IJIET, e-ISSN 2548-8430, p-ISSN 2548-8422, Vol. 9, No. 1, January 2025, pp. 186-212

International Journal of Indonesian Education and Teaching
http://e-journal.usd.ac.id/index.php/IJIET
Sanata Dharma University, Yogyakarta, Indonesia

ETHNOMATHEMATICS STUDY OF PRAMBANAN RAMAYANA BALLET AND THE APPLICATION OF CONTEXT IN MATHEMATICAL PROBLEMS

Monica Tiara Gunawan[1], Hongki Julie[2*], and Marcellinus Andy Rudhito[3]
[1,2,3]Sanata Dharma University, Indonesia
monicatiara416@gmail.com[1], hongkijulie@yahoo.co.id[2] and rudhito@usd.ac.id[3]
*correspondence: hongkijulie@yahoo.co.id
https://doi.org/10.24071/ijiet.v9i1.9371
received 1 August 2024; accepted 31 January 2025

2

Abstract

This research aimed to describe the history of Ramayana Ballet Prambanan performances, the performance of the second half of the "*Anoman Obong*" scene, the philosophical meaning and characteristics of the second half of "*Anoman Obong*", the training of dancers of the second half of "*Anoman Obong*", and the fundamental activity of mathematics in the second half of "*Anoman Obong*". This qualitative research examined ethnomathematics in the cultural context of Ramayana Ballet Prambanan. Data were collected through observation, interviews, and documentation, with validation through experts and triangulation of sources and techniques. Data analysis included data reduction, presentation, and conclusion drawing. The results showed five mathematical activities in the history of Ramayana Ballet Prambanan, namely *counting*, *locating*, *measuring*, *playing*, and *explaining*. There are five mathematical activities in the second half performance of "*Anoman Obong*", namely: *counting*, *locating*, *measuring*, *designing*, and *explaining*. There existed four mathematical activities in the philosophical meaning of the second act of "Anoman Obong", namely *counting*, *locating*, *designing*, and *explaining*. The *counting*, *locating*, and *measuring* activities were present in all data classes and can be used for learning mathematics in the domains of numbers, algebra, geometry, and measurement. The *designing* activity was only present in the second, third, and fourth data classes, and can be applied in math learning.

Keywords: *Anoman Obong*, domain test, fundamental mathematical activity, Prambanan Ramayana ballet

Introduction

Ethnomathematics was first introduced by D'Ambrosio in 1985, ethnomathematics itself is mathematics used by identifiable cultural groups, such as in cultural tribal communities, groups of workers, children of a certain age, and professional classes (Ambrosio, 1985). This is also in line with the opinion (Cimen, 2014), that ethnomathematics is mathematics practiced by a cultural group that shares similar experiences and practices with mathematics in a distinctive and unique form. According to Barton (1996), ethnomathematics is mathematics

This work is licensed under CC BY-SA.
Creative Commons Attribution-ShareAlike 4.0 International License.

practiced among identifiable cultural groups. According to Borba (1990), humans interact using the language and codes of their socio-cultural groups, which reflect their knowledge, including mathematics. Mathematical knowledge expressed in the language of a particular socio-cultural group is called ethnomathematics. The term ethnomathematics links mathematical practices to cultural contexts referring to "*ethno*" or culture, "*mathema*" or mathematical understanding, and "*tics*" or technical skills (Rosa & Orey, 2011). This is also in line with the opinion of Rusli dan Safaah (2023), who says that ethnomathematics is the study of mathematics through culture, integrating mathematical concepts and methods used by various cultural groups, including indigenous communities, workers, professionals, and children. This study emphasizes cultural history to develop measurement, calculation, reasoning, and classification techniques, which help explain environmental phenomena and social contexts. According to Bishop (1988), there are six fundamental mathematical activities in ethnomathematics studies, namely *counting*, *locating*, *measuring*, *designing*, *playing*, and *explaining*. The following is an explanation of each fundamental mathematical activity according to Magnusson (2023).

Counting activity: This activity involves a systematic method of comparing and ordering countable phenomena and using numbers, words, or real objects to indicate quantities. Ways of counting and describing quantities may vary depending on culture and tradition. Generally, this activity deals with ideas about relationships with numbers.

Locating activity: This involves exploring the spatial environment and describing that environment, such as creating maps, diagrams, or graphs that show cultural or geographical relationships, or mapping mathematical concepts within a particular culture.

Measuring activity: This activity refers to measuring qualities for comparison and management purposes, as well as properties in a cultural context related to everyday life. This process involves the use of measures, such as length, weight, time, temperature, volume, and various other attributes that may vary according to culture and tradition.

Designing activity: This activity involves creating patterns, shapes, or designs for objects or spatial environments. Designing activities generally involve mathematical concepts such as symmetry, proportion, and pattern.

