customer loyalty but without neglecting the direct and indirect impact of Website image, Innovativeness on E-customer satisfaction and E-customer.

2. Literature Review and Hypothesis

Website Image

As one of the characteristics of the site that supports the appearance of an online retailer, graphics or images must be made attractive so that consumers who visit the site will be interested in exploring it (Lohse & Spiller, 2000). Unattractive or poor design elements can confuse and discourage consumers from purchasing. Shopping online is fun and satisfying to consumers when the site design is neat, easy to navigate, and fast. The neatness, ease of navigation, and speed of the site can save time in shopping and not drain the minds of consumers in making transactions (Saputra et al., 2020). In the context of online marketing, the exchange of information occurs in the virtual sphere, providing more space to explore so that the possibility of uncertainty and risk of more significant information gaps compared to offline market purchases so that the WI is essential for marketing success (Oh et al., 2008), furthermore, according to Oh et al., (2008). The image presented on the website is also a support that creates a sense of comfort and provides a perception of an item's quality. Links, colors, and graphics also positively impact intent, while menus negatively impact the passion and pleasure of online shopping (Koo & Ju, 2010). In addition, the design and layout of products on a website can significantly increase CS. Website image is an essential dimension of online relationships as it is considered a key element in influencing E-CS and E-CL (Pereira et al., 2016). WI is believed to impact customer satisfaction and E-CL related to online purchases. Therefore, we propose:

H1; H2; H3: *WI has a positive and significant impact on E-CS and E-CL directly and indirectly.*

Innovativeness

IN means an organization will pursue new ideas and concepts in process, product, or service development. Proactive refers to organizations with forward-looking and responsive characteristics in the industry environment involved. IN is the process or result of developing the mobilization of knowledge, skills, and experience to create or improve new products, processes, or systems that provide meaningful or significant value (Pereira et al., 2016). Because consumer needs are constantly changing, customers who have a high level of innovation will tend to abandon purchases with the same method; marketers must be observant of digital technology-based innovation because digital business model innovation, platform innovation, product innovation, and marketing innovation have had a significant impact on the company's marketing strategy in many ways. Digital product innovation and digital marketing innovation, such as distribution, promotion, and pricing elements in the marketing mix, have allowed companies to compete in fundamentally new ways (Varadarajan et al., 2022). Product innovation influences consumer loyalty, meaning that the better the quality of product innovation, the better consumer satisfaction will be Varadarajan et al., (2022); Pereira et al., (2016). IN is believed to impact E-CS and E-CL related to online purchases. Therefore, we propose:

H4; H5; H6: *IN has a positive and significant impact on E-CS and E-CL directly and indirectly.*

E- Customer Satisfaction

Parasuraman first introduced the concept of CS, which is the difference between expectations before purchase and evaluation after purchase (Parasuraman et al., 2005). In e-commerce, electronic satisfaction refers to a customer's evaluation of their experience when making online and offline transactions (Alonso et al., 2017). Satisfaction is a consumer assessment of the features of products or services sold by the website

store to CS for what they expect is correct or even more than expected (Pereira et al., 2016). Website satisfaction refers to a well-designed website's navigation experience and positive perception (Jin et al., 2013). CS should be the priority as a fundamental determinant in maintaining long-term customer relationship behavior (Al-maamari & Abdulrab, 2017). Finally, E-CS has an impact on E-CL. Therefore, we propose:

H7: *E-CS has a positive and significant impact on E-CL.*

E-Shopping Experience

E_SE customer experience has become a central topic in digital marketing today; their success depends mainly on how they provide services that can provide a positive experience to customers and maintain them (Becker & Jaakkola, 2020). Previous shopping experiences can affect the satisfaction or failure of the first purchase, and then they will evaluate and redo it later. While not all experiences are good, the positive impact of a good experience can affect satisfaction and lead to addiction to subsequent purchases with new methods (Mofokeng, 2023). Online shopping is an essential factor in determining the reliability of a website in predicting online purchase intent. After the Trust factor and combined with social presence features, we will have three factors (convenience, e-service quality, and lifestyle) that mutually influence the decision-making process and the intention to buy online. Previous purchases can provide a quality customer web shopping experience (Saputra et al., 2020). A positive customer experience is vital in generating desired outcomes for a business, such as a strong emotional attachment to the brand and increased customer satisfaction that leads to customer loyalty (Anshu et al., 2022). Online shopping experiences and e-shopping significantly moderate the impact of product variation on trust. The impact of on-time delivery on loyalty is significantly moderated by the online shopping experience (Mofokeng, 2023). The E-SE impacts E-CS and positively creates E-CL and online purchases. Therefore, we propose:

H8: *E-Experience Shopping moderates positively and significantly on E-CS and E-CL*

E-Loyalty

E-CL can be defined as the willingness to buy back a product in the future despite the influence of competitors' situations and marketing efforts. However, Gen Z members show low loyalty value (Omar et al., 2021). Winning their hearts and minds will benefit the Company (Ayuni, 2019). E-loyalty focuses not only on price but also on repetitive behavior in visiting and purchasing products/services online by accessing a company's website as the first choice among alternatives, supported by good faith and positive emotions online. The Company, despite situational influences and marketing efforts, leads to transfer behavior (Molinillo et al., 2022). To build and maintain customer trust and loyalty, online vendors should focus on the quality of electronic services before, during, and after transactions to guarantee their satisfaction (Pereira et al., 2016). WI is a direct antecedent of overall E_CS, directly and positively impacting destination E-CL.

2.1. Research Framework

Figure 1 presents a research model integrating the moderation effect of E-SE on E-CS and E-CL, with WI and IN as exogenous predictors and E-CS as mediators. Based on the theoretical and empirical research outlined earlier, this hypothesis is formulated as follows.

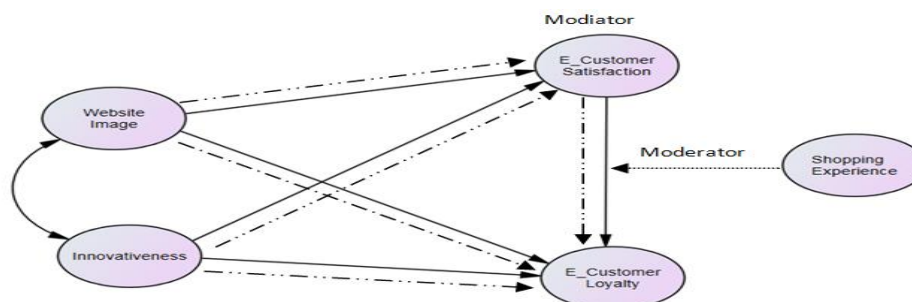


Figure 1. Research Framework

Notes:

- Direct Effect \longrightarrow
- Indirect Effect \dashrightarrow
- Moderating Effect $\cdots\cdots\rightarrow$

3. Research and Methodology

3.1. Data

This study is conducted on the Gen-Z of Aceh Province, Indonesia. Gen-Z are those born from 1997 to 2012 (Linnes & Metcalf, 2017). A quantitative research design is applied to this study because it is exploratory in nature (Stadtländer, 2009; Pantano & Priporas, 2016). His research methodology includes primary surveys conducted by submitting and collecting individual questionnaires online through Google Forms, then sent directly to the social media used. Those actively making online purchases for the past six months are in the target sample. This survey was conducted for one month, targeting around 500 online shopping users. Obtained as many as 250 finally responded. Of these, 50 people had not purchased in the past six months and were excluded from the study.

3.2. Data Analysis Method

Pealatan analisis data dalam penelitian ini menggunakan perangkat lunak AMOS degan metode Struktural Equation Modeling (SEM).

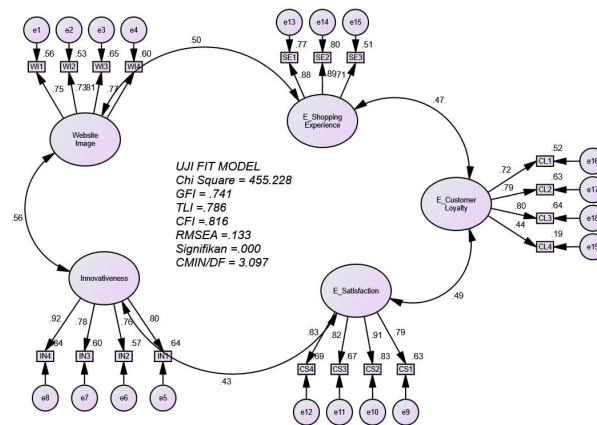
4. Result And Discussions

Before construct testing, the instrument was tested for initial validation with an elimination process so that only valid instruments believed to represent the variables studied were used.

4.1. Confirmatory Factor Analysis (CFA)

CFA is used to see the extent to which the model is acceptable, and validation construct testing where the loading factor at a level greater than 0.50 is used to see to what extent the indicator can represent the model and the variables tested. Reliability can be seen from the CR value, which is more than 0.7. Variance extracted (VE) measures how much variance of an indicator is extracted by the variable formed. With an intervention value greater than 0.50 (Hair et al., 2014).

1. UJI CONFIRMATORY FACTOR ANALYSIS (CFA)



Standardized Regression Weights: (Group number 1 - Default model)

The goodness of the Fit Model is acceptable, where the GFI value is 0.741, AGFI 0.909, TLI 0.786, CFI 0.816, RMSEA 0.133, CMIN-DF 3.097 and p-Value 0.102, AGFI 0.909 and Chi-Square value 455.228 lower than table df 95 = 118.751. So that model evaluation does not need to be done (Hair et al., 2014). Using 4-5 goodness of fit criteria as long as it contains Absolute Fit Indices, Parsimony Fit Indices, and Incremental Fit Indices, the SEM model of this study is accepted (Hair et al., 2014).

Table 1. Construct Validity

		Estimate
WI1	<--- Website_Image	.750
WI2	<--- Website_Image	.731
WI3	<--- Website_Image	.807
WI4	<--- Website_Image	.773
IN1	<--- Innovativeness	.802
IN2	<--- Innovativeness	.755
IN3	<--- Innovativeness	.775
IN4	<--- Innovativeness	.917
CS1	<--- E_Satisfaction	.793
CS2	<--- E_Satisfaction	.908
CS3	<--- E_Satisfaction	.819
CS4	<--- E_Satisfaction	.829
SE1	<--- E_Shopping_Experience	.876
SE2	<--- E_Shopping_Experience	.895
SE3	<--- E_Shopping_Experience	.711
CL1	<--- E_Customer_Loyalty	.723
CL2	<--- E_Customer_Loyalty	.793
CL3	<--- E_Customer_Loyalty	.797
CL4	<--- E_Customer_Loyalty	.439

The results of the construct validation test show that all variable items used have a high construct value obtained a CR value much more significant than 0.70, so it can be declared excellent reliability. Valid and constructively reliable has been fulfilled because all items' VE value is above 0.50.

4.2. Hypothesis Test Result

Hypothesis testing is done through three stages: first, direct impact testing, then impact mediation, and finally, impact moderation of the buying experience. Terms of admission if the C.R value is more significant than 1.98 and significantly less than 0.05.

Table 2. Regression Weights

Eksogent	Endogent	Std Estimate	Estimate	S.E.	C.R.	P
Direct Effects						
E_Customer_Satisfaction <---	Website_Image	0,256	0,308	0,107	2,879	0,004
E_Customer_Satisfaction <---	Innovativeness	0,250	0,272	0,092	2,935	0,003
E_Customer_Loyalty <---	Website_Image	0,188	0,223	0,107	2,073	0,038
E_Customer_Loyalty <---	Innovativeness	0,112	0,120	0,091	1,316	0,188
E_Customer_Loyalty <---	E_Customer_Satisfaction	0,282	0,278	0,093	2,991	0,003
Indirect Effects						
E_Customer_Loyalty <---	E_Customer_Satisfaction <---	0,071	0,075	0,041	2,073	0,038
E_Customer_Loyalty <---	E_Customer_Satisfaction <---	0,072	0,086	0,035	2,102	0,035
Moderation Effects						
E_Customer_Loyalty <---	Shopping_Experience	-0156	-0,182	0,117	-1,563	0,118
E_Customer_Loyalty <---	ZInteraksi	0,464	0,449	0,096	4,663	0,000

Source: AMOS Output (Processed)

H1: WI has a positive and significant impact on E-CS

The test results showed that the C.R value for the first line was 2.879, which is greater than 1.90. The probability value obtained is 0.004, which is less than 0.005. Thus, website image significantly impacts consumer satisfaction in shopping online. Gen Z consumers show that they are interested in using e-commerce with good website quality to achieve their expectations in shopping online. Online shopping is fun and satisfying to consumers when the site design is neat, easy to navigate, and fast. The neatness, ease of navigation, and speed of the site can save time in shopping and not drain the minds of consumers in making transactions (Saputra et al., 2020).

H2: Website Image has a positive and significant impact on E-CL

The test results showed that the C.R value for the second line was 2.073, more significant than 1.90. Furthermore, the probability obtained of 0.038 is minor compared to 0.005. Thus, website image positively and significantly impacts Gen-Z customer loyalty in online shopping. Koo & Ju (2010) state that the design and layout of products on a website can significantly increase customer loyalty. Website image is an essential dimension of online relationships as it is considered a key element in influencing customer satisfaction and loyalty (Pereira et al., 2016).

SH3: E-CS Mediates the Impact of WI on E-CL.

The mediated effect of satisfaction on website image relationships on loyalty obtained a C.R value of 2.073 or greater than 1.90. At the same time, the probability value is 0.038 or less than 0.05. Thus, it can be stated that indirectly satisfaction plays a significant important role in connecting the impact of website image on customer loyalty in online shopping. Indirectly, job satisfaction influences this pathway by 0.071%. By (Koo & Ju, 2010) and (Pereira et al., 2016), website image is viewed is considered an important dimension of online relationships as it is viewed as a key element in influencing customer satisfaction and customer loyalty.

H4: IN has a positive and significant impact on E-CS

The test results show that the C.R. value for the second line is 2.935, which is greater than 1.90. Furthermore, the probability obtained 0.003 is less than 0.005. Thus, Innovativeness positively and significantly impacts Gen Z customer satisfaction in shopping online. Consumers at a higher level will look for different menus and displays, of course, which makes it easier for them to navigate. Because consumer needs are constantly changing, customers who have a high level of innovation will tend to abandon purchases with the same method; marketers must be observant of digital technology-based innovations because digital business model innovation, platform innovation, product innovation, and marketing innovation have had a significant impact on the company's marketing strategy in many ways. Digital product innovations and digital marketing innovations, such as distribution, promotion, and pricing elements in the marketing mix, have allowed companies to compete in fundamentally new ways (Varadarajan et al., 2022). Product innovation influences consumer loyalty. This means that the better the quality of product innovation, the better consumer satisfaction will be Varadarajan et al., (2022); Pereira et al., (2016)

H5: IN has a positive and significant impact on E-CL

The test results show that the C.R. value for this line is 1.316, less than 1.90. Furthermore, the probability obtained 0.188 is more significant than 0.005. Thus, Innovativeness has a positive but insignificant impact on Gen Z customer loyalty. Gen Z tends to get bored quickly; they have a higher level of curiosity, but when they have more experience, they will leave it quickly and look for new things, so the level of loyalty to a product decreases (Düzenli, 2021). These results reject different findings by (Varadarajan et al., 2022; Pereira et al., 2016). Product innovation influences consumer loyalty.

H6: Satisfaction mediates the Impact of IN on E-CL.

The mediating effect of satisfaction on relationships Innovation on loyalty obtained a C.R value of 2.035 or greater than 1.90. At the same time, the probability value is 0.035 or less than 0.05. Thus, indirect satisfaction plays a significant influential role in combining the impact of Innovation on customer loyalty in online shopping. Digital product and digital marketing innovations, such as distribution, promotion, and pricing elements in the marketing mix, have allowed companies to compete in new ways (Varadarajan et al., 2022). Product innovation influences consumer loyalty. This means that the better the quality of product innovation, the better consumer satisfaction will be Varadarajan et al., (2022); Pereira et al., (2016)

H7: E-CS has a positive and significant impact on E-CL.

The effect of satisfaction on loyalty obtained a C.R value of 2.991, which is greater than the requirement of 1.90. Next, the probability value is 0.003 or less than 0.05. Thus, satisfaction is significantly the determinant of loyalty. Customer satisfaction should be the priority as a fundamental determinant in maintaining long-term customer relationship behavior (Al-mamari & Abdulrab, 2017). Web image is a direct antecedent of overall satisfaction, directly and positively impacting loyalty (Pereira et al., 2016).

H8: E- SE moderates positively and significantly on the E-CS relationship on E-CL

The content-mediating effect on the Innovativeness relationship on loyalty obtained a C.R value of 2.102 or greater than 1.90. At the same time, the probability value is 0.035 or less than 0.05. Thus, indirect satisfaction plays an important role that is quite significant in connecting the impact of Innovativeness on customer loyalty in online shopping. Indirectly, job satisfaction influences this pathway by 0.072%. Product innovation influences consumer loyalty. This means that the better the quality of product innovation, the better consumer satisfaction will be (Varadarajan et al., 2022; Pereira et al., 2016). Innovation is believed to influence customer satisfaction and loyalty related to online purchases. Website satisfaction refers to a well-designed website's navigation experience and positive perception (Jin et al., 2013). Experiences have a moderating effect on relationship satisfaction and intent to repurchase (Pappas, 2014).

4.3. Managerial Implication

As one of the characteristics of the site that supports the appearance of an online retailer, graphics or images must be made attractive so that consumers who visit the site will be interested in exploring it (Lohse & Spiller, 2000). Shopping online is considered fun and satisfying to consumers when the site design is neat, easy to navigate, and fast; images, links, colors, and graphics presented on the website are attractive. The neatness, ease of navigation, and speed of the site can save time in shopping and not drain the minds of consumers in making transactions. In addition, the design and layout of products on a website can significantly increase satisfaction and loyalty (Saputra et al., 2020); Oh et al., (2008); Koo & Ju, (2010).

However, Innovativeness has a positive but insignificant impact on influencing customer loyalty of Gen Z. Gen Z tends to get bored quickly. They have a higher level of curiosity, but when they already have the experience, they will leave it quickly and look for new things, so the loyalty to a product decreases (Düzenli, 2021). A positive customer experience is vital in generating expectations for businesses, such as a strong emotional attachment to the brand and increased customer satisfaction that leads to customer loyalty (Anshu et al., 2022). Online shopping experience and e-shopping can increase customer satisfaction and loyalty (Mofokeng, 2023).

5. Conclusion

Based on the results of the discussion in the previous chapter, it can be concluded that:

1. The results of this study conclude that website image and innovativeness have a direct impact on shopping satisfaction.
2. Website image and satisfaction influence Gen-Z loyalty.
3. Innovativeness has no significant effect on Gen-Z consumer loyalty.
4. Shopping satisfaction indirectly influences the relationship between website image and innovativeness on Gen-Z consumer loyalty.
5. Furthermore, well-conducted found that the shopping experience positively and significantly moderates in increasing shopping satisfaction and realizing Gen-Z consumers' online shopping loyalty.

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The Relationship Between Knowledge and Attitudes of Waste Transport Workers and the Behavior of Using Personal Protective Equipment in Langsa City

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ABSTRACT

Garbage workers are generally susceptible to skin diseases due to contamination from the garbage, so there is a need for occupational health safety for waste transport officers. Efforts that can be made to avoid the occurrence of occupational diseases and work accidents are with Personal Protective Equipment (PPE). This study aims to determine the relationship between the knowledge and attitudes of waste transport workers towards the use of personal protective equipment in Langsa City. This research was carried out on 25 - 29 Juli 2023, at the Langsa City Environmental Service using analytical types. The population in this study were all waste transport workers who worked at the Langsa City Environmental Service, amounting to 71 people. Proportional stratified random sampling was used, which resulted in 42 people obtained using the Slovin formula. The results showed majority of respondents used personal protective equipment (52.4%), had good knowledge (62%), and had a negative attitude (57.1%). The Chi-Square test showed that knowledge (p value = 0.012) and attitude of waste officers (p value = 0.000) were significantly related to the behavior of using personal protective equipment. It is suggested that the Langsa City Environmental Service is expected to continue to improve socialization efforts and provide counseling to waste transport workers on the importance of using personal protective equipment, the benefits of using personal protective equipment, and knowing what actually work accidents. It is better to prepare personal protective equipment for workers in the form of masks, gloves, helmets/hats, boots, and work clothes that are suitable for the workplace.

Keywords: Knowledge, Attitude, Behavior, Personal Protective Equipment.

1. INTRODUCTION

Waste is closely related to public health because from these wastes live various microorganisms that cause disease. Poor waste management can have a negative impact on health. Diseases that are closely related to waste are broad, including infectious and non-communicable diseases and others. The cause can be bacteria, fungi, worms, and chemicals. One of the infectious diseases caused by waste can be contracted through the skin. Bacteria, viruses, and fungi that infect the skin are common and can damage it (Wijayanti, 2015).

Waste transportation workers are generally vulnerable to skin diseases due to contamination from garbage, so that the need for occupational health safety in waste transportation officers (Samion, 2019). Based on Law Number 1 of 1970 concerning occupational safety, work accidents are events that are unexpected and unwanted events. Therefore, worker safety is very important because it is a level of success in the field of Occupational Accidents, Safety, and Health (K3).

Law No. 13/2003 in Article 86, paragraph 1, states that every worker/laborer has the right to obtain protection for occupational safety and health. This is in accordance with Article 86, paragraph 2, which aims to

protect the safety of workers/laborers to realize work productivity. Household waste collectors are vulnerable to occupational diseases or accidents. Efforts that can be made to avoid occupational diseases and work accidents are with Personal Protective Equipment (PPE) (Yane et al, 2014 in Rusdian, 2018).

Personal protective equipment is a set of safety equipment used by workers to protect all or part of their body from the possibility of exposure to potential hazards in the work environment, including accidents and occupational diseases. When permanent control cannot be implemented or has not effectively reduced the potential for harm, personal protective equipment must still remain and must be used (Tarwaka, 2008 in Naiheli, 2019).

The use of Personal Protective Equipment (PPE) is particularly important part of preventing waste handlers to prevent diseases caused by waste. This is because waste haulers hold or experience direct contact with various kinds of garbage that have accumulated. Officers who do not use Personal Protective Equipment (PPE) in full make it easier for various diseases to enter the body through the hands, feet, and head (Etianopa et al, 2017 in Rusdian, 2018).

The International Labor Organization (ILO) reported that in 2019 as many as 2.78 million people died from work accidents, and 1.95 million were caused by accidents that occurred in the work environment. Of these cases, 35-50% of the workforce in the world experienced accidents that occurred as a result of exposure to physical, chemical, and biological hazards (Marlina, 2020). The Centers for Disease Control and Prevention (CDC, 2019 in Marlina, 2020) noted that 385,000 cases of occupational accidents occurred in the United States due to sharps contaminated with blood in health workers in the United States State Hospital.

Based on data from the Indonesian Ministry of Manpower (2021, in CNN Indonesia, 2021), 174 cases of work accidents that occurred in Indonesia in the second quarter of 2020 were recorded at around 3,174 cases with 2,164 victims. BPJS Ketenagakerjaan revealed that cases of work accidents reached 153,044 throughout 2020. This figure dropped slightly by 1.46 percent compared to 2019, which 155,327 cases.

The Indonesian Ministry of Manpower and Transmigration, in the writing of Farsida & Zulyanda, (2019) through the Regulation of the Minister of Manpower and Transmigration concerning Personal Protective Equipment (PPE) in article 2, has stated that employers are required to provide PPE for workers or laborers in the workplace in accordance with Indonesian National Standards (SNI) and provide it free of charge.

Similarly, Qanun Kota Langsa No. 3 of 2014 Article 30 point 1 (e) also states that in waste management everyone has the right to get protection due to the negative impact of waste final processing activities (Qanun Kota Langsa, 2014).

The results of related research conducted by Samion (2019) found that there was a significant relationship between respondents' knowledge of occupational health safety aspects with a p value of $0.04 < 0.05$; there is a significant relationship between attitudes towards occupational health safety aspects with a p value of $0.026 < 0.05$; and there is a significant relationship between behavior towards occupational health safety aspects with a p value of $0.034 < 0.05$.

The results of related research conducted by Febryani (2019), it is known that the classification of work accidents based on the mode of injury is as follows: (100%) who are scratched or punctured by sharp and rough objects, (59.5%) in contact with hazardous materials, (35.4%) falling, and (34.2%) being hit by objects. Based on the causative agent of unsafe acts, (98.7%) lack of personal protective equipment used, (83.5%) non-compliance with safety procedures, lack of training (58.2%), and the urge to work fast (40.5%). The most common unsafe

conditions were (83.5%) lifting too heavy, (73.4%) improper disposal of waste by residents, and rainy weather (60.8%). All car fleet waste haulers experienced the following types of injuries during work: cuts (100%), muscle/strain (51.9%), and sprains (36.7%).

The research conducted by Paletan, Hamsir, & Rostina (2020), obtained results based on the results of the chi-square test, which showed a p-valuevalue of 0.908 ($p\text{-value} > 0.05$), indicating no relationship between knowledge and the use of personal protective equipment. The attitude obtained a p-valuevalue of 0.166 ($p\text{-value} > 0.05$), indicating that there is no relationship between attitude and the use of personal protective equipment.

The Rusidian's research (2018) found that 35 waste transporters used three types of PPE, accounting many as 35 respondents. The a percentage of 71%. On knowledge in the good category with a percentage of 100%, training in the bad category with a percentage of 0%, motivation in the good category with a percentage of 77%, communication in the bad category with a percentage of 91%, availability of PPE in the good category with a percentage of 100%, supervision in the good category with a percentage of 85%, punishment in the bad category with a percentage of 100%, and awards in the bad category with a percentage of 100%.

Based on preliminary data obtained by the author from the Langsa City Environmental Service in August 2023, it is known that the number of waste transportation workers is 71 people, they are divided into three shifts: morning shift with 42 workers, day shift with 10 workers, and night shift with 19 workers, with fixed and unchanged work shifts.

Based on the results of an initial survey conducted by the author on waste transportation workers by conducting observations and interviews, it was found that many waste transportation workers in Langsa City ignored the use of PPE. Generally, workers only use boots, gloves, and some only use masks or cloth tied to cover the mouth and nose.

The author's interviews conducted by the author with waste transport officers revealed that they did not comply with wearing PPE. This the leadership never gave a warning or appeal to the officer concerned because they were considered to have sufficient knowledge about the risks of work accidents. The non-compliance has led to n attitude of indifference among most officers at the Environmental Service towards implementing rocedures for wearing personal protective equipment. This from their understanding that ases of work accidents can be easily cured. Another reason cited by waste haulers is that it is impractical and tends to interfere with heir work movements less free.

In fact, the Environmental Service Standard Operating Procedure (SOP) for cleaning field officers states in point 3 that the guard must check the completeness of PPE and attributes before working (SOP of the Langsa City Environmental Service, 2021). Starting from these existing problems, the authors are interested in knowing how the relationship between the knowledge and attitudes of waste transport workers affects the behavior of using personal protective equipment in Langsa City.

2. METHODS

This study aims to determine the relationship between the knowledge and attitudes of waste transport workers towards the use of personal protective equipment in Langsa City. A cross-sectional design was adopted in this study. The researcher utilized a quantitative approach and employed the analytical descriptive method to address research objectives and inquiries. The population in this study consisted of all waste transport workers at

the Langsa City Environmental Service, amounting to 71 people. The samples in this study were 42 respondents, which were obtained using the Slovin formula. The sampling technique used proportional stratified random sampling, where each sample taken was grouped based on the work shift included in the Langsa City Environmental Service.

3. RESULTS

Table 1. Frequency Distribution of respondents' behavior regarding the use of Personal Protective Equipment

Behavior	Frequency	%
Yes	22	52.4
No	20	47.6
Total	42	100

Based on the table above, it can be seen that the majority of respondents used personal protective equipment, namely 22 (52.4%) respondents. And the minority of respondents did not use personal protective equipment, namely 20 (47.6%) respondents.

Table 2. Frequency Distribution of Respondents' Knowledge

Knowledge	Frequency	%
Good	26	62
Fair	8	19
Poor	8	19
Total	42	100

In the table above, it can be seen that the majority of respondents have good knowledge, namely 26 (62%) respondents. Respondents who have sufficient knowledge are 8 (19%) respondents, while respondents who have less knowledge are 8 (19%) respondents.

Table 3. Frequency Distribution of Respondents' Attitudes

Attitude	Frequency	%
Positive	18	42.9
Negative	24	57.1
Total	42	100

Based on the table above, it can be seen that the majority of respondents have a negative attitude, namely 24 (57.1%) respondents. And the minority of respondents had a positive attitude, namely 18 (42.9%) respondents.

Table 4. Relationship between Knowledge of Waste Transport Workers and Behavior of Using Personal Protective Equipment in Langsa City

Knowledge	Behavior Use Of Protective Equipment						p value
	Yes		No		Total		
	N	%	N	%	N	%	
Good	18	43	8	19	26	62	0,012
Enough	3	7,1	5	11,9	8	19	
Poor	1	2,4	7	16,7	8	19	
Total	22		20		42	100	

The table above shows that out of 42 respondents, 26 respondents (62%) had good knowledge, 8 respondents (19%) had sufficient knowledge, and 8 respondents (19%) had poor knowledge. Of the 26 respondents who had good knowledge, it turned out that 18 respondents (43%) of them used personal protective equipment and 8 respondents (19%) did not use personal protective equipment. Of the 8 respondents who had sufficient knowledge, 5 respondents (11.9%) of them did not use personal protective equipment and 3 respondents (7.1%) used personal protective equipment. Of the 8 respondents who had insufficient knowledge, 7 respondents (16.7%) did not use personal protective equipment and 1 respondent (2.4%) used personal protective equipment.

The results of the Chi Square statistical test obtained the results, chi-square count > chi-square table (8.771 > 5.991), and p value < α value (p = 0.012 < α = 0.05), then H_0 is rejected which means that there is a relationship between the Knowledge of Waste Transport Officers and the Behavior of Using Personal Protective Equipment.

Table 5. Relationship between the Attitude of Waste Transport Workers and the Behavior of Using Personal Protective Equipment in Langsa City

Attitude	Behavior Use Of Personal Protective Equipmentt						p value
	Yes		No		Total		
	N	%	N	%	N	%	
Positive	17	40,5	1	2,4	18	42,9	0,000
Negative	5	11,9	19	45,2	24	57,1	
Total	22		20		42	100	

Table 5.8 shows that out of 42 respondents, 24 respondents (57.1%) had a negative attitude, and 18 respondents (42.9%) had a positive attitude. Among the 24 respondents who had a negative attitude, it turned out that 19 respondents (45.2%) did not use personal protective equipment, and 5 respondents (11.9%) used personal protective equipment. Among the 18 respondents who had a positive attitude, 17 respondents (40.5%) used personal protective equipment, and 1 respondent (2.4%) did not use personal protective equipment.

The results of the Chi Square statistical test obtained the results, chi-square count > chi-square table (22.344 > 3.841) and p value < α value (p = 0.000 < α = 0.05), then H_0 is rejected which means there is a relationship between the Knowledge of Waste Transport Officers and the Behavior of Using Personal Protective Equipment.

4. DISCUSSION

1. Relationship between Knowledge of Waste Transport Workers with Behavior of Using Personal Protective Equipment

The results concluded that out of 42 respondents, 26 respondents (62%) had good knowledge, 8 respondents (19%) had sufficient knowledge, and 8 respondents (19%) had insufficient knowledge. Of the 26 respondents who had good knowledge, it turned out that 18 respondents (43%) of them used personal protective equipment and 8 respondents (19%) did not use personal protective equipment. Of the 8 respondents who had sufficient knowledge, 5 respondents (11.9%) of them did not use personal protective equipment and 3 respondents (7.1%) used personal protective equipment. Of the 8 respondents who had insufficient knowledge, 7 respondents (16.7%) did not use personal protective equipment, and 1 respondent (2.4%) used personal protective equipment.

The results of the Chi Square statistical test showed that the chi-square count > chi-square table ($8.771 > 5.991$) and the p-value < a-value ($p = 0.012 < a = 0.05$). Therefore, H_0 is rejected, which means there is a relationship between the knowledge of Waste Haulers with the Behavior of Using Personal Protective Equipment. These results of this study are consistent with research conducted by (Arif, 2021) entitled "The Relationship Between Knowledge and Attitudes of Health Workers with the Behavior of Using Personal Protective Equipment During the Covid 19 Pandemic at Balung Regional Hospital." The results of that the knowledge of health workers with the behavior of using personal protective equipment, and 91 respondents (71.7%) had moderate knowledge was 17 respondents (13. Statistical tests using the Spearman Rho method obtained the results of p-valuevalue of 0.03.

With research conducted by Saputro (2015) entitled "The Relationship Between Knowledge And Attitude With The Use Of Personal Protective Equipment (PPE) In Workers In The Metal Casting Production Work Unit." The results of statistical tests show that there is a relationship between knowledge ($p = 0.002$) and the use of personal protective equipment among workers in the metal casting production work unit.

This is in accordance with the theory of Notoatmodjo (2012) Knowledge arises when a person uses their senses or intellect to recognize certain objects or events that they have never seen or felt before. For example, when someone tastes a newly familiar dish, they gain knowledge about the shape, taste, and aroma of the dish.

