

Ethnomathematics Pasola Lamboya Culture In Sumba Island, Indonesia

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Abstract

Indonesia is rich in culture, including the Pasola Lamboya culture. Pasola Lamboya is a game of throwing a spear at each other while riding a horse. However, the mathematical concepts in Pasola culture have not been explored since Enomathematics entered Indonesia in 2013. The purpose of this research is to describe ethnomathematics in the Pasola cultural activities of the Lamboya community and its integration into learning mathematics. The research was conducted on Sumba Island, in Lamboya District, West Sumba, East Nusa Tenggara Province (NTT), Indonesia. Observation, unstructured interviews, and documentation have been utilized for collecting data. The qualitative research approach was applied. The Miles and Huberman model is used in the data analysis approach and also The characteristics of ethnomatheatics by Bishop. Research results in the Pasola cultural activities of the Lamboya community contain ethnomathematics, including counting, determining, measuring, designing, playing, and explaining. Mathematical concepts related to ethnomathematics in the Pasola cultural activities of the Lamboya community include pictures of addition and subtraction, multiplication, and geometry (equations of straight lines, cones, flat shapes, rectangles and circles). So it can be concluded that Pasola Lamboya's cultural activities contain mathematical concepts that can be developed by making a learning trajectory theory in the form of an iceberg. The following work plan is to develop Pasola's culture-based learning trajectory theory.

Keywords: Culture, Ethnomathematics, Exploration. Pasola Lamboya, Mathematical concepts

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I. INTRODUCTION

D'Ambrosio originally introduced ethnomathematics in 1985 and stated that ethnomathematics is a science that describes the practice of mathematics in a culture that can be considered as learning about mathematical ideas that exist in every culture [1]–[7].

Indonesia is rich in culture, including the Pasola Lamboya culture. Pasola Lamboya is a game of throwing a spear at each other while riding a horse. However, the mathematical concepts in Pasola culture have not been explored since Enomathematics entered Indonesia in 2013. For this reason, it is essential to study Pasola culture, which contains elements of mathematics. Still, the Lamboya people have yet to realize that in Pasola culture they do there is a mathematical element.

Several previous studies have shown that there is ethnomathematics in Indonesian culture. [3] suggest that there are mathematical activities in traditional Javanese games, one of which is the Dhukter game, namely the concept of number operations. [8] stated that there are mathematical concepts or ideas, as well as mathematical activities in the Kemoti game. In addition, several mathematical concepts in Indonesian culture have been explored, namely Geometry Concepts in the ethnomathematics of Timor woven fabric motifs and the Ume Kbbubu traditional house (Deda & Amsikan, 2019; Tlonaen & Deda, 2021) geometric shapes in Batik Yogyakarta [11], geometric forms in the activities of the Boti Tribe [12], the concept of numbers in the Timor Weaving motif [13], the idea of measurement on Sundanese Culture [14], [15], Numerical concepts in Javanese Primbon [16], algebraic concepts in the Anak Dalam Tribe Society (SAD) in Jambi [17], The system counting in Adonara [18].

Several studies have suggested that Indonesian traditional games (ITG) make students interested in learning mathematics [19]. In addition, ITG is an innovative learning media [20]. ITG establishes good social interactions among children [21], [22]. Furthermore, the benefits of ITG to optimize mathematics learning outcomes [23], to Improving the Ability to Understand Mathematical Concepts [24], [25], to Improve Student's Perspective to Mathematics [26], fostering the character of elementary school children [27], developing mathematical connection skills [28], and as a learning medium for elementary school students [29].

The purpose of this research is to describe: 1) ethnomathematics involved in the Pasola culture of the Lamboya community and 2) mathematical concepts related to ethnomathematics in the Pasola culture of the Lamboya community.