Playing activity: This refers to the use of games and entertainment in society that involve rules that players must follow. This includes rules and norms that must be adhered to in cultural traditions.

Explaining activity: This means finding ways to explain the existence of phenomena in a cultural context. Explaining involves trying to answer the question "*why*", this can involve using language, stories or myths to explain mathematical concepts, or using legends or symbols to give meaning to mathematical numbers or phenomena.

Ethnomathematics is important to be integrated into mathematics learning and needs to be included in the school curriculum to create a more inclusive learning environment that respects cultural diversity (Brandt & Chernoff, 2015). This is because mathematics and culture are an inseparable part of everyday life so they can be used as a source of mathematics learning for students (Alvian et al., 2021). In line with this opinion, Yılmaz (2020) said that it is important to incorporate

ethnomathematics into every math class because it can help students develop their understanding. Ethnomathematics allows students to relate mathematical concepts to their previous experiences and cultural knowledge, thus making learning more relevant and easy to understand. In addition, the benefits of ethnomathematics in learning can be used to stimulate student creativity and develop their mathematical literacy skills (Runtu et al., 2023).

According to Widada et al. (2019), ethnomathematics plays a role in helping students build mathematical concepts, focusing on their knowledge of their social and cultural environment. The city of Yogyakarta has a variety of cultures that can be adopted in mathematics learning such as the Ramayana Ballet Prambanan performance (Richardo et al., 2023). Ramayana Ballet Prambanan is a performance that combines art, drama, and traditional Javanese dance. The uniqueness of this performance is that the dialog in the drama is poured into gesticulation movements that have meaning, especially in the body attitude, and hand and head movements of the dancer. This performance features flexible "*wayang wong*" (*wong* = people) and is accompanied by the strains of sinden songs and Javanese gamelan. The show is performed on two stages: an open stage with Prambanan Temple in the background that creates a mystical atmosphere under the full moon, and a closed stage called Trimurti located west of the temple. The uniqueness lies in the lighting and layout of the lamps that enhance the aesthetics and dynamics of the performance. The Ramayana story, which is depicted in the reliefs of the Prambanan Temple and is a Hindu book by Walmiki, is presented in the dance performance through the process of ekranization.

The beauty of Prambanan Temple and the Ramayana Ballet Prambanan performances have had a positive impact on the economic growth of the region and the local community, by attracting local and foreign tourists. In particular, the second act "*Anoman Obong*" has become very popular due to the inspirational character of "Anoman" for the younger generation. Anoman, the son of Dewi Anjani and Batara Guru, plays the role of a superhero who fights to save Dewi Shinta from Rahwana. The relevant research that supports this research is research conducted by Widada et al. (2019) which states that there is ethnomathematics potential in the Gayo community, such as traditional measuring instruments and ethnic artefacts such as Gayo filigree motifs and Umah Pitu Ruang traditional houses, which can be used to develop mathematics learning. Measuring tools can be applied to measurement topics in grades II and III, while artefacts can be used to teach geometry at the elementary and junior high school levels.

Furthermore, research conducted by Sari et al. (2023) states that mathematics learning using ethnomathematics and problem-based models is very effective. Students more easily understand the material with everyday objects and recognize local culture and through ethnomathematics can strengthen national identity by combining culture in mathematics learning. Research conducted by Fitriyah dan Fitriani (2021) states that there are six basic mathematical activities in the "*Syawalan*" tradition in Kaliwungu Kendal, namely *explaining*, *designing*, *measuring*, *calculating*, *location*, and *playing*. These activities involve ritual history, geometry design on fences and carnival objects, determination of direction and position with optimization methods, measurement of blanket size with geometry concepts, and counting rituals and games at the carnival. The purpose of this research is to analyze the fundamental activities of mathematics in Ramayana

Ballet Prambanan in four important aspects, namely history, the second act performance of "*Anoman Obong*", the philosophical meaning and characteristics of "*Anoman Obong*", and the training of dancers. This research is expected to be one of the efforts to preserve and promote Ramayana Ballet Prambanan to students through an educational context.

Method

The type of research used is qualitative research because the purpose of this research is to explore the phenomena that exist in Ramayana Ballet Prambanan and analyze the fundamental mathematical activities that exist in Ramayana Ballet Prambanan. This research is in line with qualitative research because it aims to deeply understand the phenomenon of performance by describing the situation and reality in the field. (Nugrahani, 2014).

In this research, the researcher is the main instrument, but to collect data in depth, the researcher uses auxiliary instruments to collect data, namely interview sheets, and observation sheets. The interview sheet contains questions for the interviewees, while the observation sheet is used to record observations during performances and interviews.

Interviews were conducted with the cast of the Anoman character as well as practitioners of dalang as well as the creator of Ramayana Ballet Prambanan accompaniment. Instrument validation in this study was conducted through expert validation, while data validity was tested using triangulation of sources and techniques, because the data collection process was carried out using two different methods, namely interviews and observations, and interviews were conducted with two different sources. Triangulation aims to ensure consistent and accurate data. (Sugiyono, 2014). There are three stages of data analysis techniques in this study, namely: data reduction, data presentation, and conclusion drawing/verification (Miles et al., 2014).