This is in line with the theory expressed by Ramdhani, Mulyati, & Putri (2019) that a person's level of knowledge can be influenced by several factors, including education, sources of information or mass media, social, cultural, economic, environmental experience, and age.

According to Notoatmodjo (2010 in Saputro 2015), knowledge is the result of observing and occurs after people make observations and senses of a particular object. Knowledge is a very important thing in shaping a person's behavioral actions. Knowledge about the use of PPE is one important aspect, as an understanding of the importance of the role of supervisors and company owners in implementing the use of PPE on their workers.

Work safety efforts that need to be carried out include periodic counseling activities tailored to the needs of the company, which are carried out by the company owner, assisted by field supervisors and other parties competent in the field of K3 to be given to workers, namely providing information about the use of PPE, technological developments about PPE, the conditions of how good PPE can be used by workers and the importance of using PPE when working in metal casting. This will provide a sense of security, so as to reduce

the incidence of work accidents and occupational diseases. Counseling itself has the meaning of a non-formal education that aims to change the behavior of workers in terms of knowledge of the use of PPE to prevent potential hazards in the workplace (Rejeki, 1998 in Saputro, 2015).

Researchers assume that the knowledge of waste transporters does not play an important role in their behavior of using personal protective equipment. This is because a broader insight and higher understanding of waste transporters does not affect their behavior of using personal protective equipment, because waste transporters do not all know and understand the importance of using personal protective equipment to protect themselves from work accidents, as well as diseases that may arise later. This is due to habits that have been passed down for generations.

2. The relationship between the attitude of Waste Transport Workers with the Behavior of Using Personal Protective Equipment

The results showed that out of 42 respondents, 24 (57.1%) had a negative attitude, and 18 (42.9%) had a positive attitude. Of the 24 respondents with a negative attitude, it turned out that 19 (45.2%) did not use personal protective equipment, while 5 (11.9%) used personal protective equipment. Of the 18 respondents with a positive attitude, 17 (40.5%) used personal protective equipment, while 1 (2.4%) did not use personal protective equipment.

The results of the Chi Square statistical test obtained the results, chi-square count > chi-square table (22.344 > 3.841, and p value < a p-value of 0.000, which a-value of 0.05. Therefore, H₀ was rejected, indicating means there is a relationship between the Attitude of Waste Transport Officers and the Behavior of Using Personal Protective Equipment.

The results of this study are consistent with research conducted by Jamaluddin & Fauzan (2021) entitled The Relationship between Knowledge and Attitudes of Domestic Waste Collection Officers with Work Accident Prevention Behavior at the Banjar Regency Environmental Service. The results showed that there was an attitude relationship (p-value 0.006) with work accident prevention behavior in domestic waste collection officers at the Banjar Regency Environmental Service in 2020.

The results of this study are in line with research conducted by Saputro (2015) entitled The Relationship Between Knowledge And Attitude With The Use Of Personal Protective Equipment (PPE) In Workers In The Metal Casting Production Work Unit. The results of statistical tests show that there is a relationship between skap (p = 0.005) and the use of personal protective equipment among workers in the metal casting production work unit.

The results of this study are not in line with the research conducted by Rachman, et al (2020) entitled "The Relationship between Knowledge and Attitudes towards the Behavior of Using Personal Protective Equipment at PT Sarandi Karya Nugraha Sukabumi. There is no relationship between attitude (p = 0.84) and the behavior of using personal protective equipment at PT Sarandi Karya Nugraha Sukabumi.

This is in accordance with the theory of Notoatmodjo (2012) that attitude is a person's closed response to a stimulus or object, both internal and external, so its manifestations cannot be seen directly but can only be interpreted first from the closed knowledge. Attitude in reality shows the suitability of responses to certain stimuli (Suma'mur, 2015). Attitude can also be interpreted as a readiness to react to a stimulus in a certain way

when faced with a stimulus that requires a response. A pattern of behavior, tendency, or anticipatory readiness to adjust to conditioned social situations (Waluyo, 2009 in Saputro, 2015).

The results of this study are in accordance with the theory put forward by Notoatmodjo (2012), which explains that attitude is a tendency to take action towards an object in a way that states the presence of signs to like or dislike the object. Attitude is only part of human behavior. Attitude is not yet an action or activity but is a predisposition to behavior. Attitude is still a closed reaction, not an open reaction, and is a readiness to act on objects in a certain environment as an appreciation of the object.

Researchers assume that the attitude of waste haulers has an important role in the behavior of using personal protective equipment. This can be understood because attitude is the most important concept in social psychology. Respondents in this study mostly had a negative attitude, thus leading them not to wear PPE. This was influenced by the officers' discomfort in wearing personal protective equipment. For the realization of attitude into action, supporting factors or possible conditions are needed, including facilities.

5. CONCLUSION

From the research conducted by Langsa City Environmental Service on 42 respondents, it was found that the Chi Square test results showed that the value of $p = 0.012 < \alpha = 0.05$, so there is a relationship between the Knowledge of Waste Transport Officers and the Behavior of Using Personal Protective Equipment. In the attitude variable, the Chi Square test results also obtained a value of $p = 0.000 < \alpha = 0.05$, so there is a relationship between the attitude of waste transport officers and the behavior of using personal protective equipment. Therefore, it can be concluded that there is a significant relationship between the knowledge and attitudes of Garbage Transport Officers and the Behavior of Using Personal Protective Equipment in Langsa city.

6. ACKNOWLEDGEMENT

1. For Environmental Service of Langsa City

It is expected to continue increasing socialization efforts and efforts to provide counseling to waste transport workers on the importance of using personal protective equipment, the benefits of using personal protective equipment, knowing what work accidents actually are, and preparing personal protective equipment should be prepared for these waste transport workers in the form of masks, gloves, helmets / hats, boots, and work clothes in accordance with the workplace.

2. For Waste Transport Workers:

Waste transportation workers are expected to always be disciplined in using personal protective equipment (PPE), especially when transporting waste.

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Diversity of Macrozoobenthic in Aquaculture Ecosystem of Lhokseumawe Regency, Indonesia

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ABSTRACT

This research was conducted to determine the diversity of macrozoobenthos in the estuary ecosystem of Lhokseumawe Regency, Indonesia. Sampling was carried out from July to September 2022 at five sampling locations. Five transects were examined each. Each sampling location has an area (10 x 10 m). The research showed that gastropods and bivalves were present at every sampling location. Macrozoobenthos diversity at the five research stations was in the range of 1,056 to 2,825, indicating moderate diversity. Macrozoobenthos diversity at the five research stations shows vulnerability to environmental changes, so management is needed.

Keywords: macrozoobenthic, aquaculture, transect, diversity index, dominance index

1. INTRODUCTION

The aquaculture conditions influence benthic habitat sustainability and determine the number of living animals that participate in ventilation and oxidize as deposit-feeders, redistributing the sediment's organic matter (Baker, Tyler et al. 2014). Biotic and abiotic components have specific roles in maintaining the stability and abundance of the food web (Jana, Lahiri et al., 2018).

A large number of benthic habitats has become a primary prominent indicator of the role of mineralization supply of organic matter in maintaining the aquatic habitats; this is due to the advantages of macrozoobenthic, which contribute the most tolerance limits to the different pollutants derived from the chemicals contaminant (de Jong, Baptist et al. 2015). Sedimentary conditions were intensely related to macrozoobenthic distribution in the aquaculture habitat as the distinction factor (Glockzin & Zettler, 2008).

The mangrove ecosystem area contributes to the diversity of abundance of food web of living habitat, and the crustacean species has become a crucial habitat for marine fisheries production. The total percentage of crab 27%, shrimp 58% and lobster 5% have contributed to the fisheries sector since 2011 (Harlioğlu, Farhadi et al. 2018).

Lhokseumawe Regency is situated in the western coastal area with the estuary and mangrove area as the crucial area for the macrozoobenthic diversity living habitat as the predominant food web of aquatic decomposers. In this study, the potential diversity of macrozoobenthic was investigated in five stations to ensure the availability and spatial distribution of important species of benthic availability within the aquaculture area.

2. LITERATURE REVIEW AND HYPOTHESIS

Benthos are organisms that attach or rest on the bottom of water and live at the bottom of the sediment (substrate) of water. Benthos can be divided based on how they eat into filter feeders (such as shellfish) and deposit feeders (such as snails). In dynamic environments (such as rivers), aquatic macroinvertebrates assess river water quality because benthic animals can provide a clear picture of the waters (Beukema, J. 1982). Benthic animals have a relatively sedentary lifestyle

and are always in contact with waste that enters their habitat—causing this group of animals to provide an overview of changes in environmental factors over time. Among the benthic animals that are relatively easy to identify and are sensitive to changes in the aquatic environment are the types that belong to the group of macroinvertebrates. This group is better known as macrozoobenthos (Resh, V. H., et al. 1996 Macrozoobenthos has a critical role in aquatic ecology in the nutrient cycle at the bottom of the waters and is one of the links in the energy flow and cycle from planktonic algae to higher consumers. Macroinvertebrates are used more often than other groups of organisms when assessing the quality of the aquatic environment (Carter et al., 2017)

3. RESEARCH AND METHOD

This research was conducted by developing a transects sampling method. The Sampling method was prepared on five stations, and physic and chemical parameter analysis was conducted to obtain the influence factor of aquaculture parameters, respectively. Complete information regarding the area of the aim of the study, the coordinate positioning technique is prepared as a geographic information system, also well-known as a biogeographic database (Faulwetter, Pafilis et al. 2016). As depicted in the map, station 1 is located at the estuary, Station 2 is located at the reservoir, Station 3 is at the mangrove area, Station 4 is at the shrimp pond area, and Station 5 is located at different spots in the estuary.

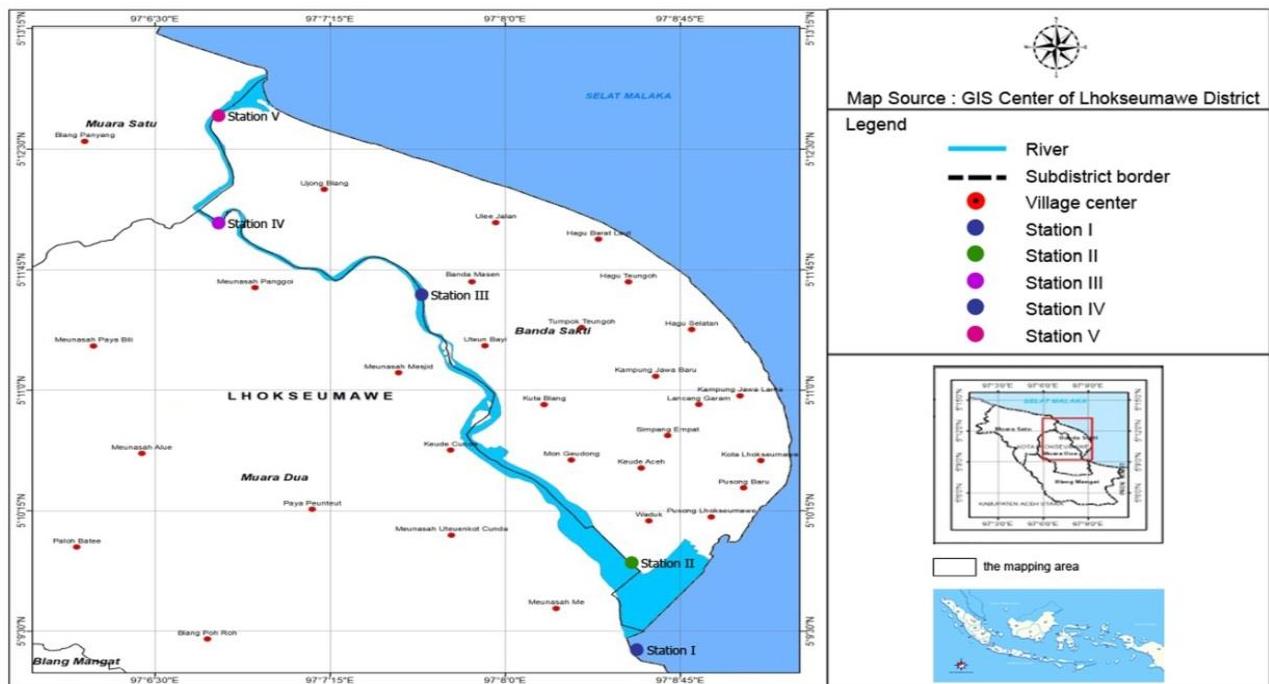


Figure1. Map of macrozoobenthic sampling point of Lhokseumawe city

In this study, every transect sampling station is divided into three substation plots with an area of (10m x 10m) to obtain accurate data on macrozoobenthic and sediment parameters.

The primary data source is data on macrobenthic diversity in the waters of Krueng Cunda, Lhokseumawe City. This research was carried out by establishing transit lines at five observation stations for taking macrozoobenthos samples. As depicted in the map, station 1 is located at the estuary, Station 2 is located at the reservoir, Station 3 is at the mangrove area, Station 4 is at the shrimp pond area, and Station 5 is located at different spots in the estuary.

Data analysis method

This research was carried out by developing a transect sampling method for the macrobenthic diversity index. The sampling method was prepared at five stations. In this study, every transect sampling station is divided into three substation plots with an area of (10m x 10m). A diversity index analysis was carried out to analyze the data obtained through observation. Determination of the Macrozoobenthos diversity index using the Shannon-Wiener formula (H') (Odum, 1963):

$$H' = - \sum P_i \cdot \ln P_i, \text{ dengan } P_i = \frac{N_i}{N} \quad (1)$$

The following formula of the Shannon-Wiener diversity calculation formula of diversity can be applied to the index that measures which is classified into three stages condition: low ($H < 2$), moderate ($2 < H < 4$), and high ($H > 4$) (Odum & Barrett, 2004). Data analysis using R-Studio.

4. RESULT AND DISCUSSION

The diversity index formula analysis shows diversity index analysis in the fifth research was formulated, the data on the diversity index yield the data range which is ranged from 1,056 to 2,500, at the first station the diversity index has 2,077, the second station has 1,514. The third station found 1,056, the fort station has 1,632, and the last sampling station, located in the estuary area, has the highest diversity index number with 2,500, the diversity of macrozoobenthic in the five research stations in the moderate level results. Moderate community conditions are community conditions that are easily changed by relatively small environmental influences. So, the Krueng Cunda water area needs environmental management for sustainability. The species composition and number of macrobenthic individuals in Krueng Cunda waters can be seen in Table 1.

Table 1. Species composition and number of macrobenthic individuals in Krueng Cunda Waters

Sum of Total			Stasiun					Individu/3m ²
Kelas	Famili	Jenis	1	2	3	4	5	
+ Annelida	+ Chironomidae	<i>Chironomus sp.</i>		127		4		131
+ Bivalvia	+ Acroloxidae	<i>Acroloxus lacustris</i>	2					2
	+ Arcidae	<i>Anadara granosa</i>	2	2		15	1	20
		<i>Anadara pilula</i>		2				2
		<i>Anadonta sp.</i>	1					1
		<i>Anapella cycladea</i>				9	2	11
	+ Mesodesmatidae	<i>Anapella cycladea</i>	1					1
	+ Mytilidae	<i>Septifer sp.</i>		10				10
	+ Mytiloidea	<i>Perna viridis</i>	158					158
	+ Neritidae	<i>Septaria tessellata</i>		1				1
	+ Ostridae	<i>Saccostrea cucullata</i>	8	21	4			33
	+ Semelidae	<i>Semele propicua</i>	2	2				4
	+ Solenidae	<i>Solen sp.</i>					1	1
	+ Unionidae	<i>Pilsbryconcha exilis</i>	2					2
	+ Veneridae	<i>Dosinia lupines</i>					3	3
		<i>Marcia opima</i>	1					1
+ Crustacea	+ Gecarcinucidae	<i>Parathelpusa convexa</i>			8			8
	+ Palaemonidae	<i>Macrobrachium rosenbergii</i>	1		1		1	3
+ Gastropoda	+ Ampullariidae	<i>Pila ampullacea</i>	3					3
		<i>Pomacea canaliculata</i>		2				2
	+ Ancyliidae	<i>Femissia rivularis</i>	4					4
	+ Buccinidae	<i>Anentome helena</i>		2				2
	+ Cerithiidae	<i>Clypeomorus moniliferus</i>	5	1			3	9
		<i>Rhinoclavis aspera</i>	2					2
		<i>Rhinoclavis vertagus</i>	2					2
	+ Lymnaeinae	<i>Lymnaea rubiginosa</i>	6					6
	+ Littorinidae	<i>Littoraria melanostoma</i>		1				1
		<i>Littoraria scraba</i>		5				5
		<i>Littorina undulata</i>		1				1
	+ Lymnaeidae	<i>Lymnaea acella</i>	2					2
	+ Melongenidae	<i>Volema myristica</i>	1	1				2
	+ Nassariidae	<i>Nassarius luridus</i>	17					17
		<i>Nassarius pullus</i>	18	4			6	28
	+ Neritidae	<i>Chiton faba</i>				1		1
		<i>Cithon squarrosus</i>	1					1
		<i>Nerita lineata</i>		1				1
		<i>Neritodyas comea</i>	1					1
	+ Olividae	<i>Oliva reticulata</i>			1			1
	+ Pachychillidae	<i>Sulcospira tetudinaria</i>	1					1
	+ Planaxidae	<i>Planaxis sulcatus</i>					4	4
	+ Planorbidae	<i>Polypylis kennardi</i>	1					1
	+ Pleuroceridae	<i>Leptoxis pracrosa</i>		1				1
		<i>Pleurocera acuta</i>		1				1
		<i>Pleurocera canaliculatum</i>	5					5
	+ Potamididae	<i>Cerithidea cingulata</i>	13	2	9	15	1	40
		<i>Cerithidea quadrata</i>		2			2	4
		<i>Terebralia palustris</i>	6					6
		<i>Terebralia sulcata</i>		2				2
	+ Terebridae	<i>Terebralia sulcata</i>				6	3	9
	+ Thiariidae	<i>Melanoides granifera</i>	3					3
		<i>Melanoides punctata</i>	1					1
		<i>Melanoides turolosa</i>			77			77
		<i>Tarebia granifera</i>			9			9
		<i>Thiara pantherina</i>	3				1	4
		<i>Thiara rufis</i>	11					11
		<i>Thiara scaraba</i>	1					1
	+ Trichotopidae	<i>Trichotropis borealis</i>		1				1
+ Holothuroidea	+ Aspidochirota	<i>Hirudo scara</i>		2			1	3
+ Insecta	+ Chironomidae	<i>Chironomus plumosus</i>					1	1
+ Malacostraca	+ Portunidae	<i>Scylla serata</i>	8			1		9
+ Oligochaeta	+ Naididae	<i>Prionospio ehlers</i>					1	1
Individu/3m²			293	194	109	51	31	678
number of species (S)			33	23	7	7	15	61
diversity index (H')			2,077	1,514	1,056	1,632	2,500	2,825

The distribution of the macrozoobenthos class, which was found in the waters of Krueng Cunda, Lhokseumawe City, is shown in Graph 2. The picture shows that the highest percentage of the macrozobenthos class in Krueng Cunda waters is represented by the Gastropoda class, namely 40%. The highest percentage of the macrozobenthos is possible because the Gastropoda class can adapt well to the environmental conditions in the research area. Besides, Gastropods have thick shells, which causes these organisms not to be easily preyed upon by predators. The high adaptability of this organism allows its existence to be abundant (Muchlisin, Z. A. et al. 2016).

Furthermore, insects are the fewest organisms and the class with the lowest percentage of presence and number is thought to be due to their way of life, which does not stay in a body of water and tends to move around. Some others may experience metamorphosis and change habitat. Most aquatic insects are Hemimetabola, namely insects that undergo an incomplete type of metamorphosis. In the young or larval phase, they have additional organs in the form of gills so they can live in the water as benthos. When they are adults, the gills disappear, and they live outside the water (Ward, 1992). Insects are indicator species that are intolerant of pollution. Types of aquatic insects are organisms that are intolerant of changes in environmental factors so that they can be used as bioindicators for good quality waters. Several genera, sensitive to specific contaminants or pollutants, experience reduced growth and survival (Ayu et al., 2022). According to (2002), the low or non-appearance of organisms may result in polluted water flows or community conditions being disturbed. The low percentage of presence is because not all benthic aquatic animals can live in polluted environmental conditions, especially organic waste contamination. The Krueng Cunda water area is suspected to have a high content of organic waste originating from domestic activities.

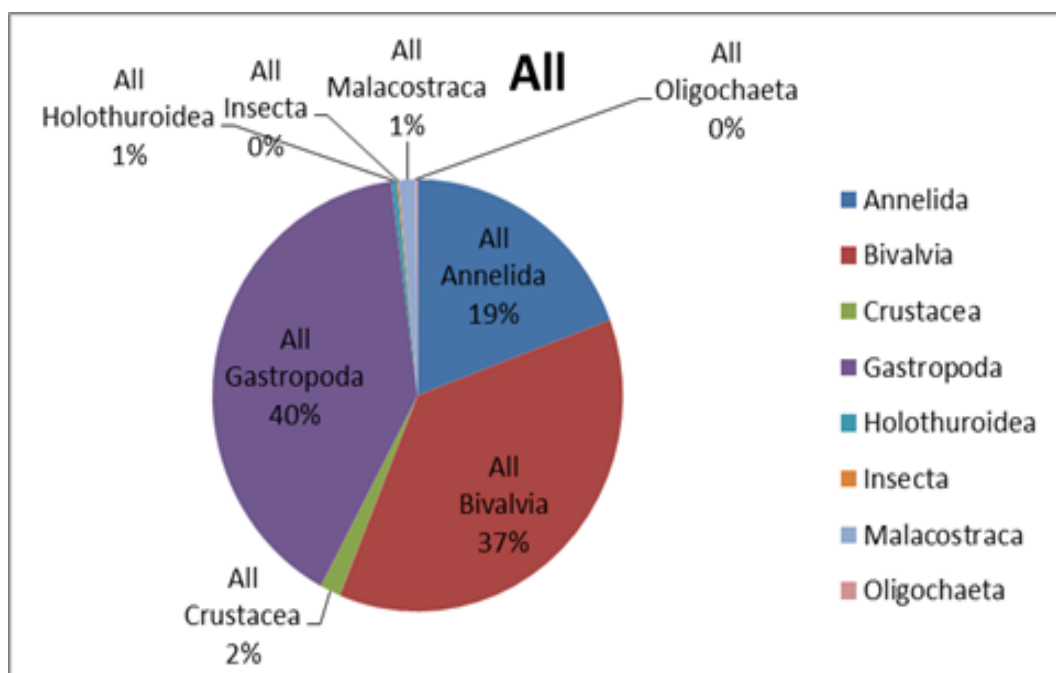


Figure 2. The distribution of the macrozoobenthos class

5. CONCLUSION

Based on the results of the discussion in the previous chapter, it can be concluded that:

- 1) Macrozoobenthos diversity at the five research stations was in the range of 1,056 to 2,825, indicating a moderate level of diversity
- 2) The low occurrence of intolerant organisms such as insects indicates pollution
- 3) There needs to be environmental management efforts to stabilize Krueng Cunda waters

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Pancasila Student Profile in Improving the Competence of 21st Century Students and Realizing Well-Being Student

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ABSTRACT

The purpose of this study was to determine the effect of the Pancasila Student Profile on the competence of 21st century and student well-being. This research uses quantitative research. The subject population of this research is all students of Sultan Agung Private Junior High School Pematang Siantar totaling 422 people and the research sample is Private Junior High School class IX students totaling 130 people. Data collection techniques were carried out by observation, interviews, documentation and questionnaires. The results of the study are: (1) there is a positive influence between the Pancasila Student Profile on 21st century competence and there is a positive influence between the Pancasila Student Profile on student wellbeing, (2) there is a moderately high correlation between the Pancasila Student Profile on 21st century competence and there is a moderate correlation between the Pancasila Student Profile on student wellbeing, (3) the Pancasila Student Profile has a positive and significant effect on 21st century competence and the Pancasila Student Profile has a positive and significant effect on student wellbeing.

Keywords: Pancasila Student Profile; Competence of 21st Century and Well-Being Student

1. INTRODUCTION

Entering the era of revolution 5.0 is certainly a challenge for all aspects of life, including the field of education. The Ministry of Education and Culture launched the "Merdeka Belajar" program to improve the education order that continues to suffer from recent setbacks to achieve Golden Indonesia 2045. The Merdeka Belajar Program is a policy program that aims to reposition the national education system to the essence of the law by providing "independence" to innovate and create to every educator as a driver of education transformation (Sherly, 2020). The Merdeka Belajar program has been launched for 22 episodes, one of which is changing the National Examination into a Minimum Competency Assessment and Character Survey. The character survey aspect was selected from 6 elements of the Pancasila Student Profile, namely faith, fear of God Almighty and noble character, global celebrity, mutual cooperation, independence, critical and creative reasoning (Juliani dan Bastian, 2021); (Kalderanews, 2020); (Kompas, 2020); (Ministry of Education and Culture Regulation No. 22/2020 on the Strategic Plan of the Ministry of Education, 2020).

The Pancasila Student Profile aims to realize students in Indonesia as lifelong learners who are competent and behave according to the values of Pancasila. The implementation of the Pancasila Student Profile cannot be separated from the guidance of a teacher as a civil servant in accordance with the motto of Ki Hajar Dewantara. The existence of teachers in front as role models for students, in the middle provides motivation to students and behind provides encouragement to students (Rahayuningsih, 2021). In accordance with the motto of Ki Hajar Dewantara, the application of the Pancasila Student Profile can be implemented through habituation, coaching and learning.

Ki Hajar Dewantara stated that education is the foundation of the formation of the nation's civilization. Education is oriented towards liberating humans starting from freedom in thinking, freedom in making decisions, dignity, mentality and democracy. Man is a free man in the sense that he lives free man outwardly and mentally without having to rely on others. The education system according to Ki Hajar Dewantara aims to create humans who are independent and given freedom of thought according to their creativity. Therefore, how can this education create competent humans without having to reduce happiness in themselves.

Through this Pancasila Student Profile, it is hoped that we can create a young generation who are competent in accordance with the development of the century and always stick to the values of Pancasila without having to reduce the happiness of students as human beings who are entitled to happiness in life. And this is the transformation of education driven by the current Minister of Education and Culture to return the educational order to its true essence in accordance with the motto of education according to Ki Hajar Dewantara. Education is not just transferring knowledge from educators to students but rather transferring educational values to students so that educators can grow into young generations with character, competence and happiness.

In this 21st century, every individual is required to master competencies in order to be able to compete globally. Students as lifelong learners are guided to master competencies that we know as 21st century competencies that develop from 4C to 6C, namely computational, creative, critical, collaboration, communication, and compassion (Nurasiah, I., Marini, A., Rachmawati, 2022); (Rizal, M., Iqbal, 2022). The Pancasila Student Profile aims to produce human resources who are moral and of noble value and master 21st century competencies as readiness to become a world community (Aulia, Maryam, 2023); (Kahfi, 2022).

Pancasila Student Profile can also realize student wellbeing. Students are given the freedom to be creative according to their talents and interests (Hastri, 2022); (Sherly, 2021). The freedom for learners to create supports the development of individual potential, builds self-confidence, and provides opportunities for deeper self-exploration. Thus, learners can feel higher happiness, satisfaction, and well-being in their learning process, creating an educational environment that supports students' physical, mental, and social development, as well as improving their overall well-being. Based on the background above, this article will discuss how the Pancasila Student Profile in improving 21st century competence and realizing student wellbeing.

2. RESEARCH METHODS

This study used quantitative research. The subjects of this study population were all students of Sultan Agung Pematang Siantar Private Junior High School totaling 422 people and the research sample was 130 students of Class IX Private Junior High School. The types of data used in this study are qualitative data and quantitative data. The data sources used are primary data and secondary data. Data collection techniques are carried out by observation, interviews, documentation and questionnaires. The data analysis technique used is quantitative descriptive analysis which includes validity, reliability, regression, determination coefficient test, and hypothesis test.

3. RESULTS AND DISCUSSION

Instrument Test

Validity tests are carried out to determine the extent of the accuracy or accuracy of a measurement instrument in performing its size function, namely so that the data obtained can be relevant to the purpose of holding the measurement. The results of the validity test can be seen in the following table:

Table 1. Instrument Test Result

Variable	Item Instrument- Total Correlation	r-table	Result
Pancasila Student Profile	0.675	0.3	Valid
Competency of 21 st Century	0.631	0.3	Valid
Wellbeing Student	0.637	0.3	Valid

Source: Data Processing Results (2023)

Based on the results of the validity test above, it can be concluded that all indicators of the variables in this study are valid. Furthermore, reliability tests are used to measure the stability of indicators of a variable. A questionnaire is said to be reliable if a person's answers to questions are consistent and stable over time. The reliability test results can be seen in the following table:

Table 2. Reliability Test Results

Variabel	Cronbach's Alpha	Instrument Items	Result
Pancasila Student Profile	0.976	12	Reliable
Competency of 21 st Century	0.976	42	Reliable
Wellbeing Student	0.976	9	Reliable

Source: Data Processing Results (2023)

Based on the results of reliability tests in Table 2 above, it shows that all indicators have a value of Cronbach's alpha if item deleted > 0.70 so that it can be concluded that all indicators of the variables in the study are reliable.

Normality Test

The normality test is used to determine the formula to be used in the hypothesis test and to find out whether the data is normally distributed or not. Test normality using Kolmogorov-smirnov test. The results of the normality test can be seen in the following table:

Table 3. Normality Test Results

Variabel	N	K-S Test	Asymp. Sig. (2-Tailed)
Pancasila Student Profile	130	1.069	0.203
Competency of 21 st Century	130	0.934	0.348
Wellbeing Student	130	1.350	0.052

Source: Data Processing Results (2023)

Based on the table of normality test results in Table 3 above, the Asymp Sig. (2-Tailed)

value of each variable is 0.05 so that it can be concluded that each variable is normally distributed.

Regression Analysis

This test was conducted to analyze the influence of the Pancasila Student Profile on 21st century competence and the influence of the Pancasila Student Profile on student wellbeing. The results of simple linear regression testing can be seen in the following table:

Table 4. The Results of the Simple Linear Regression Test Pancasila Student Profile on Competency of 21st Century

Model	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	Beta
1 (Constant)	17.624	4.764	
Pancasila Student Profile	0.301	.024	.741

a. Dependent Variable: Competency of 21st Century

Source: Data Processing Results (2023)

Based on the results of simple linear regression testing, a regression equation $Y = 17.624 + 0.301 X$ is obtained, meaning that if the Pancasila Student Profile increases by one unit, it will increase 21st century competence by 0.301 units, so it can be concluded that there is a positive influence between the Pancasila Student Profile and 21st century competence at Sultan Agung Pematang Siantar Private Junior High School.

Table 5. The Results of the Simple Linear Regression Test Pancasila Student Profile on Wellbeing Student

Model	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	Beta
1 (Constant)	15.354	2.187	
Pancasila Student Profile	.075	.011	.513

a. Dependent Variable: Wellbeing Student

Source: Data Processing Results (2023)

Based on the results of simple linear regression testing, the regression equation $Y = 15.354 + 0.75 X$ means that if the Pancasila Student Profile increases by one unit, it will increase student wellbeing by 0.075 so that it can be concluded that there is a positive influence between the Pancasila Student Profile on student wellbeing at Sultan Agung Pematang Siantar Private Junior High School.

4. DISCUSSION

Correlation Coefficient and Determination Coefficient

Correlation coefficient was used to calculate the strength of the relationship between the Pancasila Student Profile, 21st century competence and student wellbeing. The results of the calculation of the correlation coefficient and determination coefficient can be seen in the following table:

Table 6. Correlation Coefficient and Determination Coefficient Results Pancasila Student Profile on Competency of 21st Century

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.741 ^a	.549	.545	3.6926

a. Predictors: (Constant): Pancasil Student Profile
 b. Dependent Variabel: Competency of 21st Century

Source: Data Processing Results (2023)

Based on the table above, a correlation coefficient (r) value of 0.741 is obtained, which means that there is a strong relationship between the Pancasila Student Profile and 21st century competence at Sultan Agung Pematang Siantar Private Junior High School. Furthermore, the coefficient of determination (R) of 0.549 means that the high and low competence of the 21st century of 54.9% can be explained by the Pancasila Student Profile variable while the remaining 45.1% can be explained by other variables that are not discussed in this study such as teacher performance, teacher work ethic, principal competence and others.

Table 7. Correlation Coefficient and Determination Coefficient Results Pancasila Student Profile on Wellbeing Student

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.513 ^a	.263	.257	1.6951

a. Predictors: (Constant): Pancasila Student Profile
 b. Dependent Variabel: Wellbeing Student

Source: Data Processing Results (2023)

Based on the table above, a correlation coefficient (r) value of 0.513 is obtained, which means that there is a moderate relationship between the performance of the Pancasila Student Profile and student wellbeing at Sultan Agung Pematang Siantar Private Junior High School. Furthermore, a coefficient of determination (R) of 0.263 was obtained, meaning that the high and low wellbeing of students of 26.3% could be explained by the Pancasila Student Profile variable, while the remaining 73.7% could be explained by other variables not discussed in this study such as teacher creativity, learning media, learning facilities and others.

