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ANALYZING ACEH CULTURAL HERITAGE: MATHEMATICAL TOOLS AND LANGUAGE USE

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Abstract

Acehnese people have many culturallyunique mathematical treasures, such as for measuring size and volume. Some of which are different from the ones used in other parts of Indonesia and some have been rarely used and even unknown by today's generation. However, research on the measuring scales in Aceh is scant. This study was carried out to understand the Acehnese people's prevailing measuring scales used. These scales are ethnomathematics parts of the Aceh culture. The research was conducted in six districts. Snowball sampling was employed through which people who are knowledgeable on Aceh culture were selected for interview. It shows that the volume scaling units of ethnomathematics in the culture of Aceh society are kay, aree, naleh, gateng, gunca, and kuyan. 1 kuyan = 10 gunca; 1 gunca = 10 naleh; 1 naleh = 16 aree; 1 aree = 4 kay. The size and volume of the kay, aree, naleh, gateng scales vary in each district.Moreover, the language used for scales and meanings slightly varies, such as naleh that is used for measuring volume or size only in some districts of Aceh and for both volume and size in other parts of the province.

Keywords: *Ethnomathematics, Aree, Naleh, Gateng, Gunca.*

A. Introduction

Indonesia is a big country that is rich with diverse cultures. Aceh as an Indonesian westernpart province is also rich with cultural artifacts and symbols. Of which were and are used for counting, weighing, and measuring. The wealth of cultural artifacts in Indonesia should be explored to understand and preserve them. More importantly, the cultural artifacts can be used for learning materials as well as learning methods at schools. In Indonesia, it has also been emphasized in the currently implemented curriculum, *Kurikulum 2013,* to explore and use cultural artifacts for teaching and learning resources (Kurniawan, 2013). However, cultural artifacts in Aceh are less explored to be used as learning resources at schools. Consequently, young generations in Aceh are not aware of their ancestral, cultural heritage used for counting or measuring.

Despite the limited use as Pais (2011) argued, using cultural-based products for teaching can result in creative and meaningful teaching and learning. This is reasonable because cultural-based teaching and learning can create contextual learning, which is strongly connected to cultural community and are therefore interesting for students whose cultural products are used. In teaching mathematics, for instance, locally used measuring units can also be used, which is *ethnomathematics*. As Furito (2014) suggests that ethnomathematics can be used for learning resources, let alone that students of multi-cultures occupy many schools today.

Ethnomathematics is a mathematical principle used by a certain cultural group, such as children of particular class society (D'Ambrosio, 1985; Gardes, 1994). Historically, society relies on mathematics to support its lives. Ethnomathematics is bound up with history, as can be understood from the mathematical history of Mesolithic, Babylonian, ancient Egypt, and the medieval invention of Calculus. Ethnomathematics criteria can be exemplified by symbols, artifacts, values, ordinances. And mathematicians can use ethnomathematics as inspirations.

There are a plethora of studies on ethnomathematics in many ethnics in the globe (e.g., Abdullah, 2017; Furito, 2014; Nusantara, 2016; Risdiyanti & Prahmana, 2017; Kucuk, 2014; Muhtadi, 2017; Pais, 2013; Palhares, 2012;

Yusuf, Saidu & Halliru, 2010). All these studies suggest that exploring ethnomathematics is beneficial in understanding the meanings behind the use of mathematical thoughts in a variety of cultures and how different people in a culture solve their daily problems using mathematical tools.

Abdullah (2017), for instance, did ethnographic research on ethnomathematics in three areas in West Java including Cipatujah district, Tasikmalaya Regency, and Garut regency. It was found that ethnomathematics is still employed in rural areas, such as for measuring, mathematical modeling, and clock symbols. Similar research was done by Muhtadi et al. (2017) in researching Sundanese ethnomathematics found that ethnomathematics is still used for counting, measuring, making patterns, etc. Other Indonesian researchers, Haryanto et al. (2016) who investigated the hidden mathematics on the knot of house "*Rumah Kaki Seribu*" in Papua found that the characteristics of a triangle are used by Arfak tribal communities. In building their house, three important things are taken into account, including strengths, endurance, and stability. In addition, Risdiyanti and Prahmana (2017) in their research on several motifs of Yogyakarta *batik* clothes found that the concept of mathematics, mainly geometry, is used in crafting *batik*.

