Klana Udeng Mask Dance in the Ethnomathematical Perspective (As a Source of Teaching Materials)

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Abstrak

Penelitian ini bertujuan untuk mengetahui konsep matematika yang ada dalam tari topeng klana udeng, mulai dari alat musik pengiring, dan kostum, yang akan menjadi sumber untuk bahan ajar. Penelitian ini merupakan penelitian kualitatif dengan pendekatan etnografi. Penelitian ini dilakukan di Sanggar Mulya Bhakti Tambi. Teknik pengumpulan data pada penelitian ini yaitu dengan obsevasi, wawancara, dan dokumentasi. Hal tersebut akan menghasilkan catatan lapangan, transkip wawancara, dan dokumen. Subyek penelitian yaitu satu observer dan beberapa narasumber, yakni maestro tari topeng, penari lain, ahli kebudayaan dinas pendidikan dan kebudayaan, nayaga, ahli musik, dalang wayang, guru matematika dan budayawan. Teknik analisis data yaitu mengumpulkan data, pemeriksaan keabsahan data, reduksi data, penyajian data, analisis, pengambilan kesimpulan. Hasil penelitian ini menunjukan bahwa terdapat konsep-konsep matematika pada bentuk alat musik, dan bentuk ornamen kostum. Konsep matematika yang muncul dalam alat musik tari topeng klana udeng adalah garis, sudut, bangun datar, bangun ruang sisi datar, bangun ruang sisi lengkung, lingkaran, barisan aritmetika. Konsep matematika yang muncul dalam kostum tari topeng klana udeng adalah garis, sudut, bangun datar, bangun ruang sisi datar, bangun ruang sisi lengkung, lingkaran, barisan aritmetika, kesebangunan dan kekongruenan, perbandingan.
Kata Kunci: Etnomatematika; Sumber Bahan Ajar; Tari Topeng Klana Udeng.

Abstract

This study tries to identify the mathematical ideas present in the klana udeng mask dance, including the musical accompaniment devices and costumes. This study uses an ethnographic method and is qualitative. The site of this study was Sanggar Mulya Bhakti Tambi. In this study, observation, interviews, and documentation were used as data collection methods. Field notes, interview transcripts, and documents will result from this. One observer and a number of resource people, including the master of mask dance, other dancers, cultural experts from the education and culture department, nayaga, music experts, puppeteers, mathematics teachers, and cultural observers, served as the research subjects. Data collection, validity checks, data reduction, data presentation, analysis, and conclusion-making are all data analysis procedures. The findings of this study suggest that mathematical ideas can be represented by both musical instruments and costume accessories. Lines, angles, flat shapes, flat side spaces, curved side spaces, circles, and arithmetic sequences are examples of mathematical ideas that can be seen in the klana udeng mask dancing instrument. Lines, angles, flat shapes, flat side spaces, curved side spaces, circles, arithmetic sequences, similarity and congruence, and comparisons are examples of mathematical principles that can be seen in the klana udeng mask dancing costume.
Keywords: Ethnomathematics; Consideration of Teaching Materials; Klana Udeng Mask Dance.

I. INTRODUCTION

Mask dance is a type of dancing that involves wearing a mask-like facial covering. Dancers wear unique costumes during performances, as well as a face covering that is typically referred to as a mask (Rochmat, 2010). Mask dance is characterized by the employment of masks and distinctive costumes from head to toe, including clothing, face masks or other masks, anklets and hands, head coverings, and other accessories. Indramayu is also familiar for mask dancing. Mask dances can be traced back to Sheikh Hidayatullah or Sunan Gunung Jati, who preached Islam to Indramayu. However, a closer examination reveals variances between the mask dances of Indramayu and Cirebon, such as the pekem (Sadiyah and Suharjana, 2020). According to Mr. Tinus, a cultural specialist at the Indramayu Culture and Tourism Office, Sunan Gunung Jati introduced the Indramayu mask dance as a means of disseminating Islamic symbolism (Interview, October 27, 2021).