Hypothesis Testing

Hypothesis testing was carried out to determine whether the Pancasila Student Profile and 21st century competence have a significant relationship or not as well as to find out whether the Pancasila Student Profile and student wellbeing have a significant relationship or not. The results of hypothesis testing can be seen in the following table:

Table 8. t Test Results Pancasila Student Profile on Competency of 21st Century

Model	T	Sig.
1 (Constant)	3.699	.000
Pancasil Student Profile	12.470	.000

a. Dependent Variable: **Competency of 21st Century**

Source: Data Processing Results (2023)

Based on the table above, it can be seen that the calculated value of the Pancasila Student Profile variable is 12,470 > the table is 1.978524 or a significant level of 0.000 < α 0.05 means that the Pancasila Student Profile has a positive and significant effect on 21st century competence

at Sultan Agung Pematang Siantar Private Junior High School. This is in line with research (Aulia,

Maryam, 2023) (Kandah, 2023) (Santika, 2023) (Santika, 2023) states that the Pancasila Student Profile aims to produce human resources that are moral, of noble value and master 21st century competencies. (Mustari, 2023) in his research stated that the Pancasila Student Profile aims to form superior human resources, form lifelong students who are globally competent and have behavior in accordance with Pancasila values.

Table 9. t Test Results Pancasila Student Profile on Wellbeing Student

Model	T	Sig.
1 (Constant)	7.020	.000
Pancasil Student Profile	6.754	.000

a. Dependent Variable: Wellbeing Student

Source: Data Processing Results (2023)

Based on the table above, it can be seen that the calculated value of the Pancasila Student Profile variable is $6.754 > t_{table}$ is 1.978524 or a significant level of $0.000 < \alpha 0.05$ means that the Pancasila Student Profile has a positive and significant effect on student wellbeing at Sultan Agung Pematang Siantar Private Junior High School. This is in line with research (Hastri, 2022); (Sherly, 2021) which states that the Pancasila Student Profile can realize student wellbeing. Through the Pancasila Student Profile, students are given the freedom to be creative in developing individual potential, garnering self-confidence and providing opportunities for students to explore more deeply so that students can feel happiness in themselves.

5. CONCLUSION

Based on the results and discussion, it can be concluded that (1) there is a positive influence between the Pancasila Student Profile on 21st century competence and there is a positive influence between the Pancasila Student Profile on student wellbeing, (2) there is a strong relationship between the Pancasila Student Profile on 21st century competence and there is a moderate relationship between the Pancasila Student Profile on student wellbeing, (3) The Pancasila Student Profile has a positive and significant effect on 21st century competence and the Pancasila Student Profile has a positive and significant effect on student wellbeing.

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DIFFICULTY IN ONLINE LEARNING FOR PROSPECTIVE MATH TEACHERS

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ABSTRACT

Pandemic has caused changes in learning in universities and has led to the emergence of student learning difficulties. The aim of the researcher is to find out the learning difficulties of students during the pandemic. This type of research is qualitative with a case study approach. The research subjects were 25 students. The data collection technique used a questionnaire with 20 statement items. Data analysis used descriptive qualitative analysis method flow model (flow model), namely data reduction, data presentation, and drawing conclusions. The results of the study showed that as many as 38.4% of prospective mathematics teacher students had difficulty learning mathematics in online learning. This means that as many as 61.6% of prospective mathematics teacher students who do not have difficulty learning mathematics.

Keywords: Difficulty learning; Prospective mathematics Teachers; Online learning

1. INTRODUCTION

In the early 2020, March to be exact, an unexpected circumstance hits the live of the people of Indonesia in the form of the 2019 Corona Virus Disease, commonly known as Covid-19. This phenomenon is still ongoing even now in 2021 and has affected many fields, from the health departments, economics and social life as well as in the field of educations. Indonesia was also forced to undergoes changes in their educational systems. (Herliandry, Nurhasanah, Suban, & Kuswanto, 2020).

The changes in the Indonesian educational systems during the Online learningpandemics refers to the Ministry of Education and Culture referrals No. 36962/MPK.A/HK/2020 regarding educational process during the Online learningpandemics with an alternative of learning from home, which allows the teachers and students to indirectly interact from afar (Hadiprasetyo, et. Al., 2020). This long-distance-learning methods was in line with the Ministry of Education and Culture directive No. 19, 2013, which is a learning process using the communicative media of an online-applications, come to be more widely known as online learning.

Online learning is a learning process utilizing the advancement of internet technology to create various learning interactions (Nabila and Sulistiyarningsih, 2020). Online learning usually exploits device or media such as mobile phone, laptop and computer to perform the learning process (Putria, Maula, and Uswatun, 2020). The applications that were used include ELearning Unimal, Telegram, Google Meet, Zoom or other agreeable media to connect the instructors and the students. The media used will be agreed between the instructors and the students based on which media is best used for the learning process.

Both students and instructors are required to be able to utilize online learning, which also includes learning mathematics. It is widely known that mathematics have abstract characteristics, which provides a challenge for prospective math teachers to comprehend the subject during the Online learningpandemic. This is due to some mathematics subjects requires direct visualization to fully comprehend it, and was unable to be fully conveyed through online learning. The changing educational systems due to the pandemics from direct interaction at the university to the online home learning brings up problems faced by prospective math teachers in comprehending mathematics subjects.

Difficulties in learning are problems faced by a person in an unsuitable learning environment – make students unable to concentrate, the instructors unable to effectively conveyed difficult materials (Fauziah, Sukarno and Sriyanto, 2021). Difficulties in learning emerges when the inability of the students in comprehending the problem-solving algorithm, concepts, and basic principles even when

they try to learn it. Furthermore, their inability in abstracting, generalizing, deductively thinking, and remembering the concepts or principles made them come to the conclusion that the subjects given was extremely hard (Waskitoningtyas, 2016). There are 2 factors that cause difficulties in learning, an internal factor and an external factor. The internal factor could be divided into 3 aspects which are students' interest and motivation in learning. External factors includes parental influence as well as the instructors teaching methods in teaching the students. (Lestari, Meter, and Negara, 2015).

Ever since the implementation of online learning, there are many issues that occurred in its applications. The experiments conducted by Purwanto, et. Al (2020) stated that one of the most obvious impacts is the difficulties in learning in the learning from home process. Students feels stressed during the learning process, feeling forced, and lack of facilities and infrastructure at home. Utami and Cahyono (2020) found some issues that occurred during online learning which includes low initiative from students to learn, students unable to adapt to the routines of online learning, students focused more in acquiring good grades rather than improving their comprehensions, many students complains and gave up in committing to the given task during the e-learning process.

Difficulties in online learning is also apparent in the research done by Wardani, Anita and Ayriza (2020), which stated that the issue is also apparent on the parents of the students. Most parents is not knowledgeable with the subjects and therefore find it hard to inspire and motivates their children to learn, difficulties in managing time between work and accompanying their children, parents difficulties in operating the media, limited internet connection and parents' impatience in accompanying their children in during the learning causes difficulties in learning for the child at home,

The solution to improve and maintain the quality of online learning is by evaluation, studying and examining the difficulties that prospective math teachers face during a period of online learning. Further research is needed to obtain more information on the difficulties in learning faced by prospective math teacher during the nline learning to find the best solution against those difficulties, which is the main aim of this research. This research also aim to hopefully minimalize the difficulties faced by students during online learning and finding the solutions for those difficulties as well as improving the quality of online learning for future uses.

2. METHODS AND MATERIALS

This research applied a qualitative research methods by describe the data through percentage level imaging of the students questionnaire answers analytically based on the real situation on a population. Every prospective math teacher at the mathematics department of Malikussaleh University was the population of this research. The samples of this research were 25 prospective match teachers. The data for this research was collected using difficulties in learning mathematics online questionnaire.

The questionnaire consists of 20 question with 4 grading range of Very Suitable (VS), Suitable (S), Not Suitable (NS), and Very Not Suitable (VNS). The test was first prepared, constructed and validated in an instrumental trial.

The questionnaires were distributed to the students via Google Form, a very useful and helpful application to quickly and widely distribute questionnaire by sharing the web-link of the questionnaire to the research subjects. The questionnaires were answered by choosing the options provided by Google Form. The data were than analyzed using the descriptive qualitative analysis flow model, consisting of three steps of data reduction, data presentation and conclusion.

3. RESULT

Findings

As previously stated, to find and understand the difficulties faced by prospective math teacher face during the online learning process. By distributing questionnaire through Google Form of 20 set questions based on the indicators of difficulties in learning. Shown in Table 1 is the result of the questionnaire from the qualified respondent of 25 students.

Table 1. Difficulties in Learning Questionnaire Summary Result

No.	Factors	Difficulties in Learning Indicator	Items	Students	Percentage
1.	Internal Factors	Technical Difficulties	3	16	64%
		Learning Habits	5	14	56%
		Learning Motivation	5	10	40%
2.	External Factors	Instructor/University	4	3	12%
		Parents	3	5	20%
Average Score					38,4%

The table 1 above shows that the internal factors of difficulties in learning on a technical level is 64%, on the students learning habits is 56%, and 40% is unmotivated in undergoing the learning process of online learning. On the external factors, 12% of the students did not received support from their instructors or university, and 20% did not received support from their parents. Indicating that 38.4% of prospective math teachers at the Malikussaleh University face difficulties in learning online during the Online learningpandemic. This is also indicates that 61.6% of prospective math teachers did not face difficulties in learning online during the Online learningpandemics. The percentage of the difficulties in learning online can also be seen in the following graph.

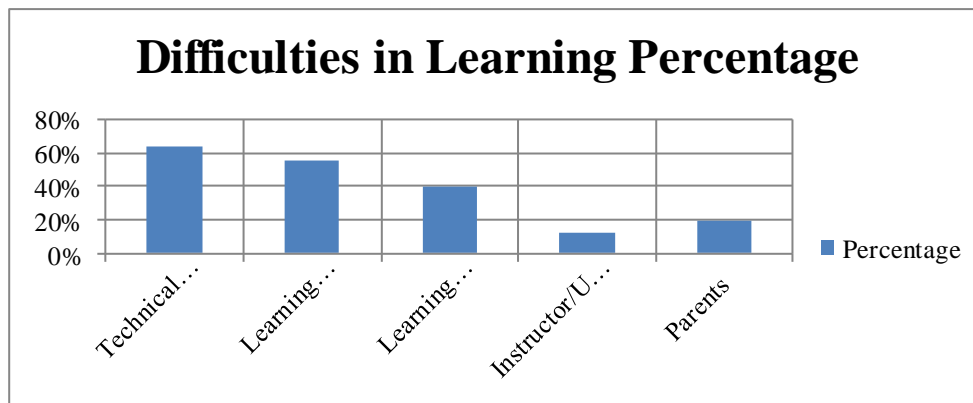


Fig 1. Questionnaire Result Percentage of Students Difficulties in Learning

The graph above shows that the percentage of difficulties in learning. The highest percentage of difficulties is the indicator for technical difficulties regarding the execution of online learning like connection and signal issues during class. Most students of Malikussaleh University comes from a variety of places, which causes difficulties for the students in attending and presenting at class due to connectivity issues. Lateness is also an issue for the students in joining a class through Zoom or Google Meet, students also suffers from connectivity issues and blackout which hinders the learning process of the class. A different kind of technical difficulties is the issues with mobile data that both students and instructors face. Applications like Google Meet, Google Classroom, Zoom or WhatsApp requires having a substantial mobile data and therefore requires an extra cost for the students and instructors to conduct the learning process. Despite the existence of mobile data allowance, students did not only use mobile data during class. Social media and online game in their free time would also uses up their mobile data allowance. To be able to attend class, students were forced to find places with a stable Wi-Fi connection such as the university environment.

4. DISCUSSIONS

This difficulty is in line with the result of Isnaini (2020) research that stated that students face technical difficulties regarding connectivity and lack of mobile data, some students was also uneducated in utilizing the internet, some don't even have their own mobile phone, all of this causes the learning process to be not maximized. During the learning process, students faces problems like not understanding the instructor, not following the flow of the process, unmotivated and bored students and the difficulty of adapting online, the task given online were also considered to be too difficult for the students.

The second highest percentage of difficulties in learning in this research is the indicator of learning habit. This indicates that most students face difficulties relating to their learning habits. Most prospective math teacher have not feel comfortable when undergoing online learning and the transition of learning environment burdens the students making them unable to learn favorably. Until now, students still have difficulties in receiving and absorbing the subjects from the instructors online. The research done by Dewi (2020) also supports this finding, stating that long distance learning method causes the students to require time to adapt to the new changes that would also affects their comprehensive level on the subject.

The next indicator of difficulties in learning is the learning motivation. The prospective math teach of Malikussaleh University have begun to bore themselves during the one-year period that they have utilizes online learning. Online learning limits the chance for students to directly ask question and discussed the subjects with the instructors as well as not having colleagues that can help motivate themselves and inspires them in this pandemics. This reality is in line with the condition of online learning on the research of Cahyani, Listiana and Larasati (2020) that concluded that high-school student felt less motivated to learn when undergoing online learning because of the limitation of a virtual space making it hard for students to interacts with teachers and other students, limiting students chances to ask questions and to absorbs the knowledge. This phenomenon causes students motivation to lower and could affects the students grades.

External factor of difficulties in learning, such as instructor and parents, was quiet low. This means that many students still receives supports and motivations from their instructors and parents to undergoes the online learning during the Online learningpandemics. Most instructors was also quiet adept in using technology, internet and social media as their facilities in teaching, keeping quality of the learning process during the pandemic. Most students could already be categorized as an adult and most have already been used to live independently, most students did not think that guidance from their parents as nothing that was too important.

The difficulties of learning faces by primary school students on research done by Utomo, et. Al (2021) stated that the students of SDN Sidoharjo 01 suffers from the decrease of the students' interest in learning, the students were also confused as to how to find information by themselves on difficult subjects online. The students also felt great degree of stress during online classes because of the decreasing opportunity to be guided thoroughly by their teacher. Parental guidance is also lacking due to most parents lacking the ability to guide their children using the online learning system and leaving their child to learn by themselves.

The negative view of online mathematics learning is also shared with Fauzy and Nurfauziah (2021) who stated that online learning came about abruptly due to the Online learningpandemic, causing a non-optimal learning environment with little to no preparation. Furthermore, students were unable to adapt to the sudden changes and felt unprepared when experiencing online learning on the subject of mathematics. This negative view on online learning indicates that there are many difficulties that students face when learning mathematics by online.

There are few solutions of these difficulties such as anticipating signal difficulties by finding location with high signal and makes full use of the government mobile data allowance, focusing it only for learning purposes. Students can also held discussion with their colleagues and instructors through personal WhatsApp applications if they felt that the discussion during class was lacking. Instructors should also provide an interesting presentation to lift up the spirit of the students despite learning online.

Utari, Wardana and Damayani (2019) stated that the solution of difficulties of learning online is by providing an interesting learning medium, furthermore by increasing the amount of practice

question to make the students learn and understand more about the subject of math. The last solution is by building teamwork with the students' parents, because they have a great role in motivating the students. Students that received warm behavior and good attention at home would be more motivated to learn. Therefore, it is important for parents to always give attention to the development of the students learning of mathematics by accompanying them when they are learning at home, if they were ever to find some difficulties the parents can help them to overcome those difficulties. A different alternative is by giving the child a private tutor.

The situation of study-at-home students is one of many efforts in to entice students independent learning, because the atmosphere of online learning could motivate students to learn and made them learn independently, learn more effectively, and made students not fall behind the advancement of knowledge and technology (Yulia and Putra, 2020). Other than strategy to make a successful online learning environment, Lewis (2015) optioned that knowledge about students learning habits and their ability in deciphering the correct formula in an online environment is also important. As with normal, face-to-face, teaching, an understanding of teaching methods is necessary to accommodate the students' learning habits. A successful online learning connects the teaching methods to the learning habits using facility of media and available online sources.

Other than the importance of instructor understanding the learning habit of their students, the capability of the instructor regarding technologies is also needed for the online learning to work well. That is why a proper training is necessary, be it a seminar or a workshop regarding the innovation of online learning using technology. One of those technology is LMS (Learning management system), an interactive online learning system that is reliable and user-friendly that could hopefully help students understands mathematical subjects independently. This is supported by Hidayat, H., Hartono, H., and Sukiman, S. (2017) who stated that the development of LMS could made independent online learning for student easier without the need to rely on the instructor, with LMS serving as the media for students to embarks on self-learning.

Research done by Amaruddin, Atmaja and Kahfid (2020) also describes that the even without the pandemic, family have the responsibility to teach, impart knowledge, and to evaluate every progress of a child learning process and their behavior. Even students that have passed *baligh* still needs the guidance of parents. The responsibility of the parents is to guide the aspects of knowledge on a child at home, as well as guiding their behavior, values, and attitude towards the operation of social media / using gadgets. Therefore, parents must watch and evaluate their child at home, so that the online learning could be maximized as hoped. Other than the advantages and disadvantages of online learning, this researcher also elaborates regarding the solution to the problem of difficulties in online learning.

5. CONCLUSIONS

The analysis of prospective math teachers' of Malikussaleh University difficulties in learning during the Online learning pandemic era aims for the instructors to understand the difficulties that the students face in their experience of online learning during this time of Covid-19. Based on this research it could be summarized that as much as 38.4% of prospective math teachers suffers from difficulties in learning the subject of mathematics, which also mean as much as 61.6% did not face these difficulties. These result could be used as reference for instructors as an intensive guide as well as a new innovation to better a learning process whether the it's the approach, the media, the instruments or others factors that could support the online learning process, especially on the subject of mathematics to better the future.

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THE ROLE OF ULAMA DAYAH IN ANTICIPATION ACTS OF VIOLENCE IN LHOKSEUMAWA CITY

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ABSTRACT

Acts of violence such as brawls, robberies, motorbike gangs and the like have increased from year to year in Lhokseumawe City. This phenomenon was disturbing and disrupts public order because it had caused many victims. Based on data from the Head of Public Relations of Lhokseumawe Police, it was known that acts of violence in the form of fights between students occurred very frequently from the end of 2022 to August 2023. According to him, brawls between students have occurred several times, where in October-December 2022 had occurred in six cases, and in January-August of 2023 there had been twenty cases. Acts of violence should not occur in Lhokseumawe City, which is one of the areas that has implemented Islamic Sharia qanun for ten years. This research aimed to anticipate the phenomenon of juvenile delinquency and acts of violence in Lhokseumawe City by exploring and synergizing the perceptions of ulama Dayah regarding strategies, policies and procedures for prevention. Qualitative and quantitative research was carried out by using interview methods and distributing questionnaires to ulama and dayah teachers. While the collected data was analyzed descriptively, with stages; classification of data, analysis, description and conclusions. Based on the results, it was known that ulama had an important role in minimizing the number of violence in Lhokseumawe City. The role of Ulama Dayah was not only limited to the mosque pulpit, but was also active in various socio-religious activities through *tausiah* activities, *ta'lim* assemblies, *muzakarah*, and the creation of Islamic *sharia qanuns*. There were a number of strategies to prevent acts of violence, namely; increasing Islamic understanding, increasing attention to religious knowledge, increasing family supervision of children, strengthening coordination with village officials, optimizing both the role and function of ulama, empowering village government, optimizing character and moral education, as well as the government's commitment to establishing regulations that mobilize the community to take part in recitation of Islamic teachings in the dayah or recitation hall, and imposing a curfew for school-aged children on the other hand.

Keywords: Role, anticipating, act of violence, ulama dayah

1. INTRODUCTION

Acts of violence and the phenomenon of juvenile delinquency have occurred several times in Lhokseumawe in the last of six months. Based on data from the Head of Public Relations of the Lhokseumawe Police, acts of juvenile delinquency, especially in the form of brawls, had occurred very frequently from the end of 2022 to March 2023. According to him, brawls between students or certain groups had occurred several times, where in October-December 2022 it occurred in six cases, then in January-March 2023 there were around 16 cases.¹ This was also confirmed by the Lhokseumawe Police Criminal Investigation Unit, that in February 2023 there were a number of brawls with weapons, namely on February 1 in Langcang Garam which resulted in 2 people being stabbed, then on February 12 in Mon Geudong resulting in a police officer being stabbed, as well as The last brawl between two groups of students took place in Ulee Jalan village on February 25 2023.

Lhokseumawe City is one of the areas that had implemented Qanun Islamic Sharia. In fact, acts of juvenile delinquency in various forms including brawls as well as acts of violence did not occur in the city of Lhokseumawe, but in fact were often occur where were carried out by certain elements of society, from student groups, adults and even parents. In this case, it means there is a problem that must be investigated and resolved. In this case, the author searched to resolve this problem by conducting research on the perceptions of Ulama Dayah regarding strategies for

preventing acts of violence in Lhokseumawe. The views or thoughts of Ulama Dayah regarding this problem have been widely conceptualized or put on the agenda, but have not yet been systematically socialized in community life.

This research tries to explore the perceptions of Ulama Dayah regarding procedures for preventing acts of violence, and then synergize them with various policies that have been implemented by institutions and the Lhokseumawe City Government. Based on this description, the problem formulation of this research is; 1) what are the factors that influence the occurrence of acts or acts of violence in Lhokseumawe City?; 2) What is the perception of ulama Dayah in efforts to anticipate acts of juvenile delinquency and acts of violence in the city of Lhokseumawe? Meanwhile, the aim of this research is to anticipate all acts of juvenile delinquency and acts of violence by knowing the causal factors and exploring the perceptions of ulama Dayah regarding procedures or strategies for preventing these acts in the city of Lhokseumawe.

2. LITERATURE STUDY

The Perception of Ulama Dayah

Perception is the experience of an event obtained by inferring information and interpreting messages. According to Sumanto, perception is the process of understanding or giving meaning to information regarding stimuli obtained from responses to objects, events or relationships.² Based on this understanding, the perceptions of Ulama Dayah referred to in this research are the views or interpretations of Ulama Dayah regarding procedures or strategies for preventing acts of violence that occur in society. Furthermore, Ulama Dayah is a special community among Acehnese ulama who are alumni of Dayah. Ulama Dayah are considered more honorable than people who study at other educational places/institutions such as madrasah or school graduates.³ Ulama Dayah referred to in this research is ulama as leaders of modern Dayah in the city of Lhokseumawe. Furthermore, the dayah is a classical Islamic educational institution in Aceh, whose learning system adopts the *zawiyah* education system. Dayah is also one of the oldest Islamic education institutions in Aceh with a curriculum that teaches yellow books, educates students to become ulama cadres in the future. The Dayah referred to in this research are integrated Dayah (modern of boarding Islamic school) in the city of Lhokseumawe

Juvenile Delinquency

Juvenile delinquency is the actions of teenagers who are contrary to order, or violate norms, rules or laws in society which are committed when they are teenagers.⁴ Juvenile delinquency is a social pathological symptom in adolescents which is caused by a form of social neglect which ultimately causes deviant behavior. The phenomenon of juvenile delinquency includes all behavior that deviates from norms in society, status violations, and violations of criminal law. If status violations are things like running away from home, skipping school, smoking, drinking alcohol, and racing illegally, and violations are things like driving a motor vehicle without a driver's license, taking things from parents or other people without permission, and then special delinquency is like abuse. Illegal drugs, free sex, and theft.⁵

According to research conducted by the Research and Development Ministry of Social Affairs (2002), it indicates that emotional maturity in adolescents who are still unstable is one of the factors in the occurrence of juvenile delinquency. A person's emotional immaturity is characterized by explosive emotions in front of other people, not being able to look at situations critically, and having unstable emotional reactions. Juvenile delinquency can also be described as a failure to fulfill developmental tasks. Failure in this developmental task will cause adolescent individuals to become less sensitive to applicable norms and rules, and cause adolescent individuals to become

vulnerable to behavior that violates the rules and even commits criminal acts, such as brawling, mugging, sexual violence and drug use.

There are two factors that cause juvenile delinquency, namely internal and external factors. Among the internal factors are such as; 1) Identity crisis: biological and sociological changes in adolescents allow two forms of integration to occur. *First*, the formation of a feeling of consistency in one's life. *Second*, achieving role identity. Juvenile delinquency occurs because teenagers fail to reach the second integration period. 2) Weak self-control: Adolescents who cannot learn and differentiate between acceptable and unacceptable behavior will be drawn into 'naughty' behavior. Then, the external factors are; 1) family and parental divorce, lack of communication between family members, or disputes between family members can trigger negative behavior in teenagers; 2) Wrong education, such as pampering children, not providing religious education, or rejection of the child's existence; ⁶ 3) Bad peers. From several definitions that had been explained, the author concluded that violence was a real action or intimidation (semi-actual) carried out by the perpetrator against the victim, which results in the victim suffering physically, materially, mentally and psychologically.

Previous Research

The results of Kemal Fasha's research on the condition of female women's Dayah or Islamic Boarding Schools in North Aceh which was later published with the title "*The Bitter Truth: Women and the Future of Dayah Education in Aceh*" stated that Lhokseumawe and North Aceh were considered to be one of the largest Dayah granaries in Aceh, especially towards the management of non-formal and traditional dayah. ⁷ Through his research, Kemal Fasha succeeded in documenting 3 dayah who were revealed to have committed cases of sexual violence against women. The three cases have a uniform flow, namely the existence of strong Dayah authority so that cases reported by students to the police were not forwarded, pressure to receive compensation for women victims, stigmatization of families and victims as not good people, protection from the authorities gampong so that it was not policed, until there was a *Perwal/Perbub* which calls for amicable resolution for cases of violence in the Dayah. This means that the construction of violence cases boils down to the patriarchal model of men's thinking. Then, Roy Farma, in his research entitled "*The Views of Tengku Dayah Darul Huda Kab. South Aceh regarding Bullying Behavior*" stated that bullying behavior was disgraceful behavior in the form of the habit of insulting and acting disgracefully or rudely towards weak parties. ⁸ Rahmawati in her research entitled "*The Role of Sociological Learning in Preventing Juvenile Delinquency*," stated that educational institutions play a major role in overcoming juvenile delinquency in schools. ⁹

Furthermore, Muh.Sidiq, in the results of his research entitled *The Role of Parents in Juvenile Delinquency (Case Study in Mananti Village, Sinjai Regency)* stated that the role of parents in dealing with juvenile delinquency was not only limited to material problems, but also matters of a spiritual nature such as forming children's personalities, teaching religious values and social values. ¹⁰ Zainuddin, in his research results, wrote down several causes of violence cases, namely; economic factors or poverty, education, social media, and family condition factors. ¹¹ Poor economic conditions will result in people or communities ignoring their environment, including families, especially children, because parents are busy working to meet their daily needs so that children are not paid attention to.

This was different from a number of studies mentioned above, namely regarding assertive techniques in dealing with acts of violence, the issue of the psychological and psychological impact of acts of violence as well as positive social actions and behavior for victims of acts of violence.

Meanwhile, this research examined the perceptions of ulama dayah regarding strategies or procedures for preventing acts of violence that often occur in Lhokseumawe City.

3. METHOD

This research used qualitative and quantitative methods by inputting the opinions both leaders and dayah teachers regarding strategies in preventing acts of violence through interview and questionnaires. Due to the large of population, a research sample of ten Dayah institutions was determined with a target of a hundred respondents. The sample selection was based on purposive sampling with the following inclusion criteria: a) willing to be a respondent; b) the leader or deputy leader of the Dayah; c) head of administration in the school. The data was analyzed descriptively, describing information regarding the status of existing symptoms, and the state of the symptoms according to what they were at the time the research was conducted.¹² Data analysis resulting from this research was carried out in 3 stages, namely; coding, description, comparison, and drawing conclusions.

Data obtained through interview techniques were coded and grouped based on type and purpose. Then it was explained descriptively and analyzed comparatively between data on integrated Dayah which stated as a sample. Next, as the final stage, conclusions were given which would be used as recommendations to related parties in efforts to prevent acts of juvenile delinquency in the city of Lhokseumawe. Meanwhile, questionnaire data analysis was carried out using the 25th version of the SPSS application, which is one of the software applications used to carry out advanced statistical analysis. Through the use of the SPSS application, it was hoped that the quantitative data processing process from this research would be carried out quickly, accurately, complexly and easily.

4. RESULT AND DISCUSSION

The data categorized as the result of this research program activities are the ideas, thoughts or perceptions of the ulama and dayah teachers obtained through both interviews and distributing questionnaires. Interviews and questionnaires were given to the Dayah leaders and teachers who were used as research samples in this research.

Interview Result

Sama'un Risald (the leader of the Integrated Dayah Ulumuddin). According to Risald, Ulama Dayah had a significant role in preventing acts of violence. This role was as a drafter of qanuns regarding social relations to be implemented by the community and government. However, according to him, the ideas and policies conveyed by the Ulama Dayah were rarely responded to and implemented by society and the government for the reason that many people had been influenced by secular western culture. Factors causing acts of violence in the Lhokseumawe city environment were shallow religious knowledge, lack of family supervision and lack of community concern in developing the younger generation. Priority programs or policies that need to be enforced in an effort to minimize acts of violence were by actively developing children to have good morals and noble character, as well as by enforcing the law consistently, firmly and continuously. So far, the concept of Islamic Sharia law had been substantially enforced, but it was still not fully, systematically and organized.

Furthermore, according to Zulkifli Ibrahim (Deputy Chair of MPU and one of the leader of Darul Ulum boarding school) that the ulama had carried out their role actively throughout the indefinite period for the benefit of the ummah and the Muslim community in particular. Long before the government gave them the task of preaching, the ulama who were members of the MPU organization had carried out their roles actively in various strategic programs, approaches and policies. Among the programs that had been implemented in the field of *da'wah* and community development were such as; cadre formation of groups of preachers, preachers and religious

preachers, empowerment of *ta'lim* assemblies to always provide teaching and counseling in the religious field to members of the community, formation of the Dayah Agency, activation of the MPU package discussion program which was held periodically and continuously in terms of answering and resolving the problems of the people, *muzakarah* program, and strengthening coordination with Forkopindo.

However, according to him, the implementation of the ulama's role was still only theoretical (verbal *tablig*, writing and *bi al hal*), and did not extend to the field in a pro-action manner. The Ulama who were members of the MPU actively study, look for solutions to the problems of the ummah with various personal *ijtihad* and *ijma'* then convey them to the authorities to be followed up and implemented for the benefit of society and humans in general. Regarding the factors that caused acts of violence (brawls, robberies, motorbike gangs) in Lhokseumawe City, according to him, this is due to lack of religious knowledge, lack of attention to religious knowledge, economic pressure, and because had been involved with illicit goods such as alcohol and crystal methamphetamine (narcotics). According to him, if teenagers had religious knowledge, they would not easily commit acts of violence because they understood that these activities were harmer than good. Likewise, in the modern era, many people, including school-aged children, payed little attention to religious knowledge, so sometimes they were not afraid to commit violations of religion and Islamic law in general. Furthermore, increasing economic demands also sometimes caused someone to take actions that violate applicable religious norms and cultural customs.

Therefore, there were a number of solutions that must be implemented to prevent acts of violence in Lhokseumawe City. Among these solutions was that the government must be consistent and highly committed to enforcing Islamic law in a comprehensive manner. This means that the government, through the Islamic Sharia Service, had to be realistic in enforcing Islamic Sharia, not just limited to discourse and conceptualization. According to Zulkifli, enforcement of Islamic law must be balanced between material support (capital), moral and spiritual aspects. The second solution was that law enforcement based on Islamic law must be supported by all social organizations. Meanwhile, the third solution was the need for government activity morally, conceptually, materially and spiritually in terms of implementing Islamic law.

Then an interview with Syarifuddin (Leader of Integrated Dayah Misbahul Ulum Meria Paloh). According to him, the role of ulama was only in conveying *da'wah* through mosque pulpits by means of sermons, lectures and recitations in various places of worship, educational institutions including Dayah and study halls. Ulama played an important role in providing guidance was not only periodically, such as during the celebration of Islamic holidays, but also at any time, day and night in order to encourage community members to do good for the benefit of the ummah in a wise way, (*hasanah*), persuasive and professional. According to him, clerics must always be sincere in their preaching and must use themselves as models, or figures (good role models). This was because currently there were so many people who were smart but did not act correctly so they could not be used as role models. At this time, according to him, social conditions were in a crisis of confidence not only in (government) leaders, but also in ulama and community figures. Therefore, ulama must portray themselves as good and correct figures in accordance with the religious norms, customs and ideology. This was so that whatever the ulama convey would be easily believed and followed by the ummah. Furthermore, what was an obstacle in efforts to implement programs in an effort to prevent acts of violence was that Islamic sharia laws that had not been implemented consistently and firmly by the authorities. When Islamic Sharia law was not implemented strictly, violations continue to occur in society. The government should have a commitment to implement Islamic Sharia law in a comprehensive manner so that it provided a deterrent effect for members of the public who commit violations.