Kucuk (2014) researched ethnomathematics in terms of the motifs on carpets and rugs made in Anatoly, Turkey. It was found that many mathematical symbols were used in the motifs with certain meanings for the people of Anatoly in the 13 century. Geometrical shapes were widely utilized in architectural works of art and hand-knotted. Palhares (2012) after researching the ethnomathematics in Portugal concludes that "there is mathematical thinking behind many people's actions and discourse and even behind all the different kind of products of human activity.All these findings suggest that ethnomathematics in every culture plays important role in people's activities. Therefore, it is crucial to understand the meanings and mathematical thoughts behind their activities and how they can be used to support mathematics education.

In an Acehnese culture as well, many ethnomathematics treasures were and are still used in daily activities. However, ethnomathematics treasures in Aceh culture have received little attention from researchers. As such, some of the tools have been unknown, especially by the young

generations. Therefore, it is very important to explore and preserve the ethnomathematics treasures in Aceh. This research focuses on exploring and uncovering the meanings of the ethnomathematics that exist in Aceh society, especially in Pidie, Pidie Jaya, Bireuen, and Aceh Utara districts.

B. Literature Review

1. Mathematics as a cultural product

From a historical point of view, culture is defined as the legacy of a society's tradition or the whole of human activities. Mathematical activities exist in every human activity (Muhtadi, 2017; Nurhasanah, Kusumah, & Sabandar, 2017; Prahmana, 2012). In the same vein, Orey and Rosa (2008) state that mathematics is a cultural heritage. This is reasonable as people of any tribe usually utilize mathematical tools for counting, predicting, measuring, and evaluating things in their daily life, even though the tools used might be different from one culture to another.

It is for such reasons that mathematics develops in many parts of the world. It grows in the territories of India, America, Arab, China, Europe, Indonesia, and other countries. The growth and development of mathematics occur because of the challenges of life faced by humans in various regions with different cultural backgrounds. Every culture and subculture develops mathematics in their way. Accordingly, mathematics is seen as the result of the human mind in the activities of everyday society. That is why many scholars conclude that mathematics is a cultural product (Sardjiyo & Pannen, 2005), that is the result of abstraction of the human mind, as well as problem-solving tools. It has also been pointed out that mathematics is a form of culture, which is integrated into all aspects of people's lives wherever they are (Bishop, 1994; Sembiring, 2010, as cited in Rachmawati, 2012).

2. Mathematics and language

Researching language when researching ethnomathematics is indispensable. This is so because mathematics and language are interrelated and interinfluencing. Mathematics is part of language and language and other semiotic signs are products of a culture. This is so because mathematical

symbols are used in communicating meanings in human activities in a variety of cultures. According to Orey and Rosa (2008: 30), mathematics is "a language system that has its history, symbols, syntax, grammar, and comes with an enormous variety of representations. It relies on intensive use of different variables, signs for numbers, diagrams, formulas, and algorithms."

That mathematics is a language system can be understood from the use of different language for a certain amount of thing in various culture. For instance, "a handful of nuts" in English is expressed in "*saboh reugam kacang*" in the Acehnese language. When it is said "*saboh reugam*", the meaning is understood in Aceh society how much it is.

3. Ethnomathematics

The reviewed works of literature indicate that researchers have different perceptions about who firstly coined "ethnomathematics". While Rohrer and Schubring (2011), the term "ethnomathematics" was firstly introduced by researcher EwaldFettweis in the 1930s, other researchers such as Abdullah (2017) and Kucuk (2014) note that it was a Brazilian mathematician UbiratanD'Ambrosio who introduced "ethnomathematics" in 1960s. According to D'Ambrosio (as cited in Abdullah, 2017), "ethnomathematics" emanates from three Greek roots: Ethno, mathema, and tics. The term "ethno" means the socio-cultural context, including language, jargon, codes of conduct, myths, and symbols. "Mathema" refers to explaining, knowing, understanding, and a variety of related coding, measure, classify, deduce, and modeling. And the suffix "tics" equals technique. Hence, ethnomathematics can be understood as the technique used in a certain culture in measuring, classifying, counting, and the like.