Findings and Discussion

History of Ramayana ballet Prambanan

The history of the establishment of Ramayana Ballet Prambanan was initiated by the Indonesian government to increase tourism, which was then planned and organized by the Head of the Department of Land Transportation, Post, Telecommunications and Tourism Mr. G.P.H. Djatikusumo. The idea of this performance was inspired when Djatikusumo watched the ballet in front of Angkor Wat Temple while on a comparative study in Cambodia. After considering the location of the performance, the Yogyakarta area, especially Prambanan Temple, was chosen as the performance location, this is because of the reliefs of the Ramayana story in the temple and the history of the independence struggle in the area. The selection of the Ramayana story is also based on the universality and philosophy of life contained in it. The following presents the reliefs of the Ramayana story found in Prambanan Temple.



Figure 1. Ramayana story reliefs at Prambanan temple

The Ramayana Ballet was first staged on July 26, 1961, and inaugurated by Ir. Soekarno on August 25, 1961, with the presence of major figures such as Charlie Chaplin and several ambassadors. The show began to be staged in the Plataran of Prambanan Temple in 1961, but around 1980 the open stage and Trimurti stage (closed) were built for performances according to the season. The following appendix presents the open stage and closed stage.



Figure 2. Open stage and closed stage (Trimurti)

Originally, the show was only performed on the full moon and the 15th of the Javanese Calendar, but now it is performed every Tuesday, Thursday, and Saturday.

Before the COVID-19 pandemic, the show consisted of six acts, but now it has been condensed into four acts only, namely "*Shinta Ilang*", "*Anoman Obong*", "*Kumbakarna Gugur*", and "*Shinta Obong*". The performance is held at 19.30 to 21.30 WIB. The uniqueness of Ramayana Ballet has several uniqueness, namely the first dance style is a combination of Surakarta style and Yogyakarta style, so it is called Ramayana Ballet Prambanan, the dancers come from the Roro Jongrang Foundation which was established in 1961 with unique costumes and makeup on Wanara characters (monkey soldiers) using "*sinwit*" which is paint or iron powder colored red, yellow, green, and blue, in the second round "*Anoman Obong*" becomes an attractive round with fire and lighting effects that excite and the background of Prambanan Temple which adds to the aesthetics of the show.
There are five fundamental mathematical activities in the history of Ramayana Ballet Prambanan, namely: *counting*, *locating*, *measuring*, *playing*, dan *explaining*. The following is a description of the five fundamental mathematical activities.

a. *Counting*
   The *counting* activity is found in the presence of quantification that shows the amount. In addition, there is a calculation of certain objects or quantities which includes the use of numbers in the following sentences;
   1. Ir. Soekarno at the inauguration of Ramayana Ballet Prambanan came together with great figures such as Charlie Chaplin and several ambassadors from other countries.
   2. The location of the performance was chosen through deliberation with several choices, namely in Kalimantan, Bali and Java,
   3. Before the COVID-19 pandemic, the show consisted of 6 acts, then condensed into 4 acts: "*Shinta Ilang*", "*Anoman Obong"*, "*Kumbakarna Gugur*", and "*Shinta Obong*",
   4. Ramayana Ballet Prambanan has several uniqueness, the first is the dance style is a combination of Surakarta style and Yogyakarta style,
   5. Second, the dancers come from the Roro Jonggrang Foundation which was established in 1961, with the costumes and makeup of monkey soldiers using "*sinwit*" in red, yellow, green, and blue,
   6. Third, the Ramayana story in 4 acts is simpler than the Mahabrata,
   7. Another uniqueness, in the second act the scene "*Anoman Obong*" is very interesting for tourists because of the attraction of fire and the use of lighting that adds beauty.

b. *Locating*
   The *locating* activity involves determining the position of a certain object in the following sentences;
   1. The history of Ramayana was inspired by a ballet performance in front of Angkor Wat Temple, Cambodia,
   2. G.P.H. Djatikusumo, during a comparative study of Cambodia, witnessed a ballet performance in front of the temple,
   3. Due to the crowded conditions of Bali, Yogyakarta was chosen, especially Prambanan,
   4. The reliefs of the Ramayana story in Prambanan Temple support this performance art because it has life values,

5. Performances began to be staged at the Prambanan Temple Plataran in 1961,
6. The performance location with the background of Prambanan Temple adds a unique aesthetic touch.

c. *Measuring*
The activity of *measuring* has the object of measurement in time in the following sentences;
1. Ramayana Ballet Prambanan was first staged on July 26, 1961, and inaugurated by Ir. Soekarno on August 25, 1961,
2. Around 1980 or 1990, the Open Stage and Trimurti Stage were built for performances according to the rainy and dry seasons.