II. METHOD

The research method employed is qualitative exploratory study. This research was conducted in West Sumba Regency, Lamboya District. The subjects in this study were the Lamboya community, consisting of four male people. The four informants ranged in age from 34 to 78 years. The criteria for the four people are that they can play Pasola, live in Lamboya District, and have broad knowledge and understanding of Pasola culture. This study's data gathering methods included observation, interviews, and documentation [1]. There were observations recorded in the field where Pasola Lamboya was located. The interview was conducted for two days at the Lamboya Pasola and the Rato's house for each informant. This study uses the Miles and Huberman Model analysis technique and also characteristics of ethnomathematics by Bishop [30].

III. RESULTS AND DISCUSSION

The data collection process is done through observation, interviews and documentation (in the form of photos, videos and sound recordings). The research subjects consisted of four people are male, namely JTK (Informant I), are Pasola participant, 34 years old; MB (Informant II), 45 years old; FBH (Informant III), 78 years old; and ALJ (Informant IV) 59 years old. The second informant to the fourth informant had played payola when they were young and currently sits as Rato. The data obtained from the interviews were then validated using triangulation of sources by comparing the results of interviews from the four available sources so that conclusions were received about the Pasola culture of the Lamboya community.

Lamboya is one of the six sub-districts in West Sumba Regency, precisely on the island of Sumba, NTT, Indonesia.

Pasola is generally a very well-known Sumba custom. It has become a very close part of people's lives, especially in West Sumba districts in the Lamboya, Wanukaka, and Gaura/West Lamboya districts and also in Southwest Sumba District in Kodi District. The Sumba people, in general, practice the Pasola culture. However, there are only three locations for Pasola on Sumba Island: *Pasola Lamboya*, *Pasola Wanokaka* and *Pasola Kodi* (Kodibangedo). *Pasola Kodi* is usually held in the Kodi area, Southwest Sumba Regency. While *Pasola Lamboya* and *Wanokaka* in West Sumba Regency. *Pasola* culture has become one of the attractions for domestic tourists and foreign tourists to visit Sumba Island. Pasola culture is highly anticipated because it only happens once a year.

Pasola History

Pasola is derived from the term '*Sola* or *Hola*,' which refers to a wooden javelin used to throw from a fast-moving horse. The suffix '*Pa*' (*Pasola* or *Pahola*) is subsequently added, which denotes the game of hurling wooden javelins in a knightly fashion from horses being driven swiftly by groups competing on the playing field.

The origin of occurrence of *Pasola* first came from Kodi. Kodi is one of the sub-districts in Southwest Sumba Regency. There is a woman from Kodi named *Raga Kaba* or commonly called *Ratu Mandalika*. *Raga Kaba*, or *Ratu Mandalika*, has a husband named *Teba Hawu Gaiparona*, who comes from *Wanukaka*. *Raga Kaba*, or *Ratu Mandalika*, is very famous for her beauty. This is why many men crushed her. As a result, her husband, *Teba Hawu Gaiparona*, divorced her, so she was fought over by many men and made her husband jealous. From here, a stronghold was formed that supported *Teba Haba* and the stronghold of men who took people's wives. They agreed to hold a game of *Pasola*, aiming at each other and throwing a javelin from a horse. The winner of this *Pasola* game will get *Raga Kaba*. *Teba Hau* returns to his hometown of Lamboya/Wanukaka.

Nevertheless, because of *Raga Kaba's* love for her husband, she went after her husband. On the way, *Raga Kaba* stopped at Lamboya to rest and then told the culture of the Pasola game carried out on Kodi. That is where the people of Lamboya know *Pasola*. The *Pasola* Lamboya culture continues to be held every year to welcome the rice planting season and a form of respect for *Raga Kaba* as the goddess of rice.