Concerning this, several scholars have attempted to define what they mean by ethnomathematics. D'Ambrosio (1989), for instance, defines it as a mathematics science employed by humans in their own culture. Concerning this, Kucuk (2014: 172) states that ethnomathematics functions "to explain the relationship between culture and mathematics." Other researchers, Albanese and Perales (2015) point out that ethnomathematics is research focusing on the relationships between mathematics and culture.

All these studies emphasize the strong relationship between mathematics and cultural practices in a society (Kusuma, Dewanto, Ruchjana, & Abdullah, 2017; Rosa & Orey, 2019).

Seeing the importance of ethnomathematics, many studies have been rigorously carried out today. According to Kucuk (2014: 171), researching ethnomathematics paves the way for understanding "the nature of mathematics" and "one's self as well as the other people sharing the same planet." However, many of the research studies focused on 'local cultures' (Horsthemke, 2006; Pais, 2011, 2013; Rowlands & Carson, 2002). This is because ethnomathematics intends to explore the mathematics used by people based on their cultures. Pais (2011) argues that the results of the ethnomathematics studies are beneficial for learning content at school because students of multi-cultures can connect them with what they have learned in their society. In this way, good mathematical learning can happen (Putra, 2018). According to Orey and Rosa (2008: 28), "Good mathematical learning occurs with social and cultural interaction through dialogue, language, and through the negotiation of meaning of the symbolic representations between teacher and student".

C. Method

This is by nature explorative qualitative research as it explored a symptom or event (concept or problem) by doing an explanation of the symptoms (Bogdan &Biklen, 1998). It sought to produce descriptive data in the form of a description of ethnomathematics exploration of society in Aceh. The ethnographic approach of empirical and theoretical approach was used to get a description and in-depth analysis of culture based on field research. This approach focuses efforts to discover how people organize their culture in the mind and then use that culture in life, the culture exists in the human mind. The ethnographic task is to discover and describe the organization of the mind.

This research relied on Pais's (2013) suggestions for doing ethnomathematics, such as going to a local community, doing observation of the daily activities people do, and attempting to find out mathematical

motives in the activities done. The researchers tried to dig up information through interviewing some prominent figures or Acehnese people who are knowledgeable on the objects to be explored, and observing how they used them in their daily lives. This study aims to describe the results of the exploration of the forms of ethnomathematics that exist in the culture of the people of Aceh in the form of mathematical concepts in various cultural heritages that still exist and are still used today.

The ethnographic research procedure used is as proposed by Creswell and Guetterman (2019), namely by defining the problem, finding relevant data sources, namely people who know and have used the objects studied, develop research plans, collect data through observation, interviews, and documentation, analyzing data and interpreting data, and sharing information.

The research was conducted in Aceh Province, focusing on Pidie, Pidie Jaya, Bireuen, danAceh Utara. Sources of data in this study are *adat* leaders, *tuha peut* (legislative members at village level), *geuchik* (village head), mukim, and other communities who know or show their consent. Data or object in this research is cultural heritage in the form of mathematical concepts that exist in Aceh society culture which still exist and still used in Aceh society in the form of geometry, unit of width, unit volume. In collecting data, researchers used four ways of collecting data, including observation, interview, and document analysis.

