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ETNOMATHEMATICS: EXPLORATION OF THE ART OF KENTHONGAN MUSIC AS A SOURCE OF MATHEMATICS LEARNING

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ABSTRACT
Ethnomathematics is an approach tio learning mathematics that connects the material studied with the local culture of students. Ethnomathematics can be used by mathematics educators to overcome problems in the field of mathematics, namely the negative perception of students about mathematics which is seen as difficult. This study aims to explore, identify, describe and analyze mathematical concepts contained in the art of kenthongan music. This research is a qualitative descriptive exploratory research with an ethnographic approach. Data were collected by observation, documentation, and interviews. This research was conducted on the kenthongan music art group "Syailendra". The analytical technique used is the Miles and Huberman model and the data validity test uses triangulation. This study shows that there are mathematical concepts found in the art of kenthongan music, especially in the kenthongan art group "Syailendra" which can be used as learning resources in learning mathematics. The mathematical concepts found include the concept of geometry in which there is the concept of a circle and the concept of a tube, then there is the concept of natural numbers and the concept of arithmetic sequences. Furthermore, universal mathematical activities such as counting, locating, measuring, designing, playing, and explaining activities were also found.
Keywords: Ethnomathematics, Kenthongan, and Learning Resources.

INTRODUCTION
Character education for students studying in formal education and the mental revolution movement is used as an effort by the Indonesian government in preserving the nation's culture (Dominikus, 2021). One part of the education provided in formal education in mathematics education. Mathematics learning integration with culture can be done by mathematics educators to take part in cultural preservation. The study of mathematics in this culture is referred to as ethnomathematics. D'Ambrossio, a Brazilian mathematician introduced the term ethnomathematics (Pathuddin & Raehana, 2019). Ethnomathematics is an approach to learning mathematics that connects the material studied with the local culture of students. Ethnomathematics is a forum that can be used to build national character (Wahyuni et al., 2013).

Besides being used as an effort to preserve culture, ethnomathematics can also be used by mathematics educators to overcome problems that exist in the field of mathematics, namely the negative perception of students about mathematics which is seen as a difficult thing. This supports the research results (Siregar, 2017) which state that so far mathematics is still considered difficult by students, but it is important to learn. The results of the 2018 Program for International Student Assessment (PISA) study released in 2019 stated that of 78 countries, Indonesia's mathematics score was ranked 72 (Harususilo, 2019). The results of the PISA study, of course, are still not in line with expectations and become a joint task that must be completed.

Furthermore, the negative perception of mathematics which is seen as difficult exists because mathematics is considered something abstract, dry, and theoretical. Various disciplines can be explored properly if students have the ability in mathematics (Kamarullah, 2017). Therefore, the implementation of contextual mathematics learning with learning resources that come from the environment is one of the efforts to eliminate these negative perceptions. A study (Rahayu et al., 2019) concluded that mathematics material is easier to understand because it is associated with culture in the lives of students themselves. Ethnomathematics is a bridge between mathematics and culture that can facilitate students' understanding because it uses local traditions in learning mathematics (Putri, 2017). In addition, learning mathematics becomes more fun so that students' interests and mathematical abilities can increase (Fajriyah, 2018).

Previous research related to ethnomathematics has been carried out with different focuses, including research on ethnomathematics on the typical food of a particular area where the results show that there are mathematical concepts, namely social arithmetic, spatial structure, flat wake, comparison, similarity, congruence. which makes the material easier for students to understand (Huda, 2018; Pathuddin et al., 2021; Pathuddin & Raehana, 2019; Pusvita & Widada, 2019). Ethnomathematical research on the game *dengklaq* shows that there are mathematical concepts in the game *dengklaq* namely the concept of probability, mathematical logic, reflection, cube nets, relationships between angles, and plane geometry. (Fauzi & Lu'luilmaknun, 2019). Ethnomathematical research on the game dengklaq shows that there are mathematical concepts in the game dengklaq namely the concept of probability, mathematical logic, reflection, cube nets, relationships between angles, and plane geometry. (Utami et al., 2020).

In this preliminary study, there are still few studies that focus on exploring mathematical concepts in certain regional arts, especially Banyumasan arts. Therefore, the author is interested in exploring one of the musical arts of Banyumasan, namely the art of kenthongan music. The popularity of kenthongan music in the community in the Banyumasan area can be an asset for educators in Banyumas and its surroundings to explore and make it a source of contextual learning and make mathematics learning meaningful.