Based on this phenomenon, the solutions offered in an effort to minimize acts of violence were; 1) optimizing the role of ulama in *tablig* with various methods and approaches, such as through lectures, *ta'lim*, *muzakarah*, and in the authority to advise umara; 2) boarding school, namely the mobilization of children so that they like to board at various Dayahs, because if they were at the

Dayah, children would be protected from promiscuity, the influence of the external environment, and would be protected from the negative influence of cellphones and smoking; 3) increase Islamic studies for groups of housewives because mothers were the main teachers in family educational institutions; 4) strictly enforce Islamic law; 5) empowering families as *madrasiatul 'ula*; 6) empowering gampong government such as; *imam chiek*, *imem mukim*, *tuha peuet*, and other elements; 7) actively conducting routine patrols by security forces to create fear among perpetrators of violence.

Furthermore, according to Zainal Yaqob (Leader of integrated Islamic boarding school Yapena) the role of ulama in efforts to minimize acts of violence was not just limited to lectures, but must be handled by collaborating with various related parties, including by empowering three models of educational environments, namely the family, school and public. Meanwhile, among the factors behind the occurrence of acts of violence were; lack of knowledge or religious understanding, lack of religious study activities, this was because most children were busy doing homework after coming home from school, as well as a lack of support from parents.

Therefore, the policies that must be implemented in an effort to minimize acts of violence were; 1) activate Islamic study activities for teenagers or school-age children; 2) strengthen cooperation between families, ulama, government officials and community members. 3) Provide strict sanctions against perpetrators of acts of violence; 4) enforce the law firmly, fairly, consistently and systematically between the government, security forces and the community, this was because there were concerns that the perpetrators of these violations were also supported by "gangs", "thugs", or individuals who were uncomfortable with social conditions. safe and peaceful society. According to Zainal Yaqob, law enforcement in an effort to prevent acts of violence would not be carried out effectively and efficiently if there was no solid coordination or cooperation between all parties, namely; between the community, security forces, government and ulama.

As was the case with the perception of the Ulama Dayah above, according to Zainul Arifin (the leader of Dayah Ihya 'u Sunnah, Lhokseumawe City) the role of Ulama Dayah was through optimizing the development of the character and morals of students, where from the start of entering the Dayah the emphasis had been on them to always be disciplined and noble character in learning and relating to others. The development of moral character and morals was very urgent because currently the phenomenon of juvenile delinquency and acts of sexual harassment were rife in society. In Islamic scholarship, the moral and moral aspect was one of the priorities, because if a person has noble morals, then he would be diligent and disciplined in worship, and always did good towards himself, others and his environment. Furthermore, according to Arifin, the factors behind the increase in acts of violence and juvenile delinquency in the city of Lhokseumawe were a lack of attention or supervision from parents, a lack of control over the use of social media among young people, as well as the large influence of external culture where most people were still unable to understand, filter the flow of cultures coming from outside based on science, ideology, religious values, prevailing norms and customs.

Then, the obstacles faced in efforts to prevent acts of violence in the general public were the lack of coordination between community officials (gampong heads, *kadus*, *tuha peut*), as well as a lack of concern from various elements of society, where currently socio-social conditions were more individualistically oriented where didn't ever care (apathy) about the conditions of others. Based on this, the solution that needs to be implemented was to strengthen parental supervision of their children, strengthen relationships between community members, improve the communication network between village officials, and expand the network through the use of social media, so that it would strengthen relationships, open up openness, and could increase mutual care, support and advice in both patience and truth.

Then, according to Saifannur (leader of the Ulumuddin Cunda Lhokseumawe Integrated Madrassah Dayah) that Ulama Dayah played a very important role in dealing with acts of violence and the phenomenon of juvenile delinquency in Lhokseumawe City. If violence occurs within the Dayah institution, it was due to the child's inability to follow the Dayah rules, so they often commit

violations with the aim of being expelled from the Dayah. In this case, to minimize acts of violence in the Dayah environment and the wider community, was to actively carry out socialization about the dangers of acts of violence in the community and Dayah institutions carried out by the authorities and Dayah teachers. Likewise, according to Suwarman, M. Pd (Head of MA Dayah Terpadu Darul Ulum Lhok Mon Puteh) that Ulama Dayah played a big role in providing peace for the younger generation, especially in developing moral character and morals through Islamic science studies at Dayah institutions. Meanwhile, among the factors causing acts of violence were the uncontrolled influence of social media, lack of parental guidance, promiscuity, and lack of concern from community members. For this reason, the programs or policies that must be implemented were increasing children's discipline in filling their time and carrying out all daily activities, increasing religious programs or activities, enforcing a curfew with the *halaqah* of the Qur'an and limiting and controlling the use of social media (social media) by people, elderly and community members.

Fachrurrozy (Deputy Leader of Dayah Tahfizdul Qur'an Imam Syafi'i Lhokseumawe City). According to Fachrurazy, Ulama Dayah played a big role in socializing moral values and take part in educating, developing and producing young generation cadres with noble morals. Factors causing the increase in the phenomenon of violence were due to promiscuity, uncontrolled and value-free viewing of social media, as well as the influence of modernization which was sometimes incompatible with cultural values and religious norms. In this modern era, teenagers sometimes indulge too much in their desires (lusts) for pleasure, and lack the intention or enthusiasm to improve themselves and did good deeds. To deal with this phenomenon, it was necessary to streamline the role of parents or families as *madrasatul ula* in developing and forming a pious generation who were faithful, pious and had an Islamic outlook. There was a need to empower the existence of the family because children were more likely to be in the family and community environment rather than the Dayah or school environment. Dayah teachers played more of a role only as motivators and facilitators so that children acted and behaved in a noble manner in accordance with religious teachings and applicable customary norms.

Likewise, according to the head of the integrated Dayah Madrasah *Tahfizdul Qur'an* Raudhatul Hasanah in Lhokseumawe City, Ulama Dayah had an important role in anticipating all violations of Islamic sharia law in Aceh, including in Lhokseumawe City. The implementation of this role was not only theoretical, such as *muzakarah* ulama (formulating sharia rules in various aspects), but also practically, namely through optimizing *tablig* and *ta'lim* for the general public. The mission of ulama as heirs of the prophets was to spread Islamic teachings in a *kaffah* manner which had the principle of *rahmatan lil alamin*. Furthermore, related to the strategy for dealing with acts of violence in Lhokseumawe City, it was to build and empower recitation halls in every hamlet, school and government institutions. In every hamlet, public school and government institution a study hall must be built which focuses on issues of morals, faith and worship. According to him, so far various acts of violations and disobedience had occurred due to a lack of understanding and religious awareness among the community, especially the younger generation. On the other hand, this was due to the lack of parental supervision and guidance towards their children, especially in socializing and using social media. Therefore, if children were busy studying religious sciences in various study centers, they would have religious awareness and would avoid immoral behavior that violates religious teachings, applicable norms and customs.

Questionnaire Result

The results of the research through distributing questionnaires to all dayah teachers who had been designated as research samples were as shown in both table 1 and 2 at appendix one. Based on the table 1 in appendix one, it was known that among the factors causing acts of violence in Lhokseumawe City were the lack of effective implementation of moral for students (60% strongly agree) and 40% (agree), lack of concern for all elements of society, in the sense that society was apathetic (64% strongly agree), and 36% (agree), then economic factors/poverty, lack of

supervision from parents, and factors of shallow faith and pious values with an average of 60% (strongly agree) and 40% (agree).

Based on the table 2 in appendix one, it was known that the programs, or policies offered by Dayah teachers in an effort to prevent acts of violence in the Lhokseumawe city were; 1) prioritize moral development, morals and character education; 2) equipping self with the ability to defend from an early age; 3) Investigate groups who commit acts of violence and strengthen cooperation with authorized stakeholders; 4) Limit and control the use of social media; 5) Optimizing supervision of students; 6) Strengthening coordination between parents, educational institutions, law enforcement officials, ulama and the community; 7) Increasing praiseworthy practices (reading the Qur'an, *dhikr*, prayer, fasting, supplication and *istigfar*), and 8) Optimizing routine police patrols in communities and schools.

5. DISCUSSION

Based on the results of research through interviews and distribution of questionnaires as described above, it was known that the perception of ulama and dayah teachers regarding procedures for preventing acts of violence in the city of Lhokseumawe in general was through the implementation of moral and moral character education, both in formal educational institutions such as schools and informal institutions. such as family, community, and non-formal educational institutions such as study halls, mosques, and Dayah institutions. In moral and moral development activities for teenagers, ulama had a significant role which was not only limited to the mosque pulpit by means of sermons, lectures and oral *da'wah*, but also active through empowering the *ta'lim* assembly, through socio-religious discussion forums, *muzakarah*, and active provide contributions in writing and good models (*uswatun hasanah*) for the wider community.

Apart from strengthening and improving character education, it was also through enforcing Islamic Sharia law in a comprehensive manner, especially with regard to social rules. Therefore, according to him, what must be done to prevent acts of violence was to enforce Islamic law firmly, consistently, comprehensively and sustainably. Furthermore, based on the results of research as described above, it was known that among the causes of acts of violence were a lack of supervision from parents and a lack of understanding of religious knowledge. This reason was logical because the occurrence of various acts and acts of violence was not caused by the indecisiveness of the police, officials and teachers at schools, but also due to a lack of attention and supervision from the parents in their respective families. The family was the first educational institution that had a major and determining role in developing children's potential and behavior. Parents as teachers in family educational institutions must always be active in fostering, educating and supervising all their children's actions and interactions. Parents must limit their children's social interactions and activities, especially after returning home from school until the evening with the aim of developing and progressing their children's behavior (aptitude), potential, character (attitude) and skills (life skills).

Apart from empowering the roles and responsibilities of the family, it was also done by deepening insight and religious knowledge. When children had an understanding of the boundaries between halal and haram, as well as about socio-religious theories based on the Qur'an, al-Hadith, and *ijma'* ulama, then children would be able to differentiate between actions that had positive and negative values. Even with the knowledge that a child had, they would tend to behave positively in accordance with the promptings of conscience and faith in their chest. This was because faith and knowledge were interrelated, complement each other and support each other towards the birth of a good person, namely righteous deeds and righteous deeds. For this reason, as stated by Ustadz Syarifuddin, leader of the Misbahul Ulum Dayah, empowering the Dayah as a place to gain religious knowledge on the one hand and ward off external influences and promiscuity on the other hand, needed to be considered in this modern era.

Based on the research results, it was also known that there was a need for commitment from the government and all authorities in efforts to deal with the phenomenon of acts of violence and acts of

sexual harassment that occur in the city of Lhokseumawe. This was as stated by Zulkifli, the leader of Dayah Raudatul Ulum and Deputy Chair of the MPU, that the Lhokseumawe City Government must be committed to making regulations in the form of a *Perwal* which regulates the implementation of a curfew on the one hand and orders to recite the al Qur'an at various Dayah institutions or studied halls on the other hand. The commitment of the City Government and all related institutions in terms of limiting curfews was necessary because currently most of the young generation were in coffee shops and cafes at night, even before midnight. The habit of staying up late and staying in entertainment places such as coffee shops until late at night was something that was not good, because it could cause you to be influenced by the temptation of Satan and criminals who often act at night.

According to him, the increase in acts of violence and acts of sexual harassment was caused by a lack of religious understanding and awareness, especially Islam. Therefore, according to most of the Ulama Dayah, the city government should establish legal regulations in the form of a *Perwal* that mobilizes the younger generation to recite the al Qur'an in various Dayah and study halls. If young people were busy and engrossed in studying and learning at various study institutions, it would prevent them from promiscuity which could lead to crimes such as brawls, robberies, gangs, and the like.

Furthermore, based on the results of research through distributing questionnaires to Dayah teachers, it was also known that there were a number of programs or policies that need to be implemented to minimize and prevent acts of violence, especially in Lhokseumawe City. These policies and programs were such as; optimizing supervision by parents, teachers, community elements and security forces, strengthening faith and piety, increasing coordination between parents, teachers, ulama, community leaders and law enforcement officers, empowering moral education, as well as the need for regular patrols by security forces in schools and in the community environment. Parents must provide optimal and maximum supervision to their children starting from social procedures, use of celluler/phones, and supervision of learning activities outside of school. So far, many parents did not care about their children's activities and relationships after coming home from school. The family, as a *madrassatul 'ula*, should always be active in supervising and controlling the various activities of its children. According to the perception of the Dayah teachers, parents, in addition to providing material support to their children, were also obliged to provide spiritual and spiritual support by nurturing and developing their children's talents and abilities in accordance with their nature, namely by teaching the material on religious beliefs, morals, worship and other material, related to children's skills to be able to achieve prosperity in life in this world and the hereafter.

Apart from increasing supervision of children's relationships and activities, based on the results of the questionnaire, 80% of respondents also agreed on strategies to strengthen faith in an effort to prevent acts of violence. Various approaches and techniques to increase religious awareness or faith were by increasing acts of worship, such as; *dhikr*, reading the Qur'an, performing prayers, fasting and *iktikaf* in the mosque. According to the Dayah teachers, spiritual practices like those mentioned above could foster peace of mind on the one hand, and increase faith on the other hand. Furthermore, when someone had faith, it would cause them to avoid various despicable behaviors such as acts of violence. If a person often purifies himself (*tazkiatun nafsi*) by means of *dhikr* (remembering Allah SWT), reading verses of the Qur'an, praying, fasting (controlling emotions and desires), and *muhasabah* through *iktikaf*, his heart would be calm and pure, his mind was focused, his behavior was organized, and he had character starting from his words, actions and thoughts. In such an emotional and spiritual condition, it was impossible for someone to carry out despicable practices and behave badly, such as committing acts of violence and sexual harassment that harm other people.

Furthermore, according to the perception of the Dayah teachers, the policy that must be implemented to prevent acts of violence was to increase coordination between parents, teachers, communities and law enforcement officials. This means those parents, teachers, the community and

security forces had to interact with each other, establish communication, support each other, look after each other and lead to order and peace. According to the author, the perception of Dayah teachers to establish communication and understanding between each party, starting from parents in the family, teachers at school, and community leaders in the wider environment was something that is urgent. This was because the socio-cultural reality in the current era which was apathetic, individualistic and materialistic was actually one of the factors behind the increasing number of cases of violations in Lhokseumawe City.

Then, apart from the theoretical policies as described above, the respondents also agreed on a practical approach, namely that security forces such as the Police, WH and Satpol PP should always actively carry out routine patrols in the community and schools on a regular and continuous basis. According to the author, this was natural so that it created fear for a person or group who would commit a crime. According to the author, the lack of routine patrol activities by security forces means that groups of "motorcycle gangs", robbers and brawlers were free to carry out their bad actions, especially at night. Routine patrol activities should not only be carried out by security forces, but also by community members by forming village security teams as well as by various mass and youth organizations. This was because if the burden was only placed on the security forces, it would be limited, whereas if there is togetherness and unity between members of the community as a whole, then the burden, no matter how heavy would be easy to carry out. If the routine patrol activities of security forces and community members during the day and night were empowered acts of violence, juvenile delinquency and all other immoral acts would be prevented and minimized.

6. CONCLUSION

Ulama Dayah had an important role in efforts to prevent acts of violence in Lhokseumawe City. The role of ulama was not only limited to the mosque pulpit, namely as preachers, and lecturers, but also as initiators and drafters in producing qanuns of Islamic law, as well as actively empowering *amar makruf nahi munkar* verbally and in writing through the institution of Dayah, *majelis ta'lim*, and collaboration with *umara*. According to the ulama dayah, there were a number of obstacles that cause the phenomenon of violent, namely; lack of supervision from parents, shallow knowledge and faith, and because of being involved in illicit goods. A number of priority programs that need to be implemented to prevent and minimize acts of violence were; strict law enforcement, empowering character and moral education in various educational institutions, increasing supervision by parents, strengthening coordination between all elements of society, government commitment to implementing a curfew and mobilizing the community to various study institutions.

Furthermore, according to the Dayah teachers, a number of policies that needed to be implemented in an effort to prevent acts of violence were prioritizing moral development, morals and character education; providing knowledge about reproductive health and the ability to defend oneself from an early age; and carrying out investigations into groups of perpetrators of violent acts and strengthening cooperation with authorized stakeholders; and also limiting and controlling the use of social media. Furthermore, through optimizing supervision of students; strengthening coordination between parents, educational institutions, law enforcement officials, ulama and the community; increasing praiseworthy practices (reading the Qur'an, *dhikr*, praying, fasting, prayer and *istigfar*), as well as optimizing routine police patrols in communities and schools.

Based on the description above, several things were recommended in preventing act of violence, namely: *first*, that the ulama carry out their role optimally and maximally, not just limited to the mosque pulpit, but also actively contribute their thoughts verbally and in writing through *ta'lim* assemblies, workshops, *muzakarah*, problematic discussions *ummah*, as well as being a stabilizer for the *umara*. *Second*, every parent should improve their function and role as supervisors, educators and coaches of their children. Children were a gift from God who when they were born, were pure from stains and sins. Therefore, in order to have good character and behavior in accordance with their nature, children should always be nurtured and directed towards good things

in accordance with Islamic teachings and cultural customs. *Third*, leaders should have a commitment to carrying out their responsibilities in accordance with those entrusted to them by their people. In this context, the Lhokseumawe City Government had to have a high commitment to enforcing the rules of Islamic law in a strict manner. The derivative of the Islamic sharia qanun was the creation of a *Perwal* regarding the implementation of a curfew, as well as regulations that mobilize young people to recite the Koran in Islamic schools and prayer halls. Then, it was recommended to all elements of society to care about social situations and conditions by looking after each other, developing and strengthening relationships, and working together to maintain a peaceful and comfortable climate. The results of this research were still limited, both in quality and quantity, therefore it was recommended to all parties to create and develop similar studies with the aim of creating a social climate that was peaceful, comfortable and serene in the sense of supporting each other in truth, patience and progress.

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LITERATURE STUDY: DYNAMIC ASSESSMENT IN MATHEMATICS

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ABSTRACT

The aim of this paper is to collect sufficient information about dynamic assessment in mathematics. The method in this paper is a literature study that collects several studies or writings to answer dynamic assessment in mathematics. Mathematics Dynamic Assessment (MDA) is a method teachers can use to help students understand mathematics practically and flexibly applied in the mathematics curriculum. MDA integrates four research-effective assessment approaches in mathematics: 1) Determining student interests for the purpose of embedding instruction in meaningful and authentic contexts; 2) CRA assessment, 3) error pattern analysis, and 4) flexible mathematics interviewing. Four features of MDA: Interaction: Dynamic assessment often involves face-to-face interaction between students and teachers; Assessors offer support and assistance to help students solve math problems. Feedback: During dynamic assessment, students receive immediate feedback on their answers or help students understand mistakes and learn from their mistakes. Adaptability: Dynamic assessment can be adapted to students' skills to help understand certain concepts so as to provide support and motivation. Problem Solving Ability: Dynamic assessments often focus on students' ability to solve problems rather than simply evaluating their mathematical abilities.

Keywords: Mathematica, Dynamic Assessment, Mathematics

1. INTRODUCTION

Mathematics is an important discipline in education, and a deep understanding of mathematical concepts is the key to student success in this field. Assessment is an integral part of the educational process, and in recent years, there has been increasing attention to more dynamic approaches to assessment in mathematics. Dynamic assessment is an approach that aims to better understand students' progress in mathematics, rather than simply measuring their ability to memorize facts or answer test questions. This assessment involves continuous observation of students' thinking processes, the use of formative feedback, and an emphasis on conceptual understanding and problem-solving abilities.

According to Bavali, M., Yamini, M., & Sadighi, F (2011) that *dynamic assessment* is an approach to assessment that focuses on the learning process and individual development. The concept of *dynamic assessment* was first introduced by Lev Vygotsky, a famous Russian psychologist in the field of developmental and educational psychology. Vygotsky played a key role in developing the idea of the zone of real development (*Zone of Proximal Development* , ZPD). This concept refers to the range of an individual's abilities within which they can successfully complete a task with the help of another, more experienced person or appropriate instruction. Meanwhile, according to Teo, A. K (2012) *Dynamic assessment* is a way to identify and understand a person's ZPD by involving interaction between the examiner (or educator) and the individual being assessed. The examiner not only measures the individual's current abilities, but also seeks to see how far the individual can develop through guidance or assistance. So, the concept of *dynamic assessment* was first developed by Lev Vygotsky as part of his framework for thinking about cognitive development and education. This concept has subsequently become the basis for many assessment approaches that focus on individual understanding and development. According to Khaghaninejad (2015) said that *Dynamic*

assessment is a powerful tool in exploring individual potential and helping them achieve higher levels of understanding and achievement through guidance and in-depth social interaction. This approach reflects Vygotsky's view of learning as a process that occurs through interaction and socialization, as well as increasing individual abilities through support and guidance.

Dynamic assessment according to Lev Vygotsky is an assessment approach that focuses on individual understanding and development in the learning context. Vygotsky introduced this concept as part of his theory of the *Zone of Proximal Development* (ZPD), which is one of the core concepts in his theory of cognitive development. The following are several key points about *dynamic assessment* according to Vygotsky in Daneshfar, S. and Moharami, M (2018) (a) **Zone of Real Development (ZPD)**: Vygotsky argued that every individual has a ZPD, which is the range of abilities within which a person can successfully complete a task with help or support. ZPD is the distance between an individual's actual abilities and his or her maximum potential. *Dynamic assessment* is designed to identify and understand a person's ZPD. (b) **Social Interaction** : Alsaadi (2021) said that *Dynamic assessment* emphasizes the importance of social interaction in learning. This process involves interaction between the examiner or educator and the individual being assessed. The examiner not only measures the individual's current abilities, but also provides assistance, hints, or questions designed to help the individual overcome tasks or problems that may be beyond his or her abilities if left unaided. (c) **Development Through Guidance** : *Dynamic assessment* seeks to identify individual development potential by involving them in dynamic assessment activities, Poehner E. _ Matthew (2008) . This process provides an overview of the extent to which an individual can develop through guidance or educational intervention. (d) **The Important Role of Scaffolding** : *Scaffolding* is an important concept in *dynamic assessment* . It refers to the support or framework provided by examiners or educators to help individuals solve complex tasks, Shabani, K., Khatib, M., Tabataba'i University, A., & Ebadi, S. (2010) . *Scaffolding* can gradually be adjusted to individual abilities so that they can become more independent in completing the task. (e) **Changes in Assessment** : *Dynamic assessment* recognizes that assessment does not have to be static. On the contrary, assessment can be an active learning tool and help individuals achieve their potential, (Leung C onstant, 2007) . (f) **The Importance of Learning Context** : *Dynamic assessment* considers the specific learning context. This means that dynamic assessment can be adjusted to the material or learning objectives being studied, Hidri, S and R oud, (2020) . (g) **Focus on Understanding** : *Dynamic assessment* focuses more on the individual's understanding and ability to solve problems rather than on measuring the final result that is right or wrong. Atkinsol, L. (2001).

According to Prastami, HB, & Kartono, K. (2023). Dynamic assessment in mathematics aims to (1) better understand students' abilities in formulating mathematical problem solving strategies. (2) providing ongoing feedback that helps students improve their understanding of mathematical concepts. (3) Increasing student involvement in their own learning and assessment processes. (4) Create an inclusive learning environment, support student development, and encourage deeper understanding of concepts. Dynamic assessment in mathematics is an approach that aims to measure students' understanding and mastery of mathematical concepts continuously and in depth. This approach focuses on understanding concepts and their application in various contexts, not just on memorizing formulas or algorithms. Dynamic assessments also provide students with opportunities to think critically, solve problems, and communicate their understanding effectively

Dynamic assessment also has the potential to improve mathematics teaching, because teachers can better identify student needs and difficulties, and design lessons accordingly. In the context of this article, I will explore the use of mathematical concepts in schools. This paper will analyze how this approach can improve students' understanding of mathematical

concepts and provide insight into effective ways of implementing dynamic assessment of mathematics teaching. It is hoped that this paper can contribute to the development of mathematics pedagogy and help create a better learning environment for students to master mathematics subjects better.

2. RESEARCH METHODS

The method for writing this article is a literature study of research results that have been published in national journals. Literature study is a series of activities related to methods of collecting library data, reading and taking notes, and managing research materials. Another definition of literature study is looking for theoretical references that are relevant to the case or problem found. These references can be searched from books, journals, research report articles, and sites on the internet. The output of this literature study is the collection of references that are relevant to the formulation of the problem. The results of the research examined are regarding dynamic assessment of mathematics. The results of the literature study will be presented in the form of a description that will make it easier for readers to understand the effectiveness of using dynamic assessment in mathematics.

3. RESULTS

Approaches to Dynamic Assessment

Dynamic assessment approaches in mathematics can be categorized into four parts. This approach can be directed within students. and the approach in question can be seen below.

Determines student interests for the purpose of embedding instruction in a meaningful and authentic context

Determining student interests for the purpose of embedding instruction in a meaningful and authentic context is a learning strategy that aims to make course material more relevant and interesting for students. By understanding students' interests and preferences, teachers can design more engaging and relevant learning experiences, Harackiewicz, Smith, & Priniski (2016). The following are examples and further understanding:

- a. **Mathematics in Personal Finance:** A mathematics teacher can determine a student's interest in personal finance. For example, if most students have an interest in investing or managing their own money, teachers can design lessons that involve math concepts such as interest, investing, or budget planning.
- b. **Literature in Everyday Life:** A literature teacher can determine a student's interest in certain films or music. Teachers can choose literary works related to those interests and analyze them together.
- c. **Natural Science in Ecology:** If students are interested in environmental issues or nature conservation, natural science teachers can design research projects that involve understanding natural science concepts such as the water cycle or food chains in the context of local ecology.

By determining student interests and integrating them into learning, teachers can create more interesting, relevant and meaningful learning experiences for students. This can increase student engagement and allow them to see the connections between what they learn at school and their everyday lives. In mathematics, determining student interests for the purpose of embedding instruction in a meaningful and authentic context can be very effective. The following is a concrete example of Mathematical Modeling in Music Event Planning

- a) **Situation:** A mathematics teacher wants to teach mathematical modeling concepts to students in an intermediate level class. After talking with students, he found that many of

them had an interest in music and wanted to learn more about how mathematics could be used in a musical context.

- b) Instruction that is embedded in a meaningful and authentic context: Rhythm Analysis: Teachers can begin by discussing mathematical concepts related to musical rhythm, such as counting beats in various time signatures (for example, 4/4, 3/4, or 6/8). Students can identify rhythm patterns in their favorite songs and count the beats in specific lines.
- c) Sound Frequency: Teachers can discuss the concept of frequency in a musical context. Students can understand how frequency relates to pitch and low pitch in musical instruments. They can calculate sound frequencies based on wavelengths and learn about the relationships between notes in a musical scale.
- d) Modeling Musical Volume: Teachers can ask students to model musical volume using mathematical concepts. They can compare volumes in decibels (dB) for various musical instruments and understand how changes in volume can be represented mathematically.
- e) Concert Performance Chart: Teachers can invite students to plan a music concert. Students can create graphs that show how ticket sales develop over time and how concert revenues relate to production costs. It will integrate mathematical concepts such as graphs, percentages, and comparisons.

4. DISCUSSION

CRA Assessment

CRA (Concrete-Representational-Abstract) assessment is an approach to learning mathematics that is used to help students understand and master mathematical concepts better, Minarti, ED, & Wahyudin. (2019) . This approach breaks learning into three stages: concrete stage, representational stage, and abstract stage. The following is the definition and example of using the CRA Assessment approach:

- a. Concrete Stage (*Concrete*): At this stage, students are introduced to mathematical concepts through real and concrete experiences. They use physical objects, manipulatives, or physical activities to understand the concept. Example in Mathematics: Concept: Addition. A teacher teaches addition to first grade students using physical manipulatives such as wooden blocks or marbles. The teacher asks students to add some marbles to the basket. Students then count how many marbles they have added by moving the marbles one by one and absorbing the process. If the teacher wants to teach adding fractions, he or she can provide pieces of paper that represent fractions, such as 1/2, 1/4, and 1/8. Students can physically arrange these pieces and see how fractions are used in real situations, such as dividing a cake.
- b. Representational Stage : After understanding the concept concretely, students are then invited to illustrate the concept using visual representations, such as pictures, diagrams, or mathematical models . Once students have a concrete understanding of addition, the teacher illustrates the addition operation using pictures or cards showing the objects being added. Teachers also use the plus sign (+) as a symbolic representation of addition. Once they understand adding fractions concretely, students can transfer their understanding to visual representations, such as pie charts or number lines, to visualize the operation of adding fractions.
- c. Abstract Stage (*Abstract*): After having a strong understanding through the concrete and representational stages, students then move their understanding to the abstract stage, where they work with mathematical symbols, formulas, and mathematical operations formally. Once students have a strong understanding of addition in concrete and representational form, they then practice addition abstractly, namely by using numbers and mathematical formulas. For example, they learn to add numbers such as $3 + 4 = 7$. After understanding the addition of

fractions in concrete and representational form, students can then write addition operations in the form of mathematical symbols, such as $1/2 + 1/4 = 3/4$.

The CRA approach allows students to build a strong understanding of mathematical concepts before they actually enter the formal mathematical operations stage. This helps students understand the meaning of mathematics in more depth and prevents merely mechanical understanding. CRA (*Concrete-Representational-Abstract*) assessment is an approach in teaching mathematics that aims to help students understand mathematical concepts in depth through three sequential stages: concrete, representational, and abstract, Nugroho, SA, & Jailani, J. (2019) . This approach is designed to allow students to build a strong understanding of mathematical concepts by starting with concrete experiences and experiencing visual representations before moving on to more abstract mathematical concepts.

Error Pattern Analysis

With this approach, students have a strong foundation to master more complex mathematical concepts. Error pattern analysis is the process of observing and recording errors made by students when they work on mathematical problems, (Lai, 2012). This includes identifying the types of errors, their causes, and recurring error patterns. In this analysis, errors are considered a valuable source of information about students' understanding of mathematical concepts. For example, a mathematics teacher teaches students about decimal multiplication operations. After giving several exercises, the teacher realized that many students made mistakes in multiplying decimal numbers. The following are examples of error patterns that may be encountered and their analysis:

- a. **Mistakes in Multiplying Decimals:** Many students make the mistake of putting a decimal point in the product without considering the number of decimal digits in both factors. For example, they might multiply 0.25 by 0.3 and produce 0075 as the answer. This error may occur because students do not understand how to determine the position of the decimal point in the decimal product. Teachers can provide additional exercises that focus more on this concept and ask students to visualize multiplication with a decimal point representation.
- b. **Digit Grouping Errors:** Some students may have difficulty separating decimal digits from whole digits when multiplying. They may mix up decimal digits and whole digits when doing calculations. Analysis: This error may occur because students do not understand the importance of separating decimal digits from whole digits. Teachers can use manipulatives or visual representations to help students understand these concepts better.
- c. **Errors in Rounding:** Students may also make errors in rounding decimal multiplication results. They may not know how many decimal digits to include in the answer. Analysis: This error may occur because students do not have sufficient understanding of the rounding rules in decimal multiplication. Teachers can provide special training regarding rounding in decimal multiplication.

Flexible Mathematics Interview

Dynamic assessment in mathematics often involves flexible mathematics interviews. This is an evaluation method that allows teachers to interact directly with students to understand their understanding of mathematical concepts. The following is an example and explanation of a flexible mathematics interview in the context of dynamic mathematics assessment. Flexible mathematics interviews are a dynamic assessment approach in which teachers interact with students face-to-face or in small groups to explore their mathematical understanding, Ginburg Herbert (2009). The main goal is to explore students' understanding in more depth, identify their thinking patterns, and gain insight into how students deal with

certain mathematical problems. Suppose a teacher wants to assess students' understanding of the concept of adding fractions. He decided to conduct a flexible mathematics interview with a student. Here is an example of how such an interview might go:

Teacher : "Hi, Rama, we will talk about adding fractions today. Let's look at the first question. If you have $\frac{1}{3}$ of a cake and you add it with another $\frac{1}{4}$ of a cake, how will you add them?"

Rama : "Hmm, I think I just need to add the numerator, so $1 + 1$ is 2."

Teacher : "Good, you have done the first step correctly. Now, what about the denominator?"

Student : "Oh yes, the denominator must remain 3 because that is the denominator of the first fraction."

Teacher : "You are absolutely right. So, how do you add up now?"

Student : "So, $\frac{1}{3} + \frac{1}{4} = \frac{2}{3}$."

Teacher : "Great, you really understand it! Now, what if we want to add another $\frac{1}{3}$ to it?"

Student : "Hmm, I think I just need to add the numerator again, so $2 + 1$ is 3."

Teacher : "Good, you have understood it well. Now, try to convey to me in words, what you have learned about adding fractions."

Student : "Adding fractions involves adding the numerators if the denominators are the same. If the denominators are different, we need to find the common denominator first."