Pasola di Lamboya is done in Hobakalla, a small lake in the middle of a broad and flat field. The timing of the Pasola of the Lamboya community occurs in February; if the full moon appears for three consecutive days, then on the fourth day, the pemali drum (*bedu biha*) will be sounded as a sign of the start of *Pasola*. The second sign is the appearance of *Nyale* (sea worms which is the incarnation of *Pasola Raga Kaba*) in the Laimadongara sea. The number of *Nyale* collected or appeared as a sign that is believed to be able to determine the size harvest of people on the Sumba island.

The timing of Pasola Lamboya can be seen from natural signs, including the first, namely if the full moon appears for three consecutive days, then on the fourth day the drum pamali (*bedu biha*) will sound the

signal for the start of Pasola. The pamali drum (*bedu biha*) that is sounded is in the village of *Zodana* which is the center of the pamali village or sacred village for all tribes in Lamboya, and is the center of *wula podu wula nyale* (fasting month and nyale month). The drum pamali (*bedu biha*) used is made of snake skin and the drum beater is made of human skin. The second sign is the appearance of nyale in the Laimadongara sea.

The determination of the Pasola month in February and March is a sign that the time or arrival of the Pasola month coincides with the rainy season. This is indicated by the busy work of the Lamboya people working on their fields and gardens, the sound of frogs and the sound of lightning and thunder striking in the sky. The Pasola month is also purified as the Nyale month, which means the month of self-purification for all the life activities of the Lamboya people in welcoming the harvest month. , pounding rice at night.

If the above restrictions are violated, the person concerned must pay a fine (*penalwa rato*) by feeding the village where the person comes from. If you violate it when it is close to Pasola day, the fine that must be paid is a pig that is the size of four people to carry and seven rice balls (*puraka*), but if it is violated when it is still far from Pasola day, the fine is only a pig that is the size of two people to carry and three rice balls. (*puraka*).

Pasola's Attributes

Participants who take part in the Pasola competition are required to prepare the equipment and attributes that will be used, including:

Hingngi dete and hingngi bawa

Hingngi date and Hingngi Bawa are clothes used (both around the waist and slung over the shoulders) by Pasola participants. The fabrics used can vary (with different motifs) according to the wishes and comfort of the players or Pasola participants. The fabric used is also long. Players who do not wear traditional clothes are not allowed to participate in Pasola. The traditional dress signifies a knight ready to fight bravely and bravely on a horse, as shown in Figure 1.



Figure 1. Hingngi

Jara

Jara is a horse used for Pasola matches. Horses in Pasola do not have to use stallions but can also use female horses. If the horse is five years old, it is appropriate to join the Pasola. However, it is also seen from the condition of the horse whether the horse can be ridden or not and whether the running speed is worthy of being included in the Pasola, as shown in Figure 2.



Figure 2. Jara

Hobata (Tangengi)

Hobata or Tangengi is one of the attributes that must be used by participants or players when participating in Pasola. *Hobata or Tangengi* means a crown that symbolizes the majesty of a formidable and brave knight to attract the sympathy of a Nyale princess. *Hobata or Tangengi* is made of cloth that is added with decorations such as chicken feathers, as shown in Figure 3.



Figure 3. Tangengi

Kariggi

Kariggi is a wood used as a weapon against enemies. The *kariggi* used initially was javelin wood, but over time the wood used could use other woods besides javelin. The wood (*Parigi*) used has a length of one to two fathoms. The wood (*Parigi*) used must also be straight so that when throwing at the opponent, it can hit the target and fly far if thrown from a far direction. The wood (*Parigi*) is made with several exciting models, some have the bark removed or peeled off as a whole, and some are made in parts where the top part of the bark is peeled or removed, followed by the bark that is not removed or removed, so on until the bottom end or vice versa. The wood (*Parigi*) used during the payola also has a blunt end (it is not allowed to use a pointed end because it can harm the opponent and the payola spectators), as shown in Figure 4.



