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Exploration of the Counting Habit of the Hatam Tribe in Nuhuwei Papua Barat Indonesia

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ABSTRACT

The Hatam tribe is one of the sub-tribes of the Arfak tribe. This study aims to explore the numeracy culture of the Hatam Tribe spoken by the Hatam Tribe community who inhabit Nuhuwei Village, Ransiki District. This research is ethnographic. The techniques used for data collection are interviews, exploration, literature study, desk study, and documentation. Interviews and explorations were conducted with several elders who spoke the Hatam language in Nuhuwei Village. Literature and documentation studies were conducted by looking for other sources of information related to the previously existing Hatam language to obtain accurate results. The Desk Study was conducted to find out the mathematical patterns of the Hatam Tribe. The results obtained from this study are that mathematically, the counting patterns spoken by the Hatam people who inhabit Nuhuwei Village have different dialects from the speech of the Hatam people who inhabit other areas. Besides that, another finding is that the pattern of mentioning numbers spoken by the Hatam tribe inhabiting Nuhuwei Village correlates with the counting pattern on the Jarimatika. We call this latest finding related to counting using the Hatam language-based Jarimatika as Himatam (Calculating Using Jarimatika in the Hatam language). This finding shows that learning numeracy for elementary students in Nuhuwei Village can be done more easily using the Himatam Method.

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A. INTRODUCTION

Ethnomathematics is mathematics that is inherent and practiced in a culture. The culture in question is the habits of human attitudes in their environment, such as the attitudes of urban or rural community groups, work groups, professional classes, students in age groups, indigenous peoples, and certain other groups (Prahmana et al., 2021; Prahmana & D'Ambrosio, 2020; Pramudita & Rosnawati, 2019; Risdiyanti & Prahmana, 2018; Sarwoedi et al., 2018; Muhtadi et al., 2017). Indonesia is one of the countries in Asia with a multicultural population. Among several cultures found in Indonesia, the Papuan archipelago is one area with a variety of cultures. The Papua region consists of 2 provinces with more than 200 tribes and more than 270 languages, one of which is the Hatam language. The Hatam language is spoken by the Hatam tribe, one of the sub-tribes of the large Arfak tribe inhabiting West Papua. This is because Papua areas, especially the hinterlands, are still difficult to reach. The isolation of this region results

in the uniqueness of knowledge that develops in each region or hinterland. One of the unique knowledge is mathematical knowledge. Ethnomathematics is more interesting than formal mathematics, more acceptable to indigenous people, more accessible and affordable, especially for those living in rural and coastal areas, and appeals to traditional practices (D'Ambrosio, 2016). One part of the culture that can attract students' attention is the local language.

Hatam language, one of the regional languages in Indonesia, is spoken by the Hatam tribe (Badan Pengembangan dan Pembinaan Bahasa, 2016). According to Reesink, there are several sub-tribes within the Hatam tribe, so the language dialect, pronunciation, and writing are also different in these sub-tribes. As a result, the younger generation of the Hatam tribe rarely uses the Hatam language, which impacts the preservation of the Hatam language. Some reasons for the threat to language resilience in an area include natural disasters, wars, infectious diseases, hegemony, migration, mixed marriages, political policies, and pride in one's own language (Irwan, 2011; Sallabank, 2010). The results of a study on the vitality and resilience of the Hatam language have been carried out by Inayatusshalihah (2018), Badan Pengembangan dan Pembinaan Bahasa (2016), and Tondo (2009). The results show that the Hatam language is one of the endangered languages (Tondo, 2009), and is at a vulnerable level (Inayatusshalihah, 2018; Badan Pengembangan dan Pembinaan Bahasa, 2016). One of the reasons is the lack of hatam language speakers compared to other languages in an area. Inayatusshalihah (2018) states that the survival of the Hatam language is vulnerable to the threat of extinction even though intergenerational language transmission is still maintained. This vulnerability is due to a decrease in the number of domains of language use and the absence of teaching materials and orthography, as well as limited documentation.