Mask dance is a distinctive style of dance that is done in art performances, one of which is in the ngarot heritage. It is distinguished by its appealing costumes and make-up, which includes a mask known as a kedok that represents the attractive aesthetics of human figures. by utilizing a material known as dodot or cangcut (Hidayat, 2017). When ngarot is practiced, mask dances are also performed (A Rahman Tang et al. 2017). As a result, mask dancing is a kind of art that attracts a lot of interest. Performers don masks and take on the role of characters with deeper meaning. Five characters appear on the mask: panji, samba or pamindo, rumyang, tumenggung and klana.

The klana udeng mask dance is an extension of the klana mask dance. In contrast to the sobra head covering used in the klana mask dance, the udeng head covering is used in the udeng clan mask dance, which also has the final dance performed by the five different mask characters (Sugiarto et al., 2012). The klana udeng mask dance, which is an expression of mask dancers in Indramayu's creativity, is said to be a continuation of the klana mask dance by Mami Wangi, a master of mask dancing and proprietor of Sanggar Mulya Bhakti in Tambi Village. This klana udeng mask dance is performed. The five characters of the traditional mask dance of Indramayu come from the klana, the banner, the sambha/pamindho, the rumyang, and the tumenggung.

Studies on dance ethnomathematics already exist, such as Ethnomathematics in Kejei Dance as Rejang Lebong Culture (Destrianti et al., 2019), Ethnomathematics Exploration in Caci Dances in the Mangarai Community of East Nusa Tenggara (Maure & Ningsi, 2018), Ethnomathematics of the Kretek Dance Movement Kudus in Mathematics Learning (Maure & Ningsi (Nurina & Indrawati, 2021). This study's theme was "Klana udeng mask dance in an ethnomathematical viewpoint (as a source

of teaching materials)" since, based on the titles of these studies, no one has connected the klana udeng mask dance with ethnomathematics or used it as a teaching resource.

In order to rekindle interest in mathematics and cultural components from the usual Indramayu, the focus is on discovering the mathematical principles that are present in the Indramayu Mask Dance, beginning with the musical instruments and dance costumes and from these items can be used as sources. instructional resources created by teachers. The authors are interested in exploring "Klana Udeng Mask Dance in the Ethnomathematical Perspective (As a Source of Teaching Materials)" in light of the issues raised above.

II. METHOD

In this study, a qualitative methodology and an ethnographic perspective are used. This study will be conducted in Tambi Village, Sliyeg District, Indramayu Regency, West Java, which is situated at Jalan Raya Jatibarang-Karangampel KM. 3. Key informants from the Indramayu Education and Culture Office, dancers who are direct descendants of the masked puppeteers, other dancers, and cultural observers made comprised the research subjects. The following are the steps used in this study: In this case, researchers used observation, interviews, and documentation guidelines to gather data. Next, they analyzed the data by

condensing it, presenting it (on display), and drawing conclusions. The research subjects were key informants from the Indramayu Education and Culture Office, dancers of the original descendants of the masked puppeteer, other dancers, and cultural observers.

III. RESULT AND DISCUSSION

A. Mathematical concepts contained in the Klana Udeng Mask Dance Musical Instrument
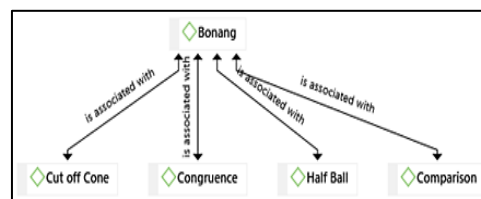
1) Bonang

Figure 1. Bonang's Mathematical Concepts

This bonang typically encounters kemnyang, according to Mami Wangi, a master of masquerade dance at Sanggar Mulya Bhakti Tambi (Interview, 29 June 2022). This bonang is smaller than a gong but has the same size and shape as a gong (congruent). Iron-made Bonang is shaped like a decapitated cone (Andarini et al., 2019). In grade 9 mathematics, the chapter on curved side spaces, the chapter on congruence and similarity, and the chapter on multilevel comparisons all include lessons on cones, spheres, and comparisons (Subehan et al., 2015).
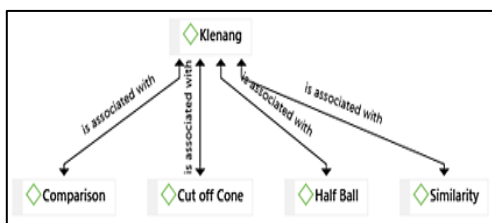
2) Klenang