LITERATURE REVIEW

Ethnomathematics

D'Ambrossio (in Pathuddin & Raehana, 2019) introduced the term ethnomathematics. Ethnomathematics is mathematical knowledge expressed in the code, or language of a particular sociocultural group. Ethnomathematics is concerned with the practice of mathematics, mathematical ideas, and mathematical knowledge of a socio-cultural group of people related to calculations, grouping, sorting, inferring, and modeling (Dominikus, 2021). Bishop states that six universal mathematical activities can be found in every cultural group, namely counting, locating, measuring, designing, playing, and explaining (Dominikus, 2021).

Culture

Culture or culture comes from the word buddhayah which is Sanskrit. The word is the plural form of the word buddhi which means mind (Nurmansyah et al., 2019). According to E.B. Taylor (in Nurmansyah et al., 2019), Culture is a complex thing that includes knowledge, art, belief, morals, law, abilities, customs, and habits acquired by humans. According to Koentjaraningrat (in Dominikus, 2021), elements of culture include knowledge systems, livelihood systems, languages, social organizations, arts, religious systems, and systems of living equipment and technology. Furthermore, culture and mathematics are closely related to each other.

Kenthongan

Kenthongan music is one of the traditional arts in the Banyumasan area. This art can be enjoyed by the local community or long distance because it is packaged very attractively. Kenthongan is a traditional musical instrument typical of Banyumasan consisting of bamboo or wood (Munawar, 2020). In the kenthongan performance, there is a kenthong which is a musical instrument made of bamboo which is played by hitting it. At first, kenthongan was used as a communication tool in traditional community life with certain gestures or beats. Now, this traditional instrument has become one of the alternative forms of music favored by the public. The art of kenthongan music is also known as the art of "thek-thek" (Syah, 2013).

Organologically, the physical instrument of kenthongan is a form of the metamorphosis of the musical instruments calung, angklung, krumpyung, gondoliyo (bongkel). The romance of the Banyumasan community towards the past attached to these musical instruments and all bamboo musical instruments combined with contemporary nuances have given birth to creative ideas through kenthongan music (Syah, 2013). Along with the changing times, the art of kenthongan music continues to grow so that the use of musical instruments for each art group is different.

Learning Resources

The Association for Educational Communication and Technology (AECT) states that learning resources are everything in the form of messages, people, materials, equipment, techniques, and environments that are used independently or in combination to facilitate learning activities (Suhirman, 2018). According to how to obtain information, learning resources are divided into three types, namely audio, video, and audiovisual. Four factors influence learning resources that need to be known to understand the characteristics of learning resources so that their use in learning activities can be optimal, namely technological developments, local cultural values, economic conditions in general, and user conditions (Prastowo, 2018).

Mathematics

According to Nasution, mathematics comes from the Greek word "mathein" or "manthenein" which means "to study". It should be suspected that the two words are closely related to the Sanskrit word "medha" or "widya" which means "intelligence", "to be found out", or "intelligence" (Suyitno, 2018). According to Fitch, a more complete definition states that mathematics is a collection of hypothetical deductive theories, each theory is a particular system of unexplained basic meanings, symbols, and points of departure for thinking that are not proven, but steady (axioms or postulates) and logically derivable theorems that simply follow deductive processes. All definitions characterize mathematics as abstract, and general, and focus on patterns and structures (Suyitno, 2018).

Experts have views on the nature of mathematics, including mathematics as a deductive science, mathematics as a science of patterns and relationships, mathematics as a language, mathematics as a science of organized structures, and mathematics as an art. (Ibrahim; Suparni, 2012).

RESEARCH METHODS

This research is a qualitative descriptive exploratory research with an ethnographic approach. The purpose of this study is to explore, identify, and describe the mathematical concepts contained in the art of kenthongan music. This study uses an ethnomathematical study framework developed through four general questions, namely "where to look for it?", "how to find it?", "what is this?", and "what does it mean?"(Pathuddin et al., 2021; Prahmana & D'Ambrosio, 2020). Furthermore, observations and documentation of the art of kenthongan music as well as interviews

with the performers of kenthongan music "Syailendra" were used as data collection techniques. The objects observed are musical instruments used in the art of kenthongan music which includes the shape, material, size, and how to play the musical instruments in kenthongan art. The data obtained were then analyzed using the triangulation method to explore the relationship between shape, material, size and how to play musical instruments in kenthongan art with mathematical concepts. The data analysis technique using the Miles and Huberman model is used in this study where data analysis is carried out until the data becomes saturated. The components in the data analysis are reduction, display, conclusion and verification.