Mathematics is a basic science that has an important role in the world of education and is one of the sciences that underlies the rapid development of today's technology and knowledge. Mathematics subjects must be given to all elementary school students to equip students with the ability to think logically, critically, analytically, and systematically, and can make students think scientifically. Mathematics learning is not only oriented to students' cognitive thinking skills but also to students' skills in solving problems that are formless and presented using mathematical symbols (Selvianiresa, 2017). That is why mathematics is often referred to as a scary, boring, confusing subject and is avoided by students. Moreover, many teachers can use conventional examples only by lecturing, memorizing, and remembering lessons without being supported by learning media or examples of innovative learning and involving students to be active in learning. The social and cultural values of the community can be a tool in developing school mathematics teaching materials (Dahlan & Permatasari, 2018). As stated by Rosa & Orey (2015) that numeracy plays an important role in an ethnomathematis based-programme.

Important dimensions in ethno-mathematics show that ethno-mathematics aims to recognize and respect history, traditions and mathematical ideas developed by various members of cultural societies. Historically, ethno-mathematics directs students to build their mathematical knowledge through local wisdom-based interpretations of mathematical phenomena (Rosa & Orey, 2016). Therefore, to protect the Hatam language from the threat of extinction, we designed this research. So that the purpose of this study is to explore the arithmetic culture of the arfak community and preserve the Hatam language, one of which is

the Hatam language spoken by the people in Nuhuwei village through mathematics, and then and relate it to various learning methods in the classroom.

B. METHODS

This research is a qualitative research with an ethnographic approach. Nuhuwei Village, Manokwari Selatan Regency, Papua Barat was chosen as the location of this research. Nuhuwei Village is one of the villages located in Ransiki District, South Manokwari Regency, West Papua Province. The village of Nuhuwei is located at the foot of the southern part of the Arfak Mountains. To get to this village, it can be reached by land for ± 45 minutes by car from downtown Ransiki District, South Manokwari Regency. 90% of the residents of this village are the Hatam Tribe (Atam). Therefore, we chose this village as our research location, as shown in Figure 1.

Figure 1. Research Location

Data collection techniques that used in this study were observation, interviews, and literature review. The procedure for collecting data until the exploration results are obtained regarding how to count the people of the Arfak tribe who inhabit the village of Nuhuwei can be seen in the following diagram, as shown in Figure 2.