Figure 2. Klenang's Mathematical Concepts

This klenang sounds like anang anang, according to Mami Wangi, a master of masquerade dance at Sanggar Mulya Bhakti Tambi; possibly this is because it is called klenang (Interview, 29 June 2022). Similar to kenong, klenang likewise resembles a truncated cone due to the higher diameter of the upper circle than the lower one. A hemispherical shape can also be seen at the top of the circle; it is this portion that is struck till it emits sound. In grade 9 mathematics, the chapter on curved side spaces, the chapter on congruence and similarity, and the chapter on multilevel comparisons all include lessons on cones, spheres, and comparisons (Subehan et al., 2015).

3) Saron
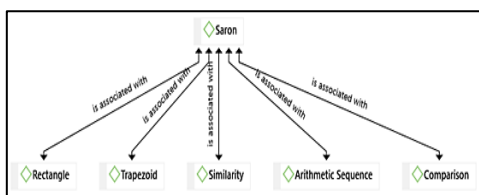
Figure 3. Saron's Mathematical Concepts

When a nayaga is sounded, according to Pak Candra, the tip must be retained to prevent the voice from breaking, and this saron serves as the standard for dancers to follow (Interview, 19 April 2022). The

saron is shaped like a rectangle with a length and width, which when put together will create a trapezoid. This saron's rectangular shape, which increases in length from left to right, indicates that it will mathematically form as an arithmetic sequence. The grade 7 semester 2 quadrilaterals and triangles chapters contain math lessons on rectangles and trapezoids (As'ari et al., 2014). Arithmetic sequences are covered in mathematics lessons for class 11 in the chapter on sequences (Manullang et al., 2017). In grade 9 mathematics, the chapters on congruence and similarity and graded comparisons contain lessons on congruence and comparisons (Subehan et al., 2015).
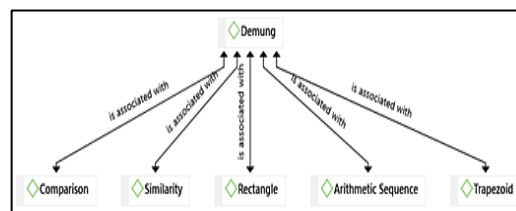
4) Demung

Figure 4. Demung's Concepts of Mathematics

Mami Wangi, a master of masquerade dance at Sanggar Mulya Bhakti Tambi, claims that this demung is shaped like a saron but is larger (Interview, 29 June 2022). The same is true of demung, which likewise has a greater shape from left to right and an increase in length that is the same as an arithmetic sequence. If the rectangle is placed as shown in the image, it will take the form of a trapezoidal flat shape. Chapters on rectangles and

triangles are contained in grade 7 mathematics classes that cover trapezoids and rectangles (As'ari et al., 2014). Arithmetic sequences are covered in mathematics lessons for class 11 in the chapter on sequences (Manullang et al., 2017). In grade 9 mathematics, the chapters on congruence and similarity and graded comparisons contain lessons on congruence and comparisons (Subehan et al., 2015).

5) Gong
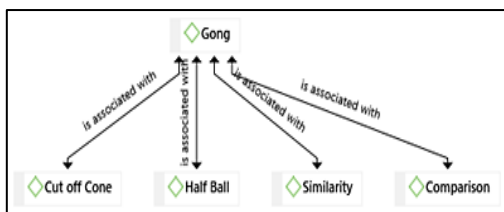
Figure 5. Gong's Concepts of Mathematics