Characteristics of Mathematics Dynamic Assessment Interaction

Understanding and explanation of Interaction: Dynamic assessment often involves face-to-face interaction between students and teachers; assessors offer support and assistance to help students solve math problems. Interaction in the context of dynamic assessment in mathematics refers to the face-to-face relationship between students and teachers or assessors during the assessment process. This is an important aspect of this approach, where the assessor actively interacts with students as they complete the math assignment or problem. The aim is to (a) understand students' thinking and understanding in more depth, (b) provide support, and (c) help students overcome difficulties they may encounter in the problem-solving process. For **Understanding Student Thinking** : During the interaction, the assessor attempts to gain a better understanding of the student's thinking. This involves asking questions, listening to students' answers, and observing the steps taken by students as they work on math problems. By understanding students' thinking, assessors can identify thinking patterns that may influence their understanding of mathematical concepts. **Providing Support** : During the interaction, the assessor can also provide support to the student. This support can take the form of guidance, positive feedback, or hints that help students continue in completing their math assignments. This helps students feel supported and can increase their confidence in solving math problems. **Identifying Difficulties** : This interaction also allows the assessor to identify difficulties that the student may be experiencing. By asking relevant questions and observing student actions, assessors can identify where students may be experiencing difficulties or concepts that may be confusing them. This allows the assessor to design appropriate assistance or adjustments. Formative Assessment: These interactions can also serve as a form of formative assessment, where the assessor uses information obtained during the interaction to guide further instruction. If the assessor realizes that a group of students is having difficulty with a particular concept, he or she can plan appropriate additional learning to help students overcome those difficulties. Measuring Deep Understanding: Through these interactions, assessors can measure student understanding in more depth than just measuring the final results.

Feedback

Definition and explanation of Feedback: During dynamic assessments, students receive immediate feedback on their answers or help students understand mistakes and learn from them. In the context of dynamic assessment, feedback is the process of providing direct feedback to students regarding their answers or performance during learning or when working on mathematics assignments. The purpose of feedback is (a) to help students understand the concepts being studied, (b) to identify errors, and (c) to enable them to learn from their mistakes, (Leung C onstant, 2007) . **Helps Understand Concepts** : Feedback in dynamic assessments is used to help students understand the math concepts being studied. When students answer questions or solve math problems, the teacher or assessor provides feedback that explains the concept more clearly. Feedback can take the form of additional explanations, examples, or illustrations that help students absorb the concept. **Identifying Mistakes** : Feedback is also used to identify possible mistakes made by students. This includes conceptual or computational errors that may interfere with their understanding. **Correcting Wrong Understanding** : Feedback aims to help students correct wrong understanding. If students give inaccurate answers or do not understand mathematical concepts correctly, feedback will help them to understand better and change their incorrect understanding.

Adaptive capabilities

Adaptive capabilities in dynamic assessment aim to create a more effective and relevant learning experience for each student, helping them understand mathematical concepts better, and reach their maximum potential. It also promotes an inclusive approach that recognizes that each student has unique needs in mathematics learning. Adaptive capabilities in the context of dynamic assessment refer to the ability of assessors or teachers to adapt their approach, teaching, or evaluation to individual student abilities and needs. This means teachers or assessors can identify where each student is in their understanding of a particular math concept and design appropriate learning strategies to help them understand that concept . Here is a further explanation of adaptive capabilities in dynamic assessment:

Identification of Student Abilities : Adaptive abilities begin with recognizing the individual student's level of understanding of the mathematical concepts being studied. Teachers or assessors will use various assessment tools, such as observation, formative tests, or interviews, to measure student abilities. **Student Grouping** : After identifying the students' level of understanding, the teacher or assessor can group students based on their abilities. This can involve forming groups that are homogeneous in terms of ability, so that students with similar levels of understanding can work together. **Needs-Based Teaching** : Adaptive capabilities allow teachers or assessors to design instruction that fits students' needs. **Individual Support** : Students who have difficulties may be given more intensive individual support. This could be extra tutoring, personal guidance, or other help tailored to their needs. **Motivation**: Adaptive capabilities also enable teachers or assessors to provide appropriate motivation. **Continuous Evaluation** : Teachers or assessors continuously monitor student progress and conduct ongoing evaluations.

Problem Solving Abilities in Dynamic Assessment

Problem-solving abilities in dynamic assessment refer to the emphasis on students' ability to apply the mathematical concepts they learn to solve real problems or unstructured situations. This means that dynamic assessment not only evaluates students' understanding of mathematical formulas or theories, but also the extent to which students can use that knowledge in a meaningful context. The goal of problem-solving abilities in dynamic assessment is **to measure deep understanding** : problem-solving abilities enable a deeper

assessment of students' understanding of mathematical concepts. **Measuring Practical Ability** : The main goal of mathematics is to provide practical tools for solving problems in everyday life and work contexts. **Encourages Critical Thinking** : Problem solving requires critical and analytical thinking. In dynamic assessment, the goal is to encourage students to think more deeply about problems, formulate strategies, and evaluate their solutions. **Measuring Transferability** : Problem-solving ability measures the extent to which students can transfer mathematical knowledge and skills from one context to another. **Identifying Skills that Need Improvement** : With a focus on problem solving, dynamic assessments also help teachers identify specific skills or concepts that students may need to improve. **Develop Life Skills** : Problem solving ability is a very valuable skill in everyday life and in various fields of work.

a. Dynamic Assessment Rubrics in Mathematics

Dynamic assessment rubrics can be described as follows: **Assessment Rubrics** : Books and journals can include clear and structured assessment rubrics to assist teachers in evaluating student understanding. This rubric covers various aspects, such as understanding concepts, problem solving, and mathematical communication. **Portfolio**: Dynamic assessment often involves collecting a student's portfolio containing examples of their work over a certain period of time. This portfolio can include various types of math assignments, such as word problems, projects, or problem solving. **Open Questions**: Teachers can use them in dynamic assessments to dig deeper into student understanding by asking open questions that encourage critical thinking and in-depth problem solving. **Classroom Discussion**: Mathematics journals often include research on the use of classroom discussion as a dynamic assessment tool. Discussions can help students talk about their understanding and explain their thinking processes. **Formative Assessment**: Dynamic assessment is often closely related to formative assessment, which refers to the use of information obtained from an assessment to direct subsequent learning. This may include adapting instruction based on student needs. **Contextual Problem Solving**: Books and journals can discuss the importance of evaluating students' ability to apply mathematical concepts in real-world contexts or different problem situations. **Student Engagement**: Dynamic assessment may also include evaluation of student engagement in the learning process, such as participation in discussions, collaboration with peers, and active problem solving.

5. CONCLUSION

Mathematics Dynamic Assessment (MDA) is a method teachers can use to help students understand mathematics practically and flexibly applied in the mathematics curriculum. MDA integrates four research-effective assessment approaches in mathematics: 1) Determining student interests for the purpose of embedding instruction in meaningful and authentic contexts; 2) CRA assessment, 3) error pattern analysis, and 4) flexible mathematics interviewing. Four features of MDA: **Interaction**: Dynamic assessment often involves face-to-face interaction between students and teachers; **Assessors** offer support and assistance to help students solve math problems. **Feedback**: During dynamic assessment, students receive immediate feedback on their answers or help students understand mistakes and learn from their mistakes. **Adaptability**: Dynamic assessment can be adapted to students' skills to help understand certain concepts so as to provide support and motivation. **Problem Solving Ability**: Dynamic assessments often focus on students' ability to solve problems rather than simply evaluating their mathematical abilities.

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THE SUITABILITY OF THE SPATIAL PATTERN OF NORTH ACEH DISTRICT TO THE LEVEL OF EARTHQUAKE DISASTER RISK

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ABSTRACT

An earthquake is a shaking phenomenon that occurs on the surface of the earth, which is a type of natural disaster that is very close to the lives of the people of Indonesia and Aceh. This writing focuses on the suitability of spatial patterns in earthquake disaster management in North Aceh Regency through Pre-Disaster, Emergency Response and Post-Disaster measurement indicators. The purpose of writing is to find out and analyze the supporting and inhibiting factors in managing the earthquake disaster in North Aceh Regency. This writing method is qualitative writing with a descriptive approach. The results of this writing show that the role of the Regional Disaster Management Agency (BPBD) through spatial suitability patterns in dealing with the earthquake disaster in North Aceh Regency is through 3 measurement indicators, namely the first pre-disaster stage by providing training about disasters to the community, second the emergency response stage in dealing with floods in connection with carrying out steps ranging from disaster anticipation to disaster evacuation, and finally the post-disaster stage by building flood management facilities but it is still in the construction process due to the large coverage of flood-prone areas and limited budget. The North Aceh Regency Regional Disaster Management Agency should continue to improve the capabilities of human resources, organizational capacity, availability of infrastructure and collaboration. Communities around disaster locations must be protected to reduce casualties and material losses.

Keywords: Earthquakes, Spatial Patterns, North Aceh, Disasters

1. Introduction

Indonesia is a disaster-prone area because it is located in the ring of fire so it has a high vulnerability to the dangers of geological disasters which include earthquakes, volcanic eruptions, land movements/landslides and tsunamis¹. Based on data from BMKG, Aceh and the surrounding area are part of Indonesia's seismotectonics². This area is traversed by the Mediterranean Mountains and the subduction zone caused by the meeting of the Indo-Australian Plate and the Eurasian Plate. With these conditions, North Aceh and Lhokseumawe City have quite high levels of disaster vulnerability.

Geographically, Indonesia is located at the meeting point of four tectonic plates: the Asian continental plate, the Australian continental plate, the Indian Ocean plate, and the Pacific Ocean plate. Geographically, Indonesia is located at the meeting point of four tectonic plates: the Asian continental plate, the Australian continental plate, the Indian Ocean plate, and the Pacific Ocean plate. Data shows that Indonesia is one of the countries with the highest level of seismicity in the world³.

Law Number 26 of 2007 concerning Spatial Planning (UUPR) mandates spatial planning based on disaster mitigation to create areas that are safe, comfortable, productive, and sustainable. Law Number 24 of 2007 concerning the Implementation of Disaster Management (UUPPB) also regulates that mitigation is a series of efforts to reduce disaster risk. By reviewing the mandate of the two laws, it shows that spatial planning based on

¹ BMKG. (2018). Catatan Sejarah Gempa di Aceh. BMKG.

² Soemabrata, J., Zubair, A., Sondang, I., & Suyanti, E. (2018). Risk mapping studies of Hydro-Meteorological Hazard in Depok Middle City. International Journal of GEOMATE, 14 (44)

³ Badan Nasional Penanggulangan Bencana. 2017. Buku Pedoman Kesiapsiagaan Bencana. Jakarta: BNPB.

disaster mitigation is one of the efforts or Disaster Risk Reduction (DRR). The response to disasters is in the form of disaster mitigation which is in line with their efforts to stabilize and improve living standards⁴. The implementation of disaster management consists of pre-disaster, during-disaster and post-disaster stages. Spatial planning is included in the pre-disaster stage. So that spatial planning plans are more effective as disaster mitigation/DRR. The aim of spatial planning based on disaster mitigation/DRR is to realize regional resilience from disasters⁵. Spatial planning can minimize disaster risk in the pre-disaster stage which will be more effective, including savings in terms of financing compared to the rehabilitation and reconstruction stages.

Considering the characteristics of disasters in North Aceh Regency, referring to spatial planning policies and the implementation of disaster management, disaster mitigation-based KRB spatial planning is needed in North Aceh Regency.

2. Literature Review

Aceh Province is a province is highly susceptible to disasters. This is caused by geology and geography. Aceh Province is located in the ring of fire, which has resulted in several volcanoes and will make the subduction zone the center of earthquake and tsunami disasters.

North Aceh Regency has many factors that can cause disasters, including geography, climate, social, cultural, economic, and technical factors. From natural disasters to non-natural disasters, and social disasters that result in death, environmental damage, loss of property, and even psychological effects on victims regularly, quickly and precisely. Human factors are also very important in this case, such as inaccurate land use, dumping waste into rivers, living in flood areas, and land construction.

Disaster management includes all efforts that involve policy determination to development recovery programs resulting in disasters, emergency response, rehabilitation and restoration, and in this case, is guided by Law Number 24 of 2007 concerning Disaster Management. Based on this, each community group must fulfill the abilities and skills to face their environment when adversity occurs. This hazard resolution aims to provide protection to the population from the threat of disaster hazards, implementing existing laws and regulations, ensuring that the handling of these hazards is carried out in a coordinated, comprehensive, planned and integrated manner. In this case, regional governments have a duty to fulfill, prosper and protect the people in their working areas in a democratic manner.

Thus, the government has the right in the process of implementing disaster management, including establishing disaster management policies, determining national and regional disaster status, establishing regulations regarding the application of technology for notification of sources of danger, distribution of logistics needs on a national scale to disaster victims. This has also been explained in Presidential Regulation Number 21 of 2008 concerning the Implementation of Disaster Management. Presidential Regulation Number 8 of 2008 concerning the Establishment of the National Disaster Management Agency. Aceh Qanun Number 5 of 2010 concerning Disaster Management and Aceh Qanun Number 6 of 2010 concerning the Establishment of the Organizational Structure and Work Procedures of Aceh Disaster Management Agency 6. As well as North Aceh Regent Regulation Number 31 of 2017 Article 6 has explained the functions of the Regional Disaster Management Agency.

2.1 Regional and Spatial Planning

Spatial planning involves the structural form and pattern of space utilization, whether planned or not. Based on Law no. 26 of 2007 concerning Spatial Planning, the definition of spatial planning does not only have the dimension of space utilization planning, but also

⁴ Wisner, Ben; Piers Blaikie; Terry Cannon and Ian Davis. *At Risk: Natural Hazards, People's Vulnerability and Disasters*. New York: Routledge

⁵ Sutanta, H. (2012). *Spatial planning support system for an integrated approach to disaster risk reduction*. PhD thesis, Centre for Spatial Data Infrastructures & Land Administration,

includes the dimension of utilization and control of space utilization. Meanwhile, regional spatial planning is a process that involves many parties with the aim that the use of space provides maximum prosperity to the community and ensures sustainable living. Spatial planning is carried out through processes and procedures for preparing and determining spatial plans based on applicable laws and regulations, and is binding on all parties⁶.

According to Suchahyo (2016: 104), Spatial planning functions as space allocation for various socio-economic activities of the community and environmental conservation activities in the city area, regulates the balance and harmony of space allocation, serves as a basis for preparing indications for the five-year medium-term main program for 20 years, and as a basis for granting permission to use space in the area. Then the role of spatial planning is essentially intended to achieve optimal resource utilization by avoiding resource utilization conflicts wherever possible, preventing environmental damage and increasing harmony. Spatial and regional planning based on disaster mitigation is expected to help reduce the impact of natural disaster risks, such as earthquakes, tsunamis, floods, volcanic eruptions and other natural disasters. Planning, utilization and control of regional and city or regional spatial planning should take into account natural disaster factors, especially in cities and regions located in areas prone to natural disasters, this aims to minimize the negative impacts of disasters. The 2005 Hyogo Framework for Action (HFA) and UNISDR also mandate the role of land use planning in reducing disaster risk, including limiting development in disaster-prone areas.

Space Utilization and Control

According to (Hadi, MA 2013)⁷ Space utilization is a series of development implementation activity programs that utilize space according to the time period specified in the spatial planning plan. Space utilization is carried out through the implementation of the spatial planning program. What is meant by financing the space utilization program is the mobilization, prioritization and allocation of funding required for the implementation of development.

According to Lutfi Muta'ali (2013:32), controlling the use of space in disaster-prone areas that have been determined as an effort to direct the use of space so that it remains in accordance with the spatial plan that has been determined. Control of space use is implemented through zoning regulations, permits, monitoring, evaluation and control of space use. Controlling space utilization is an inseparable part of the spatial planning process. According to Kartika (2011:123) The use of space in its implementation is not always in line with the spatial plan that has been determined. These discrepancies or violations are caused by several factors, including market development pressure on space, unclear control mechanisms, and weak law enforcement⁸. This condition suggests that to create orderly development in space, measures to control space utilization are needed. This tendency for deviation can occur because spatial planning products do not pay enough attention to implementation aspects or conversely, space utilization does not pay enough attention to spatial planning. Spatial planning utilization control is carried out so that spatial planning utilization can proceed in accordance with the spatial planning plan.

2.2 Disasters

Understanding Disaster

According to BNPB head regulation no. 4 of 2008 concerning Guidelines for Preparing Disaster Management Plans, a disaster is an event or series of events that threatens and disrupts people's lives and livelihoods caused by both natural/non-natural factors and human factors which result in human casualties, environmental damage, property loss, objects and psychological impact. Definitions of disasters vary, according to Ongkosongo in (Liesnoor 2010:8) disaster is an impact of activities or risks that have a negative effect on

6 Gammara Gumayani. 2004. Pengaruh Kebijakan Politik Pembangunan Terhadap Tata. Ruang Kota (Studi Kasus: Kota Jakarta). Jurnal NALARs Volume 3 Nomor 2 Juli 2004: 46-59.

7 Hadi, M. A. (2013). Urban sprawl di kota Semarang: Karakteristik dan evaluasinya terhadap rencana detail tata ruang kota. Jurnal Bumi Indonesia, 2(4).

8 Kartika, I. M. (2011). Pengendalian pemanfaatan ruang. GaneC, 5(2), 123-130.

humans⁹. Stefan and Unesco generally explain disasters as influences received by humans that cause humans to lose and suffer losses. Disasters are a limitation of human ability to minimize risks. If the risks that occur can be minimized then disasters are said to be reduced.

2.3 Earthquake & Tsunami

Damage mechanism from earthquakes, vibration energy sent through the earth's surface from depth. Vibrations cause damage and destroy buildings, which in turn can kill and injure the people who live there. The cause of earthquakes is the release of energy by geophysical adjustments deep in the depths of the earth along areas of cracks that form in the earth. Tectonic processes resulting from the slow movement of continents over the earth's surface. Local geomorphological shifts, volcanic activity. A tsunami is a series of sea waves that can travel at speeds of up to 900 km per hour, mainly caused by earthquakes that occur on the seabed.

3. Research Methods

Research methods are the workflow of research activities in general. The stages of the state of the art description and road map are:

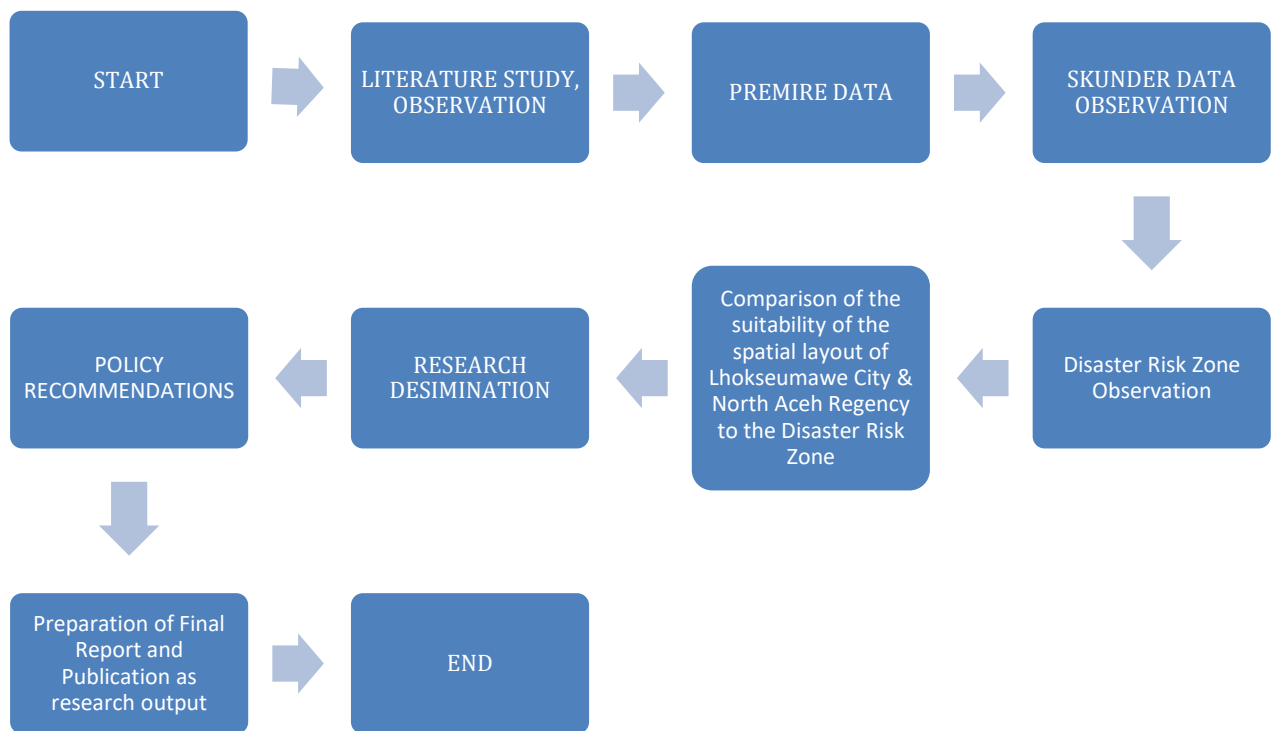


Figure 1. Research Methodology

3.1 Research Variables

Research variables are anything in any form that is determined by the researcher to be studied so that information about it is obtained, then conclusions are drawn [12]. The variables used are divided into several groups, namely: 1) Disaster risk level variable consisting of threat/danger (hazard) and vulnerability, and 2) Variable suitability of spatial patterns to earthquake and tsunami disasters.

3.2 Methods and Data Collection

The unit of analysis used in this research is all sub-districts in North Aceh Regency. Data collection was carried out by means of a secondary survey. A secondary survey was carried out to obtain data in the form of earthquake and tsunami threat maps, spatial pattern maps, and thematic maps related to existing conditions in North Aceh Regency. Analysis Method Disaster Risk Analysis Disaster risk is a combination of the characteristics and frequency of danger in a particular place or potential losses due to disasters in a certain area and time period which can be in the form of death, injury, illness, life at risk, loss of security, displacement, damage or loss of property. and community disturbances. Disaster risk aspects consist of threats, vulnerabilities and capacity. The level of disaster risk can be determined using the equation:

$$R = Hx \frac{v}{c} \dots\dots\dots \text{(equation 1)}$$

Information:

- R: Disaster Risk (Risk)
- H: Danger (Hazard)
- V: Vulnerability
- C : Capacity (Capacity)

In this research, the plan is to only use threat variables and vulnerability variables. So to determine the level of disaster risk only comes down to the threat stage multiplied by vulnerability.

3.3 Data Types and Sources

Primary Data The primary data source in this research was obtained through accurate data sourced from the North Aceh Regency Regional Disaster Management Agency (BPBD) Office and residents affected by the earthquake. The secondary data in this research was obtained from the law that regulates regional disaster management, namely Law Number 24 of 2007 concerning Disaster Management and Regulation of the Regent of North Aceh No. 31 of 2017 in North Aceh Regency and books about earthquake disasters. Research informants are desired subjects for researchers to analyze. Research informants were chosen deliberately and played a role in providing the information needed during the research period. Research subjects in qualitative research are called informants.

4. Results

North Aceh Regency has 852 gampongs and 27 sub-districts and is included in areas potentially prone to earthquakes. In North Aceh Regency there are 19 sub-districts, namely Matangkuli, Lhoksukon, Pirak Timu, Samudera, Tanah Luas, Tanah Pasir, Tangaan, Tanah Jambo Aye, Baktiya, Baktiya Districts. Barat, Seunuddon, Cot Girek, Syamtalira Aron, Paya Bakong, Geureudong Pase, Simpang Kramat, Sawang, Muara Batu, and Kuta Makmur.

North Aceh Regency is located in the northern part of Aceh Province, according to the Bakosurtanal Map. Geographically, the borders of North Aceh Regency with other areas have changed. There are several regional expansions, as shown by Republic of Indonesia Law Number 48 of 1999 concerning the Establishment of Bireuen Regency and Simeulue Regency, Republic of Indonesia Law Number 2 of 2001 concerning the Establishment of Lhokseumawe City, and Republic of Indonesia Government Regulation Number 18 of 2003 concerning the Relocation of the Capital of North Aceh Regency from the Lhokseumawe City Area to Lhoksukon.

The topography of North Aceh is very diverse, ranging from extensive lowlands in the north stretching from west to east to mountainous areas in the south. Because the eastern Sumatra route crosses the lowlands of North Aceh, these lowlands are more economically developed than the southern interior. In lowland areas, rice fields and residential areas consist of agricultural land; on the coast, salt water fisheries ponds. In the highland areas,

plantation land began to be widely cultivated by the community. Because the irrigation system for rice fields in North Aceh still relies on traditional irrigation, and most of the rice fields there are still rain-fed, the agricultural potential in the region cannot yet be relied upon to improve the standard of living of its people. North Aceh Regency has an area of 3,296.86 km², or 329,689 ha, and consists of 27 sub-districts, 70 settlements and 852 gampongs administratively.

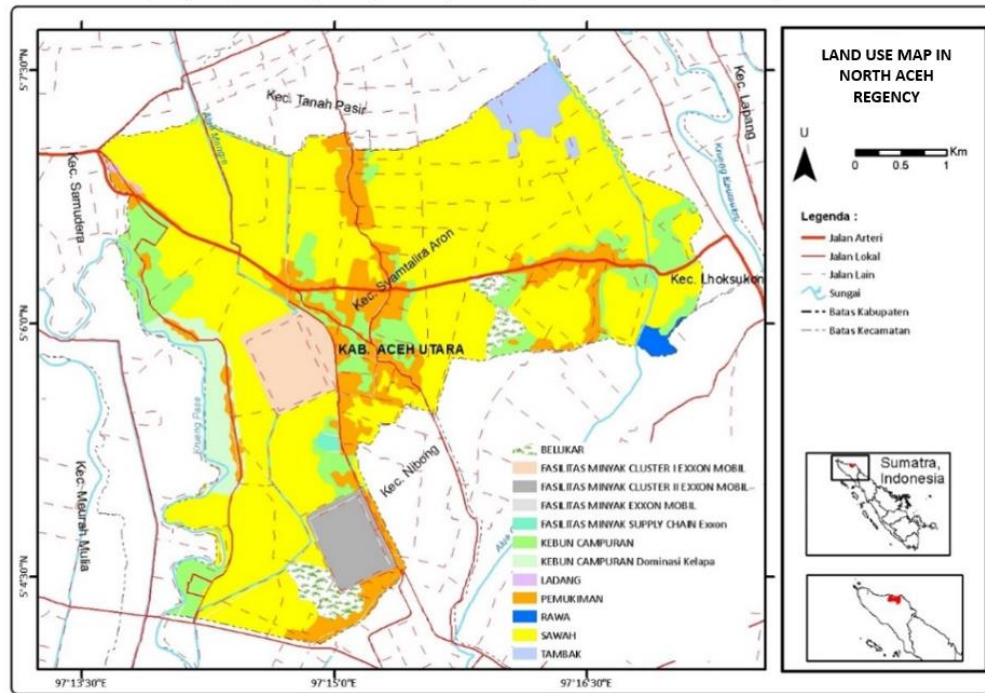


Figure 2. Land Use Map. Source: Field Survey, 2022

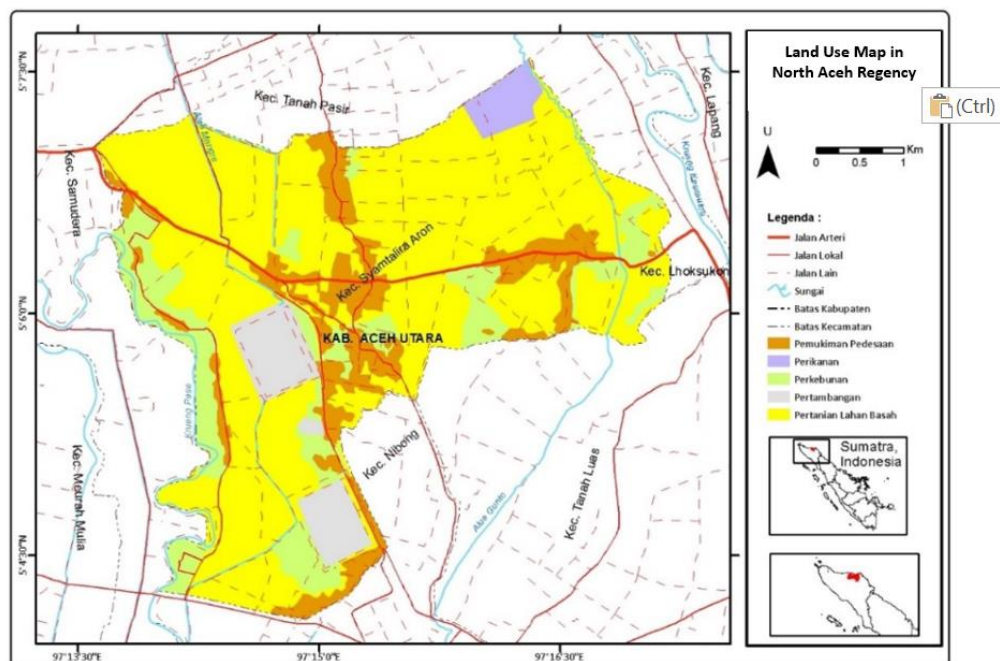


Figure 3. Map of RTRW Spatial Patterns for North Aceh Regency 2012-2032. Source: North Aceh Regency Bappeda, 2022

The land use map consists of 11 types of land use including scrub, four Exxon Mobil oil facilities, mixed plantation, mixed plantation dominated by coconut, field, swamp, settlement, swamp, paddy field and pond. While the spatial pattern defines five types, namely rural settlements, fisheries,

plantations, mining and wetland agriculture. Based on Figure 2, the types of arterial and local roads have a greater influence on the occurrence of land use mismatches with the RTRW with patterns extending along the road and converging at road intersections. The majority of unsuitable types of land use, namely shrubs and rice fields, have been intensively converted into plantations and plantations and rice fields into residential areas. This research strengthens the findings of other researchers that public facilities, roads and factories have an important role, especially regarding the realization of regional development, equal distribution of development results (Hadijah & Sadali, 2020; Martínez et al., 2020; Sebayar, 2020). Several types of land use that are in harmony and are not in harmony with other spatial patterns are tabularly presented in Tables 1 and 2.

Table 1. Suitability of land use to RTRW

Type of Land Use	RTRW Spatial Pattern	Description	Area (hectares)	
Settlement	Rural Settlement	in accordance	241,51	11,39
Fish Pond	Fishery	in accordance	41,75	1,97
mixed plantation	Plantation	in accordance	156,92	7,4
mixed plantation dominated by coconut	Plantation	in accordance	52,56	2,48
Exxon Mobil Cluster I Oil Facilities	Mining	in accordance	69,58	3,28
Exxon Mobil Cluster II Oil Facilities	Mining	in accordance	48,91	2,31
Oil Facilities Supply Chain Exxon	Mining	in accordance	4,00	0,19
Swamp	Agriculture	in accordance	10,02	0,47
Ricefield	Wetland	in accordance	1283,60	60,51
The total area of land use suitability for RTRW is				90,00

Source: Author's primary data analysis, 2023

Table 2. Incompatibility of land use with RTRW

Type of Land Use	RTRW Spatial Pattern	Description	Area (hectares)	
Shrubs	Rural Settlement	It is not in accordance	0,425	0,02
Exxon Mobil Cluster I Oil Facilities	Rural Settlement	It is not in accordance	1,177	0,06
Exxon Mobil Cluster Ii Oil Facility	Rural Settlement	It is not in accordance	0,682	0,03
Exxon Oil Supply Chain Facility	Rural Settlement	It is not in accordance	0,197	0,01
Mixed Gardens	Rural Settlement	It is not in accordance	23,082	1,09
Coconut Domination Mix Garden	Rural Settlement	It is not in accordance	3,316	0,16
Ricefield	Rural Settlement	It is not in accordance	16,215	0,76
Ricefield	Fishery	It is not in accordance	2,684	0,13
Thicket	Plantation	It is not in accordance	45,242	2,13
The total area of land use suitability for RTRW is				210

Source: Author's primary data analysis, 2023

Based on Tables 1 and 2, the results show that the total area of the research area in Syamtalira Aron District is 2121.20 hectares. Of the total area, there are 212.36 hectares or 10 percent of which have land use that is not in accordance with the spatial pattern directions in the RTRW. However, most of the land use in Syamtalira Aron District is still in sync with the spatial use directions set out in the Regional Spatial Planning (RTRW). The area of land use that is in accordance with the RTRW is 1908.84 ha or 90% of the total area of the sub-district and that is not appropriate is 212.36 ha or 10% of the total area of the sub-district. The three types of land use that are suitable and have the largest area are rice fields, mixed gardens and residential areas with respective percentages of 60.51%, 11.39% and 7.4% of the total area of the sub-district. Meanwhile, other types of use such as Exxon Mobil oil facilities, coconut-dominated mixed plantations, swamps and ponds have a suitable area of less than 4% of the total area of the sub-district.

There are matches and discrepancies between land use and RTRW in Syamtalira Aron District. Based on spatial analysis using land use maps and RTRW maps, it was found that an area of 1908.84 ha was suitable or 90% of the total area of the sub-district and 212.36 ha was not suitable or 10% of the total area of the sub-district. The plantation area is the area with the highest incompatibility with existing land use in the form of residential areas, Exxon Mobil facilities with an area of more than 45.83 ha. Incompatibility of land use types with RTRW is a necessity, due to the high demand for land for the construction of public facilities and settlements. Therefore, local governments need to review regulations regarding RTRW in order to create quality, integrated and sustainable development. There are at least three reasons why the implementation of RTRW in Syamtalira Aron District is not 100% appropriate. These causes are the political factors of policy makers, the level of economic growth, the amount of people's income and consumption. Even though the RTRW has been ratified through North Aceh Regency Qanun Number 7 of 2013, the public does not understand the function of the spatial plan, how accurate it is, how to use it, and how it is prepared. The lack of community participation in preparing spatial plans is thought to be the cause of land use incompatibility with the RTRW. Moreover,

the public will be increasingly unfamiliar with the existence of the RTRW if the RTRW document is not published down to the site level, both online and offline. Therefore, the North Aceh regional government needs to prepare a revised RTRW by involving elements of the community to obtain effective and efficient use of space. Local regional governments need to pay attention to four conditions at the sub-district government level, namely: social, population, economic, environmental, application of the latest science and technology. The hope is that evaluation of the RTRW in each sub-district, as in this research, can become an instrument for other sub-district governments to assess the progress of all space utilization activities. Thus, optimal use of space is able to achieve the goals of a sustainable district spatial plan.