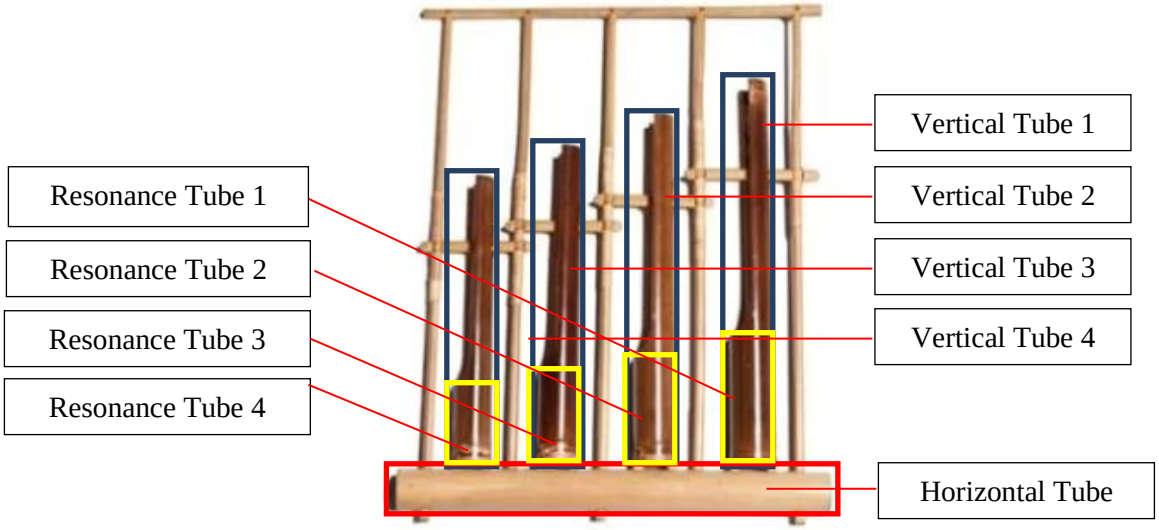
RESULTS AND DISCUSSION

Ethnomathematics of Musical Instruments in the Kenthongan Art Group "Syailendra"

The results of this study are to reveal the exploration of musical instruments used in kenthongan art which will then be discussed what mathematical concepts are contained in the art of kenthongan music. By observing the shape of the musical instrument, it is seen that the musical instrument used in kenthongan art contains elements of geometry. In addition, for melodic musical instruments that use tones, the symbols of letters and numbers that represent the tone will be written. For some people who have not memorized the names of musical instruments, it will be mentioned musical instruments through the characteristics contained in the elements of geometry. The use of numbers to represent scales indirectly applies mathematical concepts. This research focuses on the kenthongan art group "Syailendra" located in Karangsentul Village, Padamara District, Purbalingga Regency. The ethnomathematics of the musical instruments played by the “Syailendra” art group (namely: angklung, gambang, dhendhem, tripok, simbal, hihat dan snare drum, bass bedug, and sello) are explained as follows.

1. Angklung

   Angklung is a traditional musical instrument that produces sound due to its impact on the angklung tube. Between the vertical and horizontal tubes if shaken repeatedly it will produce sound (sound waves). The sound produced also depends on the length of the resonant tube, if the short resonant tube is shaken, the frequency of the sound produced is high and vice versa, if the long resonant tube is shaken, the frequency of the sound produced is low. The high and low frequencies produced by the angklung depend on the height of the tube, the height of the resonance tube, and the diameter of the tube (Badruzzaman et al., 2022). The angklung played



in the kenthongan art group "Syailendra" is a standard angklung that has 20 tones, namely E – F – G – A – B – C – D -E – F – G – A – B – C – D – E – F - G – A – B – C. Angklung consists of four bamboo tubes with a certain size and different which is adjusted to the required tone.