Figure 4. Kariggi

Lagori

Lagori is bells, one of the attributes used by horses attached to the horse's neck belt. *Lagori* (in Bahasa giring-giring) is made of aluminium, which resembles a small ball inside and a large one that wraps a small ball inside to produce a beautiful and loud sound. Several people use gold for a small ball in it, namely the original bells or *Lagori*. *Lagori* means the beat or rhythm in the Pasola is proper to enliven the Pasola and increase the enthusiasm of the players and those who watch it, as shown in Figure 5.



Figure 5. Lagori

Kadu Jara

Kadu Jara is a horse horn, an attribute used by Pasola horses. Horse horns (*Kadu Jara*) symbolize the crown of a solid and valiant horse in following the Pasola. Horse horns (*Kadu Jara*) are made from horse tails taken from the hair, wrapped or spun from nylon or nylon ropes, and added with decorations to beautify the horse horns (*Kadu Jara*), plus colourful cloth at the ends as shown in Figure 6.



Figure 6. Kadu Jara

Katangka

Katangka is a neck tie worn around the horse's neck, which is used to attach the bells (*Lagori*) to the neck. Horse neck tie (*Katangka*) in a circular shape. A horse neck tie (*Katangka*) is made of buffalo skin, or it can also be used from horse skin and covered or covered with colourful cloth, as shown in Figure 7.



Figure 7. Lagori

Hela

Hela is a horse seat that is used as a seat for players or Pasola participants who are mounted on a horse's back. Saddle knows that the horse seat (*Hela*) can use cloth or pillows according to the comfort of the players or Pasola participants, as shown in Figure 8.



Figure 8. Hela

Pasola Rules

Pasola games or competitions have rules that must be carried out by all Pasola participants, including:

1. The number of participants in the camp is not limited, even though the number between the two camps does not match
2. Participants must accept the risk of getting injured
3. The horse used must be decorated with predetermined attributes
4. Participants must use attributes following the provisions
5. When attacking an opponent, do not attack when the opponent is in a back position
6. Opponents who have fallen cannot be attacked
7. Participants must not hold grudges outside the Pasola game

Pasola Rituals and Organizations

1. The first day of storing betel nut on coconut leaves (*pan*) is carried out by the *Anamalangata* tribe, namely *Ranca Pamali*. The next day is the Pamali rice field plan by the *Ubuteda* tribe.
2. The second day is a rest day where the buffalo used is rested or in *Lamboya ngah kari*.