This gong, according to Sanggar Mulya Bhakti Tambi dancer Mba Yani, is one of the standards when dancing (Interview, 3 July 2022). Gong resembles a truncated cone because to the difference in diameter between the top and bottom, while the diameter below is smaller. A half-ball is present in the huge diameter circle; it is this half-ball that is struck to produce sound. Three gongs—small, medium, and giant gongs—are used in mask dancing. There are mathematical ideas embedded in the gong, such as truncated cones, hemispheres, similarities, and comparisons. In ninth-grade mathematics, the chapter on curved side spaces, the chapter on congruence and similarity, and the chapter on multilevel comparisons all include lessons on cones, spheres, similarity, and comparisons (Subehan et al., 2015).
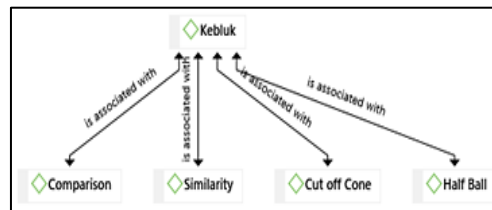
6) Kebluk

Figure 6. Kebluk's Concepts of Mathematics

This kebluk sounds like "bluk bluk," according to Mami Wangi, a master of masquerade dance at Sanggar Mulya Bhakti Tambi. Perhaps this is why it is called "kebluk" (Interview, 1 April 2022). The top and bottom circles of the kebluk have different diameters, with the top diameter being bigger than the bottom one, giving the kebluk the appearance of a truncated cone. The circular has a semi-spherical shape at its summit. In this mask dance, there are 4 kebluk, each of which is the same shape but a different size. The issue of truncated cones, hemispheres, likeness, and comparison can be responsible for this. In ninth-grade mathematics, the chapter on curved side spaces, the chapter on congruence and similarity, and the chapter on multilevel comparisons all include lessons on cones, spheres, similarity, and comparisons (Subehan et al., 2015).
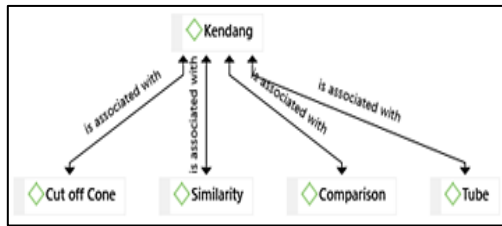
7) Kendang

Figure 7. Kendang's Concepts of Mathematics

Pak Supali Kasim, a humanist, claims that he punched the kendang mask in place of using his hands to sound it (Interview, May 31, 2022). Mathematical ideas, such as the use of decapitated cones and half-spheres as well as similarity and analogies, can be seen in the kendang masks used in musical instruments. In ninth-grade mathematics, the chapter on curved side spaces, as well as the chapter on congruence and similarity, there are lessons on cones, spheres, and congruence (Subehan et al., 2015).
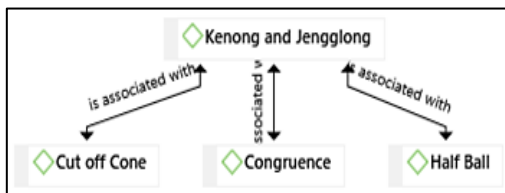
8) Kenong and Jengglong

Figure 8. Kenong and Jengglong Concepts of Mathematics

This kenong and jengglong are sounded together with the same note, claims Mami Wangi, a master of masquerade dance at Sanggar Mulya Bhakti Tambi (Interview, 29 June 2022). There are two headless cones and a half ball in kenong style. The game of Jengglong is shaped like a half-ball and a truncated cone. where the material of a

truncated cone, a half-sphere, and resemblance are mathematical notions. In ninth-grade mathematics, the chapter on curved side spaces, the chapter on congruence and similarity, and other lessons on cones, spheres, similarity, and congruence are covered (Subehan et al., 2015).
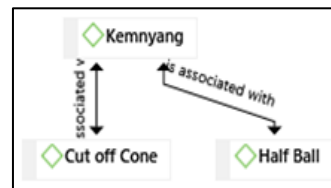
9) Kemnyang

Figure 9. Kemnyang's Concepts of Mathematics

This kemnyang typically faces a bonang, according to Mami Wangi, a mask dancing master at Sanggar Mulya Bhakti Tambi (Interview, 29 June 2022). A sliced cone and a half ball are two mathematical concepts that are present in the kemnyang musical instrument. This is from the chapter on creating curved sides in the ninth-grade maths curriculum (Subehan et al., 2015).
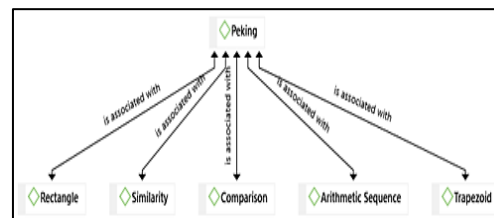
10) Peking