Figure 1 The Concept of a Circle on The Angklung Tube Base and The Concept of a Tube without a Bottom and Lid on an Angklung

In angklung found the concept of a circle on the base of the angklung tube. The tube concept is found in vertical tubes, resonance tubes, and horizontal tubes. The resonance tube and the horizontal tubes are tubes without a bottom and a lid. The bamboo in the vertical tube is split vertically to the height of the resonance tube. In addition to the tube concept, the concept of an arithmetic sequence is also found where the scales contained in the angklung are arithmetic sequences where the notes are C – D -E – F – G – A – B if written in numeric notes is 1 – 2 – 3 – 4 – 5 – 6 – 7 form a series of numbers from left to right with the rule that each next term is the previous term added by one. The arithmetic sequence is an arithmetic sequence where the first term is 1, the last term is 7, the difference is 2 and the number of tribes is 7. Furthermore, the concept of natural numbers 1 to 7 is also found in the numerical notes.

2. Gambang

The gambang is a musical instrument that is played by hitting and serves to train balance because the gambang is different from other musical instruments where the gambang is hit using both hands where each left and right-hand holds two percussions (Wulandari, 2020). The gambang in the kenthongan art group "Syailendra" is a musical instrument made of bamboo and how to play it is using four percussions where two bats are held in the right hand and two bats are held in the left hand. There are three types of gambang used, namely the standard gambang which consists of 20 tones (E – F – G – A – B – C – D -E – F – G – A – B – C – D – E – F - G – A – B – C), gambang 21 tones (E – F – F# – G – A – B – C – D – E – F – F# – G – A – B – C – D – E – F – F# – G – A), and gambang 33 tones (E – F – F# – G – G# – A – A# – B – C – C# – D – D# – E – F – F# – G – G# – A – A# – B – C – C# – D – D# – E – F – F# – G – G# – A – A# – B – C).

Figure 2 Concept of Circle on Base and Concept of Tube without Cap on Gambang 20 Tones

Figure 3 The concept of a circle on the base and the concept of a tube without a cap on a 21-tone Gambang

Figure 4 The concept of a circle on a base and the concept of a tube without a lid on a Gambang 33 Tones

Figure 5 The concept of a circle on the surface of a Gambang percussion and the concept of a solid tube on a Gambang percussion

In the gambang, the concept of a tube without a lid is found on the xylophone bamboo and the solid tube on the gambang percussion. In addition, the concept of a circle was also found on the base of the standard 20-tone gambang, 21-tone gambang, 33-tone gambang, and on the surface of the gambang percussion. The concept of an arithmetic sequence is also found where the scales contained in the standard 20-tone gambang are arithmetic sequences where the notes are C – D -E – F – G – A – B if written in numeric notes is 1 – 2 – 3 – 4 – 5 – 6 – 7 form a series of numbers from left to right with the rule that each next term is the previous term added by one. The arithmetic sequence is an arithmetic sequence with the first syllable being 1, the last syllable being 7, the difference 2, and the number of syllables being 7. Furthermore, the concept of natural numbers 1 to 7 is also found in the standard 20-tone gambang number notes.

3. Dhendhem

Dhendhem is also known as slenthem. Dhendhem has a larger wilahan (bamboo blade) than Gambang. Dhendhem has a function similar to Balungan in Javanese Gamelan, which is to give a beat in the flow of the gendhing song (Pangestika & Rokhmat, 2019). Dhendhem is played with an instrument similar to the gambang percussion, only it is larger. The dhendhem's big head can produce a soft sound with a big hum (Sudiawan, 2015). There are two types of dhendhem used in the "Syailendra" art group, namely the standard dhendhem containing 10 tones and the 20-tone dhendhem. Dhendhem 10 tones consist of tones C – D – E – F – G – A – B – C – D – E. Dhendhem 20 tones consist of C – C# – D – D# – E – F – F# – G – G# – A – A# – B – C – C# – D – D# – E – F – F# – G. Dhendhem is played using two percussion instruments. When the song is played, dhendhem is played by following the bass chord of the song.