3. The next day continued with pan ata buta, where the community began to cut coconut leaves to make diamonds. Next in the afternoon, there will be a banana stem Pasola in the field of SD Bogor Watu while training the horses that will be used in the Pasola the next day. The spear used is a banana stem. The term is usually called banana stem Pasola (banana stem Pasola is not a Pasola ritual, but only to train horses, preparations for the next day when Pasola takes place). After the banana stem, Pasola is complete. The community will gather in their respective big villages to gather and eat together and perform their respective rituals according to the rules of their respective villages by cutting chicken (*horomanu*).
4. The next day, on Pasola day, around 04.00 WITA in the morning, all *Rato* will gather at Laimadongara (the name of the beach where the ritual and the first Pasola and catch Nyale). In the ritual, a red rooster (*horomanu*) will be cut, and they will also eat diamonds together. After that, catch Nyale. In Catch Nyale, there is a traditional poem sung by Rato, which reads: "*Rangeu dumge kawal tauta ban tawuha laura. Rangeu kakadi kajawawe tara mara tag koko digmage wulla inya wulla ama amge nyiwe mamadikge dahi tomage torro ramge kam kariggi hapalamad kaito pahajolamadge tadage nyale tanam kamahorage haila jarage wout*". This means that if the Nyale caught are excellent and saw good, and the Pasola will run well, this also means that the community's harvest will be good.
5. After that, *Rato Welajung* and *Rato Malissu* will do the first Pasola on the beach by throwing the javelin three times. The thrown javelin must not hit the opponent or the horse; if the javelin hits a person or a horse, then something undesirable or error in traditional rituals will happen. *Rato Welajung* and *Rato Malissu* are *Rato* people who perform rituals on Laimadongara beach and own a Pasola horse named *Hogorhakangali* (a horse from Welajung) and a Walabaku horse (a horse from Malissu).
6. After the ritual and Pasola on the beach, around 08.00 in the morning, *Rato Welajung* and *Rato Malissu* headed to the Hobakalla field, where the Pasola will be held; however, before the players enter the arena; first, *Rato Welajung* and *Rato Malissu* perform a ritual, namely throwing betel nut while chanting poetry custom, namely: "*Dikdage tau patut wulla patangarage dikdage rah dau nyalege yinage badaka takge jarage hapa baggage lado nehe*". This means the month and date we have been waiting for have arrived, now is the time for the cavalry war to begin safely and peacefully. After that, *Rato Welajung* and *Rato Malissu* did the Pasola by throwing the javelin three times. The javelin that was thrown should not hit the opponent or the horse. If the weapon hits a person or a horse, something unwanted will happen or an error in the traditional ritual. This is the symbolic opening of the Pasola. After *Rato Welajung* and *Rato Malissu* leave, all players or participants who will compete in Pasola enter the field. Meanwhile, *Rato-Rato* returned to Laimadongara to rest.
7. While at the Hobakalla field, the present spectators could exchange diamonds, which was a sign of friendliness between one tribe and another and the Lamboya community's hospitality to all present spectators, especially immigrants. Spectators or the Lamboya community also wear traditional clothes (not required).
8. Pasola lasts approximately four hours. Suppose *Rato Welajung*, *Rato Malissu*, and other *Rato* returned from Laimadongara and passed through Hobakalla. Pasola has also been completed in that case, and all Pasola participants and spectators must disperse and return to their respective homes.
9. After arriving at their respective homes or villages, the villagers prepare food to eat together or eat traditionally (*Horo*), and diamonds and meat to *Marapu Harona* (village guards) to be offered.

According to the findings of the study, the ethnomathematics included in the Pasola culture of the Lamboya community can be applied in schools (Dominikus, 2019; Dominikus, Nenohai, & Hale, 2020); (Abi, 2016; Fauzi & Luilmaknun, 2019; Laurens, 2016).

The ethnomathematics in Pasola culture as follow:

Counting

Counting activities contained in the Pasola culture of the Lamboya people are:

1. Calculate the length and width of the cloth that will be used to make the pasola attribute, namely hobata by counting the number of spans to find out the length and width of the cloth. For adults the count is three to five inches, while for children the count is two to four inches, while for height it is calculated using one or one-half inch of an adult's hand.
2. Count the amount of wood used by the participants in the pasola where each participant may only hold a maximum of three sticks on a horse, after the wood is finished, add three sticks, and so on until the pasola game is over. Why is only three woods allowed because it is based on the appearance of the full moon three times before the fourth or last day of the appearance of the full moon. This was also the reason for the rato to conduct the first pasola in Laimadongara and Hobakalla by throwing wood three times as a sign of opening the pasola.
3. Calculating the timing of Pasola by looking at the appearance of the full moon in February. If the full moon appears four times, the pasola sign will begin. The main basis for this calculation is the shape of the full

moon and is supported by natural signs, namely the appearance of nyale (sea worms) on the Laimadongara beach, the sound of frogs and the sound of thunder in the sky.

4. Counting the time for Pasola matches starting from the morning ritual, namely from dawn to noon. In this case the counting activity shown is in the division of time used during the Pasola implementation process. The division of time can be seen in the time used for the opening ceremony as well as continued with the process of carrying out the pasola game only used from dawn to noon, while from noon to evening, all Lamboya people return to their respective villages to perform the closing ritual by eat together and then store food in the *Natara* (a place of worship for the ancestors) as an expression of gratitude for the implementation of Pasola.
5. Counting the bells (*lagori*) in one horse's neck tie (*katangka*), namely six to eight bells with the distance between the bells of three to four adult fingers.
6. As well as calculating the age of a horse that is suitable for use in Pasola. If the horse is five years old and the horse is physically strong enough to run and can be ridden, then the horse can participate in the Pasola. Because basically the horse used is a salalwood horse.