Analysis of the data in this study was by using the framework proposed by Creswell and Guetterman (2019), namely by conducting domain analysis, taxonomic analysis, componential analysis, and theme analysis, with the following steps. Firstly, all data or an overall picture of the phenomenon of experience, or knowledge that had been collected were organized. Then, the data was read in its entirety and marginal notes on data that is considered important were made. The meaning of statements felt by respondents by treating the same statements was found and classified. Furthermore, statements that are irrelevant to topics and questions or statements that are repetitive (overlapping) were omitted, leaving only basic questions and statements

that do not deviate from what the researchers would discuss. The statements were then collected into the unit of meaning and then written a description of how or important information was obtained. Furthermore, the essence of the phenomenon, cultural relics, or materials such as ethnomathematics studies, were sought. A narrative explanation of the essence of the findings being researched and gained the meaning of the informant's experience was then provided. The data and relate to existing research questions were described and reviewed. Several conclusions from data that have been reduced and narratively arranged by the researchers were drawn.

D. Result and Discussion

After analyzing the data, it was found that Acehnese people in their daily life use many kinds of scales to measure or calculate the volume of crops, both in their rice fields and other planting gardens. As well as in buying and selling transactions, they always use measuring tools or volume scales. Some of the various volumes of tools and units in the Aceh community are explained below.

1. Result

a. Volume measuring units in Aceh society

The results of field observations and interviews with community leaders show that in their day-to-day transactions, Aceh people use several units in calculating or measuring rice yields. The units start from the smallest unit to the large unit. The small one is *mok*. *Mok* is often used in measuring goods or objects such as flour, rice, and others. It is always used when cooking or trading transactions. Next is *kay*. *Kay* is a unit larger than *mok*. Next is *aree*. Aree is larger than *mok* and *kay*. The comparison between *mok* with *aree* is, 1 *aree* equals 6 *mok*. While the comparison between *kay* with *aree* is 1 *acre* equal to 4 *kay*.

The next unit is *naleeh*. A *naleeh* is a larger unit of *mok, kay*, and *aree*. The comparison is 1 *naleeh* equals 16 *aree*. The larger unit of *naleeh* is *gunca*, a single shoot equal to ten *naleh*. The highest unit of all the units of sukatan owned by the people of Aceh is Kuyan. One kuyan equals 10 gunca.

Aceh people in their cultural life use units that are inherited in the heredity for measuring volume or ordering. The results of interviews with community leaders in Pidie, Pidie Jaya, Bireuen, and North Aceh reveal thatthe units of scales ranging from the smallest to the largest. The scale units are: *mok, kay, aree, naleh, gateng, gunca, and kuyan*. Some people still understand this scale, but many young people today do not understand it (the results of interviews with several people - people around 20 years old - in Pidie and Pidie Jaya). The comparison is:

1 *kuyan* = 10 *gunca*
1 *gunca* = 10 *naleh*
1 *naleh* = 16 *aree*
1 *aree* = 4 *kay*
1 *aree* = 6 *mok*

In applying these scales, the Aceh people since the ancients made a measuring instrument or volume that is *mok, kay, aree, naleh, and gateng*. To measure the size of rice field, for instance, using units applicable to the volume units of *aree* and *naleh*, which are associated with the number of rice seedlings required to plant in a patch of rice fields. When measured using a standard unit area, the size of rice filed for one *naleh* of seeds is approximately 2500 square meters or ¼ ha. But there is also a unit of scale *teungeh dua*, which is used for rice fields or land area of 1.5 *naleh* rice seedlings or 24 *aree* of rice seedlings. (The result of the interview with a community of Pidie and Pidie Jaya district).

b. Volume Measuring Scales in Aceh Society

The people of Aceh, in addition to having the units mentioned previously, also have several measuring instruments. The results of observations in Pidie, Pidie Jaya, Bireuen, and North Aceh, show that the local community often used several models and forms of measuring tools. The measuring instruments are homemade and traditionally created by the people themselves, based on existing inherited measuring tools. Brief descriptions of the tools are as follows.

1) *Mok*

Mok is one of the smallest volume measuring scales in Aceh society. Many people in Aceh use it for daily cooking as rice as the main food for a family there is measured by *mok* rather than by kilogram. That is why Acehnese people frequently use *"Padum boh mok lon taguen bu?"* (How many *mok* I should cook the rice). It is usually made of a used milk can. From the results of the interviews with the respondents in Pidie district, Pidie Jaya, and Aceh Timur, it was found that *mok* was made of a can of milk the size of 300 ml.