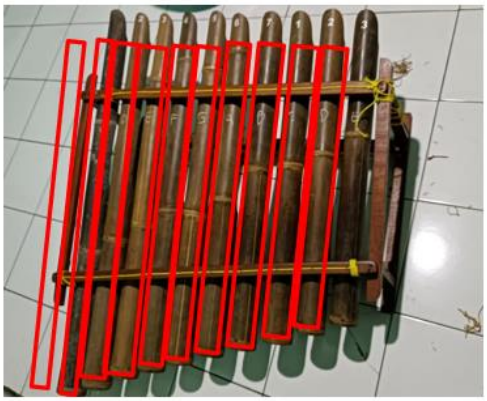


Figure 6 Concept of Circle on Base and Concept of Capless Tube in Standard 10 Tone Dhendhem

Figure 7 Concept of Circle on Base and Concept of Capless Tube in Standard 20 Tone Dhendhem

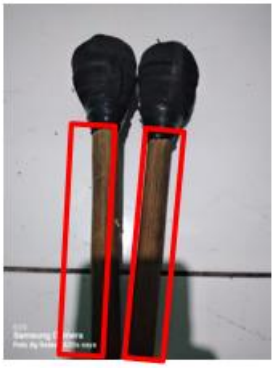


Figure 8 Concept of Circle in Forest and Concept of Solid Tube in Tubuh Dhendhem

In the standard 10-tone drum, 20-tone drum, drum drum found the concept of a circle. In dhendem, the concept of a tube without a cover was found on dhendem bamboo and a solid tube on the stalk of dhendem bamboo. In addition to the concept of a circle, a tube without a cover, and a solid tube, there is also a concept of an arithmetic sequence where the scale found in the 10-tone standard sound is an arithmetic sequence where the C – D - E – F – G – A – B if written in numeric notes is 1 – 2 – 3 – 4 – 5 – 6 – 7 form a series of numbers from left to right with the rule that each next term is the previous term added by one. The arithmetic sequence is an arithmetic sequence with the first syllable being 1, the last syllable being 7, the difference 2, and the number of syllables being 7. Furthermore, the concept of natural numbers 1 to 7 is also found in the 10-tone standard dhendhem number notes.

4. Tripok, Simbal, Hihat dan Snare drum
   Tripok is a collection of musical instruments consisting of five musical instruments, namely ketipung 1 (which reads "tung"), ketipung 2 (which reads "no"), kempul (which reads "tang"), tom 1 (which reads "dung"), and tom 2 (which reads "dem"). Tripok is played by being hit with two bats. The tripok game follows the rhythm of the angklung that is played where how to play it is determined by the type of song being played. In the kenthongan art group "Syailendra", the sizes of ketipung 1, ketipung 2, kempul, tom 1, and tom 2 are 6", 6", 6", 12", and 10, respectively. In traditional kenthongan art, the tripod serves as a rhythmic holder, which is to decorate songs and give accents (Larasati, 2012).

A Simbal is a metal accompaniment that rests on a stick, sounded by being hit with a bat. Simbal are made of brass and belong to the group of percussion instruments. Simbal are used as variations and mood builders (Yelli & Plastika, 2017). In other words, simbal can give a special color to a song played by the kenthongan art group. There are various sizes of simbal, namely 10", 12", 14", and 16". In the kenthongan art group "Syailendra", the size of the simbal used is 16".

Furthermore, hihat are two simbal plates that are combined into one part where usually the two parts are the same size. The hihat function is very important because it has a role in regulating the tempo in the game. There are various hihat sizes, namely 10", 13", 14", and 15" (Kurniawan, 2016). Hihat is sounded by being hit with a bat. In the kenthongan art group "Syailendra", the size of the hihat used is 14".

The snare drum is a musical instrument consisting of a wooden or metal shell made of holes, while the holes are each covered with a membrane. This musical instrument is played by hitting it with two sticks made of wood to produce a loud sound. Snare drums come in various sizes ranging from 10" to 15". In the snare drum, there is a very important part, namely the snare wire or stainer which is located at the bottom of the snare drum. If the upper side of the snare drum is hit, the stainer that is attached to the bottom of the snare will interact which produces a very loud sound (Kurniawan, 2016). In the kenthongan art group "Syailendra", the size of the snare drum used is 14".

When pop songs are played, the instruments that are played are the snare drum and hihat. When a koplo or dangdut song is played, the musical instrument being played is ketipung and hihat. When a mixed song (pop mix and koplo or dangdut) is played, the musical instrument played is tripok, simbal, hihat, and snare drum.