All counting aspects as seen in interview with informan as follow (P: researcher, N : informant)

P: *Aganawe ba tauwe lado pirana kahalana?* (How to determine pasola time?)

N: *Ba wula dudakana ba hukana, bana hadalwudakana mate wula hapata wudawainage wula mana mate mono badaka nyale ta hub ban Laimadongara nyiwe kahalana.* (If in February the full moon has appeared three times, the fourth time is Pasola with nyale kalua already in the Laimadongara sea).

P: *Aganadaho hadana nak jara ka dahha hawai ta kahalana?* (How do you determine which horse is eligible to participate in Pasola?)

N: *Kole ba lima daukana jara mono bana kulhadana malai mono bada paneni ata nyidahowe bana dokna na kahalana. Ma jara mane mono jara bai jara nuttudage.* (If the horse is five years old and is strong enough to run and be ridden. Horses that participate can be stallions or mare).

P: *Piradaho ata ka dekuna ta kahalana?* (How many people follow pasola?)

N: *Nutkamoge ba piradi.* (There are no conditions How many people follow Pasola?).

P: *Aganawe hada raidi rade hawai ta kahalana?* (How to make pasola attributes?)

N: *Hada raidi hobota na raini ka tuja ta top bada ukura waige katak. Harai wai lagori wal ta bahi mono emas ka ha merata bola marha. Hada rai katanga ha merani rewo takoko bebu da tauwi ta jara. Kadu jara raidadi wal ta kalari nilonu bebu dadaudi kikku jara. Hadaraidadi karinggi ukura ulhoni tah lima dappa bebu da lainadi kalitana. Rawai hela winna halaptadadi hinggi mono luna.* (For the hobota, make it out of a cloth like a crown that is given a head circumference and measure it with the head. Measuring cloth for adults' spans is three to five spans, while for children it is two to four spans, for the height of one or 1 1/2 of an adult's hand span. For lagori of made of aluminum or gold like a small ball. For the frog, make it like a necklace, then put it on the horse's neck. For the kadu jara make a new nylon loop and decorate it with a ponytail. For kariggi, cut the wood, use new deppa to peel the skin. For hela, just fold a cloth or use a pillow.

Measuring

In the pasola culture of the Lamboya people, the activity of measuring using body measurements, namely to find out the size of the cloth used to make *hobata*, is used in spans where for adults it is three to five spans, while for children it is two to four spans. To find out the length of the *javelin* is measured by hand where one javelin is twice the size of an adult's hand or four times that of a child's or for the *catangkaka* or neck tie, use the size of the horse's neck by draping it around the horse's neck to be used.

P: *Aganawe hada ukradi hawai ta kahalana?* (How to measure pasola attributes?)

N: *Hobatana ukura waidi kataku ata, karangka ukurawaidi koko jara, kadu jara ukurawaidi kataku jara, hinggi ukurawaidi kabu ata, karinggi ukurawaidi lima.* (For hobata, use the size of a person's head, for katangka, use the size of a horse's neck, for kadu jara, use the size of a horse's head, for hinggi, use the size of a person's waist, for karinggi, use the size of a person's hand, from one to two fathoms).

Designing

In the Pasola culture of the Lamboya people, the design activities carried out are designing or making Pasola attributes, including:

1. Designing a hat (*hobata*) by first measuring the length of the cloth three and five inches for adults while for children the size is two and four inches then making it resemble a hat, after that on the left or right side a piece of wood is also the same height with the height of the hat on which enough chicken feathers are attached. The shape of the *hobata* which resembles a cone was chosen by the community because it matches the shape of the traditional Sumba house itself and also the community has the thought that the pasola is the culmination of all the traditional rituals of the Lamboya people, namely nyale in welcoming

the harvest season, so that the top of the hat or *hobata* is in the shape of a spire, and the part below are the stages carried out by the Lamboya community.