Figure 10. Peking's Concepts of Mathematics

Rectangles, congruences, trapezoids, and arithmetic sequences are among the mathematical notions present in this Peking musical instrument. This can be

found in the mathematics chapter on quadrilaterals and triangles in grade 7 semester 2 that deals with rectangles and trapezoids (As'ari et al., 2014). Arithmetic sequences are covered in mathematics lessons for class 11 in the chapter on sequences (Manullang et al., 2017). In grade 9 mathematics, the chapters on congruence and similarity and graded comparisons provide lessons on similarity and comparison (Subehan et al., 2015). Arithmetic sequences are covered in mathematics lessons for class 11 in the chapter on sequences (Manullang et al., 2017).
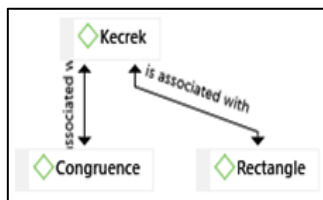
11)   Kecrek

Figure 11. Kecrek's Concepts of Mathematics

Ranti, a dancer at the Mulya Bhakti Dance Studio, claims that this kecrek is a musical instrument that makes a creaking sound when struck with a tool like a hammer (Interview 3 July 2022). Rectangles and congruence are two mathematical ideas present in the kecrek musical instrument. This is from the chapter on quadrilaterals and triangles in the second semester of the grade 7 maths course on rectangles (As'ari et al., 2014). In the chapter on congruence and similarity in grade 9 mathematics, there is

a lesson on congruence (Subehan et al., 2015).
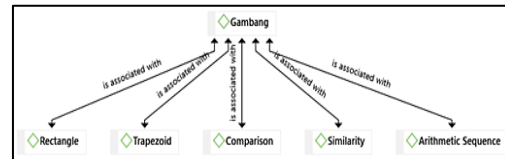
12)   Gambang

Figure 12. Gambang's Concepts of Mathematics

The mathematical ideas of rectangles, trapezoids, arithmetic sequences, and resemblance are all present in this gambang. This can be found in the mathematics chapter on quadrilaterals and triangles in grade 7 semester 2 that deals with rectangles and trapezoids (As'ari et al., 2014). Arithmetic sequences are covered in mathematics lessons for class 11 in the chapter on sequences (Manullang et al., 2017). In the chapter on congruence and similarity in grade 9 mathematics, there is a lesson on congruence (Subehan et al., 2015).

B. Mathematical concepts contained in the Klana Udeng Mask Dance Costume

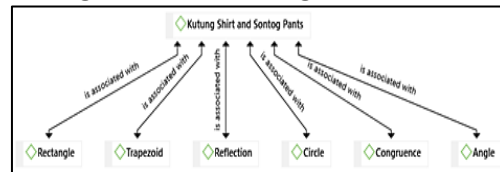1) Kutung Shirt and Sontog Pants

Figure 13. Kutung Shirt and Sontog Pants Concepts of Mathematics

He was known as the kutung shirt because of how short it was, according to Mami Wangi, a master of masks from Sanggar Mulya Bhakti Tambi, and one pair of soitog pants (Interview, 29 June 2022).

Circular shapes, angular shapes, rectangular shapes, as well as similarity and congruence, are all represented mathematically in the kutung shirt and sontong pants. This is covered in the chapter on the flat wake in maths lectures (Hobri et al., 2018). Material with lines and angles (As'ari et al., 2014). Similarity and congruence chapter content (Subehan dl., 2015). Chapter material should be circled (As'ari et al., 2014).
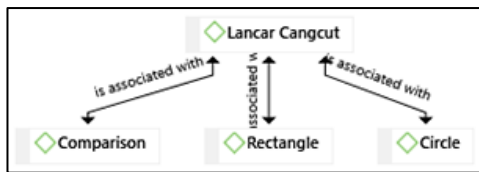
2) Lancar Cangcut