2) *Kay*

Kay is also a small volume measuring scale used by the people of Aceh. *Kay* is also homemade and it is not sold in the market. *Kay* is made of coconut shell or half of the coconut paraboloid or half ball. To determine the volume of a *kay*, it needs to compare with the volume of *aree*, which 1 *aree* equal to 4 *kay* or 1: 4. It is not known what the diameter and height of the kay are.

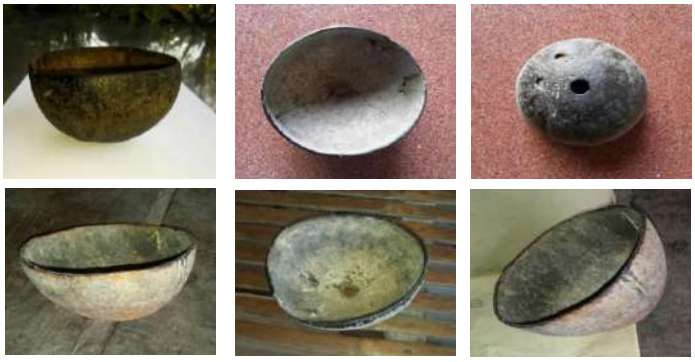

Figure 1. Kay
Source: Author's Documentation

According to some respondents and observationsin Pidie, Pidie Jaya, and Aceh Utara districts, to make a *kay* it needs to have a coconut shell, which is cleaned and rubbed its inside and outside parts. The contents of the volume of one *aree* must have four *kay*. If the size of a volume of a *kay* has not reached a quarter of *aree*, it needs to be reshaped or changed with another coconut shell to fit four *kay* in one *aree*.

The results of observations and interviews with community leaders in the districts of Pidie and Pidie Jaya show thatcreating a *kay* as mentioned above can be said as a trial and error process. The *kay* produced must be reliable. From the research in several sub-districts in Pidie, it was found that the size or volume of *kay* used there varies.From the results of observations and measurements of cultural objectsof a*kay* in Rambayan, for instance, is 7.5 cm in height, its circumference of the top surface 28.5 cm, and its volume 350 ml. Differently, *kay* in Beureueh, Pidie district, is 7 cm high, its circumference of the top surface 33 cm, and its volume 330ml. *Kay* in Lala village Meunasah Tuha, Mila, Pidie District, its height is 7.5 cm, its circumference of the top surface 34,5 cm, and its volume 400ml. *Kay* in Paloh village, Pidie district, its height is 7 cm, its circumference of the top surface 23 cm, and its volume 450 ml. This shows that the measurement tools that exist in today's society vary significantly in volume size. However, of course, this is not good if the tool is used in buying and selling transactions.

3) Aree

The results of observations in Pidie, Pidie Jaya, and North Aceh found a measuring tool called *aree*. *Aree* is one of the measuring scales the people of Aceh have. *Aree* is a hand-made product by the community for their use and there is also not sold in the market. *Aree* is made of tubular bamboo. To make an *aree*, people only need bamboo, and cut at the base of the *aree* is the separator of the bamboo is shaped like the original. To determine the volume of the *aree*, they only measure from a comparison with a *kay* that has a ratio of 1 *aree* equals 4 *kays* or 1: 4. There is no specific provision for the exact height or circumference.