2. The first horse horn (*kadu jara*) prepares the tools, namely tamarind wood, rope that has been spun and horse tail hair, by making the rope that has been spun around the wood together with horsehair tying on each wood. The three woods used in the horse's horn or *kadu jara* follow the number of woods held by the player while riding the horse to do the pasola.
3. Horse neck ties (*katangka*) are made of buffalo skin or horse skin. First, the skin used is dried in the sun until dry, after which it is cleaned and trimmed using a knife and then made to resemble a necklace and then covered with cloth (the color of the cloth is not specified).
4. wood (*karinggi*) is made using javelin or lantoro wood which is not too large in size or equivalent to one person's thumb and also wood that is straight from the base to the tip with a length that is twice the length of an adult's hand or four times that of a child's hand -Children, all the wood used is peeled and some are made alternately where at first the skin is peeled and then it doesn't go on and on. The wood or *karinggi* is made based on the shape of the spear of the Lamboya people which in everyday life is used as a weapon to protect themselves from danger. It's just that the wood or *karinggi* is not sharpened at the ends because it is too risky.

Playing

In the Pasola culture of the Lamboya people there are rules and criteria for implementing Pasola. The rules in the pasola game are the total number of participants ± 100 people, the number of participants from each side is not limited, even though the numbers don't match between the two camps (for example, side A is 30 people and side B is 40 people or side A is 40 people and side B is 50 people), the horse used must be decorated with the specified attributes and the horse is at least 5 years old.

For the procedure in carrying out the pasola match, namely when carrying out the attack each participant has three sticks held by the horse, after the sticks have been used up, three more sticks will be added, and so on, three sticks will be added until the game is over. Material means the attributes or tools used in the Pasola competition, namely *hingngi dete* and *hingngibawa*, *jara*, *hobata* or *tangengi*, *karinggi*, *lagori*, *kadu jara*, *kataangka*, and *hela*.

From the ethnomathematics found in as described before, there are mathematical concepts under the school curriculum, namely, the concept of measurement, the concept of addition, the concept of multiplication, and the concept of geometry (equations of straight lines, conical shapes, flat shapes of rectangles and circles). The findings of this study corroborate those of [10], [31]. Mathematical concepts in the Pasola Lamboya Culture can be integrated into mathematics learning [32]–[34]. Integration in learning mathematics is needed because ethnomathematics can improve mathematical abilities in learning mathematics [35]. This finding can also create a learning trajectory theory as an iceberg following realistic mathematics education, which can help students in contextual learning and a cultural introduction to students.

According to Rato, the implementation of Pasola in the past was different from today. For example, for the pasola spectators who no longer come to wear traditional clothes, the government is also involved in determining the time for the payola, so it is different from the natural signs that Rato has paid attention to. For example, a natural sign is the emergence of *Nyale* (sea worms). The more *Nyale*, the more abundant the harvest that year.

IV. Conclusion

Based results of the research and discussion that have been described previously, it can be concluded that in the Pasola culture of the Lamboya community (1). Ethnomathematics were found: counting, measuring, designing, and playing; (2). Found mathematical concepts related to ethnomathematics, namely the concepts of addition and subtraction as well as the concept of multiplication in counting activities, measurement concepts in measuring activities, and geometric concepts (equations of straight lines, conical shapes, rectangular flat shapes and circles) in the designing activity.

Following the results of the study and the conclusions above, it is recommended that (1). Develop a learning trajectory theory as an iceberg based on the Pasola culture; (2). Pasola culture may be used for contextual learning and cultural introduction to students, which impacts the preservation of Pasola culture on Sumba Island.

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