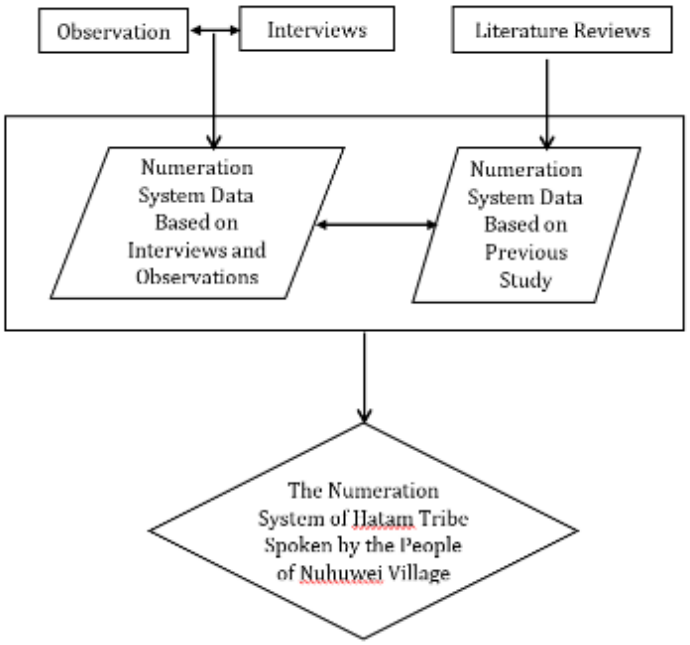

Figure 2. Data Collection Technique

First, we conducted observations and semi-structured interviews to selected informants by using a purposive sampling technique. The informants in this study are the people of the Hatam tribe who live in the Nuhuwei Village, especially those who speak the Hatam language, which consists of the village head and traditional elders in the Nuhuwei village. Furthermore, the data obtained from the observations and interviews were aligned with the results of the literature review, so that the data collected consisted of emic data and ethical data regarding the arithmetic method of the Arfak tribe who live in Nuhuwei village. In addition, to ensure the validity of the data collected, the researchers matched the results of interviews between one informant and another, and conducted a literature study. Furthermore, the researchers explored the mathematical mention of numbers in the Hatam language.

C. RESULT AND DISCUSSION

Based on the results of interviews with several respondents and the results of several previous studies/writings, information related to the mention of numbers in the Hatam language is obtained, summarized as shown in Table 1.

Table 1. Relationship between Hindu-Arabic Numbers and Their Hatam Language

Numbers	Hatam Language	Numbers	Hatam Language
1	Gom	16	Simnai Muhwidip Brimi Gom
2	Can	17	Simnai Muhwidip Brimi Can
3	Ningai	18	Simnai Muhwidip Brimi Ningai
4	Bitai	19	Simnai Muhwidip Brimi Bitai
5	Muhwi	20	Nye Tunggwagom
6	Muhwi nda gom	21	Nye Tunggwagom Bi Gom
7	Muhwi nda can	22	Nye Tunggwagom Bi Can
8	Muhwi nda ningai	23	Nye Tunggwagom Bi Ningai
9	Muhwi nda bitai	24	Nye Tunggwagom Bitai
10	Simnai	25	Nye Tunggwagom Muhwi
11	Simnai Brimi Gom	26	Nye Tunggwagom Muhwi nda gom
12	Simnai Brimi Can	27	Nye Tunggwagom Muhwi nda can
13	Simnai Brimi Ningai	28	Nye Tunggwagom Muhwi nda Ningai
14	Simnai Brimi Bitai	29	Nye Tunggwagom Muhwi nda Bitai
15	Simnai Muhwidip	30	Ningot Ningai

Table 1 shows a “fifth” pattern in the Hatam tribal counting system. So the mention of numbers one to five in a row is gom, can, ningai, bitai and muhwi. For the number six, the narrative is muhwi nda can, which if interpreted as a word in Indonesian, it means muhwi (five) nda (with/and) gom (one). Then continue with the number six, muhwi (five) nda (with/and) can (two). Then the number seven, muhwi (five) nda (with/and) ningai, further shows the regularity of the repetition. Up to ten, spoken as simnai. Illustrations for these figures can be seen in Figure 3.

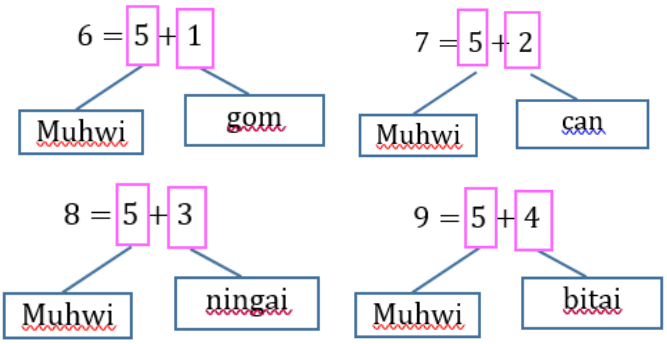

Figure 3. Illustration of Word Formation in Mentioning of 6, 7, 8, and 9

When saying the number eleven, the respondent pronounces simnai brimi gum, which in Indonesian is interpreted as simnai (ten) brimi (more) gom (one), eleven is pronounced as simnai (ten) brimi (more) can (two), and so on until five twelve that are pronounced simnai (ten) muhwidip (over five). Furthermore, sixteen which are spoken as simnai (ten) muhwidip (more than five) brimi (more) gom (one) and so on until the twenty mentions change to nye tunggwagom. Then with the same pattern until ningot ningai (thirty), ningot bitai (forty), ningot muhwi (fifty), ningot muhwi nda gom (sixty), ningot muhwi nda can (seventy).