Figure 14. Lancar Cangcut Concepts of Mathematics

If formed before, this lancar cangcut would resemble a rectangle. The circle component comes next. Mami Wangi, a master of masquerade dance at the Mulya Bhakti Tambi class, claims that the short part of the lancar cangcut, which extends from the knee to the top, is five fingers long. Because there shouldn't be any sensuality in the mask dance, it can't be too lengthy or too short for the right leg (Interview, 29 July 2022). Rectangles and circles are the mathematical notions that this lancar cangcut contains. This is covered in the chapter on the flat wake in maths lectures (Hobri et al., 2018). Chapter content should be circled (As'ari et al., 2014).
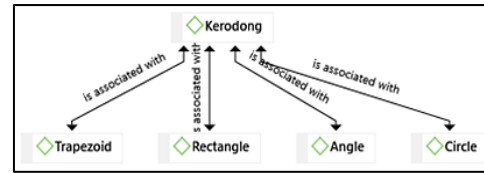
3) Kerodong

Figure 15. Kerodong Concepts of Mathematics

The reason it was termed kerodong, according to Mami Wangi, a master of masquerade dance at Sanggar Mulya Bhakti Tambi, was because many people in the past donned a veil (Interview, 29 June 2022). The kerodong contains the geometrical ideas of rectangles, circles, trapezoids, and angles. This is covered in the triangle and quadrilateral chapters of arithmetic instruction. Material with lines and angles (As'ari et al., 2014). Chapter content should be circled (As'ari et al., 2014). The information in the chapter on flat wake (Hobri et al., 2018). The reason it was termed kerodong, according to Mami Wangi, a master of masquerade dance at Sanggar Mulya Bhakti Tambi, was because many people in the past donned a veil (Interview, 29 June 2022). The kerodong contains the geometrical ideas of rectangles, circles, trapezoids, and angles. This is covered in the triangle and quadrilateral chapters of arithmetic instruction. Material with lines and angles (As'ari et al., 2014). Chapter content should be circled (As'ari et al., 2014). The information in the chapter on flat wake (Hobri et al., 2018).
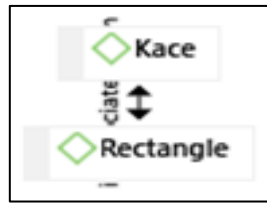
4) Kace

Figure 16. Kace Concepts of Mathematics

Rectangles and parallel lines are examples of mathematical notions in kace. This is covered in the chapter on the flat wake in maths lectures (Hobri et al., 2018). According to As'ari et al. (2014), this is covered in math classes on line and angle topics.
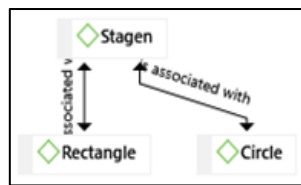
5) Stagen

Figure 17. Stagen Concepts of Mathematics

When used to create a circle, this stagen has a rectangular shape. Therefore, circles and rectangles are the mathematical notions at this level. This is covered in the chapter on the flat wake in maths lectures (Hobri et al., 2018). Chapter content should be circled (As'ari et al., 2014).
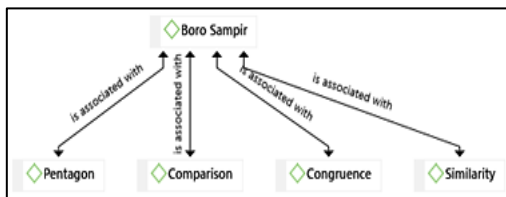
6) Boro Sampir

Figure 18. Boro Sampir Concepts of Mathematics

There used to be just one boro, but Mami Wangi, a master of masquerade dance at Sanggar Mulya Bhakti Tambi, claims that as time passes and innovation increases, there are now three boro sampir (Interview, 29 June 2022). In addition to pentagons, circles, and angles, boro also contains the mathematical ideas of likeness and congruence. According to As'ari et al. (2014), this is covered in math classes on line and angle topics. Similarity and congruence chapter content (Subehan dl., 2015). Chapter content should be circled (As'ari et al., 2014). This is covered in the chapter on the flat wake in maths lectures (Hobri et al., 2018).
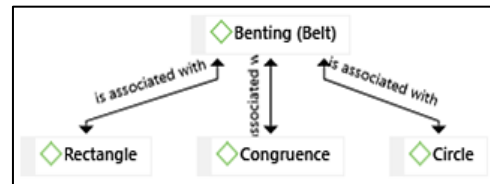
7) Benting (Belt)

