**Abstract:** Culture is a habit that contains important elements and fundamental values and is close to human life which is passed down from generation to generation. Culture can be used as a medium of learning for students in schools as well as the learning culture itself. Badeng is a traditional musical art culture from Sanding Village, Malangbong District, Garut Regency, West Java which is must be preserved. The aims of study are to explore the mathematical concepts and character value in Badeng music so that they can be implemented and integrated in teaching mathematics in elementary schools.

**Keywords:** Etnopedagogics, Etnomathematics, and Badeng.

**I. INTRODUCTION**

The diversity of cultural arts is a valuable resource of Indonesia to be studied and explored by students, especially at elementary schools as an asset for the future of the nation's successors. Exploring and preserving the values of local cultural wisdom is a recent major issue in education, and is part of the process of character and moral construction to strengthen the children’s identity as part of the nation (Hidayat, 2019). The preservation of local wisdom values is a liability and a necessity to build the characters of Indonesian human resources to allow them to compete with other nations (Human Development and Competitiveness). The improvement of the education quality will likely occur when a good interaction process emerges as the result of formal and contextual knowledge obtained from the community (indigenous peoples).

The moral crisis stems from the poor cultivation of values among children, both spiritual values and moral values is considered as the main issue that befalls Indonesia today [1, 2, 3] The influence of foreign cultures is believed to be the main cause; accordingly only a small number of students are aware of the culture in their neighbourhood and the values contained therein [4, 5].

Education at the primary level is the most appropriate first step to instil the character values among children [6, 7, 8]. Ethno-pedagogy brings a distinctive perspective in line with the values that develop in Indonesia, including the socio-cultural aspects, the philosophical foundation of Pancasila, the atmosphere and climate of diversity, as well as the scientific / academic tradition in educational institutions or in the community [9, 10].

Badeng is one of the Indonesian cultures rich in character values. It originally comes from Sanding Village, in Malangbong District, Garut Regency, West Java. Then, on August 11, 2011, there was an expansion of the Sanding Village Area through Garut Regional Regulation Number 14 of 2011 concerning the Formation of Girimakmur Village.

Girimakmur means hopes, and lofty ideals of the founding figures/community of Girimakmur Village. Girimakmur comes from two syllables, namely "Giri" which means "Mountains" and "Makmur" which is taken for the name of one of the clerical figures in the region who died during the period of the independence of the Republic of Indonesia. In addition, the word "Makmur" also means "prosperous", suggesting that Girimakmur villagers will become more prosperous without abandoning their cultural values.

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history and advanced in various fields, despite being situated in a mountainous area far from the frenetic pace of the city. This is in line with one of the objectives of rural expansion, which is to improve services and accelerate rural development.

To preserve the history of Badeng which has been famously originated from Sanding Village, the local community leaders agreed to include Sanding Village in Girimakmur Village area. Consequently, both Girimakmur Village and Sanding Village residents can jointly preserve Badeng.

Badeng has been preserved for more than 200 years old as the result of the inheritance process from generation to generation, namely:

1. The first generation (late 17th century), by Lurah Acok and Embah Santi.
2. Second generation (18th century), by Manduki, Djadja, Suminta and Madja.
3. Third generation (19th century) by Sarkowi and Kaedji.
5. Fifth generation (1970), by Mumu Safe'i, Kohri, Sarnan, Kurdi, Musir, Rohim, Suhrman through Medal Cipta Organization.

The seventh generation (2011), in the Sanding Village area by Udin Holidin, Ucha Hamid, Hatomi, Salim, Samono, and Karso (Badeng Medal Cipta). Meanwhile, in the Girimakmur Village Area, it is succeeded by the descendants of Sukarya (Ki Musir) in Sanding Village (Badeng Waruga Jagad).

As an effort to preserve the local cultural wisdom of Badeng art, on this occasion the author were trying to explore
the character values and mathematical concepts contained in Badeng to be further implemented and integrated in the learning process at elementary schools.

II. METHOD

This study used descriptive qualitative research that described existing phenomena, both scientific and human-made phenomena, related to the exploration of the mathematical concepts at elementary schools and the character values in Badeng art. Data collection was carried out using observation and documentation techniques. The data collected was then processed using data analysis techniques adopted from Miles & Huberman [11] who suggested that activities in the qualitative data analysis were carried out interactively and continuously to obtain saturated data. The measure of data saturation was characterized by no more new data or information being obtained. Activities in the analysis included data reduction, data presentation (data display) and verification (conclusion drawing).