The mention of the "fifth" pattern is in line with the results of previous research by Haryanto et al. (2016, 2017) which states that the numeration of the arfak community uses base 5. However, there is a difference in principle between the fives pattern found in this study and the base five pattern in the two previous studies conducted by Haryanto et al. (2016, 2017). The fives pattern that is meant here is the repetition of the mention of one to five in each number. For example, the mention of the number twenty-four is nye tunggwagom (twenty) bitai (four). Or thirty spoken as ningot ningai, forty spoken as ningot bitai, fifty spoken as ningot muhwi, sixty spoken as ningot muhwi nda gom, seventy spoken as ningot muhwi nda can. For the mention of the tens number obtained in this study, it can be seen in Table 2.

Table 2. Some Multiples of Ten and Their Hatam Language

Numbers	Hatam Language	Numbers	Hatam Language
10	Simnai	60	Ningot Muhwi nda gom
20	Nye Tunggwagom	70	Ningot Muhwi nda can
30	Ningot Ningai	80	Ningot Muhwi nda Ningai
40	Ningot Bitai	90	Ningot Muhwi nda Bitai
50	Ningot Muhwi	100	Untin Gom

It can be seen that the regularity of the repetition pattern of one to five occurs in the mention of tens (multiples of ten) ranging from thirty to ninety. The mention of other tens digits also has a similar regularity/pattern, the data of which is seen in Table 3.

Table 3. Some Relationship between Hindu-Arabic Numbers and Their Hatam language

Numbers	Hatam Language	Numbers	Hatam Language
31	Ningot Ningai Bi Gom	71	Ningot Muhwi nda can Bi Gom
32	Ningot Ningai Bi Can	72	Ningot Muhwi nda can Bi Can
33	Ningot Ningai Bi Ningai	73	Ningot Muhwi nda can Ningai
34	Ningot Ningai Bitai	74	Ningot Muhwi nda can Bitai
35	Ningot Ningai Muhwi	75	Ningot Muhwi nda can Bi Muhwi
36	Ningot Ningai Muhwi nda gom	76	Ningot Muhwi nda can Muhwi nda gom
37	Ningot Ningai Muhwi nda can	77	Ningot Muhwi nda can Muhwi nda can
38	Ningot Ningai Muhwi nda Ningai	78	Ningot Muhwi nda can Muhwi nda Ningai
39	Ningot Ningai Muhwi nda Bitai	79	Ningot Muhwi nda can Muhwi nda Bitai

Table 3 shows that "ningot" is used to denote tens that are more than twenty-nine. Table 3 shows that the larger the number to be mentioned, the longer the words must be mentioned to mention certain numbers. For example, the number eighty-eight is ningot muhwi nda ningai muhwi nda ningai and the number ninety-three is ningot muhwi nda bitai bi ningai. The formation of each word can be seen in the following illustration in Figure 4.