Figure 19. Benting (Belt) Concepts of Mathematics

One of the props used in the klana udeng mask dance is the benting. This significant item is shaped like a series of rectangular pieces with a circle in the center. Circles, rectangles, and congruences are hence the current mathematical constructs. Similarity and congruence chapter content (Subehan dl., 2015). Chapter content should be circled (As'ari et al., 2014). This is covered in the chapter on the flat wake in maths lectures (Hobri et al., 2018).
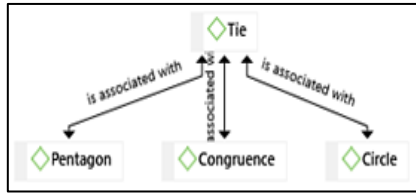
8) Tie

Figure 20. Tie Concepts of Mathematics

Some claim that this tie has Portuguese influences because there were Portuguese in ancient times, while others assert that the meaning is to use the Bima puppet while wearing a snake necklace, according to Mami Wangi, a masked maestro at Sanggar Mulya Bhakti Tambi. In ancient times, ties were used to indicate a person's degree and featured gold coin accents (Interview, 29 June 2022). This tie features coins, congruence, and similarity in addition to a mathematical element around the neck in the form of a pentagon circle. According to As'ari et al. (2014), this is covered in math classes on line and angle topics. Similarity and congruence chapter content (Subehan dl., 2015). Chapter content should be circled (As'ari et al., 2014). The information in the chapter on flat wake's mathematics lesson (Hobri et al., 2018).
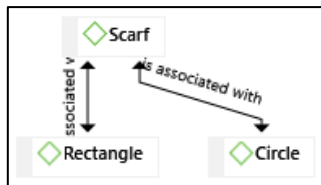
9) Scarf

Figure 21. Scarf Concepts of Mathematics

The length of the scarf required for the klana udeng mask dance, according to Ranti, a dancer with Sanggar Mulya Bhakti Tambi, is ankles. The udeng clan doesn't perform the soccer soder movement that is seen in other mask dances, but senior dancers typically still wear one of the long scarves because they typically perform a variety of mask dances (Interview, 3 July 2022). The shawl has geometric shapes like circles and rectangles. This is covered in the chapter on the flat wake in maths lectures (Hobri et al., 2018). Chapter content should be circled (As'ari et al., 2014).
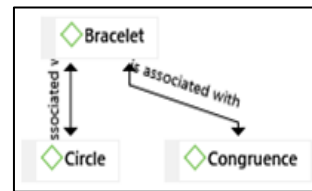
10) Bracelet

Figure 22. Bracelet Concepts of Mathematics

The bracelets worn on the hands and feet are known as binggel, according to Mami Wangi, a disguised dance instructor at Sanggar Mulya Bhakti Tambi, although they are not permitted to wear bracelets that read (Interview, 29 June 2022). The bracelet contains mathematical components, such as circles, similarity, and congruence. This is part of the chapter's information on congruence and resemblance (Subehan dl., 2015). Chapter content should be circled (As'ari et al., 2014).
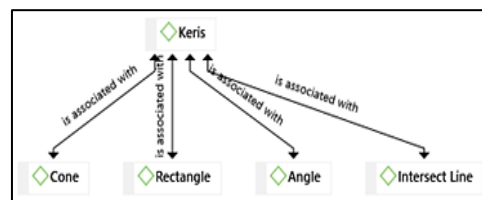
11) Keris

Figure 23. Keris Concepts of Mathematics

This keris contains a mathematical element in the form of a cone at the keris cover's end as well as a rectangular element, and it also contains corners. This

can be discovered in math classes that cover lines and angles (As'ari et al., 2014). flat structures in math courses (Hobri et al., 2018). The information in the chapter on creating curved lateral spaces (Hobri et al., 2018).
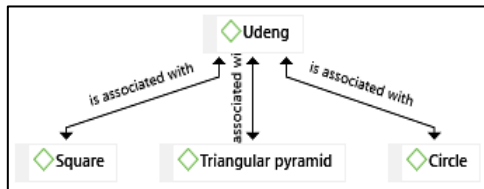
12)   Udeng