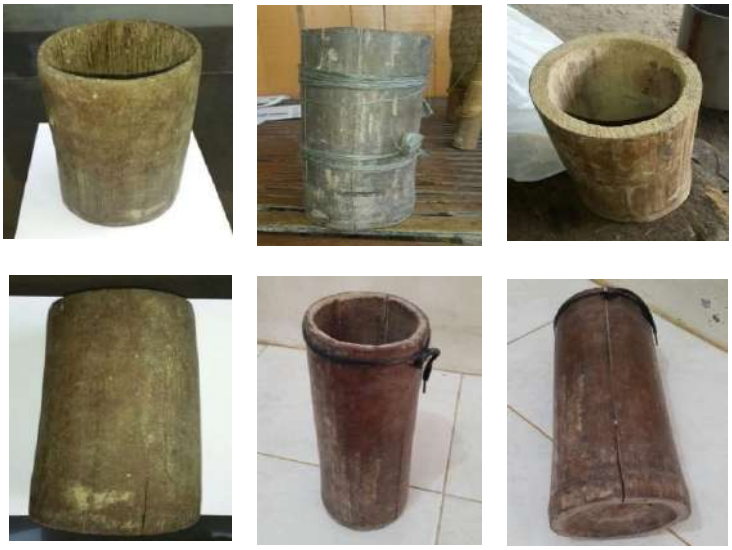

Figure 2. Aree
Source: Author's Documentation

To make this Aree according to some respondents both in Pidie, Pidie Jaya,Bireuen,and Aceh Utara districts. In general, can be described how to make the existing Aree in Aceh society. If the community has Kay, then to make Aree is to take a rather large bamboo and cut it on the bamboo's hole joint (or trieng), then clean it or bamboo it, then measure the volume or the contents of a bamboo/ Aree should be as many as four Kay. If the contents of the Aree have not reached four Kay, then the size of the Aree must be modified so that the volume of exactly four Kay in one Aree. The height and circumference of the Aree are varied; there is a high and tone a little short depending on the size of the bamboo used. (The result of interviews with some of the people in some districts within Pidie district).

How to manufacture as mentioned above is a way through trial and error or trial and error. The results obtained or Kay obtained are still very questionable reliability. From the research results of researchers in some districts in Pidie District obtained the size of the Aree that they use every day is highly varied depending on how to manufacture. After observing and measuring the height and circumference of the inside and measuring the volume, the results are as follows. The first Aree in Rambayan Kuta Baro

District Pidie District is 13.5 cm high, the circumference of the top 42 cm, and the volume, when measured by Kay volume used in the place, is 5 Kay plus 50 ml. The two Aree in the Beureueh subdistrict of Mutiara Pidie Regency is 22.5 cm high, the circumference of the top surface is 32cm, but the researchers did not measure the volume with Kay. Third Aree in Lala Village, Mila sub-district Pidie district is 21.5 cm high, the circumference of the top surface is 30 cm, but the researchers also do not measure the volume with Kay. Fourth, but the researchers did not measure the volume with the existing Kay. In Paloh Village, Pidie District, Pidie District, the height is 26cm, the circumference of the top surface is 28 cm, but the researchers also do not measure the volume with Kay.

4) Naleeh

The observations carried out in the districts of Pidie, Pidie Jaya, and North Aceh, found a measuring tool called *Naleeh*.*Naleeh* is one of the measuring tools owned by the people of Aceh. *Naleeh* is also a hand-made product by the community themselves, and it is not sold in the market. Naleeh is made of board-shaped beams. To make a *naleeh*, it needs raw materials from the board, and it is made in the form of blocks. To determine the volume of *naleeh,* it needs to compare with that *aree* with a ratio of 1 *naleeh* equal to 16 *aree* or 1:16. There is no specific provision for its length, width, height, or circumference.

Figure 3. Types of naleeh
Source: Author's Documentation

There are two kinds *naleeh* in Aceh society, as shown in the picture above. The first one is made of wood-shaped blocks and tones and the second of zinc and wicker rattan. Researchers conducted observations and measured the top and bottom circumferences of the inside and measured the height of the cultural object, and found that: Naleeh made of the board that researchers found has a length of 50.5 cm, 31.5 cm wide, and 17 cm high. Naleeh made of zinc is often called the *naleeh gating* cone-shaped flatter with a height of 33.5 cm, a top circumference of 93 cm, and a periphery of 110.5 cm. *Naleeh gating* is found in Rambayan. Another kind of *naleeh gateng* is made of woven rattan with the shape of the top surface of the circle and base square-shaped as shown in Figure 2.3 above. But *naleeh gating* made of wicker rattan is not so reliable of its volume, because its volume can increase when there are pressures in filling it.The results of this measurement show that the sizes are different, which results in different volumes. This difference will make it difficult for people to use these tools in buying and selling transactions or in trading.