d. *Playing*
The *playing* activities have rules that must be followed, such as the rules of performance time in the following sentences;
1. Originally, performances were performed on the full moon and the 15th according to the Javanese Calendar,
2. Currently, the show is performed every Tuesday, Thursday, and Saturday at 19:30 to 21:30,
3. Dancers have come from the Roro Jonggrang Foundation since 1961, with special costumes and makeup for Wanara characters using "sinwit" in red, yellow, green, and blue.

e. *Explaining*
The activity of *explaining* there is an explanation related to the existence of phenomena in the show. In the following sentences;
1. Ramayana Ballet Prambanan is a performance that combines art, drama without dialog, and dance on the Ramayana story,
2. The show was established as an Indonesian government project to boost tourism, handed over to G.P.H. Djatikusumo,
3. The location of the show was chosen in Prambanan, Yogyakarta, for strategic and historical reasons, including the participation of the people of Prambanan in the guerrilla war,
4. The Ramayana story contained in the reliefs of Prambanan Temple is actualized in the form of performing arts,
5. Ramayana Ballet Prambanan was first staged on July 26, 1961, and inaugurated by Ir. Soekarno on August 25, 1961, with the presence of major figures,
6. This performance has a Prambanan dance style which is a combination of Surakarta and Yogyakarta styles.
7. The Ramayana story in this performance focuses more on 4 acts and is simpler than the Mahabrata story

The following is a summary of the fundamental mathematical activities in the history of Ramayana Ballet Prambanan.

Table 1. Fundamental math activities in the history of Ramayana ballet Prambanan

Counting	Locating	Measuring	Playing	Explaining
Identify the number of acts in a performance.	Determining the position of the performance location, such as in front of Angkor Wat Temple and Prambanan Temple Plataran	Measure the time of the performance, both the first date and the approximate time.	Following the rules of time and characteristics, such as the full moon and the color of "sinwit"	Describes various aspects such as the existence, location, name, and story chosen for the show.

Furthermore, after analyzing fundamental mathematical activities, researchers designed problems that can be used in learning mathematics in the classroom, especially for VII grade students. These problems can trigger students' authentic strategies in thinking and solving problems. The following are presented problems for each fundamental mathematical activity that can be given to seventh grade students in mathematics learning.

a. *Counting*

The *counting* activities help students develop basic numeracy skills that are essential in math. By counting, students learn to organize numerical information and identify patterns. In counting activities, problems can be created in the number domain and algebraic domain for grade VII SMP such as operations in numbers and determining performance time. There are examples of problems that can be made:

1. How many years is the gap between the first performance of Ramayana on July 26, 1961, and today?
2. Ramayana Ballet Prambanan was first performed on July 26, 1961. In which year did Ramayana Ballet celebrate its 50th anniversary?
3. If Ramayana Ballet is performed every Tuesday, Thursday, and Saturday, how many performances are there in a month consisting of 4 weeks?
4. If it was originally performed only on the full moon and the 15th of the Javanese Calendar in a month, and is now performed every Tuesday, Thursday, and Saturday in a month, how many times more often is it performed now than before?
5. The first performance of Ramayana Ballet Prambanan was inaugurated on August 25, 1961. How many days were there between the first performance on July 26, 1961, and the inauguration by Ir. Soekarno on August 25, 1961?
6. The Ramayana Ballet performance lasts from 7:30 pm to 9:30 pm. If x is the duration of the performance in hours, write an algebraic equation that expresses the relationship between the start time and end time of the performance. Determine the value of x!
7. If the total time in one day is 24 hours and the duration of each Ramayana Ballet performance is 2 hours, write an algebraic equation to calculate the percentage of time used for the performance and determine the value of the percentage.

1. *Locating*
   The *locating* activities help students understand the concepts of location and position in a geographical or spatial context. This is useful in developing map reading skills and understanding relationships between places. In the locating activity, problems can be created in the geometry domain for class VII SMP such as location coordinates, as well as determining the shortest route. Examples of problems that can be created are:
   1. Suppose: the location of the open stage is located at coordinates (-5, 4), while the closed stage is located at coordinates (7, 5) and the bus parking lot is located at coordinates (-1, -11). If the entrance ticket booth is located in the middle between the open stage and the closed stage, what are the coordinates of the location of the entrance ticket booth to the bus parking lot?
   2. An audience is at the open stage and wants to go to the closed stage (Trimurti) and then to the bus parking lot. If the distance from the open stage to the covered stage (Trimurti) is 113 meters to the north and from the covered stage (Trimurti) to the bus park is 50 meters to the east, what is the total distance that the audience must travel?