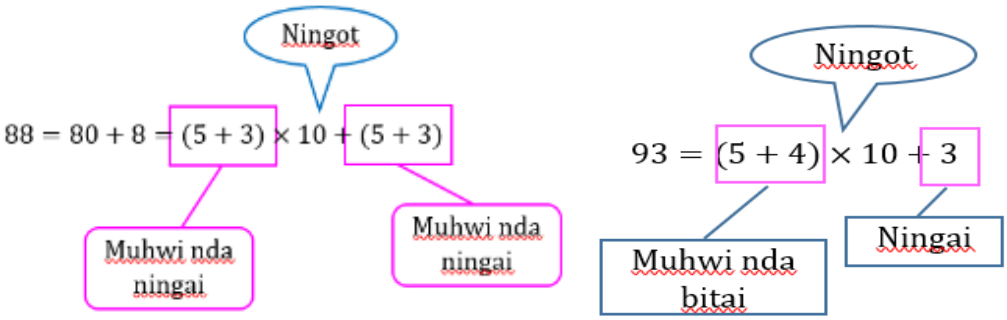

Figure 4. Illustration of Word Formation in Mentioning 88 and 93

Although the mention of a number feels very long when the number is getting bigger, based on our observations, this mention correlates with jarimatika. An illustration of the correlation can be seen in Figure 5.

Figure 5. Illustration of Jarimatika in Hatam Language

In Jarimatika, the five numbers use the fingers on the right hand to represent 1-5. These five numbers will then be the basis for mentioning the next numbers. An illustration of the mention of 6, 7, 8, and 9 in the Hatam language can be seen in Figure 3. The pattern can be illustrated in the similarity in Jarimatika as in Figure 6. The numbers 6, 7, 8, and 9 in Jarimatika are symbolized using the right hand, as shown in Figure 6.

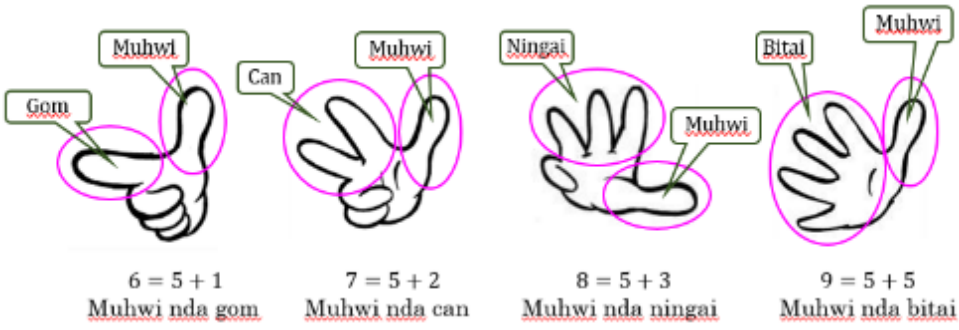

Figure 6. Illustration of Jarimatika 6-9 in Hatam Language

The mention of subsequent numbers also follows a similar pattern and is related to jarimatika. Next, the tens number is symbolized using the finger on the left hand plus the right fist as shown in Figure 7.

Figure 7. Left-Hand Illustration for Jarimatika 10-90 in Hatam

The tens designation follows the same "fifth" pattern. As an example, we will discuss the numbers 88 and 93. Look at the illustration of the mention of 88 in Figure 4. The pattern on the jarimatika when associated with the pronunciation using the Hatam language can be seen in Figure 8.