5. Acknowledgement

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Identification of Productivity Factors in Salt Production Among the Madura People,s Salt Using the Murvin E. Mundel Method

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ABSTRACT

Sumenep Regency is the district that produces the highest amount of salt on the island of Madura. The salt produced is traded to various regions, creating a trading network. The issue at hand is that salt farmers in the Sumenep district are striving to enhance their salt productivity, which is currently considered inefficient. Therefore, it is necessary to measure salt productivity among the Madurese population. The aim of this study is to assess salt productivity among the people to achieve maximum quality in community salt production. Additionally, the study seeks to identify the factors influencing increases or decreases in salt productivity, particularly in the Sumenep district. This study commenced by identifying the criteria for Madurese salt productivity, determining input and output variables using the Murvin E. Mundel method, measuring productivity values for each productivity index, and subsequently analyzing salt production productivity among the Madurese. Based on the analysis, proposals for improvements will be formulated to address the existing challenges. It is noteworthy that the total productivity index has increased by 4%. so, it can be concluded that Madurese salt farmers' businesses have started to operate effectively and efficiently.

Keywords: Murvin E. Mundel, Efficiency, Productivity, Salt

1. INTRODUCTION

Indonesia boasts the largest salt-producing land area, with 60% of it located in East Java. The largest expanse of salt fields can be found on the island of Madura, covering 15,347 hectares. Sumenep is the district with the highest salt production on the island of Madura. The salt production in the Sumenep district encompasses several sub-districts, totaling 27 sub-districts, with 11 of them being significant contributors to salt production (Agustina, 2020). The average resident in the district works as a salt farmer by producing people's salt in one harvest (Ruslan, 2017). Salt is an important factor for life in basic needs. Salt is also an important need for industries, such as the chemical industry, the drug industry and so on. The existence of salt which is considered important makes the Ministry of Marine Affairs carry out programs in increasing salt productivity in Indonesia (Agustina, 2020).

The existence of salt found in seawater affects its physical properties, for example in density, compressibility, freezing point, and temperature. Viscosity and light absorption do not have a significant effect on salinity, two properties that greatly determine the amount of salt in the sea (salinity) are electrical conductivity (conductivity) and osmotic pressure. The greater the amount of salt in the water, the higher the salinity and osmolar concentration of the solution and the greater the pressure of the osmotic media (Agustina, 2020).

Based on data from the Sumenep Fisheries Service, salt production in 2015 produced 236,117.96 tons, in 2016 it was 17,109 tons, in 2017 it was 232,393.29 tons and in 2020 it was 236,368 tons (Huda, 2021). People's salt production has a weakness in its productivity, namely at a low level of purity (<95%). The level of purity produced by people's salt in Sampang regency is between 88 – 91%, Pamekasan district has a NaCl content of 91.34% and Sumenep district has a

NaCl content of 91.20%. The low level of salt purity and productivity levels that experience large differences between locations, making it an economic challenge for salt farmers. Moreover, salt farmers generally sell crosok salt or only rough forms (Putri, 2020).

Many things can be evaluated in supporting people's salt production which is still low. Evaluation of production factors is carried out to increase the efficiency of people's salt production productivity. Factors related to salt production such as land area, labor, supporting equipment, and experience from salt farmers (Ministry of Industry, 2018).

Sumenep Regency in producing people's salt, on average, still uses simple and traditional methods. The success factor of people's salt production depends on natural conditions, for example on weather intensity. When the dry season, Salt farmers maximize salt production by harvesting heavily in that season. The quality of salt that is still unable to compete causes the process of people's salt absorption to be uneven, salt prices become unstable, the production process is still traditional, and competition from salt products between regions is a problem that occurs in salt production in Sumenep district. In addition, the income of farmers is relatively low because they can only produce salt in the dry season while the income of these farmers is not comparable to the needs when the rainy season arrives. The area of salt land and the availability of human resources included in it, it is necessary to review the advantages and disadvantages when producing salt people. This study was conducted to determine the factors that affect people's salt productivity (Agustina, 2020).

2. LITERATURE REVIEW AND HYPOTHESIS

Salt is an ionic compound applied with the chemical formula NaCl, where the content of sodium and chloride ions is 1: 1. Salt is also called "white gold" because most of the time in human history, salt was included in a valuable commodity and the price of salt was the same as gold at the time of ancient civilization (Karabulut, 2020). Salt is a complement to the needs of food and a source of electrolytes in the human body. Salt is also included in solid objects that have white and crystalline color characteristics in the content of NaCl compounds as much as >80% and the composition of other compounds such as CaSO₄, MgSO₄, MgCl₂, and others (Hoiriyah, 2019).

The following is an explanation of the three types of salt quality (Hoiriyah, 2019).

1. Quality One Salt (K - 1)

Salt with quality one (K – 1) is the best quality salt that has met the requirements for industrial materials or for consumption with the following composition.

- NaCl : 97,46 %
- CaCl₂ : 0,723 %
- CaSO₄ : 0,409 %
- MgSO₄ : 0,04 %
- H₂O : 0,63 %
- Impurities : 0,65 %

2. Two Quality Salt (K – 2)

Salt with quality two (K – 2) is salt whose quality is below K-1. K-2 salt must be reduced to levels of various substances in order to meet standards for industrial raw materials. The salt content in quality (K-2) is between 90 – 94%.

3. Three Quality Salt (K – 3)

Quality Three (K-3) salt is the type of salt that has the lowest quality in people's production. The content of quality type three (K – 3) is usually between 80 – 90%, sometimes mixed with soil so that it

is slightly brownish in color.

Productivity is a benchmark for the success of a company in empowering its resources to produce targeted products. Productivity has a relationship with production efficiency in the form of a ratio between the products produced and the resources used. This ratio shows the level of the Company's productivity and for evaluation materials on ongoing operational processes in order to create an effective and efficient company activity (Supriyadi, 2020).

The Marvin E. Mundel method is a measurement of productivity based on the concept of industrial engineering forms and the definition of costs in cost accounting. Marvin E. Mundel's model requires companies in productivity measurement to have current time standards, which are also still difficult to meet for most companies in Indonesia (Lukmandono, 2021). The following is a formula from mathematical calculations (Suparto, 2020).

$$IP \text{ Parsial} = \frac{AOMP/AOBP}{RIMP/RIBP} \times 100$$

$$IP \text{ Total} = \frac{AOMP/AOBP}{RIMP/RIBP} \times 100$$

Information:

AOMP = Output in the measured period.

AOBP = Output at base period.

RIMP = Input – input in the period to be measured.

RIBP = Input at base period.

Efficiency is a comparison between output and input. Efficiency is based on how the resources used can produce an output. Efficiency is also a saving that is used in resources in organizational activities, more precisely on efficiency of usability. This efficiency aims to use smaller resources to achieve the same results. One of the methods used in measuring efficiency is to use a frontier approach (Erliana, 2020).

3. RESEARCH AND METHOD

This research was conducted with the aim of achieving the level of efficiency of people's salt productivity in Sumenep. This research was conducted on community salt farming in Tega village, Sumenep. The choice of location is because the village has a large enough land in producing people's salt. The object of the research conducted is the productivity of salt farming of the Madurese. The initial stage that will be carried out in this study is by collecting data which includes primary data and secondary data. Primary data is obtained by conducting interviews with salt owners and farmers conducted directly. Secondary data are obtained from historical data on people's salt production as well as data needed in processing Murvin E. Mundel's data.

Data analysis method

The data analysis technique carried out is by determining input and output variables. Output is the sales value of the product (salt), while the output value becomes a supporting resource in creating a product. Inputs are several variables that include labor, capital, transportation, depreciation costs. The steps to be taken in the data analysis technique are to calculate partial productivity and total productivity from 2020 to 2023 by dividing the sum of output by each of the input variables. Furthermore, an analysis will be carried out to determine how influential salt production factors are on people's salt productivity and make proposals for improvements.

4. RESULT AND DISCUSSION

The following is input and output data that affects the production efficiency of Sumenep people's salt farmers for the period 2020 to 2023.

Tabel 1 Data on the output and input of people's salt farming 2020 to 2023

Items	Period 1 (2020)	Period 2 (2021)	Period 3 (2022)	Period 4 (2023)
Output				
Cost of Sales	Rp550.000	Rp600.000	Rp1.700.000	Rp1.800.000
Input				
Cost of Labour	Rp75.000	Rp75.000	Rp75.000	Rp75.000
Capital	Rp1.500.000	Rp1.800.000	Rp2.930.000	Rp3.062.000
Cost of Transportation	Rp1.200.000	Rp1.800.000	Rp1.800.000	Rp1.800.000
Depreciation Cost	Rp1.600.000	Rp1.600.000	Rp1.600.000	Rp1.600.000

Table 1 shows data on the output and input of smallholder salt farming from 2020 to 2023. The table consists of items and many items in each period 1 (2020) to period 4 (2023). The output variable consists of cost of sales and input variables consisting of cost of labour, capital, cost of transportation, and depreciation cost.

The Marvin E. Mundel method has two forms of mathematical calculations on measuring the productivity index are as follows:

$$IP = (AOMP \text{ or } RIMP)/(AOMB \text{ or } RIBP) \times 100$$

Or

$$IP = (AOMP \text{ or } AOMB)/(RIMP \text{ or } RIBP) \times 100$$

Partial productivity calculation

Labour Productivity Index

$$IP = (1.800.000 / 75.000)/(1.700.000 / 75.000) \times 100 = 106\%$$

Capital Productivity Index

$$IP = (1.800.000 / 3.062.000)/(1.700.000 / 2.930.000) \times 100 = 101\%$$

Transport Productivity Index

$$IP = (1.800.000 / 1.800.000)/(1.700.000 / 1.800.000) \times 100 = 106\%$$

Depreciation Cost Productivity Index

$$IP = (1.800.000 / 1.600.000)/(1.500.000 / 1.600.000) \times 100 = 106\%$$

Partial productivity calculation

$$IP = (1.800.000 / 6.537.000)/(1.500.000 / 6.405.000) \times 100 = 104\%$$

The results of the productivity analysis are as follows.

1. Partial productivity measurement:

- a. The productivity index in the workforce increased by 6% from the previous period, this shows that the labour owned has been effective in working.
- b. The productivity index in capital decreased by 1% from the previous period. This shows that salt farmers have made an advantage in salt production.

- c. The productivity index in transportation has increased by 6%. This shows that the use of transportation facilities supports production activities on people's salt.
- d. Depreciation cost productivity index of 6%. This shows that there are some depreciation costs in the improvement of people's salt production facilities have been carried out periodically.

2. Total productivity measurement:

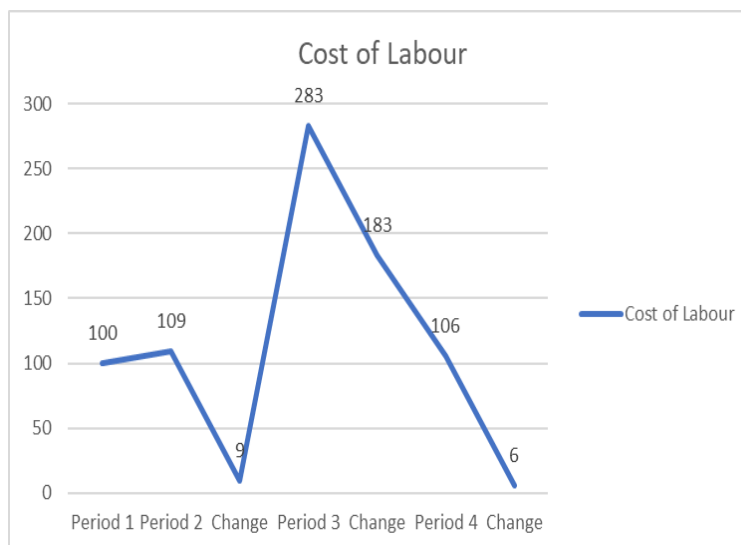
The total productivity index increased by 4%. So it can be concluded that the salt farmer business has begin to run effectively and efficiently.

Tabel 2 Index Calculation Recapitulation Results

Description	Period 1	Period 2	Change	Period 3	Change	Period 4	Change
Cost of Labour	100	109	9	283	183	106	6
Capital	100	91	-9	174	74	101	1
Cost of Transportation	100	73	-27	283	183	106	6
Depreciation Cost	100	109	9	283	183	106	6

Table 2 shows the results of the recapitulation of the index calculation. There is a description table consisting of cost of labour, capital, cost of transportation, depreciation cost. In the cost of labor period 1 is 100, period 2 is 109 so that a change of 9 is obtained.

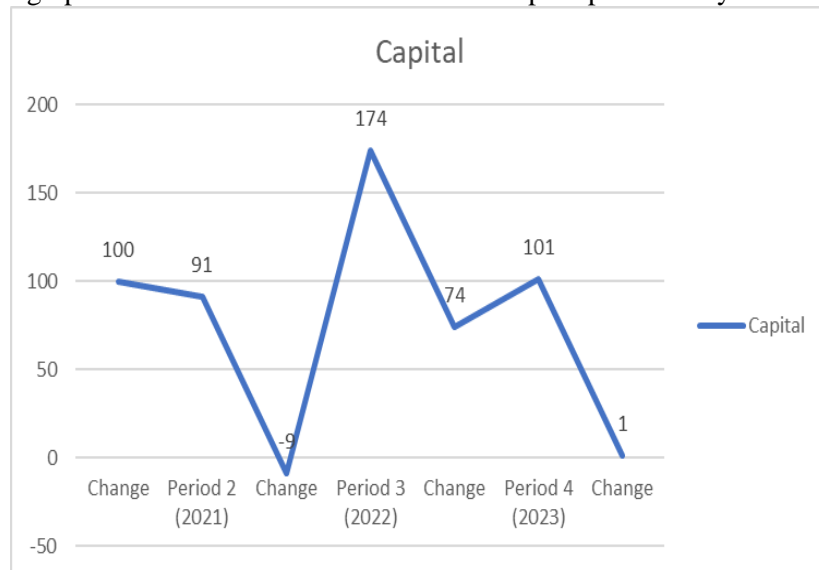
The following is a graph of the results of the calculation of labour cost productivity.



Gambar 1 Graph of changes in labour costs

From the graph above, it can be seen that the highest productivity decline in labor costs is in period 4 (2023) of 6%.

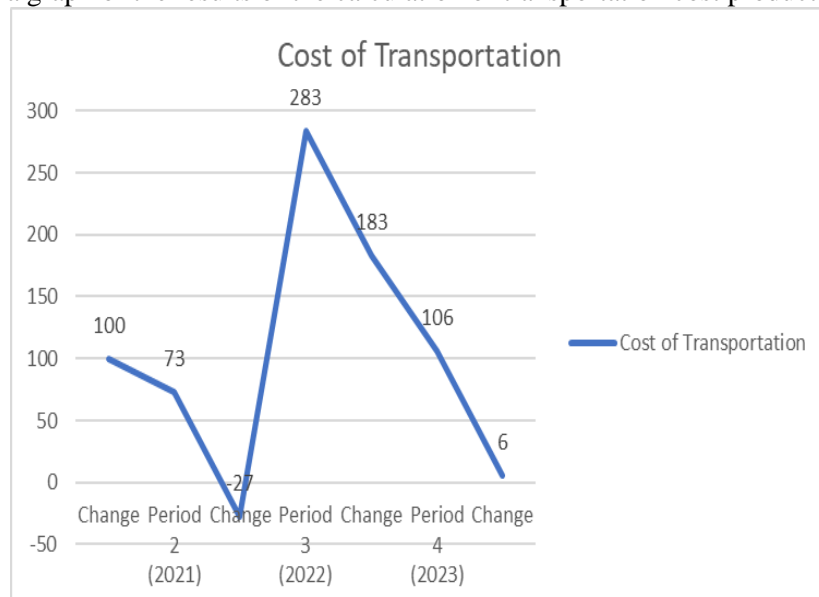
The following is a graph of the results of the calculation of capital productivity.



Gambar 2 Graph of changes in capital

From the graph above, it can be seen that the highest decrease in productivity for capital was in period 2 (2021) of -9%.

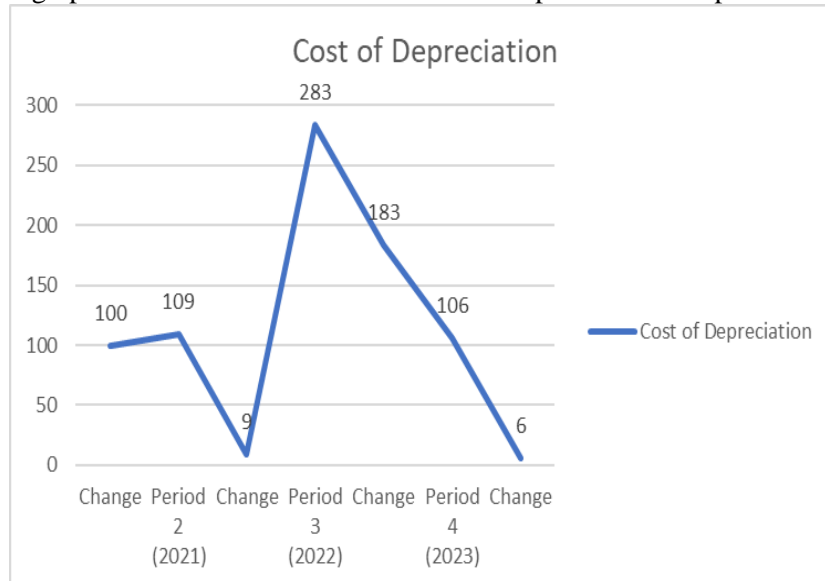
The following is a graph of the results of the calculation of transportation cost productivity.



Gambar 3 Graph of changes in transportation costs

From the graph above, it can be seen that the highest productivity decline for transportation costs was in period 2 (2021) of -27%.

The following is a graph of the results of the calculation of depreciation cost productivity.



Gambar 4 Graph of changes in depreciation costs

From the graph above, it can be seen that the highest productivity decline for depreciation costs is in period 4 (2023) of – 6%

5. CONCLUSION

Following the results of the study, it can be concluded that each criterion on the productivity index of people's salt farming has increased and decreased or fluctuated. Where each variable experienced an increase in productivity in the previous period and measurements were carried out by measuring two types, namely partial productivity and total productivity. For the lowest change in labor costs, it is in period 4 (2023) at 6%, for the lowest change in capital productivity it is in period 2 (2021) at 9%, and for the lowest transportation cost productivity index it is in period 2 (2021) at 27%, for the lowest depreciation cost productivity index it is in period 4 (2023) at 6%. Measurement in productivity analysis should be done by measuring various variables in more detail in order to find out the extent of the increase or decrease in the level of productivity of the business that has been running. The recommendation to increase competitiveness among salt farmers is to use plastic geomembrane (HDPE) so that the quality produced from salt has a better selling value and productivity in salt production can increase.

6. ACKNOWLEDGEMENT

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IMPLEMENTATION OF MBKM TO BOOST STUDENTS' 6C COMPETENCY

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ABSTRACT

This study aims to describe the application of MBKM to boost students' 6C competencies. This research emphasizes that the application of MBKM can improve students' 6C competencies. This is because MBKM encourages students to be actively involved in various learning activities that can develop their competencies. This research method uses a descriptive qualitative approach, which produces descriptive data in the form of written or spoken words from students. This research procedure applies simple steps to collect data, namely interview studies, documentation, and questionnaires to students. The results of this study indicate that the presence of MBKM raises a new paradigm in the world of education including higher education. The policy of the minister of Education and Culture in 2020 with the concept of MBKM is considered relevant and appropriate to be implemented in the current democratic era. Based on the facts in the field, the application of this concept provides flexibility to the academic world, ranging from freedom in learning to freedom to partner with institutions that have relevance to their specialists. Therefore, with the MBKM innovation, it can contribute to increasing student competence in developing their competencies (communication, collaboration, critical thinking, creative thinking, problem-solving thinking, and compassion).

Keywords: MBKM, 6C competency.

1. INTRODUCTION

The Ministry of Education and Culture has issued four policies regarding Higher Education in early 2020. The four policies that were initiated in the form of Merdeka Belajar and Kampus Merdeka; opening new study programs, university accreditation systems, legal entity state universities, and getting the right to study three semesters outside the study program. In supporting the implementation of the Independent Campus program, specifically on fulfilling students' rights to be able to study outside the study program or college. The implementation of the Merdeka Student Exchange is open to Indonesian students to have the opportunity to take part in the learning process at any university in Indonesia as an effort to strengthen and expand student competencies. The background of the Merdeka Student Exchange program is to realize a pattern of cooperation between universities in Indonesia in order to develop and increase competitiveness nationally and globally. This cooperation is expected to improve and equalize the quality of higher education in Indonesia. In this cooperation between universities in providing each other with each other to improve quality, expand access, and expand relations between universities nationally. One of the objectives of this program is to improve or change the form of learning.

The learning process in the Merdeka Campus is one of the manifestations of student-centered learning which is very essential. Learning in the Merdeka Campus provides challenges and opportunities for the development of innovation, creativity, capacity, personality, and student needs, as well as developing independence in seeking and finding knowledge through the realities and dynamics of the field such as ability requirements, real problems, social interaction, collaboration, self-management, performance demands, targets and achievements. Through the Merdeka Belajar program, which is well designed and implemented, students' hard skills and soft skills will be formed strongly (Director General of Higher Education, Ministry of Education and Culture, 2020). It is hoped that the implementation of an independent campus can change the learning paradigm that continues to innovate.

Rapid innovation in the world of higher education requires universities to be able to change

the mindset, attitude and behavior and new ways of doing things of the academic community, so as to produce graduates who are adaptive and resilient in the face of change and uncertainty. Therefore, the curriculum policy must elaborate the ability of students in the pedagogical dimension, life skills, the ability to live together (collaboration), think critically, and creatively. Learners must have soft skills, transversal skills, life skills, and skills that are not visibly related to specific occupational and academic fields. The curriculum must pay attention to the development of vocational-based education with a variety of skills that not only prioritize the concept of link and match between universities and the industrial world, but also emphasize the capacity of graduates who are agile, adaptive, and sensitive to changes in the industrial and economic environment (Latifah, et al. 2021). This proves that curriculum formation is one of the determinants of increasing educational innovation, curriculum changes are a form of evaluation of the previous learning process.

Learning is a complex aspect of human activity, which cannot be fully explained (Trianto, 2016). It can be interpreted more easily that learning is a product of continuous interaction between development and life experience. Learning in a complex meaning is the self-conscious effort of an educator to provide lessons to his students, namely directing student interactions with other learning resources in order to achieve the expected goals.

The emergence of MBKM in the learning process has several obstacles. One of the problems is about culture and environment, there are several findings that question culture and environment, such as in research (Mufidah: 2022) found that the phenomenon of culture shock in students who take part in independent student exchange programs is an obstacle for them. Therefore, self-adjustment efforts are needed in order to adapt and communicate effectively. Referring to the results of previous research, this research has similarities with the cultural category, namely the adaptation and cultural influence of independent campus exchange students. More specifically, this study focuses on the effect of MBKM on 6C competence, which describes how the MBKM program can increase competence in the fields of communication, collaboration, critical thinking, creative thinking, character, and culture.

2. METHODS

This research method is a needs analysis in developing MBKM Innovation to improve 6C skills in the learning process. As a research step that uses Reflective, Recursive, Design, Development, this research is included in the analysis step through the define stage. The define stage in the research method is the initial stage carried out by researchers to determine the scope of research and the focus of analysis. This stage is important to do so that the research can run effectively and efficiently, and produce valid and accountable results. In the define stage, researchers need to do several things, namely (1) Determine the research problem. Research problems are questions or statements that researchers want to answer or prove. Research problems must be clear, specific, and testable. (2) Determine research objectives. Research objectives are what researchers want to achieve through their research. Research objectives must be specific, measurable, achievable, relevant, and timed. (3) Determining the research population and sample. The population is the entire unit that is the object of research, while the sample is part of the population taken to represent the population. Researchers need to determine the population and research sample appropriately so that the research results can be generalized. (4) Determine research variables. Research variables are objects or attributes that will be measured or observed in research. Researchers need to determine research variables clearly and precisely so that data analysis can be carried out appropriately. (5) Determine the research hypothesis. Research hypotheses are conjectures or temporary answers to research problems. The research hypothesis needs to be formulated clearly and specifically so that it can be tested. (6) Determine data collection methods. Data collection methods are techniques or methods used to collect research data.

Researchers need to determine the right data collection method so that the data obtained can fulfill

the research objectives. (7) Determine the data analysis method. Data analysis methods are techniques or methods used to analyze research data. Researchers need to determine the right data analysis method so that the data obtained can be interpreted correctly. The define stage is a very important stage in the research method. This stage is the basis for the next stages of research. Therefore, researchers need to carry out the define stage carefully and carefully so that the research can run smoothly and produce optimal results.

This research method uses a descriptive qualitative approach that conducts mixed data collection from qualitative and quantitative data. This research procedure applies simple steps to collect data, namely interview studies, documentation, and questionnaires to students and FGDs as data deepening.

3. RESULTS AND DISCUSSION

Education is all efforts and all planned efforts, to develop potential in order to have religious spiritual strength, self-control, personality, have intelligence, noble character and have skills. Education is able to shape personality through environmental education that can be learned either intentionally or not. Education is also able to shape humans to be disciplined, unyielding, not arrogant, can respect others, creative, independent, and responsible.

To get proper education is inseparable from the efforts made by the government and people who play a role in education itself. Various efforts have been made to improve education and various education systems have been launched in order to create education as expected. Of the various education systems that have been implemented, there is a system called MBKM (Merdeka Belajar Kampus Merdeka), which was launched by the minister of education and culture which aims to encourage students to master various sciences to prepare for entering the world of work.

As we know, Kampus Merdeka is one of the policies of the Minister of Education and Culture Nadiem Makarim, which provides a policy for universities to provide the right to study for three semesters outside the study program. MBKM is basically a new concept that allows students to gain learning independence in higher education (Leuwol et al., 2020; Muhsin, 2021; Wijayanto, 2021). This concept is a continuation of the previous concept, namely Merdeka Belajar. The planning of the Independent Campus concept is basically a learning innovation to get quality learning quality.

The purpose of this MBKM is to encourage students to master various fields of science in accordance with their fields of expertise, so that later they will be ready to compete in the global world (Baharuddin, 2021; Fatmawati 2020; Tohir, 2020). Then this policy provides opportunities for students to choose the courses they will take based on their own wishes.

In this MBKM learning process, it is one of the manifestations of student centered learning which is very essential. Learning in this MBKM provides challenges and opportunities for the development of innovation, creativity, capacity, personality, and student needs, as well as developing independence in seeking and finding knowledge through reality and field dynamics. Besides being a new learning system that is very effective to implement, here MBKM can Culture, and Character.

MBKM Improving Competence in Collaborations

The success in the learning process is inseparable from the cooperation carried out both between lecturers and students and students with students. Here in this MBKM Program, it can improve good cooperation (Collaborations), this can be seen when students in the learning process work together to solve a problem or create a product according to the learning theme. This MBKM program is very good for increasing the sense of care, responsibility, and cooperation that is embedded in students.

MBKM Improve Communication

As social beings, of course, we need each other between one human being and another, in order to live well and harmoniously, of course, we must communicate well. Here in the MBKM Program can improve communication, because when students communicate with other students it will train themselves how to speak politely and politely then use good and correct language because they have seen people when communicating while studying on other campuses. Therefore this MBKM Program can improve Communication.

MBKM Improving Creative Thinking Competency

As students who are creative and have integrity, of course, they already have the ability to think creatively in learning, but with this MBKM program, it can increase Creative Thinking in students. Because when students study on other campuses, of course, students will see other students who are more creative, thus encouraging these students to find and develop ideas, ideas and thoughts to create new things. In addition, students with creative thinking will easily face problems and find solutions to these problems, therefore this MBKM Program can improve and encourage students to think creatively (Creative Thinking).

By improving creative thinking competencies, students will be better prepared to face future challenges that are increasingly complex and dynamic. Students will be able to generate new ideas or ways of solving problems, so that they can contribute positively to the progress of the nation.

MBKM Improves Critical Thinking Competency

In the learning process, of course, students have different abilities both in thinking skills and other abilities. Here with this MBKM Program, students when in learning seem motivated to think critically (Critical Thinking), this can be seen when students provide an argument about the topic discussed they provide opinions that are logical and easy to understand and will find solutions to existing problems. So that this MBKM Program can improve the ability of critical thinking in students.

MBKM Improving Character Competency

In this MBKM Program can improve character competence (Character), in students, why is that, because when students study on other campuses they will find and see various characters that exist in other students, there are those with good character, sociable, optimistic, ambitious, active, and others. Therefore, students who take part in this MBKM Program will be motivated by these people so that they will also instill good character in themselves.

MBKM Improving Cultural Competence

Basically, each region has a different culture, this culture has its own values in each region. In this MBKM Program, students when conducting studies on other campuses, they will see various cultures owned by the regions they visit, which is very helpful for other students to know about foreign cultures. So he will be motivated to maintain and preserve his culture and can even promote the beauty of his culture to outsiders. Therefore, this MBKM program can improve culture.

4. CONCLUSION

Education always strives to create students who always innovate. Not only able to be highly educated but able to become agents of change in small and large scopes. The resulting innovation is able to make a maximum contribution to the progress of a nation that has quality human resources. That is why universities are expected to be able to make innovations in every learning process, namely student-centered learning in order to support the achievement of quality graduates who are

ready to face the situation of a developing and changing era. The results showed that the MBKM

innovation can contribute to increasing student competence in developing their competencies (communication, collaboration, critical thinking, creative thinking, problem-solving thinking, and compassion). This is the foundation for students to prepare themselves before going down to the world of work.

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The Effect of Knowledge about Exclusive Breastfeeding on Mother' Behavior in Providing Exclusive Breastfeeding

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ABSTRACT

Research shows that exclusively breastfed infants receive antibodies from breast milk that help prevent diarrheal diseases and pneumonia during the first years of their life before their bodies can produce their antibodies. There have been several published studies highlighting the benefits of exclusive breastfeeding. However, until now, there are still mothers who do not give exclusive breastfeeding to their babies for various reasons and ignorance of the importance of exclusive breastfeeding for babies. This study aims to prove the effect of maternal knowledge about exclusive breastfeeding on maternal behavior in providing exclusive breastfeeding to infants. The population consists of mothers who have toddlers domiciled in Bireuen Regency. The sampling technique used purposive sampling with inclusion criteria: having a living child aged six months to 5 years, a history of spontaneous delivery, 37-40 weeks gestational age, average birth weight, having good primitive reflexes, never in an incubator, and not having congenital abnormalities. The total sample size was 100 respondents, but one was disallowed due to incomplete instrument filling, so the data could not be processed. The research instrument was a questionnaire containing open and closed questions taken cross-sectionally. Data collection was conducted door-to-door from June to August 2023. Samples that met the inclusion criteria were obtained from the local village midwife. Data processing was performed univariate and bivariate on the variables of knowledge about exclusive breastfeeding and maternal behavior in providing exclusive breastfeeding using descriptive statistical tests and simple linear regression. The results of the study for the characteristics of respondents showed that most respondents were between 30-40 years old (5.5%), the majority of respondents' education was undergraduate (39.4%), most respondents did not work (59.6%), the parity status of multiparous respondents (62.6%), the behavior of respondents did not provide exclusive breastfeeding (78.8%) and most respondents did not know about exclusive breastfeeding (55.6%). Conclusion: maternal knowledge about exclusive breastfeeding has a positive impact on maternal behavior, with a significance value (α) of 0.021, unstandardized Coefficients of 2.727, and regression coefficient of 0.191.

Keywords: influence, exclusive breastfeeding knowledge, exclusive breastfeeding, maternal behaviour

1. INTRODUCTION

The World Health Organization (WHO) and the United Nation Childrens Fund (UNICEF) in 2005 issued a new protocol on "immediate breastfeeding" as a "life-saving" measure for newborns that every health worker should know. The protocol is to have the mother's skin contact with the baby's skin immediately after birth for at least one hour and helping the mother recognize when her baby is ready to suckle. Achieving 6 months of exclusive breastfeeding depends on successful initiation of early breastfeeding within the first hour. UNICEF states that 30,000 infant deaths in Indonesia and 10 million deaths of children under five in the world each year could be prevented through exclusive breastfeeding (Depkes, 2007).

The National Policy to provide exclusive breastfeeding for 6 (six) months has been established in the Minister of Health Decree No 450/Menkes/SK/IV/2009 on exclusive breastfeeding. According to the health minister's decree number 450/MENKES/ 2004 on exclusive breastfeeding in Indonesia, exclusive breastfeeding is established for 6 months and is recommended to be continued until the child is 2 years old or older with appropriate supplementary feeding.