2. *Measuring*
   The *measuring* activities teach students measurement skills that involve the use of units and measuring instruments. This is important in math, as well as everyday life. In measuring activities, problems can be created in the measurement domain for grade VII SMP such as measuring the stage area and measuring the performance time. Examples of problems that can be made:
   1. If an audience member sits 4.5 meters from the open stage and walks 3.1 meters forward towards the stage, what is the audience member's distance from the stage now?
   2. What is the duration of each act in this performance?
   3. If in one performance there are 200 spectators on the open stage and 100 spectators on the closed stage (Trimurti), what is the ratio of the number of spectators on the open stage to the Trimurti stage?

1. *Playing*
   The *playing* activities help students understand the concept of play in the context of time and frequency. It also teaches the importance of schedules and routines. In playing activities, problems can be created in the number domain as well as data analysis and uncertainty for grade VII SMP such as number operations and compiling patterns in tables. Examples of problems that can be created:
   1. If the show is performed every Tuesday, Thursday, and Saturday, how many times is the show performed in one week?
   2. Ramayana Ballet Prambanan is performed on Tuesday, Thursday, and Saturday. Arrange the weekly pattern in a table for the performance schedule for one month (4 weeks). Determine how many performances are performed in one month.

2. *Explaining* (menjelaskan)
   The *explaining* activities develop students' ability to understand and convey information. This is important for communication skills and a deeper understanding of concepts. In explaining activities, problems can be created in the number domain for grade VII, such as explaining comparison and explaining averages. There are examples of problems that can be made:
   1. Before the COVID-19 pandemic, Ramayana Ballet performances consisted of six acts, but have now been condensed to four. What percentage reduction in the number of acts has occurred? Explain how you calculated it!
   2. If there are 12 performances of Ramayana Ballet Prambanan in one month, and the average audience for each performance is 320 people, what is the total audience in one month? Explain how you calculated it!



Figure 2. Ramayana Ballet performance of the second half of the "*Anoman Obong*" scene

Anoman is a white ape figure in the Ramayana story who acts as an ambassador of Sri Rama. Anoman in Sanskrit means "The Big Jaw", Anoman is also the son of Batara Guru and Dewi Anjani. In the beginning, Dewi Windradi had 3 children named Dewi Anjani, Guwarsa, and Guwarsi, they fought over "*Cupumanik Astagina"* which contains the beauty of the universe, so Resi Gotama who is their father threw the object away.

While looking for it, Guwarsa and Guwarsi turned into apes after entering the Sumala Spring, while Dewi Anjani only washed her face and hands, making her have an ape-like face and hands. Resi Gotama advised them to meditate in different ways, Dewi Anjani meditated "*nyantoka*" or like a frog, Guwarsa meditated like a bat hanging on a tree, and Guwarsi meditated like a deer in the forest. Batara Guru who was flying above Dewi Anjani dropped a tamarind leaf or "*sinom*" on Dewi Anjani's lap. After eating the tamarind leaves, Dewi Anjani conceived and gave birth to Anoman, but he died after giving birth or in the Javanese language called "seda kunduran". Finally, Batara Bayu disguised as Resi Maruto took care of Anoman and gave him clothes similar to Batara Bayu such as poleng cloth, jarot asem fertilizer on his head, gelung minangkara, and balibar mangosteen, for example. Batara Bayu also taught him various things. Batara Bayu also taught him various magical powers such as Ajian Pameling, Ajian Sepiangin, and Ajian

Mundri, while Anoman has several other names such as "Senggana" which means hope and will, "Guru Putra" which means the son of Batara Guru, and "Dayapati" which means Anoman was sent by Rama to fight against Rahwana in order to reclaim Shinta.

The second act of Ramayana Ballet Prambanan is called "*Anoman Obong*" because there is a burning scene of Anoman that becomes the main highlight. In this scene, Anoman is chosen as Rama's messenger to go to Lanka with the three senopati. However, on the way they are tricked by Sayempraba who is a concubine of Rahwana by offering poisonous fruits and making them blind, but because of Anoman's magic, he manages to save the three senopati and continue the journey by using his inner vision. Then Anoman met Garuda Sempaki who was unable to fly, because Garuda Sempaki knew that Anoman was Rama's messenger he healed the eyes of the four senopati, and in return Anoman also healed Garuda Sempaki's wings so that he could fly again. Anoman continued his journey to Alengka alone, when he arrived at Argasoka Park he saw Rahwana seducing Shinta, he disguised himself as a small monkey so as not to make anyone suspicious. After Rahwana left, he approached Shinta and conveyed the message that he came as Rama's messenger by giving a ring from Rama and telling Shinta that Rama would come to pick her up. In the next scene Anoman appears in the scene "*Anoman Kiprah*" which shows his expertise in dancing and destroying Argasoka Park, but he was captured by Indrajit who is the son of Rahwana using the Nagapaksa Arrow.