III. RESULTS AND DISCUSSION

A. The History of Badeng

Badeng were part of the development of the spread of Islam history carried out by Wali Songo in Java island, especially during the time of Sunan Kalijaga around the end of the 17th century in West Java who preached through a cultural approach. Badeng emerged around 1800 by an Islamic propagator named Arfaen Nursaen who came from Banten. Arfaen migrated from Banten and settled in Sanding Village, Sanding/Girimakmur Subdistrict, Malangbong District, Garut Regency, West Java. Arfaen was known as "Lurah Acok" by the villagers. Literally, the meaning of the word "Badeng" comes from the word "Bahadrang/Bahadreng" which means gathering to confer or deliberate. The word "deliberation" can be interpreted as an invitation to the people in Sanding Village to gather, argue, deliberate, and finally agree to embrace Islam. The word "badeng" also comes from the Arabic word "baidun" which means "strange".

Badeng demonstrates three elements of art, namely music, song and dance. Although most of the movements were adopted from pencak silat, the rest was gentle dance movements. The dance is usually played by men wearing sontog pants between the heels and knees, and long-handed sala trong shirts, and triangular headbands. Meanwhile, female players wear Muslim clothing.

B. Waditra in Badeng

Waditra is musical instruments used in Badeng art and generally has two types, namely two dog-dog lojor and seven angklung which have the same shape with different terms / names, sizes and meanings as explained below.

1. Dogdog Lojor

According to several historical sources, Dogdog Lojor first appeared and developed in Lebak Regency, South Banten. This musical instrument was called Dogdog Lojor because it produced a unique sound such as "dog..dog..dog". That sound was the origin of the name of this musical instrument and many people then called it "dogdog". While lojor itself in Banten Sundanese language means "long". Dogdog lojor is made from a piece of "Jambe or Pinang" tree trunk. The centre is made hollow, with one side covered by goat skin tied by a rope (simpay) made of "Hoe/Rotan" which functions as a membrane or drum membrane. In addition to binding the skin, Simpay is also used as an ornament on the dogdog stem. In badeng art, there will be 2 lojor dogdogs played by two nayaga.
Figure 2. Waditra Badeng: Dogdog Lojor

Based on Figure 2 above, there are several components contained in dogdog lojor, including:

a. Goat Skin

The skin used to cover one of the kaluwung holes is soaked and dried goatskin. This skin serves as the membrane of the drum that produces the sound by being struck.

b. Kaluwung/Crew

Kaluwung/Awak dogdog is a resonator made from the trunk of the “Jambe/Pinang” tree. Geometrically it is in the form of a tube with a height/length of 99 cm and a diameter of 20cm. This height indicates 99 good names (Asmaul Husna) that must be instilled and practiced in everyday life.

c. Simpay

Simpay is a rope made of woven rattan to tie the skin and as a decoration of kaluwung. The two simpays that bind the skin mean that God created His creatures in pairs (Day and Night, Men and Women, Leaders and People, etc.).

d. Paseuk

The paseuk is a nail made of wood for adjusting the tightness of the simpay and skin (regulating the pitch) of the tone. Geometrically, paseuk is a triangular prism. Paseuk also means "masinikeun" or setting a decision as a result of deliberation.

2. Angklung

Angklung is a multitonal (double-pitched) musical instrument developed by Sundanese community. This musical instrument is made of bamboo, sounded by shaking (the sound is caused by the collision of bamboo pipe bodies) so as to produce vibrating sounds in an array of 2, 3, to 4 tones in each size, both large and small. Jonathan Rigg's Dictionary of the Sundanese Language, published in 1862 in Batavia, wrote that angklung was a musical instrument made of bamboo pipes cut at the ends to resemble the pipes as in an organ, and bound together in a frame, vibrated to produce sound. The types of bamboo commonly used as musical instruments are black bamboo (awi wulung) and ater bamboo (awi temen), which turn whitish yellow in color after the drying process. Each tone is produced by the sound of the bamboo tube, which is in the form of a blade of each bamboo segment from small to large.