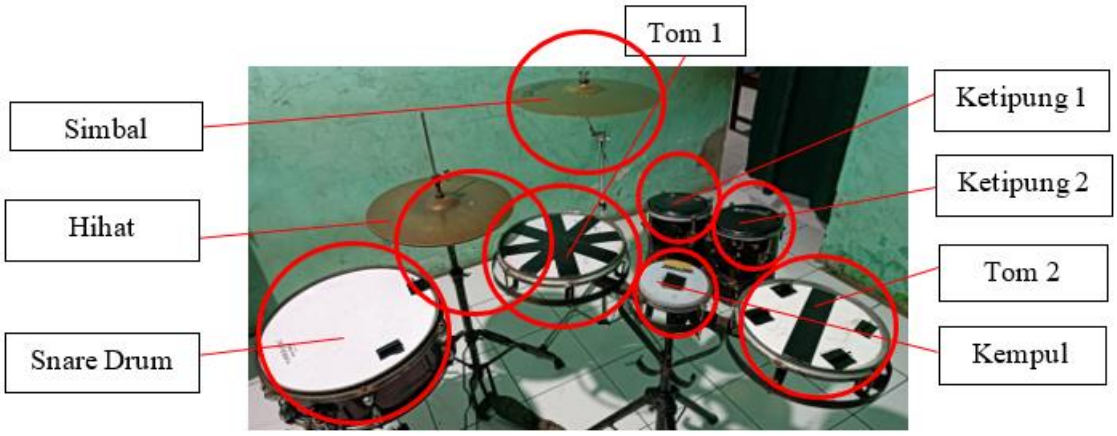


Figure 9 The concept of the center of a circle on Simbal and Hihat, Circle Concept on Simbal, Hihat, Ketipung 1, Ketipung 2, Tom 1, Tom 2, Kempul, Snare Drum, Bottomless Tube Concept on Ketipung 1, and Ketipung 2, Tube Concept on Snare Drum

In simbal and hihat found the concept of the center of the circle. In simbal, hihat, ketipung 1, ketipung 2, tom 1, tom 2, kempul, and snare drum the concept of a circle is found. In Ketipung 1 and Ketipung 2, the concept of a tube without a bottom is found. In the snare drum, the tube concept is found.

5. Bass Bedug

Bass bedug plays a role in playing low notes. Bass bedug is a musical instrument made of plastic drums that are no longer used, then the lid is closed using used rubber truck tires in layers and the way to play it is by beating it using the same percussion instrument as sello. (Fandanu et al., 2021). On the bass bedug found the concept of a circle.

Figure 10 Circle Concept on Bass Bedug

6. Sello

Sello is a musical instrument consisting of three musical instruments in the form of a tube without a base with different sizes, namely sello 1 (deg) which measures 14", sello 2 (tung) which measures 6", and kempul (tung) which measures 8". Sello is played by being beaten using the same percussion as the bass drum. When playing a pop song, sello 1 for kick (deg). When playing dangdut or koplo songs, sello 1 is used to make a dut sound, while sello 2 is kempul as a companion variation (tung). In the intro to a pop song, the musical instruments that are played are ketipung 2 (tak) and sello 1 (deg). In the intro to dangdut or koplo songs, the musical instruments that are played are ketipung 1 (tung) and sello 1 (dut). Sello found the concept of a circle and the concept of a tube without a base.

Figure 11 Circle Concept and Bottomless Tube Concept on Sello

Analysis of Mathematical Concepts in Kenthongan Music as a Source of Mathematics Learning

The mathematical concepts found in the art of kenthongan music, especially the musical instruments used by the kenthongan art group "Syailendra" can be used as a learning resource in

mathematics learning that is associated with a local culture so that mathematics learning can be contextual and meaningful learning. The mathematical concepts found in the art of kenthongan music are in the form of geometric concepts and the concept of circles which are explained as follows.

1. Geometry Concept
   a. Circle Concept
      Based on the results of the study found the concept of the center point on the circle contained in the simbal and hihat. The supports are placed in the middle of the simbal and the hihats are circular for balance. The center point of the circle is equidistant from the edge of the simbal and the hihat.
      Based on the results of the study, there is the concept of a flat shape, namely a circle. The circular shape is found on the angklung base, the standard gambang base of 20 tones, the gambang base of 21 tonnes, the 33 tones of the gambang base, the surface of the gambang percussion, the standard dhendhem base of 10 tones, the dhendhem base of 20 tones, the surface of the dhendhem percussion, the tripok (ketipung 1, ketipung 2 , kempul, tom 1, tom 2), simbal, hihat, snare drum, and bass bedug. In these musical instruments, the circles have different diameters.