In the next scene, "*Pasewakan Alengka*" Rahwana wanted to kill Anoman but was prevented by Wibisana because an Ambassador should not be killed, hearing this Rahwana kicked out Wibisana and Kumbakarna and ordered Indrajit to burn Anoman in Alengka Square. In the next scene, after the dancers enter, the fire is prepared, the fire attraction by the raksaksa dancers and ends with Anoman being burned or lobong but because of his magic Anoman is not burned and he destroys the whole of Lanka with fire. The last scene in this act is very meaningful and is awaited by audiences of all ages because of the spectacular fire attraction.

This second half performance required tools and materials to display the fire attraction in the "*Anoman Obong*" scene such as torches, wicks, baking pans or gongseng, rapak, buckets, scissors, a mixture of kerosene and pertalite, fireworks, rags, raffia, and trolleys.

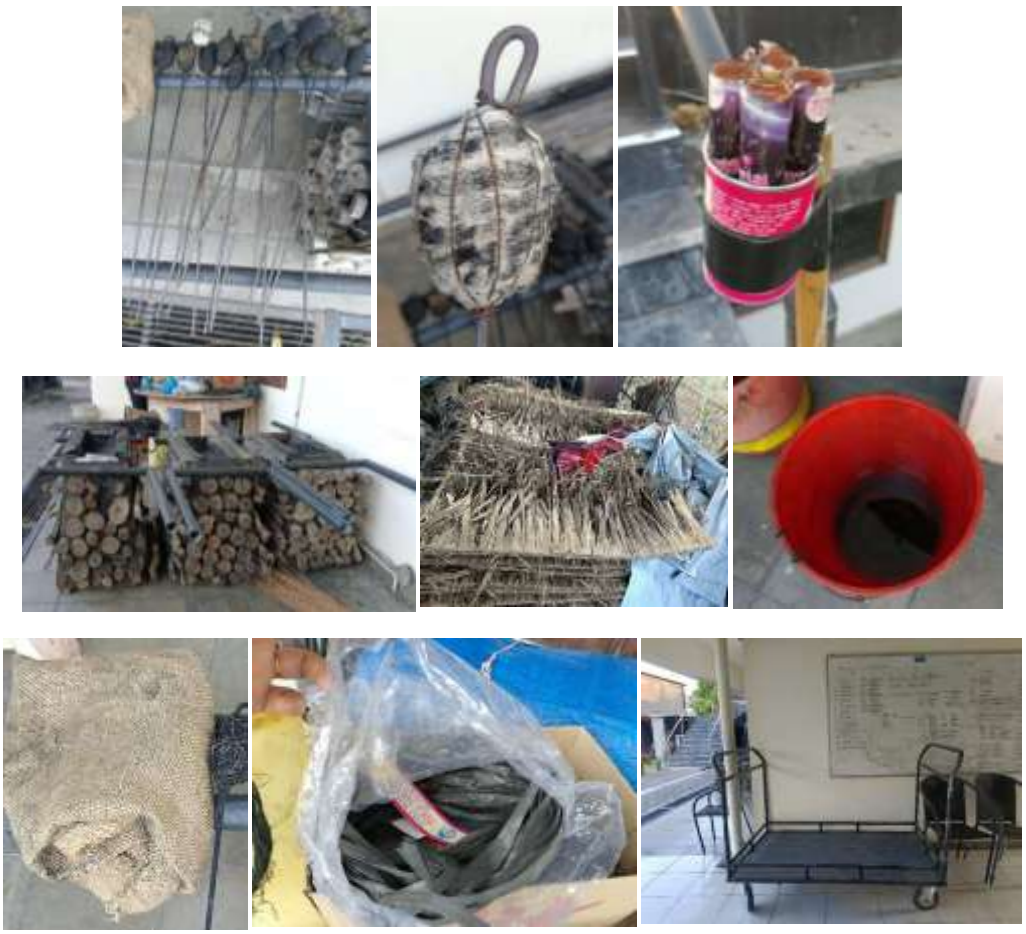


Figure 3. Tools and materials for "*Anoman Obong*" scene

The upper stage area used by Anoman is divided into three parts, namely the left and right sides used for the $10.1m \times 8.2m$ rapak area, and the center side of $6m \times 8.2m$ used for fire attractions.



Figure 4. Left side and right side of the upper stage



Figure 5. Center side upper stage

There are five fundamental mathematical activities in the second act of Ramayana Ballet Prambanan performance "*Anoman Obong*", namely counting, locating, measuring, designing, and explaining. The following is a description of the five fundamental mathematical activities.

a. *Counting*

The activity of *counting* is the presence of a certain number of objects or quantity in the following sentences;