Exclusive breastfeeding for infants is one of the efforts to prevent death and malnutrition in infants and toddlers (Wahyuni, 2022). The World Health Organisation (WHO) recommends that infants be breastfed until 6 months of age without eating or drinking any other liquids, except vitamins, minerals, and medicines approved for medical reasons (Prasetyo, 2016). Up to 30,000 infant deaths in Indonesia and 10 million deaths of children under 5 years of age worldwide could be prevented annually through exclusive breastfeeding. The benefits of exclusive breastfeeding are also felt by breastfeeding mothers, especially in preventing postpartum hemorrhage (Rahmadhani, 2013).

Inadequate milk production is one of the factors that cause failure in exclusive breastfeeding, this is in accordance with research by Chan (2006), from 44 postpartum mothers, 44% stopped breastfeeding before the baby was 3 months old because of insufficient milk, 31% because of breast problems, 25% felt exhausted. One of the efforts to increase breast milk is to breastfeed the child regularly. The more often the child sucks the mother's nipple, there will be an increase in milk production and vice versa if the child stops breastfeeding, there will be a decrease in breast milk. When the baby starts sucking the breast milk, there will be two reflexes that will cause the milk to come out at the right time, namely the milk formation/production reflex or prolactin reflex stimulated by the prolactin hormone and the letdown reflex.

When a baby sucks the nipple of the breast, a hormone called prolactin is produced, which regulates the cells in the alveoli to produce milk called prolactin, which regulates the cells in the alveoli to produce milk. The milk is collected into the milk ducts. Second, the let-down reflex. The baby's suction will also stimulate the production of another hormone, oxytocin, which makes the muscle cells around the alveoli contract, so that the milk is pushed towards the nipple. Thus, the more the baby sucks, the more milk is produced (Perinasia, 2006).

Postpartum preparation for primiparous mothers will certainly be different from multiparous mothers, primiparous mothers have never experienced, and have very little information in terms of caring for babies and breastfeeding. The low level of exclusive breastfeeding is influenced by the age factor, namely mothers aged 18 years will be different in going through the postpartum period and breastfeeding compared to mothers aged 40 years (Maritalia, 2017).

Based on data from the 2016 Basic Health Study (Riskesdas), exclusive breastfeeding in children aged <6 months was 40% less. These achievements show that nationally, the rate of achieving the goal of exclusive breastfeeding is still very far from the predetermined target of 80%. This is because public awareness of breastfeeding promotion is still relatively low. In fact, there is no match for the quality of breast milk, including formula milk. In addition, the knowledge of mothers about exclusive breastfeeding and its benefits for infants is also low (Kemenkes RI, 2017).

Data from the Provincial Health Profile of Nanggroe Aceh Darussalam (2019) shows that only 27,339 babies were exclusively breastfed or 27.0% of the total 101,140 babies. The districts with the lowest coverage are: (1). Sabang, with 108 or 15.7% of infants exclusively breastfed. (2). Simeulue, 119 babies or 11.%. (3). Bener Meriah, 397 babies or 14.4%. The districts with the most exclusive breastfeeding were Bireuen, with 3,925 babies or 44.7%, Aceh Besar, with 2,663 or 33.7% and Aceh Tengah, with 2,323 or 58.8% (Profil Kesehatan NAD, 2019).

Based on data from the 2019 Bireuen Health Office, Peusangan sub-district has the highest number of babies, namely 1,198 babies aged 0-6 months out of all babies in Bireuen district. Of these babies, only 726 or 60.6% were exclusively breastfed, while the rest were breastfed with complementary foods (Dinkes Bireuen, 2019).

2. LITERATURE REVIEW AND HYPOTHESIS

2.1 Parity

Parity in a broad sense includes gravida (number of pregnancies), partus (number of births), and abortus (number of miscarriages), while in a special sense it is the number or number of children born. Parity is said to be high when a woman gives birth to her fourth or more child. A woman who is aware of having three children and another pregnancy occurs, her health will begin to decline, experience less blood and bleeding through the birth canal (Nurhariyanto, 2009).

Parity indicates the number of previous pregnancies that have reached the limit of viability and have been delivered, regardless of the number of children. Triplet births only count as one parity (Oxorn, 2015). Parity is the birth rate of a woman (BKKBN, 2016). The number of parities is one component of parity status which is often written with the notation G-P-A, where G states the number of pregnancies (gestations), P states the number of parities, and A states the number of abortions. For example, a woman with parity status G3P1A1, means that she has been pregnant twice, with one parity and one abortion, and is currently pregnant for the third time (H.Dirckx, 2004). Based on the number, the parity of a woman can be divided into: a) Nullipara is a woman who has never given birth to a child at all b) Primipara is a woman who has given birth to a child, who is large enough to live in the outside world c) Multipara is a woman who has given birth two to four times d) Grandemultipara is a woman who has given birth to 5 or more children and usually experiences complications in pregnancy and childbirth (Manuaba, 2009).

2.2 Maternal behaviour

According to Pratama (2018), infant breastfeeding behaviour is influenced by knowledge, attitude and practice. Behaviour is an activity that arises as a result of interaction between stimuli and individuals that can be observed directly. Changes in maternal behaviour in breastfeeding infants before 6 months of age can be influenced by knowledge and attitude factors. The mother's attitude will lead to a response in the form of action to carry out the exclusive breastfeeding programme before the baby is 6 months old. Thus, maternal behaviour can be measured by knowledge, attitude and practice factors.

Mothers' knowledge about exclusive breastfeeding is also passed down from their parents. Her childhood experience of exclusive breastfeeding obtained from her parents is one of the sources of knowledge that can support the mother's level of knowledge about exclusive breastfeeding. A mother's past personal experience of exclusive breastfeeding behaviour by others she trusts shapes her attitude towards the practice. Mothers who have had previous experience tend to have a better understanding of the benefits of the management implemented, so they tend to have a better attitude (Heryani, 2010).

Low knowledge about the benefits and purposes of exclusive breastfeeding can be the cause of exclusive breastfeeding failure in infants (Wahyuningsih, 2012). Research conducted by Sariati, (2017) showed that mothers' knowledge about breastfeeding has an influence on exclusive breastfeeding. Mothers with good knowledge provide exclusive breastfeeding, but some mothers do not provide it because they only know and do not want to practice because the mother does not have the awareness to provide it. Mothers with less knowledge about breastfeeding said that they only breastfed for a few months because the milk did not come out anymore and the mother was worried that the baby was fussy which was considered hungry so that additional food was given before the age of over 6 months.

According to Nurlaeli (2018), the better the attitude, the greater the chance of breastfeeding. Mothers with higher education have a desire to breastfeed their babies compared to mothers with lower education.

Mothers with higher education nowadays find it easier to find information about breastfeeding, so they are smarter in deciding what is best for their babies. Highly educated mothers will also be smarter in responding to various formula promotions. Whereas low-educated mothers tend to believe formula milk information more easily. Mothers assume that their child will look healthier if given formula milk.

2.3 Exclusive breastfeeding

Exclusive breastfeeding is breast milk given to infants from birth to six months of age without any additional food. Exclusive breastfeeding means not giving the infant any other food or drink, including water, other than breastfeeding, except medicines and vitamin or mineral drops, where expressed breastfeeding is allowed. Exclusive breastfeeding starts from 1 hour after the birth of the baby without giving any pralacteal food such as sugar water or tajin to the newborn, breastfeeding according to the baby's needs, including night feeding and only vitamins, minerals and drugs in drops or syrups are allowed. Exclusive breastfeeding is the provision of breast milk alone to infants 0-6 months without the addition of other liquids such as formula milk, orange juice, honey, tea water, plain water and without the addition of solid foods such as bananas, papaya, milk porridge, biscuits, and rice teams (Haryono, 2014).

This is supported by the Ministry of Health of the Republic of Indonesia through the Infant and Young Child Feeding (IYCF) strategy, which recommends three stages of the gold standard of infant feeding consisting of Early Breastfeeding Initiation (IMD), exclusive breastfeeding for six months, followed by breastfeeding and complementary feeding until the child is at least two years old (Yadika, 2019).

Hypothesis

Hypothesis that will be proven in this study are:

- (Ho) There is no effect of maternal knowledge about exclusive breastfeeding on maternal behaviour in providing exclusive breastfeeding.
- (Ha) There is an effect of maternal knowledge about exclusive breastfeeding on maternal behaviour in providing exclusive breastfeeding.

3. RESEARCH AND METHOD

Data

This study is a cross sectional quantitative study, using primary data taken door to door. The population is mothers who have toddlers domiciled in Bireuen Regency. The sampling technique used purposive sampling with inclusion criteria: having a living child aged 6 months to 5 years, a history of spontaneous delivery, 37-40 weeks gestational age, normal birth weight, having good primitive reflexes, never in an incubator and not having congenital abnormalities. The total sample size was 100 respondents, but 1 respondent was disallowed due to incomplete instrument filling so that the processed data became 99 respondents. The research instrument was a questionnaire containing open and closed questions. Data collection was carried out from June to August 2023. Samples that fit the inclusion criteria were obtained from local village midwives.

Data analysis Method

Data processing and analysis through the stages of editing, coding, entry and tabulation using the spss application. During the editing process, out of 100 respondents whose data were taken, only 99 were processed, while 1 respondent had to be disallowed due to incomplete filling of the instrument so that the data could not be processed. Data processing was carried out

univariately for each variable and bivariate to test blood pressure variables (independent) and sleep quality (dependent).

1) Univariate Analysis

Univariate analysis uses descriptive statistics to determine the frequency, number and percentage of respondent characteristics including: age, education, occupation, parity status.

2) Bivariate Analysis

Bivariate analysis using linear regression test was conducted to test whether there is an effect of maternal knowledge about exclusive breastfeeding on maternal behaviour in exclusive breastfeeding for infants.

4. RESULT AND DISCUSSION

Result

Univariate Analysis

The results of univariate data processing using descriptive statistics including age, education, occupation, parity status can be seen in table 1. This data is included in the characteristics of respondents.

Table 1. Characteristics of Respondents

No	Variabel	n	(%)
1	Mum's age		
	20-30 years	41	41,4
	30-40 years	52	52,5
	> 40 years	6	6,1
	Total	99	100
2	Education		
	Bachelor's Degree	39	39
	Diploma	17	17
	High School	36	36
	Medium School	4	4
	Elementary	3	3
	Total	99	100
3	Work		
	Employed	40	40
	Not Working	59	60
	Total	99	100
4	Parity Status		
	Primiparous	37	37
	Multiparous	62	63
	Total	99	100

Based on table 1, the characteristics of respondents based on age are mostly at the age of 30-40 years, namely 52.5 respondents or around 52.5%. The characteristics of the majority of respondents' education are undergraduate, totalling 39 respondents or around 39%. The characteristics of the majority of respondents' jobs are not working (IRT), totalling 59 respondents, which is around 60%. Characteristics of parity status of the majority of multiparous 62 respondents or 63%.

Bivariate Analysis

The results of data processing for each independent variable of maternal knowledge and dependent maternal behaviour in providing exclusive breastfeeding are shown in tables 2.

Table 2: Respondents' knowledge about exclusive breastfeeding

No	Variabel	n	(%)
1	Respondent's knowledge		
	Know	44	44,4
	Don't know	55	55,6
	Total	99	100

Table 3. Respondent behaviour

No	Variabel	n	(%)
1	Respondent behaviour		
	Exclusive breastfeeding	21	21,2
	Not exclusively breastfed	78	78,8
	Total	99	100

For the independent variable of maternal knowledge about exclusive breastfeeding, it is divided into 2 categories, namely knowing and not knowing. Based on table 2, the majority of respondents did not know about exclusive breastfeeding, namely 55 respondents (55.6%). As for the variable of respondents' behaviour in providing exclusive breastfeeding, most respondents did not provide exclusive breastfeeding to their babies, namely 78 respondents or around 78.8% as shown in table 3.

Table 4. Linear regression test results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.727	.453		6.018	.000
Respondents' Knowledge	.191	.081	.232	2.350	.021

a. Dependent Variable: Prilaku ASI Eksklusif

The results of the linear regression statistical test in Table 4 obtained a significance value of 0.021, which means that there is an influence of respondents' knowledge about exclusive breastfeeding on their behaviour in providing exclusive breastfeeding. The magnitude of the effect of respondents' knowledge about exclusive breastfeeding on their behaviour in providing exclusive breastfeeding is 0.021, which means that it is directly proportional or has a positive effect. Every 1% increase in knowledge about exclusive breastfeeding will result in a 0.021 increase in behaviour in providing exclusive breastfeeding.

4.1 DISCUSSION

Respondent Character

The number of respondents in this study was 99 people, all of whom were mothers who had babies aged between 6-59 months. Most of the respondents in this study were between 30-40 years old, namely 52%. According to Notoatmodjo (2013), the older a person is, the better his mental development processes, but at a certain age, the increase in mental development processes is as fast as when he was in his teens. Thus, we can conclude that increasing a person's age can affect the increase in knowledge he acquires, but at certain ages or towards old age as well as the acceptance or increase in knowledge will decrease. So that age affects a person's mindset, the older the age the more the endurance of capture and mindset increases so that the knowledge gained is better.

The respondents' characteristics based on education showed bachelor's degree as the highest level of education, with 39 people which corresponds to 39% of total respondents. High level of education can form progressive values in a person, especially in accepting new things, including the importance of exclusive breastfeeding for infants. Research conducted by Suyatno (2000) stated that most breastfeeding mothers with a high level of education work outside the home, the baby will be left at home with the care of grandmothers, parents, in-laws or other people who may still inherit old values in infant feeding. A high level of education among women in rural areas is not a guarantee that they will abandon the wrong traditions or habits in infant feeding, as long as the social environment in the place of residence does not support this direction. Previous research explains that mothers who have high education are able to receive information about exclusive breastfeeding well and have broader knowledge about exclusive breastfeeding compared to respondents with low education (Afriyani, 2018).

The characteristics of the respondents based on the mother's occupation from the results showed as much as 59 mothers (60%) did not have occupation and don't go to work. One of the most common reasons for mothers not breastfeeding is because they have to work. In the study, it was found that the number of working mothers who provided exclusive breastfeeding was less than that of non-working mothers.

There are demands and opportunities to work to help the family economy, some mothers choose to work outside the home. Therefore, by working, mothers cannot have full contact with their babies, as a result, mothers are more likely to give formula milk, which causes the frequency of breastfeeding to decrease and the productivity of breast milk will decrease. This situation causes mothers to stop breastfeeding, while mothers who do not work have free time and can have direct contact with the baby when breastfeeding, so that breast milk productivity becomes a lot (Widdefrita & Mohanis, 2014).

Working mothers may not provide exclusive breastfeeding because most working mothers have less time to care for their babies, while non-working mothers are more likely to provide exclusive breastfeeding, so that mothers can provide exclusive breastfeeding to their babies (Dahlan, 2013).

Respondents who provided exclusive breastfeeding in this study were mostly multiparous mothers, with 62 people (63%). Parity is associated with the mother's experience when breastfeeding. Mothers with more than one parity will be more confident and able to overcome obstacles that occur during the breastfeeding process (for example, how to overcome breast milk not coming out) so that multiparous or grande multiparous mothers are more likely to provide exclusive breastfeeding (Gobel, 2012).

Respondents' Knowledge of Exclusive Breastfeeding

The majority of respondents did not know about exclusive breastfeeding, namely 55 respondents (55.6%). The results of this study are similar to other studies which state that the level of knowledge, education, working status of the mother, and the number of children in the family have a positive effect on the frequency and pattern of breastfeeding. Research conducted by Ambarwati (2004). Mothers' lack of knowledge about exclusive breastfeeding will cause the failure of exclusive breastfeeding because mothers have no motivation to provide exclusive breastfeeding to their babies and vice versa, good maternal knowledge will cause success in exclusive breastfeeding so that mothers are motivated to provide exclusive breastfeeding to their babies (Astuti, 2013).

Notoatmodjo (2003) states that knowledge is the result of knowing and this occurs after people perceive a certain object. Sensing occurs through the five human senses, namely the senses of sight, hearing, smell, taste and touch. Knowledge basically consists of a number of facts and theories that allow a person to be able to solve the problems he faces. Knowledge or cognitive is a very important domain in shaping a person's actions (overt behaviour).

Respondent Behaviour

From the study, it was found that most respondents whose behaviour did not provide exclusive breastfeeding (78.8%) was higher than those who behaved to provide exclusive breastfeeding (21.2%). This is in accordance with the concept that human attitudes will influence their behaviour. However, a positive attitude is not always followed by positive behaviour. Research by Permana (2006) showed that mothers' positive attitudes towards exclusive breastfeeding practices were not followed by exclusive breastfeeding. Please avoid repeating the first paragraph for the same sentence and use the second sentence to showcase your professional credentials.g of their babies. Attitude is not automatically realised in an action. The realisation of attitude into real action requires support factors from certain parties, such as health workers and people closest to the mother.

Based on the results of the linear regression statistical test, a significance value of 0.021 was obtained, which means that there is an influence of respondents' knowledge about exclusive breastfeeding on their behaviour in providing exclusive breastfeeding. This is corroborated by research conducted by Sunoto (2001) which reveals that behaviour based on knowledge will be more lasting than behaviour that is not based on knowledge (Notoadmodjo, 2002).

The effect of respondents' knowledge about exclusive breastfeeding on their behaviour in providing exclusive breastfeeding is 0.021, which means that it is directly proportional or has a positive effect. Every 1% increase in knowledge about exclusive breastfeeding will result in a 0.021 increase in behaviour in providing exclusive breastfeeding. Maternal knowledge about exclusive breastfeeding can influence mothers in providing exclusive breastfeeding. The better a mother's knowledge about the benefits of exclusive breastfeeding, the more she will exclusively breastfeed her child. Vice versa, the lower the mother's knowledge about the benefits of exclusive breastfeeding, the less likely the mother will provide exclusive breastfeeding (Rulina, 2002).

5. Conclusion

Based on the results of the description in the previous chapter, it can be concluded that:

- 1) There is an effect of maternal knowledge about exclusive breastfeeding on maternal behaviour in providing exclusive breastfeeding.

- 2) The higher the mother's knowledge about exclusive breastfeeding, the more likely the mother is to give exclusive breastfeeding to her baby.
- 3) Every increase in knowledge about exclusive breastfeeding by 1% will increase the behaviour of mothers to provide exclusive breastfeeding by 0.191.
- 4) Increasing the knowledge and improving the behavior of breastfeeding mothers in providing exclusive breastfeeding is expected to reduce infant mortality rates, improve the health of mothers and babies, and create a healthy generation.

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Characterization of Sawang River Sand for Foundry Application

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ABSTRACT

The study investigated characteristic of Sawang river sand in Aceh Indonesia for its possible use in foundry application. Experimental techniques which included determination of moisture content, clay content, Grain Fineness Number, and grain shape of river sand were conducted to measure foundry properties of the sand. Tests are carried out following the standards and procedures defined by the American Foundrymen's Society (AFS). Results obtained revealed that the river sand has moisture content of 5.81 % and clay content of 13.66%. The value of the Grain Fineness Number (GFN) obtained is 49.9, which is still within the acceptable range of mold sand and suitable for metal casting. The sand has angular grain shape, slightly rounded mixed with angular and slightly rounded. Sawang river sand will be suitable for casting of casting of light steel, grey iron, and non-ferrous metals, with the addition of binding agent in suitable proportion. However, further study is recommended on the sand test for casting to assess the quality.

Keywords: sawang river sand, properties, molding, foundry

1. Introduction

The metal casting process involves the pouring of molten metal into a mold. Therefore, the mold material and molding method must be selected with care [1, 2]. Most of castings are made in sand molds because metallic molds wear out too quickly to be economical for ferrous metals production [3, 4, 5]. Selection of the molding material depends on the type of metal being poured, the type of casting being made, the availability of molding aggregates, the mold and core making equipment owned by the foundry, and the quality requirements of the customer. Sand is a common material used in the sand mold of metal casting and its characteristics give a great deal of influence to the mold properties. Sand for molding is generally classified into three groups that are natural sand, silica sand and special sand. The silica sand such as mountain sand, sea sand, beach sand, river sand and lake sand. Both natural and silica sand are composed of silica (SiO₂). Zircon, olivine and chromite sand are classified as special sand which is expensive.

The shape, size, composition, and purity of the sand are important factors to the success of the mold making operation [6, 7]. The size distribution of the sand affects the quality of the castings. Coarse grained sand allows metal penetration into the molds giving poor surface finish to the castings. Fine grained sands generate better surface finish but need higher binder content and the low permeability may cause gas defects in castings. Most mold sands should fall within 50-60 grain fineness number (GFN) or 220-250 microns average grain. Grain shape is defined in terms of angularity and sphericity. Sand grains vary from well-rounded to rounded, sub-rounded, sub-angular, angular and very

angular. Within each angularity band, grains may have high, medium or low sphericity. The best mold sands have grains which are rounded with medium to high sphericity giving good flowability and permeability with high strength at low binder additions. More angular and lower sphericity sands require higher binder additions, have lower packing density and poorer flowability [7].

The objective of this study is to investigate the potential of Sawang river sand as a molding material for metal casting process.

2. Methods

The sand investigated for this study was collected from S river Aceh Indonesia. Its coordinates are 5°14'22"N and 96°56.56"E. The sand properties was investigated to determine its possible use in the metal casting. Properties of the sand investigated are, moisture content, clay content, grain size and distribution, and grain shape. The investigations were carried out according to American Foundrymen Standard (AFS) procedure.

2.1 Moisture Content (MC)

Fifty (50) grams of sand sample was weighed with the digital balance and dried in oven at 110°C for 20 minute. The ratio of loss of weight for each sand sample on heating and that of the sample before heating, expressed in percentage [8]. Moisture content is expressed mathematically as:

$$MC (\%) = \frac{W_1 - W_2}{W_1} \times 100 \quad (1)$$

Where W_1 is the weight of moist sample, and W_2 is the weight of the dried sand.

2.2 Clay content

The clay content was determined using glass bottle and solution of salt water (NaCl). Fifty (50) grams of dried sample was placed into the glass bottle followed by 475 ml of water and twenty (20) grams of NaCl, the glass bottle was set on rotating sand washer. Sand sample was washed until clear solution was obtained. The sand had been dried in the oven and the remaining sand was weighed. The ratio of the loss of weight in the sand sample on heating and that of the washed sand sample, expressed in percentage, gives the clay content [9].

$$Clay\ content (\%) = \frac{W_a - W_b}{W_a} \times 100 \quad (2)$$

Where W_a is the initial weight of dried sample before washing, and W_b is the remaining weight of dried sample after washing.

2.3 Grain size and distribution

The sand grain size and distribution was determined using sieve analysis, and mechanical sieve shaker was employed for the experiment. The sieve shaker was arranged from the sieve with the highest mesh opening to the lowest mesh opening in descending order on the mechanical sieve shaker. Fifty (50) grams of clay-free sand samples were sifted through standard set of sieves for 15 minutes and the weight of sand in every sieve was weighed using electronic balance. The percentages of the sand passed through the sieves and retained in the sieves were recorded [7]. The grain distribution for each samples were obtained and the Grain Fineness Number (GFN) was calculated using the equation:

$$GFN = \frac{\sum(W_n \times S_n)}{\sum W_n} \quad (3)$$

Where W_n is the weight of sand collected on each sieve and S_n is grain fineness coefficient.

2.4 Grain Shape

The angularity of sand was estimated using the Olympus BX51M microscope with the digital

camera to determine the shape of the sand grains.

3. Result and Discussions

The moisture content is the amount of water present in the sand. The river sand has the average moisture content of 5.81 %, as shown in Table 1. This falls in the range of 4 – 8% which are within the satisfactory AFS molding sand moisture content for casting of light steel, heavy grey steel and medium grey iron [10, 11].

The average clay content of the river sand was found to be 13.66%, the results of the various tests are presented in Table 2. From the standard requirement for casting, these values are above the recommended standard values of 4% - 12% for ferrous metals, while that of non-ferrous metals of 12% - 18% [6, 8, 10, 12,13].

The grain sand distributions from sieve analysis of the sand sample are as shown in Table 3. By using Eq.3, GFN was calculated and established that 49.9. This number classifies it under coarse grain size, which is still within the acceptable range of mold sand and suitable for metal casting application [7, 10, 14,15]. This type of sand possesses high permeability and refractoriness. Variation in percentage of sand retained with sieve and grain distribution for the sand sample is presented in Figure1.

Tabel 1 The Moisture Content of River Sand

No. Test	W ₁ (gram)	W ₂ (gram)	MC (%)
1	50	47.05	5.90
2	50	47.05	5.90
3	50	47.15	5.70
4	50	47.16	5.68
5	50	47.05	5.90
Average			5.81

Tabel 2 The Clay Content of River Sand

No. Test	W _a (gram)	W _b (gram)	Content (%)
1	50	43.05	13.90
2	50	44.30	11.40
3	50	43.40	13.20
4	50	42.85	14.30
5	50	42.25	15.50
Average			13.66

Tabel 3 Sieve Analysis of River Sand

Sieve No	W _n (gram)	S _n	W _n x S _n
20	3.45	12	41.4
40	10.19	20	203.8
60	12.42	40	496.8
80	12.48	60	748.8
100	5.65	80	452
Pan	5.25	100	525
Total	49.44		2467.8



Figure 1 Graph of river sand grain size distribution

The shape of sand also influences the packing density and sand surface area and the consumption of binder is proportionate to the sand surface area. The best foundry sand is generally rounded with medium to high sphericity grains [7, 16, 17, 18]. The river sand has angular grains, low sphericity mixed with angular grains, medium sphericity as shown in Figure 2.



Figure 2 Sand grain shape classification

4. Conclusion

The characteristic of Sawang river sand has been investigated in this study and the following conclusions are made:

- 1) Moisture content of river sand has of 5.81%, which is falls in the range the recommended standard values of 4% - 8% for casting of light steel, heavy grey steel, and medium grey iron.
- 2) Clay content of the sand was found to be 13.66%, which is above the recommended standard values of 4% - 12% for ferrous metals, while that of non-ferrous metals of 12% - 18%.
- 3) The grain fineness numbers of the sample show a coarse aggregate with a value of GFN 49.9, which is still within the acceptable range of mold sand and suitable for metal casting.
- 4) The river sand has angular grains, low sphericity mixed with angular grains, medium sphericity.

5. Acknowledgement

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INCREASING KINESTHETIC INTELLIGENCE IN EARLY CHILDHOOD THROUGH BAJANG BAJANG CREATIONS DANCE AT JEUMPA BAN KEMANG KINDERGARTEN BENER MERIAH DISTRICT

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ABSTRACT

This research is "Increasing Kinesthetic Intelligence In Early Childhood Through Bajang Bajang Creations Dance At Jeumpa Ban Kemang Kindergarten Bener Meriah District". This research aims to determine (1) the form of presentation of the Bajang-bajang dance at the Jeumpa Ban Kemang Kindergarten; (2) Application of creative dance to improve the kinesthetic intelligence of children aged 5-6 years at Jeumpa Ban Kemang Kindergarten; (3) To determine children's responses to learning creative dance to improve the kinesthetic intelligence of children aged 5-6 years at Jeumpa Ban Kemang Kindergarten. This research was motivated by the results of observations at the Jeumpa Ban Kemang Kindergarten, where the majority of children in the 5-6 year old class group had a tendency to move while learning very dominantly and beyond normal limits such as running here and there in several meetings during the teaching and learning process activities in that class. Apart from that, another problem which is also very important is that the learning strategies used by teachers do not support the learning age needs of children in the class, such as creating a pleasant playing atmosphere and often placing children to sit quietly and listen to the teacher, such as creating classroom conditions in elementary schools. Therefore, in this study, the researcher aims to implement a solution so that children in this class who have special kinesthetic intelligence can channel their movement needs and so that the child's kinesthetic intelligence can continue to develop. The method that the researchers used was using dancing activities. The dance that is danced is a dance created by Bajang-bajang which originates from Bener Meriah Regency. The type of research used is classroom action research. The results of this research show that dancing activities are very suitable for developing children's kinesthetic intelligence. This can be seen from the percentage results of the first cycle of the first meeting, the average kinesthetic intelligence of children is still starting to develop, namely 93.3%. Meanwhile, in cycle II, children's kinesthetic intelligence achieved an increase of 86.7%. In the first cycle, the teacher's activity score reached 60% and the child's activity score was 50.6%, in the second meeting, the teacher's activity score was 77.7% and the child's activity score was 69.4%. whereas in cycle II at meeting I the teacher's activity score was 81% and the child's score was 74.1%, while at meeting II the teacher's activity score was 84.7% and the child's activity score was 82.3%. This proves that dance activities can increase children's kinesthetic intelligence.

Keywords: kinesthetic intelligence, bajang bajang creations dance, early childhood

1. INTRODUCTION

This research is motivated by the results of observations at the jeumpa ban kemang kindergarten, what happens in the field is that children aged 5-6 years have a tendency to move while learning very dominantly and beyond normal limits such as running here and there in several meetings in the teaching and learning process. In that class. Apart from that, another problem which is also very important is that the learning strategies used by teachers do not support the learning age needs of children in the class, such as creating a pleasant playing atmosphere and often placing children to sit quietly and listen to the teacher, such as creating classroom conditions in elementary schools. Therefore, in this study, the researcher aims to implement a solution so that children in this

class who have special kinesthetic intelligence can channel their movement needs and so that the child's kinesthetic intelligence can continue to develop. The method that the researchers used was using dancing activities. The dance that is danced is the bajang-bajang creation dance originating from Bener Meriah regency.

This has attracted the attention of researchers from the seven intelligences described above, namely kinesthetic intelligence. Researchers assume that movement is a necessity for children. Many people think that children who are quiet and don't move much are good and obedient children. In fact, children who don't move much can have a bad impact on children's health, according to the words of I. H. Dharma and Astuti. R. in Laurel Schmidt's book (2012: 27) which states that children learn through the integration of the brain and physical movement. Apart from that, the multiple intelligences view sees the tendency to move in children as intelligence, and is called kinesthetic intelligence. The fact of this research will cause chaos in the class so that teachers will have other problems, namely teachers are unable to implement active learning and support children's growth and development so that children just sit quietly and listen to the teacher. This certainly causes boredom, feeling tired, and affects the child's ability to concentrate. Therefore, in this situation, teacher expertise is very necessary in modifying learning, such as using strategies that are fun and still meet children's movement needs, especially strengthening kinesthetic activities and this can be channeled through dance activities. One of the dances that can be taught to young children is creative dance whose movements are easy for children to imitate. Creative dance is a dance that is innovated based on the rules of traditional dance. One of the creative dances in Bener Meriah district is the Bajang-Bajang dance. Bajang-bajang dance means mixed dance. This dance is the result of a mixture of movements from various traditional Gayo dances such as a combination of Guel dance movements, Munalo dance, and others. The Bajang-bajang dance is a creative dance that is easy to dance and attractive to PAUD students because the dance is easy to imitate, the duration is not too long, and there are not many floor patterns. This is in line with Widya's opinion (2010: 13) that dance that suits the basic abilities and needs of young children from an intellectual, emotional, social, perceptual, physical, aesthetic and creative perspective is in the form of themed dance, the dance movements are imitative, varied dance movements, in the form of a group dance, with a floor pattern of approximately five, dancing time approximately five minutes, and accompanied by music.

So here the researcher feels it is necessary to conduct classroom action research through dancing activities entitled "Increasing Kinesthetic Intelligence In Early Childhood Through Bajang Bajang Creations Dance At Jeumpa Ban Kemang Kindergarten Bener Meriah District".

This research tries to apply dancing activities as a solution to meet children's movement needs and improve children's kinesthetic intelligence at Jeumpa Ban Kemang Kindergarten. The research questions structured in this study are (1). What is the form of Bajang-bajang dance presentation at Jeumpa Ban Kemang Kindergarten? (2). How is creative dance applied to improve the kinesthetic intelligence of children aged 5-6 years at Jeumpa Ban Kemang Kindergarten? (3). How do children respond to creative dance learning to improve the kinesthetic intelligence of children aged 5-6 years at Jeumpa Ban Kemang Kindergarten?

2. LITERATURE REVIEW

Kinesthetic Intellegency

Early childhood is a time when children are actively imitating and practicing what they see and hear, so it is very important to direct children's activity during this period to positive things by Anggi, Fauziatul (2021; 9) children's intelligence is interrelated and make many contributions to a child's development at every stage. One tip can be to give children the opportunity to take part in dancing activities. Dancing is one of the activities to fulfill children's movement needs, and apart from fulfilling these needs, it turns out that without realizing it, dancing can also have other impacts such as influencing language development, social emotional development and other aspects. So it can be concluded that dancing is quite an important thing to teach to young children. The Intelligence of Children According to the Main View of the Multiple Intelligences Theory Quoted in (Safira, 2010:15) is as follows: 1) Every child has the certainty of having nine intelligences. These intelligences can be highly developed, moderately developed, or less developed. 2) All children, in general, can develop each intelligence to an adequate level of mastery if they receive sufficient support, enrichment and teaching. 3) Intelligence works together in daily activities. Children who have need musical and kinesthetic intelligence. 4) Children have various ways to show intelligence in each category. "Children may not be very good at jumping but are able to bounce well (kinesthetic intelligence), or don't like telling stories, but understand quickly when asked to tell stories (linguistic intelligence)" By (Rani Yulianti, 2010: 2-6) The nine intelligences in the multiple intelligence theory are 1) verbal linguistic intelligence, 2) mathematical logical intelligence, 3) musical intelligence, 4) visual spatial intelligence, 5) kinesthetic intelligence, 6) interpersonal intelligence, 7) intrapersonal intelligence, 8) naturalist intelligence, 9) existential intelligence. Kinesthetic intelligence is the ability a person has to use their body to move and convey ideas through movements such as being able to change various body positions using large and small muscles. One of the activities that can be done to train children's kinesthetic intelligence is dancing. Because in dancing there are meaningful movements so that children's kinesthetic/physical intelligence can improve.