   b. Tube Concept
      Based on the results of the study, it was found that the concept of building a tube space on the kenthongan musical instrument, namely:
      1) Tubes without bottoms and lids found in angklung are precisely in resonance tubes and horizontal tubes. In the angklung, the concept of a tube without a base and a lid was found because the instrument's base and lid have the same circle size, the circle on the base and the lid are perforated (no tube base and lid) and have a tube blanket.
      2) The capless tube found on the gambang and dhendhem. The concept of a tube without a lid was found on this instrument because the bottom and top of the tube have the same circle size, the circle on the lid is perforated (no tube cap) and has a tube cover.
      3) The solid tube found in the gambang and dhendhem drumsticks. In the percussion of the musical instrument, the concept of a solid tube was found because the instrument's base and lid have the same circle size, the circle on the base and lid is not perforated (there is a lid and tube base), has a tube blanket and the inside of the tube is not perforated (solid) because the gambang percussion and the dhendhem percussion are made of wood.
      4) Tubes without a bottom are found in ketipung 1, ketipung 2, and sello. The concept of a tube without a base is found in this instrument because the lid and bottom of the tube have the same circle size, the circle has a hole in the base (no tube base) and has a tube blanket.
      5) The tube was found on the snare drum. The concept of a tube was found in this instrument because the lid and base of the instrument have the same circle size, the circle on the lid and base is not perforated (there is a lid and tube base) and has a tube blanket.

   The geometric concepts found in this study are the center point of a circle, a circle, and a tube consisting of a tube without a bottom and a lid, a tube without a lid, a solid tube, a tube without a bottom, and a tube that can be implemented as a source of mathematics learning that can be

used to identify shapes. Flat shapes and shapes, radius and diameter of a circle, area of a circle, a circumference of a circle, the height of the tube, area of tube base and lid, the circumference of tube base and lid, area of tube blanket, a circumference of tube blanket, and tube volume. In addition, it can also be used to compare the size of the circle on musical instruments used in kenthongan art.

2. Concept of Natural Numbers
   Natural numbers are integers starting from 1 to the right. Based on the results of the research, the concept of natural numbers is found in the angklung numeral notes, 20 tones of standard gambang, and 10 tones of standard dhendhem (1, 2, 3, …,7).

3. Arithmetic Sequence Concept
   There are three types of gambang and two types of dhendhem on the gambang and dhendhem used in the kenthongan art group "Syailendra". The types of gambang and dhendhem that contain the concept of arithmetic sequences are the standard type of gambang and dhendhem. The standard type of gambang and dhendhem has the same tone level, which is one tone. The standard gambang has 20 tones, namely E-F-G-A-B-C-D-E-F-G-A-B-C-D-E-F-G-A-B-C. The distance or difference in notes on the standard gambang is the same, that is, by one tone. There are 10 tones in the standard dhendhem, namely C-D-E-F-G-A-B-C-D-E. In the standard dhendhem there is no half-tone increase, so the difference or distance between each note in the standard dhendhem is always the same, namely one note.
   Based on the results of the study, it was found the concept of arithmetic sequences on the angklung number notes, 20 standard gambang notes, and 10 standard dhendhem notes (1, 2, 3, …,7). On the angklung number notes, the standard xylophone is 20 tonnes, and the standard dhendhem is 10 tones with a=1 and b=1. Formula $U_n = a + (n-1)b = 1 + (n-1)1 = 1 + n - 1 = n \Leftrightarrow U_n = n$.

The concept of natural numbers and the concept of arithmetic sequences can be implemented as a source of mathematics learning, which is used to identify and understand the types of numbers contained in musical instruments played in the kenthongan art group and to identify the types of sequences and find the U_n formulas in arithmetic sequences found on the angklung musical instrument, the standard gambang of 20 tones, and the standard dhendhem of 10 tones.
Furthermore, there is a universal mathematical activity that can be found in the kenthongan art group "Syailendra". This is following Bishop's statement and can be explained as follows:

1. Counting Activity
   In counting activities, many aspects of kenthongan music are related to counting activities. When playing a song, every kenthongan player must do a numbering activity while reading the notation. The activity of counting is always carried out by angklung, gambang, and dhendhem players when reading the notation. This counting activity is also related to the number of players in a group because the number of players must match the completeness of the available musical instruments.