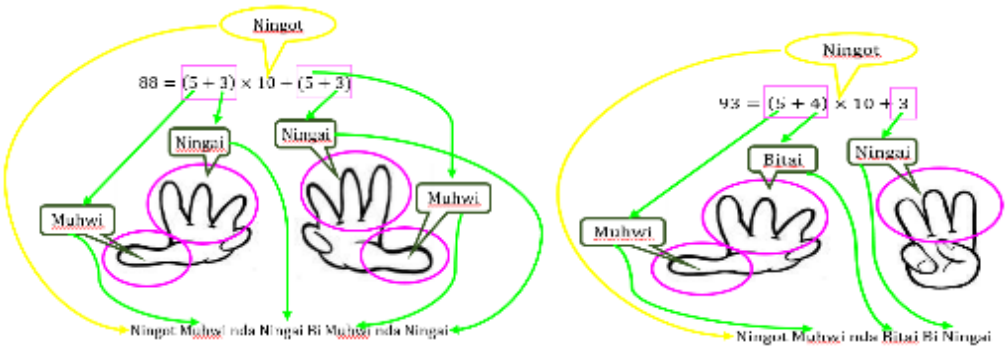

Figure 8. Illustration of Jarimatika 88 and 93 in Hatam

Based on the explanation that has been given previously regarding the results of tracing the numeracy culture of the Hatam Tribe spoken by the people in Nuhuwei Village and based on the results of cultural exploration by counting using Jarimatika, it is seen that the mention of numbers spoken by the people in Nuhuwei Village has a correlation with Jarimatika. This finding distinguishes this study from previous studies by (Haryanto, Nuham, et al., 2017; Haryanto, Toto, et al., 2017; Haryanto, 2016). In addition, there are differences in the mention of several numbers in the Hatam language found in this study compared to previous studies. This difference in mention is caused by differences in dialect between one sub-tribe and another. Reesink (1999) states that dialect differences exist between one sub-tribe and another.

The researcher also found that there were repetitions of words in the mention of a certain number in this study. Based on the research study's result, this repetition depends on certain numbers that will be mentioned as previously described. The repetition of words in the Hatam language occurs through free morphemes, as Arsai (2010) found and Matang & Owens (2014) stated. According to Arsai (2010), the repetition of this word one of its functions is to show the plurality of the words to be mentioned. While Matang & Owens (2014) specifically stated that there is a repetition of the mention in the traditional numeration system of Kate in Papua New Guinea (PNG).

In addition to the differences in dialect and word repetition, as previously mentioned, the researcher found a relationship between the pattern of mentioning numbers in the Hatam language and the pattern of hand movements on the finger. The findings of this study answer the previous research questions by Haryanto, Nuham, et al. (2017), Haryanto, Toto, et al. (2017) dan Haryanto (2016) related to the difficulty of teaching numeracy to students and the Hatam tribal community due to the movement of the fingers of the Hatam tribal community. In this study, if the mention of numbers in the Hatam language is symbolized using finger movements, it will be closer to the finger and easier to teach to students. Previous studies by Al Musthafa & Mandailina (2018), Dewi et al. (2020), Pramita (2017), and Sitio (2017) mention the use of the Jarimatika method in learning mathematics can improve the numeracy skills of elementary school students. By finding the similarity of the pattern of mentioning numbers in the Hatam language with the pattern of hand movements on the finger, we believed that learning to count for students and the Hatam Tribe community will be more meaningful. In meaningful learning, a person will construct previous learning experiences and associate new experiences, facts, and phenomena with their knowledge structure, as Gazali (2016) and Rahmah (2018) proposed. This meaningful mathematics can be achieved by using cultural artifacts described by Sharma and Orey in Rosa et al. (2017) and applying ethnomathematical-based learning (Dahlan & Permatasari, 2018). This is in line with the results of research conducted by Machaba & Dhlamini (2021), Darmadi (2018), Pradhan (2018), Ulfie (2015), and Brandt & Chernoff (2015) which showed that learning mathematics becomes more meaningful by involving local wisdom in the process of learning mathematics.

D. CONCLUSION AND SUGGESTIONS

Based on the results of the discussion and data analysis, it was found that the numeracy culture of the Hatam Tribe spoken by the Hatam people who inhabit Nuhuwei Village, Ransiki District, has a different dialect from the speech of the Hatam people who inhabit other areas.

Another finding is that there is a repetition of words in the pronunciation of numbers in the Hatam language. In addition, another finding is that the pattern of mentioning numbers spoken by the Hatam tribe who inhabits Nuhuwei Village is correlated with counting patterns in Jarimatika. We call this latest finding related to counting using Jarimatika based on the Hatam language as Himatam (Calculating Using Jarimatika in the Hatam language). This finding shows that learning numeracy for elementary school students in Nuhuwei Village can be done more easily and meaningfully by using the Himatam Method. The results of this study bring an opportunity for further research on how to develop a Papuan nature-based numeracy learning tool, especially counting using the Hatam language. This effort will greatly assist in efforts to preserve the Hatam language.

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