Angklung consists of two main parts, namely the tube and the frame (rereg) as shown in figure 3 [12,1314].
Geometrically, angklung is formed from various elements of flat (square) and spatial (tube) shapes. There are seven angklungs used in Badeng art, namely 2 angklung roel, 2 angklung indung / bapa (mother/father), 2 angklung kendung (child), 1 angklung kecer with varying sizes according to its name.

a. Angklung Roel

Two Angklung Roel are played by a man called Dalang (Leader) who sets the rhythm during the performance. It symbolize that a leader must show a fair attitude (not leaning to the right or left hand). In addition, he must be able to unite all the instruments and nayaga (the players) to produce harmonious sounds and rhythms.

b. Angklung Indung/Bapak (mother/father)

Two Angklung Indung symbolize the two parents (father and mother) who are responsible for their families (their children). Parents or families as the primary education for children must be able to direct their children to have good morals and avoid bad ones. In addition, parents must also be able to be good role models for their children. Parents are prohibited from instructing children about things that are prohibited by religion.
c. Angklung Kendung (child)

Angklung kendun becomes a symbol of two children (son and daughter), that must live in harmony and peace, and devote their lives to the parents and respect each other.

d. Angklung Kecer

Angklung kecer symbolizes family (relatives/siblings), which cannot be separated in life. In addition, kecer is also symbolized as the next generation of the nation's successor which is priceless. Thus, to get a high-quality generation, the physical and mental needs must be prepared early with various forms of stimulation. Stimulation of children needs to be done as early as possible in the form of exemplary, knowledge, physical and no less important is social mental development as humans will never be separated from its role as social being who always need others.
C. Badeng Poetry

The poem of Badeng is divided into five parts using Sundanese and Arabic. This poem contains a message about the introduction of Islam and Islamic teachings and the greatness of the Prophet Muhammad SAW. The poems that researchers took in this writing were only taken the most *buahun* (lam a), as follows:

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<th>Table 1. The meaning of Badeng poems</th>
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D. Character Values and Mathematical Concepts in Badeng Art at Elementary Level

From Figure 4 to Figure 7, Waditra angklung has the size of the sora angklung tube that are 9 pieces in total. Mathematically, it is an unexpected phenomenon. The analogy of this phenomenon is related to the daily lives. Wherever we look at things, we will eventually find the same point. This is in accordance with the phenomena that occur in our society today, especially Indonesia, which is diverse. Indonesia as a country that holds the belief in "Unity in Diversity" should emulate the number nine (9), meaning that various ways can ultimately directed to achieve the same goal.

There were studies related to social arithmetic in the calculation of faraidh (inheritance science) in the Al-Quran surah An-Nisa [16]. The analysis was intended to investigate and understand contextually surah An-Nisa which is closely related to the science of faraidh contained therein. The results of this study indicated that in Surah An-Nisa it was mentioned that there were nine verses explaining the science of faraidh. The nine verses in question were: Surah An-Nisa verses: 7, 8, 9, 11, 12, 13, 14, 33, and verse 176. Accordingly, the remaining 167 verses did not explain the science of faraidh. As previously explained, there were nine verses in Surah An-Nisa explaining the science of faraidh, which is also social arithmetic, and it was concluded that there were several mathematical concepts contained therein, namely the concept of number, the concept of relation, the concept of number operations, the concept of geometry, and the concept of limit. The details of mathematical concepts in surah An-nisa are described as follows:

1. Numerical concept
The verses in surah an-nisa that contain the concept of numbers, including the concept of natural numbers, integers, counting numbers, rational numbers, fractional numbers, and real numbers are 1,3,11,12,15,20,25,43,102,152,171,176. There are numbers one, two, three and four as natural numbers, positive integers, rational numbers, real numbers

2. The concept of relation
The concept of relation in surah an-nisa was found in verse 11,12. The concept of relation in both verses contains the concept of relation more than (>).

3. Operational concept
The calculations in the verses of surah an-nisa containing the concept of number operations were found in verses 11, 12, 25, 102, and 176. The concept of number operations included division operations on the division of inheritance, the concept of addition and multiplication operations contained in the practice of calculating the share of inheritance and subtraction operations obtained implicitly in the context of making-up prayers.

4. Measurement concept
The verses in surah An-Nisa containing the concept of measurement were found in verses 40 and 92. The concept of measurement in this verse included the measurement of weight using the moon measuring instrument.