2. Locating Activity
   There is a layout used in the placement of musical instruments such as tripods, cymbals, hihats, and snare drums that are positioned. The tripod, cymbal, hihat, and snare drum are played by one player so that the position of the musical instrument must be arranged in such a way.

3. Measuring Activity
   There are differences in size in the circle of the angklung base, the gambang base, and the dhendhem base. There are differences in the size of the tubes in angklung, gambang, and dhendhem. The sizes of these musical instruments produce different sounds.

4. Designing Activity
   The musical instruments used in the art of kentongan music are designed with different shapes so that they produce different sounds as well. The circle concept is found in the angklung base, standard 20-tone gambang base, 21-tone gambang base, 33-tone gambang base, gambang drum surface, 10-tone standard dendhem base, 20-tone drum base, dendem drum surface, tripok (ketipung 1, ketipung 2, kempul, tom 1, tom 2), simbal, hihat, snare drum, and bass bedug. The tube concept is a tube without base and cover, tube without cover, solid tube, tube without base, and tube (with cover and base). The concept of a tube without a base and cover is found in angklung, specifically in resonance tubes and horizontal tubes. The tube concept without a cover is found in the standard 20-tone gambang, 21-tone gambang, 33-tone gambang, 10-tone standard gambang, and 20-tone gambang. The concept of a solid tube is found in tabuh gambang and stem tabuh dhendem. The baseless tube concept is found in ketipung 1, ketipung 2, and sello and the tube concept is found in the snare drum.

5. Playing Activity
   There are certain rules in playing the art of kenthongan music. The rules for beating musical instruments depend on the part of the song being played. At the time of the intro of the song, if the song being played is a pop song, the musical instruments played are ketipung 2 (tak) and sello 1 (deg) and if dangdut or koplo songs are played then the musical instruments played are ketipung 1 (tung) and sello 1 (dut). When the song is played, if the song being played is a pop song, the musical instrument being played is ketipung 2 (tak) and sello 1 (deg) and if dangdut or koplo song is played then the musical instrument being played is sello 2 (tung), kempul 2 (tung), sello 1 (deg), ketipung 2 (tak), sello 1 (dut). At the time of reff, if the song being played is a pop song then the musical instrument played is ketipung 2 (tak) and sello 1 (deg) and if dangdut or koplo songs are played then the musical instrument played is sello 2 (tung), kempul 2 (tung), sello 1 (deg), ketipung 2 (tak), sello 1 (dut). At the end of the song, if the song being played is a pop song then no musical instruments are played and if dangdut or koplo songs are played then the musical instruments played are sello 1 (deg), sello 2 (tung), kempul 2 (tung), and bass bedug.

6. Explaining Activity
   On the angklung, gambang, and dhendhem musical instruments used in kenthongan art there are symbols in the form of number and letter notes to make it easier for players to play these musical instruments.

CONCLUSION

Based on the results and data analysis, it was concluded that the mathematical concepts found in the art of kenthongan music, especially on the musical instruments used by the kenthongan art group "Syailendra" can be used as learning resources in mathematics learning that

are associated with the local culture so that mathematics learning can be a source of learning. contextual and meaningful learning. The mathematical concepts found are the concept of geometry, the concept of natural numbers, and the concept of arithmetic sequences.

The concept of geometry that exists in the art of kenthongan music "Syailendra" can be implemented as a source of mathematics learning that can be used to identify shapes and shapes, the radius and diameter of the circle, the area of the circle, the circumference of the circle, the height of the tube, the area of the base. and cover the tube, the circumference of the base and lid of the tube, the area of the tube blanket, the circumference of the tube blanket, and the volume of the tube. In addition, it can also be used to compare the size of the circle on musical instruments used in kenthongan art.

The concept of natural numbers and the concept of arithmetic sequences can be implemented as a source of mathematics learning, which is used to identify and understand the types of numbers contained in musical instruments played in the kenthongan art group and to identify the types of sequences and find U_n formulas in the arithmetic sequence found on the angklung musical instrument, the standard xylophone is 20 tonnes, and the standard dhendhem is 10 tones. Furthermore, there are universal mathematical activities that can be found in the kenthongan art group "Syailendra" namely counting, locating, measuring, designing, playing, and explaining activities.

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