1. Dewi Windradi had three children: Dewi Anjani, Guwarsa, and Guwarsi,
2. Anoman was given clothes similar to Batara Bayu, including poleng cloth, jarot asem fertilizer, gelung minangkara, balibar manggis and others,
3. Anoman has several powers, including "Ajian Pameling", "Ajian Sepiangin", and "Ajian Mundri",
4. Anoman was chosen as an ambassador to Lanka along with three senopati: Anggada, Anila, and Jembawan,
5. Anoman is able to form a circle of fire with both hands,
6. Loyang or Gongseng is 1.5 meters long, 65 cm high, and 35 cm wide,
7. The bucket is used to mix 10 liters of kerosene and 5 liters of pertalite,
8. The upper stage area is divided into three parts: left, center, and right side,
9. The left and right sides of the stage are 10.1 meters long and 8.2 meters wide, while the middle side is 6 meters long and 8.2 meters wide.

b. *Locating*

The locating *activity* involves determining the position of an object in the following sentences;

1. After looking for "Cupumanik Astagina", they arrived at Sendang Sumala. Guwarsa and Guwarsi entered the water and turned into apes, while Dewi Anjani only washed her face and hands, so that her face turned into an ape and her hands were hairy like an ape,
2. Resi Gotama advised Dewi Anjani to meditate "nyantoka" or meditate like a frog, Guwarsa to meditate like a bat hanging on a tree, and Guwarsi to meditate like a deer in the forest,
3. Batara Guru, flying above Dewi Anjani, is attracted and drops a tamarind leaf or "sinom" on Dewi Anjani's lap,

4. In the second act of "Anoman Obong", Wanara meets Sugriwa, Rama, and Lakshmana at Kiskenda Cave to select Rama's envoy,
5. Anoman is chosen as the ambassador to Lanka along with three senopati: Anggada, Anila, and Jembawan,
6. On the way, they were deceived by Sayempraba, Ravana's concubine, who gave them poisoned fruit and blinded them,
7. Anoman uses his inner vision to save the three senopati and continues the journey to Lanka,
8. Anoman continues his journey to Lanka alone,
9. In Argasoka Park, Anoman sees Rahwana seducing Dewi Shinta who refuses, causing Rahwana's anger, but is successfully prevented by Trijata,
10. Anoman appears in the "Anoman Kiprah" scene, showing his skill in dancing and destroying Argasoka Park,
11. Anoman is brought to the kingdom of Lanka,
12. Ravana, in his anger, drives away Wibisana and Kumbakarna and orders Indrajit to burn Anoman in Alengka Square,
13. Trolleys are used to transport the treads used in open-air stage performances.

c. *Measuring*

The activity of *measuring* has the object of measurement in time. In addition, there is an object of measurement in terms of volume, and an object of measurement in terms of length, width, and area of the stage in the following sentences;

1. The torch used in the performance is 77 cm long,
2. Loyang or Gongseng is 1.5 meters long, 65 cm high, and 35 cm wide,
3. The average duration of the fire on the torch wick in the "*Anoman Obong*" scene is about 3 to 5 minutes, starting from the making of the fire on the stage until the burning of the rapak provided,
4. The bucket is used as a mixture of 10 liters of kerosene and 5 liters of pertalite,
5. The area of the upper stage used by Anoman in the second act of the "*Anoman Obong*" scene is divided into three parts: left side, center side, and right side.
6. The left and right sides of the stage are used for the rapak with a length of 10.1 meters and a width of 8.2 meters,
7. The center of the stage used for Anoman's fire attraction is 6 meters long and 8.2 meters wide.

d. *Designing*

The activity of *designing* is the creation of the shape and design of various tools and materials used in the Ramayana Ballet performance of the second act of the scene "*Anoman Obong*" in the following sentences;

1. Anoman forms a circle of fire with both hands,
2. Torches made of iron rods are used to burn the rapak in the fire attraction,
3. The wick of the torch made of lawe thread is dipped in a mixture of kerosene and pertalite as a source of fire,
4. Pan or gongseng made of iron, zinc, and wood fragments for visual display,

Rapak made of dried sugarcane leaves in the shape of an isosceles trapezoid is used as a visual of the building of the Kingdom of Lanka.

e. *Explaining*
The activity of *explaining* there is an explanation related to the existence of phenomena in the second act of Ramayana Ballet "Anoman Obong" in the following sentences;
1. Anoman: a white ape, son of Batara Guru and Dewi Anjani, known as Sri Rama's ambassador in the Ramayana,
2. Origin of Anoman's birth,
3. Anoman received his powers from Batara Bayu or Resi Maruto,
4. The title "Anoman Obong" refers to the prominent fire attraction in this act, where Anoman is also burned using fire,
5. Storyline of the second act,
6. Influence: this act is very important and attractive to tourists because of the spectacular fire attraction, making it one of the hallmarks and most anticipated in the show,
7. Equipment: a torch made of iron rods serves to burn the rapak, the wick of the torch is made of lawe thread dipped in a mixture of kerosene and pertalite, the duration of the fire is about 3-5 minutes. A baking tray or gongseng is used as a place for fire and visuals, while fireworks and rags are used to add dramatization and put out the fire. A trolley transports rapak on an open-air stage.