According to Gardner Via (Amstrong, 2013:7) this intelligence includes certain physical skills such as Coordination, Balance, Agility, Strength, Flexibility and Speed in kinesthetic intelligence. According to Sonawat & Gogri (in Yaumi and Nurdin, 2013:16) kinesthetic intelligence is intelligence which relates to the ability to use whole body movements to express ideas and feelings as well as the skill of using the hands to create or change something and has aesthetic value. in relation to movement and dance, in dance children produce meaningful movements, so that children will be able to move their bodies and clearly this can certainly develop children's motor aspects and train children's kinesthetic intelligence. The way to indicate kinesthetic intelligence is detected through several indicators mentioned by Aan T Safira (2010: 22), namely as follows:

1. The child looks active, continues to move, rarely appears still even if he is not feeling well.
2. Children have muscle strength that is very prominent compared to children their age, dare to swing, climb globes, climbing boards, jump strongly, and land precisely.
3. Children like to touch objects that are new and considered foreign, for example touching light switches, holding paint that is still wet.
4. Children are involved in competent physical activity or sports within PAUD institutions such as TPA, KB, Kindergarten. Like a race, running to grab the ball.
5. Children are good at imitating other people's movements, bending like parents, crawling like babies, swinging their arms, imitating friends' movements.
6. Children enjoy playing with dirt or sand (2-4 years old), finger painting, planting activities, painting (4-6 years old).
7. Children are relatively flexible when speaking because they use body movements as support, move their hands to speak, and look flexible when dancing.
8. Children have good balance compared to their peers, are not far away when walking on footbridges, have a more stable foothold

Based on this, it can be concluded that children who have kinesthetic intelligence tend to be restless, have a high desire to move and like all activities related to physical activity, such as playing football, playing outdoor games (swings, slides) and imitate various movements and dancing movements.

Characteristics of Early Childhood Dance

At the age of 5-6 years, children are experiencing the process of imitation. Surya Brata in Masganti (2016: 159) Divides the Imitation Process into Three Stages, namely: (1) Projective Stage. The stage where children get an impression of the model of the object being imitated. (2) Subjective Stage. The

stage where children tend to imitate the movements or attitudes of the object model. (3) Effective Stage.

The stage where the child has mastered the thing he is imitating. There are many kinds of traditional movements that can be used as a source of creative dance for young children (Kamtini, 2013: 37). Dancing Children basically love music and dance. To hone kinesthetic intelligence according to (Khadijah, 2015: 122) we can invite him to dance together. Because dancing demands balance, harmony of body movements, muscle strength and flexibility. By Fitriani, Rudy. (2021; 10) neuroscientists confirm that songs, movements and games with music in children are good neurological activities for introducing speech patterns, sensory-motor skills and vital movement abilities. Young children are very interested if music uses songs, movement, emotions and games.

Bajang – Bajang Creative Dance

Through research results, Rahajeng (2014) stated that creative dance can improve the gross motor skills of mentally disabled children and can stimulate cognitive abilities, more precisely executive function. The development of executive function in the brain can be seen from the increase in memory in children. The presence of a stimulus in the form of a combination of movement with harmonized music results in the growth of neurons in the brain. The Bajang-Bajang dance is a dance that originates from the Gayo tribe, this dance combines various music and movements from previous classical dances. This dance contains movements that are not too difficult, so it can be imitated by young children. The word bajang-bajang comes from the Gayo language which means mixed up. It is called bajang-bajang because the movements, lyrics and rhythm have been mixed with several movements, song lyrics and other dance rhythms. The combination of movements includes gael dance movements, munalo dance, and others. Dance that suits the basic abilities and needs of early childhood from an intellectual, emotional, social, perceptual, physical, aesthetic and creative perspective is explained in Widya (2010: 6.13) is as follows:

1. Themed Dance; The aim of this type of dance is to provide an opportunity to express knowledge and experience regarding things one sees and hears, as well as providing an opportunity to express things one feels.
2. Dance movements are imitation (imitative); The aim is to provide opportunities to present real life situations based on their ability to respond to things they see, hear and feel, giving them the opportunity to explore things they know about the natural surroundings, about their environment and even about themselves.

3. Varied Dance Movements; The goal is to give children the opportunity to show muscle control throughout their body. Dance for young children should have a combination of enthusiastic movements with movements that do not require a lot of effort.
4. In the form of a group dance; The aim is to provide opportunities for children to develop their social needs.
5. Floor Pattern More or less Five; There should be no more than five floor patterns, because the child's ability to concentrate on memorizing the sequence of movements as well as memorizing the sequence of floor patterns is limited.
6. Dancing Time Approximately Five Minutes; The goal is to give children the opportunity to demonstrate their ability to concentrate longer.
7. Accompanied By Music; The aim is to give children the opportunity to show their abilities, who at the age of less than 6 years can carry out complex activities, namely moving while listening.

Bajang-Bajang Dance Floor Pattern

A floor pattern is a line or pattern formed as a way for dancers to move, move into positions to dominate the stage. The floor pattern in the Bajang-bajang dance only uses 2 floor patterns, namely consisting of a circle floor pattern and a triangular shape (two people at the back and one person at the back whose position is in the middle of the two front dancers. Can be seen in the following picture:



Circular Floor Pattern Image
With a Facing View



Triangle Floor Pattern

A triangular floor pattern with two people at the front lined up parallel and one person at the back in the middle between the two front dancers, the number of dancers in each group is three people. The form of presentation of the Bajang-bajang dance starts from the forms and movements, musical accompaniment,

clothing and make-up, props and floor patterns, this dance is a very simple dance but still interesting with all the peculiarities or characteristics that this dance has. The overall application of the Bajang-bajang dance at Jeumpa Ban Kemang Kindergarten is the same as on YouTube https://www.youtube.com/watch?v=yIE_m553INA.

3. RESEARCH METHOD

This research uses the classroom action research (PTK) method. Classroom Action Research according to Arikunto, Suharsimi. (2006), is research carried out by teachers in the classroom or at school by eliciting actions that are deliberately displayed in the classroom. In carrying out PTK, research participants must be directly involved in the research process from the beginning until finding the research results. So in this research, researchers will involve themselves directly in the research process looking for results from implementing dance activities to improve children's kinesthetic intelligence as hypothesized. The research subjects in this study were children aged 5-6 years (group B) at the Jeumpa Ban Kemang Kindergarten, namely 16 children consisting of 5 boys and 11 girls. Jeumpa Ban Kemang Kindergarten which is located at Jalan Pante Raya Dalam-Bener Ayu, Wih Pesam District, Bener Meriah Regency. The time for carrying out this research is in the odd semester of the 2022-2023 academic year. Data collection techniques will be used in this research according to Andriani, Durri et al. (2010) Observation, performance, interview and documentation techniques. The following is an explanation of the three data collection techniques that will be implemented in this research:

A. Work Method

Performance is an action assessment or practical test that is used to collect information about various behaviors that are expected to appear in children. In this case, the researcher will practice dancing directly with the children to see the level of achievement of kinesthetic intelligence of group B children at Jeumpa Ban Kemang Kindergarten through observations guided by the assessment rubric.

B. Observation.

Observations will be made on all children when dance learning activities take place. Observations were carried out to find out how children responded when learning dance and to observe children's kinesthetic intelligence.

C. Interview

Interviews will be conducted with teachers and children. Interviews were conducted with teachers to find out the teacher's activities in the dance learning process to improve children's

kinesthetic intelligence. The interview will be terminated if the research objectives have been achieved. Interview is also referred to as the grid of questions in the interview.

4. RESULT AND DISCUSSION

a. Cycle I Reflection Stage

From the results of the research carried out, the author sees that there is an increase in children's kinesthetic intelligence which has reached the criteria for starting to develop, therefore the author will make improvements which will hopefully be able to increase children's kinesthetic intelligence to reach the criteria for developing very well. The results of reflection in cycle I are:

- 1) In this initial activity, children responded well to the presence of the author.
- 2) At this stage the child is able to imitate the Bajang-bajang dance movements but is not perfect because the child is still shy about carrying out the stages of the movement, so the standard achievement determined by the author has not been achieved, namely $>80\%$, so the author continues to the next cycle.



Cycle I Reflection Image

B. Reflection Stage Cycle II



**Reflection image of Cycle II
discussion with class teacher**

After the entire learning process in cycle II was completed, the author discussed the results of observations with the class teacher to draw conclusions about whether this research was successful or not. Based on the results of the discussions, observations and documentation carried out, it can be concluded that this research was not continued in the next cycle because the children

had already achieved the criteria for improvement in kinesthetic intelligence. This can be seen from the results of performance and observations which are getting better and children's kinesthetic intelligence has increased based on the percentage of performance and observations on children's kinesthetic intelligence in cycle II. The results of the first meeting showed that there were 7 out of 15 children in the Developing According to Expectations (BSH) category as a percentage of 46.7% and 8 others in the Starting to Develop (MB) category or 53.3%. Meanwhile at meeting II, 2 out of 15 children were categorized as developing very well (BSB) if the percentage was 86.7% and 13 others were in the category Developing as Expected (BSH) or 13.3%. As for the results of observing the activities of children and teachers at meeting I, the teacher's activity score was 81% and the child's activity score was 74.1%, while at meeting II, the teacher's activity score was 84.7% and the child's activity score was 82.3%. Thus, it can be seen that the specified standard of success has exceeded the limit, so the research cycle stops at Cycle II, because the author has obtained a significant increase in children's kinesthetic intelligence.

5. DISCUSSION

Based on the results of the research carried out in cycles I and II in the form of children's performance tests, observations of children's and teachers' activities showed that increasing the kinesthetic intelligence of group B children at Jeumpa Ban Kemang Kindergarten, Bener Meriah Regency, was declared successful. Increasing children's kinesthetic intelligence through dancing activities, namely the Bajang-Bajang Dance, is a very appropriate combination.

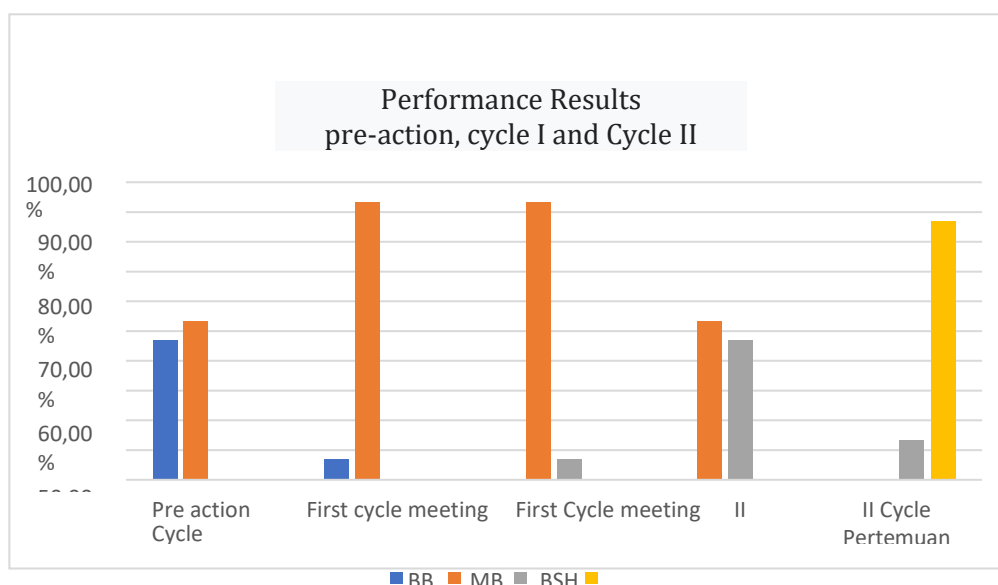
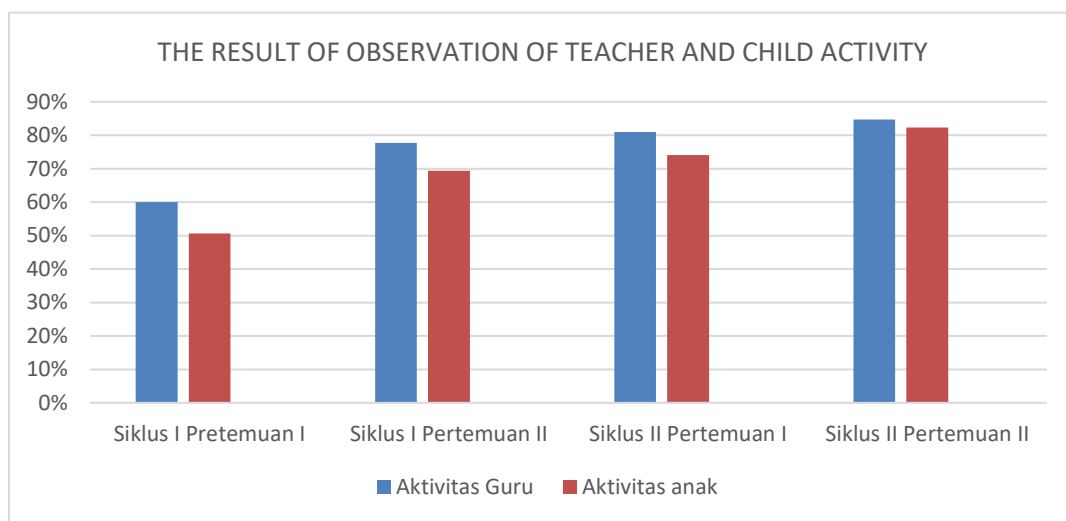


Diagram of Pre-Action Performance Results, Cycle I and Cycle II

As for the results of observing the activities of children and teachers in the first cycle of meeting I, it was obtained that the teacher's activity score reached 60% and the child's 50.6%, then at the second meeting the teacher's activity score increased by 77.7% and the child's activity score was 69.4%. Meanwhile, the results of observing the activities of children and teachers in cycle II, meeting I,



The teacher's activity score was 81% and the child's activity score was 74.1%, then at meeting II, the teacher's activity score was 84.7% and the child's activity score was 82.3%. From research conducted starting in the Pre-cycle, Cycle I and Cycle II, it shows that the average child has improved. The increase in children's kinesthetic intelligence shows that using the Bajang Bajang dancing activity is more effective in increasing children's kinesthetic intelligence. The following is a diagram of the improvement in the results of observations of teacher and child activities:

The results of this research are supported by Gardner (Linda Cambell, 2006: 2) who states that the development of kinesthetic intelligence can easily be seen if we observe Actors, Athletes or Dancers, by looking at the indicators explained by Gardner including Coordination, Balance, Strength, Dexterity, Speed and Flexibility are used as indicators for observation assessment by the author. Thus, dancing activities are one effort that can improve the kinesthetic intelligence of young children in group B (5-6 years). In accordance with this, this research also proves the theory put forward by Gardner, because the results of this research show that achievement has greatly

increased, the first target was only 80% but in this research a percentage of 86% was produced in children's performance scores and activity scores. teachers amounted to 84.7% and children amounted to 82.3%.

Child's Response

Based on the results of research conducted at Jeumpa Ban Kemang Kindergarten on 15 students by providing actions in the form of the bajang-bajang dance as an effort to increase children's kinesthetic intelligence, there was a very significant increase. The increase in children's kinesthetic intelligence at Jeumpa Ban Kemang Kindergarten is not only visible from the percentage of numbers, but can be seen from the results of the children's responses when interviewed by researchers, the children gave positive responses and seemed to really enjoy the process of learning the bajang-bajang dance. When the children were asked how they felt when dancing, the children unanimously and enthusiastically answered that they felt very happy and even wanted to continue dancing throughout school hours.

6. CONCLUSION

A. Conclusion

Based on the results of the research and discussion described in the previous chapter, it can be concluded as follows:

1. The form of presentation of the Bajang-bajang dance at Jeumpa Ban Kemang Kindergarten is carried out in groups using musical accompaniment, props, clothing, make-up and movements adapted to the dance guide video.
2. Through the Bajang-bajang creative dance, it can improve the kinesthetic intelligence of group B children at Jeumpa Ban Kemang Kindergarten, Bener Meriah Regency.
3. The increase in children's activities at Jeumpa Ban Kemang Kindergarten in the process of increasing children's kinesthetic intelligence through Bajang-bajang creative dance activities is shown by positive responses from children.

B. Suggestions

There are several suggestions that need to be conveyed regarding the results of this research, namely:

1. Jeumpa Ban Kemang Kindergarten teachers are advised to continue to innovate in providing the best education for Jeumpa Ban Kemang Kindergarten children, including improving

children's kinesthetic intelligence, such as teaching the latest and simple dances so that children are happy and interested.

2. It is hoped that future authors will be able to continue this research, so that comprehensive results can be obtained and can be used as a reference in teaching and learning activities in the classroom.

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NATION STATE AND THE LOSS OF CROSS CULTURAL COMMUNICATION IN ACEH POST CONFLICT AND TSUNAMI

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ABSTRACT

This research article is concerned with the loss of cross cultural communication as a result of the establishment of a nation state based on political principles and concepts which will also give birth to what is called a national culture where the substance is the various ethnic groups in Indonesia. The aim of this research is to build a collective awareness where the establishment of a nation state does not have to destroy the existing of its substance. This article is a qualitative descriptive research where various existing data are processed qualitatively and the results are presented descriptively. The results of the research show that the Acehese people have always had the political desire to establish a nation state, but it seems to have failed because the existence of Indonesian national political power as a fixed price that Aceh must become an integral part of the unitary state of the Republic of Indonesia (*NKRI*). In the situation and condition like this, it seems that *New Aceh*, namely Aceh post-conflict and tsunami, inevitably has to submit and comply with various regulations that exist nationally in Indonesia. Meanwhile, Aceh, which is also known to have various local wisdoms and various ways of life, seems to no longer be able to be used as a reinforcement of Acehese culture itself, which will also have an impact on the loss of cross cultural communication in Indonesia, where everything must refer to national culture. Until now, Aceh is still within Indonesia's geographical and political territory, but culturally it seems that Aceh still lives in a dualism between maintaining its ethnic culture or being absorbed into the Indonesian national system as a nation state. In the situation and condition like this, it seems that cultural communication will become weak or even disappear due to the power of Indonesian national political and cultural hegemony, where it must also be realized that post-conflict and tsunami Acehese society is a multi-ethnic and multi-cultural society. This means that cross cultural communication within a nation state is very important and does not only prioritize political communication which so far has tended to be seen as being between interests and profits, and even far from values that can provide learning in our lives.

Keywords: Nation state, cross cultural communication, Aceh post conflict and tsunami

1. Introduction

When Indonesia was established as a nation state, Aceh was known as a capital-contributing area by various other communities living in various other geographical regions of Indonesia (AD Pirous, 2005). However, the people of Aceh essentially do not want to admit that they are citizens of the Indonesian nation, although it must be acknowledged that Aceh has provided political support for an Indonesian nation state whose aim is to be free from Dutch colonialism and other nations on this earth. Because this is not in accordance with the principles of humanity and justice as this is also included in the 1945 constitution of the Republic of Indonesia (*UUD 1945*). However, on the contrary, the Indonesian state has conditioned Aceh until now that Aceh is an integral part that cannot be separated from the unitary state of the Republic of Indonesia (*NKRI*) both now and in the future (see: Helsinki Agreement, August 15, 2005).

If we think further about the situation and condition above, it shows that Aceh post-conflict and tsunami still seems to have to be rebound by a political agreement, namely the Helsinki agreement, so that it cannot leave the territory of the Republic of Indonesia. This proves that Aceh is important, not only as a contributor of capital because of its natural wealth, but also for its political support as a strengthening of Indonesia's existence as a nation state (Abdullah, 2011). Unfortunately, Aceh's various supports for Indonesia have so far been seen as either existing or non-existent, and what is even more ironic is that Aceh has been

conditioned as an area of military operations which has created a prolonged conflict situation. In the situation and condition like this, it is not surprising that people from outside Aceh will always assume that to this day they view Aceh with a security approach. In other words, whatever is related to Aceh, other people will also relate it to the security situation, and still think that Aceh is synonymous with "unsafe" or identical as a conflict area (Al Chaidar, 1998).

The situation above is of course very detrimental to the people of Aceh in general which will have an impact on the emergence of continuous negative stereotypes which will ultimately be considered as truth. This means that by conditioning Aceh as an "unsafe" region in a broad sense, this will also condition the people of Aceh and people from outside Aceh as an "inhibitor" further in social communication, economic communication, and also cultural communication. In other words, a "security approach" seems to have become a necessity in looking at Aceh and its various activities in Acehnese society in general (Alfian, 2005).

It is not surprising that the conditioning of a "security approach" will actually result in mutual suspicion towards local communities and people from outside Aceh. This mutual suspicion could have started from the emergence of "negative thoughts" which over time would also lead to the emergence of various negative stereotypes about Aceh which were not necessarily true and would actually give rise to new divisions and conflicts (Betrand, 2004). Not only that, economic investment from various foreign countries also seems difficult for security reasons. Likewise, the world of tourism also seems difficult to develop because it is seen as unsafe and uncomfortable. For this reason, it is necessary to understand here that when we look at Aceh, it is certainly not only from a political perspective, which so far has led us to forget and be complacent that Aceh has various local wisdoms which function to solve problems without problems. Likewise, the people of Aceh also have various cultural products which reflect various moral values and didactic values, which should need to be studied and reconsidered as a cross-cultural understanding (Harun, 2009).

Furthermore, we can think about that the "security approach" is essentially a political concept that is used to indicate the existence of controlled security and political stability within a nation state, even though the facts appear different. This means that whatever the political concept and its implementation through political communication within a nation state, it still seems to tend to serve interests as well as to gain material benefits. Meanwhile, cultural communication tends to inform something related to the moral values and various other didactic values which can build a collective awareness about the more substantive values of human life (Bustamam Ahmad, 2012). However, unfortunately, up to now, various collective awareness of human values, as depicted through various cultural products in Aceh after the conflict and tsunami, also seems to have been hegemonized by the power of material culture through various political conspiracies of interest and profit. For this reason, this research article is entitled: *The nation state and the loss of cross cultural communication in Aceh post conflict and tsunami*.

2.METHOD

This article is descriptive qualitative research where various existing data are collected and analyzed qualitatively, and the results are presented descriptively. Data collection techniques were carried out through literature studies such as journals, books, the internet, and various data collected through desk observation related to the title of this research. After that, data classification was carried out based on existing points related to the main problem in this research. Furthermore, the data analysis was carried out and the results of the data analysis were presented in several points descriptively. After that, conclude the overall research results from the beginning to the end of the research concisely so that the

reader can easily understand it as a contribution of thinking. The results of this research of course will be published further in both national and international journals.

3. RESEARCH RESULTS AND DISCUSSION

Aceh in political and cultural dualism

As mentioned in the introduction above, when a nation state called Indonesia was established, even though Aceh had provided political support and even capital support, culturally the Acehnese people did not seem to be integrated into a national culture. This is because the Acehnese do not seem to feel like Indonesian citizens in the political concept (Hylland Eriksen, 2002). This means that the political support of the Acehnese people for the existence of the Indonesian nation state here is on humanitarian grounds to avoid colonialism by the Dutch and other colonial nations in the world and not on the basis of the same political will to establish Indonesia. Meanwhile, culturally, the people of Aceh seem to have their own cultural strength as ethnic citizens who are integrated with all their ethnicities and various ethnic cultures (Hugronje, 2019).

In other words, until now Aceh is still in a situation and condition of political and cultural dualism. On the one hand, the Acehnese people have been politically positioned as national citizens automatically when a nation state was established. On the other hand, Acehnese are belong to one of ethnic groups who have been integrated with various ethnic cultures that have existed evolutionarily for centuries. However, the integrity of Acehnese ethnic culture has been denied, its existence in the midst of a nation state and its identity as a national culture has even been replaced. In the situation and condition like this, it seems that Acehnese ethnic culture is becoming weak and even being lost by very strong political hegemony.

Acehnese people live like at a cross road with two forked roads. But it seems there is no choice as to which path to take. It is not surprising that in conditions like these the people of Aceh have chosen their own political path by trying to establish their own nation state based on Islamic law but failed due to national political forces. Furthermore, through a long process of struggle it seems that this political failure must be continued to realize the political desire to try again to establish a nation state with a different political concept, namely a nation state based on Acehnese ethnicity, but this has still not been successful (Damanik, 2010). Even though the people of Aceh are still seen as having cultural capital that can support the political power of the Acehnese nation if they succeed in establishing an Acehnese nation-state based on the Acehnese ethnic group. However, what has happened up to now is that if we take the cultural path, it is always perceived as something that is seen as contrary to Islamic law and not in accordance with national culture.

From what is explained above, it seems that Aceh is indeed in a dualism between political interests and rebuilding the identity of the Acehnese people with all their ethnicity which is inherent in the Acehnese way of life which existed long before the founding of the Indonesian nation state. This means that long before Indonesia was declared its existence on August 17, 1945, the Acehnese already existed by occupying a certain geographical area and were seen as having an established way of life as reflected through their various local wisdom (Betrand, 2004). This means that the Acehnese are not immigrants like Chinese people in Indonesia and other parts of the world. The Acehnese here are an ethnic group that already has an Islamic culture and civilization. That's why the Acehnese are one hundred percent Muslim. But why does Acehnese ethnic culture, which is based on Islamic law, seem to be slowly disappearing and even disappearing in the midst of the Indonesian nation state? It is possible that apart from this happening due to the existence of strong national political forces, it also seems that politics has become the "commander" among Acehnese society both in the past and in the post-conflict and tsunami period.

Nation state, political communication, and the loss of cultural communication

As explained above, the existence of a nation state is a political concept. Therefore, if we think further, the geographical areas of a nation state is only exist in a political concept, where the original ownership of the territory of a nation state is a certain ethnic group which existed long before the declaration of a nation state itself. Likewise, national culture also only exists and lives in political concepts. What form or product of national culture here is of course also unclear. That is why other nations from various parts of the world such as America, Australia, and also people from Europe, for example, usually always refer to one of the cultural products found in Indonesia by mentioning or adding the ethnic name of the owner (M. Ditiro, 2013). For example: *Saman Gayo dance, Ranup Lampuan dance, and seudati from Aceh, Balinese dance, Jogja Batik, Malay dance, Riau Malay language*, and so on. Furthermore, even though Malay has been made as national language, the foreigners usually just call it "language" or "bahasa" without adding the word Indonesian, and the meaning of the word "language" or "bahasa" here is substantially the *Malay language* and its legitimate cultural owners here are Malays.

In other words, respect for various cultural products owned by their legal owners as cultural heritage is important, because they contain moral values, didactic values, and also reflect various local wisdom, etc. which can create a new awareness again for all of us who appreciate the culture. But unfortunately, until now, it seems that cultural appreciation has turned into political appreciation which is seen as bringing various material benefits. The meaning here is that society in general has experienced a change in thinking paradigm which tends to be oriented towards physical materials and money rather than having to choose the profits in the form of learning values in our life (Sugihen, 2009).

That is why currently political communication is seen as more important than cultural communication which seems to have been denigrated and perceived as something that cannot make money for society in general. It is not surprising that various problems that have occurred in this country always take the path of political communication, although the results is always in conflict. Various conflict incidents not only occurred in the Aceh region, but also in various other regions such as Sumatra, Riau, Batam, and others. This means that there has been a solution to existing problems but it still brings new problems as if we have lost various cultural methods (Fiske, 2004). In fact, all of us, including Aceh, are known to have various local wisdom which functions to solve problems without problems. This is what is meant by what has been stated in the title of the article above, that so far we have lost cross cultural communication and have indeed been conditioned to the political communication.

If we think further, Aceh post-conflict and tsunami is a "new Aceh" which in essence also came into being through a process of political communication between nations which we know as the "Helsinki Agreement" on August 15 2005. However, the *new Aceh* post-conflict and tsunami here is not a new nation state, but it is clear in the Helsinki agreement that Aceh is still an integral part of the Indonesian nation state. Therefore, this agreement is essentially to maintain peace between the independent Aceh movement (*GAM*) and the unitary state of the Republic of Indonesia through a political approach and security approach, which in this case has been facilitated by Finland. For Indonesia, a security approach is considered very important in order to maintain political and economic stability, which inevitably has to be acknowledged that the political and economic situation and conditions in Aceh have never been stable so far. It is ironic that Aceh post-conflict and tsunami is still seen as the poorest region in Sumatra. For this reason, perhaps it is time for us to return to studying the successful culture of the Acehnese in the past which is believed to have existed, but was not recorded in national history books. For this reason, the research on the history of Aceh also needs to be carried out further in the future.

Security approaches, Islamic law, and the loss of cultural reinforcement in Aceh post conflict and tsunami

A security approach is very important in a nation state, not only for the sake of existing political stability, but also for making various political, economic, social and cultural policies in a calm, comfortable and safe manner. In other words, the security approach is essentially to strengthen the government management in making decisions for the benefit of human life in general properly and correctly. However, unfortunately an excessive security approach will also bring excessive power arrogance and political hegemony. So that excessive arrogance of power will also have an impact on behavior that destroys human values, as it was the case in Aceh during the conflict. It is not surprising that Aceh has been used as a military operations area, and at the same time as an area of prolonged conflict and must be resolved using a security approach as well.

In line with the time when security operations took place through extended government hands, of course without realizing it, at the same time there had also been "destruction" of values, including the values contained in Aceh's various cultural heritages in general. For this reason, various cultural activities are automatically stopped for the reasons of security for the unitary state of the Republic of Indonesia. It is not surprising that after the conflict and tsunami it seemed that various cultural activities in Aceh were getting weaker day by day and were even unable to strengthen the existence of the Acehnese people with all of their ethnicity which had been attached to them for centuries. It is not fitting that various local cultures and various local wisdoms in Aceh should just disappear because of the political power of Indonesia. For this reason, various efforts need to be made to revitalize Acehnese culture post conflict and tsunami (Avonius, 2005).

In the efforts to restrengthen toward the Acehnese ethnicity as the characteristic and identity of the Acehnese people, of course it must be within the framework of Islamic law. This is also the case with what has happened to the Minangkabau community in West Sumatra, for example "*custom is based on sharia, sharia is based on the book of Allah*" namely the Alqur'an and Hadith. Therefore, we can reflect again that Islamic law in Aceh should not be perceived as an obstacle to various cultural activities in Aceh, but rather as a legitimizing reinforcement of what is permitted and what is prohibited related to cultural issues of the Acehnese people. For this reason, the *Aceh Ulama Council* in this case is certainly very necessary, not only those that are prohibited and permitted, but also those that are normative based on Islamic law (Ibrahim, 2004). This is very important because so far cultural researchers still seem to think that all Acehnese cultural products are Islamic. For this reason, cross cultural communication which also involves the *Acehnese Ulama Council* and Islamic religious experts is of course still very necessary so that we no longer make mistakes and mistakes in cross cultural understanding and cross cultural communication within the Indonesian nation state.

4.CONCLUSION

The establishment of a nation state should not destroy the substance of its own nation's citizens, where the substance of the nation's citizens of the Indonesian nation state are various ethnic groups that existed long before the founding of the Indonesian nation state itself. These various ethnic groups have lived and developed for centuries in an evolutionary way with their various ethnic cultures and their respective ethnicities, including the Acehnese ethnic group which has the right to live with its culture. For this reason, we should not treat discrimination and even criminalize the various advantages and disadvantages that exist towards the various ethnic groups that exist as citizens of the Indonesian nation and at the same time they are also citizens of their respective ethnic groups.

Perhaps we can learn from America's experience as a nation state that is also multi-ethnic and multi-cultural. We can think about here that initially America would try to merge its various ethnic groups and cultures into what they called the American nation through a concept called the "*melting pot*" concept. The concept of "*melting pot*" here is like if we are blending various types of fruit or vegetables, so that when we have finished blending them all, we will no longer know what type of fruit or vegetable has a clear name before blending. The concept of "*melting pot*" here America seems to have failed in trying to accommodate the various problems of its ethnic groups and cultures. For this reason, the American nation state seems to have had to change the concept of "*melting pot*" with a concept that is more in line with the name "*salad bowl*", which is like the food called "*pecah*" in Indonesia, but after being given the name "*pecah*", it seems that there are various types of vegetables contained in "*pecah*", the type and name are still visible. In Indonesia, we already have what is called "*Unity in Diversity*" or "*Bhinika Tunggal Ika*" that is, even though we are different, we are still one as the Indonesian nation. However, unfortunately, various nuances of political interests still seem to occur which might be used as further study and hopefully the article can be useful for all of us.

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