5) *Gateng*

The results of observations and interviews with community leaders in Pidie, Pidie Jaya, Bireuen, and North Aceh, found a measuring tool called the Gateng. *Gateng* is one of the largest measuring tools owned by Aceh society. *Gateng* is made by the community for their use and also there is no *gateng* sold in the market. Gateng is made of cut cone-shaped aluminum. To make a gateng, it needs raw material from zinc or aluminum plate and is shaped in cone-shaped. To determine the volume of the *gating,* it needs to compare with the ise which has a ratio of 1 gateng equals to 20 *aree* or 1: 20. There is no specific provision of its size, either its diameter, its circumference, the circumference of the base or bottom, and its height.

Figure 4. Gateng
Source: Author's Documentation

After measuring the top and bottom circumference and the height of the Gate, we found the following results. From the research in the Pidie district, it was found that the size of *gateng* is 37 cm high, its perimeter 97.5 cm, and its bottom is 123 cm. But there is no specific provision concerning its size, except its volume as described above.

2. Discussion

This study shows that many of the sizing tools used in the community in Aceh Province are not the same size, both in length, width and height, and volume. For the measurement tools to be reused, it is necessary to standardize them so that the size and volume are the same. If the tools are no longer used, they can be used as a cultural heritage of high value. This is similar to Darsa, Sumarlina, and Permana's (2020) argument that all documents resulting from the culture of local wisdom of the community are maintained properly so that the next generation will understand the culture of their ancestors through a learning process (Selasih & Sudarsana, 2018). Documents resulting from the culture are part of ethnomathematics (Rosa & Orey, 2019).

As an Islamic society, Acehnese people highly uphold the values and rules of Islam teachings that necessitate accuracy. The accuracy is also important when allocating must-shared *zakat* (charities). *Zakat* issued and shared by the community is divided into two major parts of zakat of agricultural yields and *zakat of fitrah* (soul). It was found that Aceh people know whether the harvest has reached *nisab* (limit of wealth that requires to allocate *zakat*)

or not. The people harvest their crops using *naleh* scale. If the harvest has reached more than six *gunca*, it is obliged to release *zakat* as much as 2.5 percent of the harvest for the rain-fed rice field. As for issuing *zakat fitrah*, the size of *zakat* in Aceh society is six *kays* plus two handhelds. Hence, it is clear that the importance of measuring scales in Aceh society. However, the accuracy or reliability of the measuring scales needs to be researched because the way of making is still traditional or by way of trial and error.

E. Conclusion

After having analyzed and discussed the result, several conclusions can be drawn as in the following:

The type of ethnomathematics that exists in the Islamic culture of Aceh society is the kind of unit of volume and size. The units of volume, namely: *mok, kay, aree, naleh, gateng, gunca,* and *kuyan*. The comparison is: 1 *kuyan* = 10 *gunca*; 1 *gunca* = 10 *naleh*; 1 *naleh* = 16 *aree*; 1 *aree* = 4 *kay*; 1 *aree* = 6 *mok.*

The existing measuring instruments in the Aceh community are: *mok*, made from used milk cans; *kay*, made of coconut shell that has been cleaned. The volume of the tool used still varies from one place to another; *aree*, made of cleaned bamboo. The volume is equal to 4 *kays*, but the tool used is still very varied from one place to another; *naleh*, is divided into two types of Naleh made of cone-shaped zinc whose volume is equal to 16 aces, and some are made of open top-shaped beams with a volume of 16 aces, but still need further investigation of the uniformity of the volume of tools it uses; *gateng*, which is made of zinc or cone-shaped steel plate cut off with a volume of 20 aces, but still needs further investigation of the uniformity of the volume of tools it uses. However, the size and volume of the sizing tool vary in different areas.

However, language use for scales or measuring units is different in some parts of Aceh. For example, *naleh* is used for the size of rice field in the Pidie district whereas in some parts of Aceh Utara *naleh* is for the amount of harvested rice. *Naleeh*is also used as a measure of rice fields and is also used for the volume of harvested rice.

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