Figure 24. Udeng Concepts of Mathematics

Udeng is made of triangle or square-shaped fabric, according to Mba Yani, a mask dance performer at the Mulya Bhakti Tambi studio (Interview July 3, 2022). Circles, squares, and triangles make up the mathematical building blocks of udeng. Chapter content should be circled (As'ari et al., 2014). This is covered in the chapter on the flat wake in maths lectures (Hobri et al., 2018).
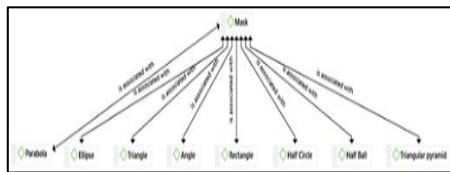
13)   Topeng

Figure 25. Mask Concepts of Mathematics

The klana udeng mask's nose, in the opinion of puppeteer Pak Suparma, is overly long (Interview, 3 July 2022). The mask has a mathematical component, which is represented by the ball and eye corner in each of the two eyes. Triangles on the crown, triangular pyramids on the

nose, parabolas above the eyes, similarity and congruence. According to As'ari et al. (2014), this is covered in math classes on line and angle topics. Similarity and congruence chapter content (Subehan dl., 2015). The content for the flat side space and circle chapters (As'ari et al., 2014). The information in the chapter on flat wake (Hobri et al., 2018). Material with parabolas and ellipses (Yuniarto, 2017).

The curriculum includes the application of learning using the concept of ethnomathematics to help students become not only intelligent or skilled learners, but also deeply and exceedingly knowledgeable about how ethnomathematics can cover all areas of education, including cognitive, affective, and psychomotor learning as well as developing good manners and character. the exquisite sense of regional culture, which defines Indonesia's national identity.

The nation's character is shaped by the contribution given by ethnomathematics, particularly that of the students who receive an education. The learning approach teaches students not only how to become technologically proficient but also how to become competitive, character-driven individuals who love their country by recognizing and assimilating culture as the foundation for science and technology.

With all of their benefits, international standard schools—which even teach their students in English on a daily basis—are

likely to make people less appreciative of their country's cultural values (Wuryandani, 2015; Nova & Putra, 2022).

Given the cultural variety of Indonesia, it is important to include local cultural values into mathematics education to avoid having mathematics viewed as a science divorced from practical application (Irfan & Widodo, 2017; Susilo & Widodo, 2018; Nurhasanah & Puspitasari, 2022). This is due to the fact that mathematical concepts found in cultural activities are seen to be crucial to understanding mathematics (Prabawati, 2016; Diniyati et al., 2022; Fauzi et al., 2023).

IV. Conclusion

Results based on research and discussion can be said that: Mathematical concepts such as lines, angles, flat waking, waking flat side space, construct curved side space, circle, and arithmetic row can be found on musical instruments such as the bonang, klenang, saron, demung, gong, kebluk, kendang topeng, kenong and jengglong, kemnyang, peking, kecrek, and gambang, among others, that are used to. The mathematical concepts of line, angle, translational motion, rotational motion, flat wake, flat side space, curved side space, circle, and arithmetic sequence are incorporated into the klana udeng mask dance costumes, which include kutung clothes, sontog pants, fluent cangcut, kerodong, kace, stagen, boro sampir, bent, tie, shawl, keris bracelet, udeng, and mask. It is hoped that the results of this research

can become teaching material for ethnomathematics in Indramayu Regency schools and a source for conducting studies on other buildings in Indramayu Regency. It is hoped that ethnomathematics will grow and develop along with the development of innovation and technology to become parts that go hand in hand and complement each other.

Acknowledgments

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Zuhroutul Mufidah.

NO IMAGE AVAILABLE

Students who are completing the undergraduate mathematics education program studying at the Wiralodra University mathematics education study program.