5. Limit concept
The verses in surah an-nisa containing the concept of limit were found in verse 29, which introduced the concept of limit understanding in a simple way, namely explaining that buying and selling would be valid if the buyer and seller were mutually satisfied with the transaction process. This is in line with the concept of limit, a function f has a limit for x close to c if and only the left limit and right limit exist and are equal.
6. Badeng Poetry

The poetry in Badeng art was created based on the situation and conditions of the community at that time. The meaning and message conveyed cannot be immediately understood, but needs to be interpreted in depth by looking at the context of the situation where this language applies. To find out the meaning of the text as a whole in this writing, the text will be seen and associated with the history of the creation of Badeng art.

The meaning of the first verse "Lillahaillallah Muhammadasullallahu" meant "There is no god but Allah, Muhammad is the messenger of Allah". The sentence -La ilaha illallah! in this first verse is a tawhid sentence where the point is to believe and believe in the existence and faith only in Allah SWT. Then in the next sentence "Muhammadasullallahu" is included, which means - "The Prophet Muhammad is the messenger of Allah". This emphasizes that apart from worshiping Allah SWT, the Prophet Muhammad must also be believed as His messenger. Believing in the prophet Muhammad automatically believe in the religion (Islam) and believe that the religion he brought was true. In psychology of da'wah communication perspective [15] this first verse was also included in the Thayyibah sentence. Thayyibah sentence in language is a good word. Thayyibah sentence is any speech that contains truth and virtue that is beneficial to oneself and others. As well as containing various ma'ruf deeds (good) and prevention of munkar deeds (evil).

The meaning of the second verse described the social activities carried out by the community, especially teenagers. In this second poem, it concerned with the younger generation, to avoid promiscuity and emphasized the sunnah of the Apostle to hasten marriage so as not to fall into promiscuity. This marriage was what Armawati Arbi meant in interpersonal communication. Marriage aimed to build a family. The substance of the power of interpersonal communication in da'wah fardiyah was the power of the Sakinah family. In terms of da'wah communication, in this second poem there were elements that contained da'wah fardiyah. Fardiyah da'wah defined as an interpersonal communication, whose relationship was used to radicalize someone and foster friendship [15,17,18]. Furthermore, it was reaffirmed in the third verse where implicitly in this verse that used Arabic as an affirmation of the first pillar of Islam, namely Syahadat. In the sentence of shahada, it was explained the oneness of Allah as a substance that had no partner for Him and the Prophet Muhammad as a messenger from Allah who must be implemented in everyday life.

The meaning of the fourth verse described the kyai as a leader who deserved to be a role model. In da'wah communication it was referred to Dakwah dzatityah which meant intrapersonal communication stating that personal factors and situations affected human behavior [15,19,20]. When an environment made the figure of the kyai a leader and a good role model, it should positively affect the human behavior in the neighbourhood as well. The figure of the kyai as a role model was intended to influence and help individuals to return to fitra (the original disposition).

The fifth poem described the situation of an individual who were unable to grow. In psychological communication perspective, this individual had no sense of humanism. Humanist psychology viewed humans as having quality and potential. Humanist humans had the ability to interpret life, free will and develop themselves. The purpose of the poem here was actually a hope. The implied message of hope in question was that even though the people in Sanding village were in a condition of uncertainty and face various difficulties, they must remain confident and believe in the teachings of Allah SWT. The understanding or belief in Allah SWT should not collapse or be affected by other cultures or understandings. This also explained that Islam was a resting place for anyone, and one of the purposes of life to get a meaningful life [21,22].

IV. CONCLUSION

The current challenges of the 21st century has proved that the world is increasingly connected to each other. Education is expected to build the insights, knowledge, skills, and characters needed to realize social justice, peace, and collaboration in global diversity. One important reference is the government policy of Improving Character Education (PPK) which is regulated in Presidential Regulation of the Republic of Indonesia Number 87 in 2017 and Minister of Education and Culture Regulation Number 20 in 2018 concerning the Improvement of Character Education in Formal Education Units. The Character Education is an educational movement that could be implemented through the application of values that are the essence of cultural values and local wisdom. Badeng is one of the local wisdom cultures that can be explored and integrated into learning processes at elementary schools. The character values contained in badeng art (Waditra, Syair, Nayaga, etc.) were in line with
current government programs related to strengthening the Pancasila student profiles, including (1) Spiritual / Religious Values, (2) Deliberation Values (3) Mutual Cooperation Values (4) Family Values (5) Unity Values, and (6) Empowerment Values. Meanwhile, math concepts that could be explored in badeng art included the concepts of number, geometry (flat and spatial shapes) and measurement.

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