The following is a summary of the fundamental mathematical activities in the Ramayana Ballet performance of the second half of the scene "*Anoman Obong*"

Table 2. Fundamental math activities in the second act of Ramayana ballet Prambanan performance "*Anoman Obong*"

Counting	Locating	Measuring	Designing	Explaining
Count the number of objects, such as children, clothes, and senopati	Determine the position of various locations in the story, such as in the forest, on the stage, and in various other places	Measuring flame duration time and volume of fuel used	Design the shape of objects and props used in the performance	Describe the origin, naming, audience response, and props used in the performance.

The following are presented problems for each mathematical fundamental activity on aspects of the Ramayana Ballet Prambanan second act "*Anoman Obong*" performance that can be given to seventh grade junior high school students in learning mathematics.

a. *Counting*
The *counting* activities help students develop basic numeracy skills that are essential in math. By counting, students learn to organize numerical information and identify patterns. In counting activities, problems can be

created in the number domain and algebraic domain for grade VII SMP such as operations in numbers. There are examples of problems that can be created:

1. Name three powers that Anoman possesses.
2. In the performance of "Anoman Obong", several tools are used such as torches, baking pans or gongseng, and fireworks. If there are 6 torches, 4 baking pans, and each torch has 2 wicks, how many wicks are used in total? Also, if 1/3 of the fireworks have already been used, and the total fireworks available are 30 pieces, how many fireworks are left?
3. If the performance "Anoman Obong" requires 5 torches, 3 baking pans or gongseng, 50 rapak, 2 buckets, 10 fireworks, 3 rags, 7 raffia ropes, and 2 trolleys. What is the total number of items of tools and materials required?
4. Dewi Windradi has 3 children namely Dewi Anjani, Guwarsa, and Guwarsi. If each child has 2 more children, what is the total number of grandchildren of Dewi Windradi?
5. Anoman has several other names such as "Senggana", "Guru Putra", and "Dayapati". What is the total number of names Anoman has including his own name?
6. In the "*Anoman Obong*" performance, the number of torches used is 3 times the number of wicks. If the number of wicks used is x and the total number of equipment is 75, make an algebraic equation and calculate the value of x!

In a show, every 5 fireworks set off results in 20 minutes of attraction. If the show lasts 120 minutes, how many fireworks are needed?

b. *Locating*

The *locating* activities help students understand the concepts of location and position in a geographical or spatial context. This is useful in developing map reading skills and understanding relationships between places. In the locating activity, problems can be made in the geometry domain for grade VII SMP such as location coordinates, and determining the location of the torch. The examples of problems that can be made:

1. The upper stage area used by Anoman is divided into three parts, the left and right sides are 10.1m×8.2 each, and the center side is 6m×8.2m. If the stage is likened to a coordinate plane with point (0,0) at the lower left corner of the stage, determine the coordinates of the upper right corner of the left and center sides of the stage!
2. If torches are placed along the right side of the stage every 1 meter starting from point (5, -3). Find the coordinates of the first torch and the fifth torch on the right side of the stage.

c. *Measuring*

The *measuring* activities teach students measurement skills that involve the use of units and measuring instruments. This is important in math, as well as everyday life. In measuring activities, problems can be created in the measurement domain and algebraic domain for grade VII SMP such as measuring the area of the stage, measuring the volume of the bucket, measuring the raffia rope and determining the distribution of oil. Examples of problems that can be made:

1. The area of the upper stage used by Anoman is divided into three parts, the left and right sides are 10m × 8.2m each, and the center side is 6m × 8.2m. Calculate the total area of the stage used for the performance. Calculate the area of the center stage used by Anoman for the fire attraction.
2. A bucket is used to mix kerosene and pertalite in the ratio 3:2. If the bucket has a capacity of 10 liters, calculate how many liters of kerosene and how many liters of pertalite must be mixed.
3. Rafia rope is used to tie torches with the length of each tie is 0.75 meters. If there are 15 torches to be tied, how many meters of raffia are needed?
4. In the "Anoman Obong" performance, the fuel mixture consists of kerosene and pertalite. If the ratio between the volume of kerosene and pertalite is 3:2 and the total mixture needed is 50 liters, determine how many liters of each ingredient are needed.

d. *Designing*

The *designing* activities involve creativity and critical thinking in creating something. This is important in developing design skills that can be applied in various projects or practical tasks. In the designing activity, problems can be made in the geometry domain as well as data analysis and uncertainty for class VII SMP such as designing the stage and designing the duration of attractions in the table. The examples of problems that can be made:

1. Based on the measurements given, design a stage for the performance of "*Anoman Obong*". Draw the stage plan with the three sections (left, right, and center) according to the given measurements. Also determine the total area of the stage and label each section.
2. If the fire attraction lasts for 4 minutes and each minute requires 1.5 liters of kerosene and pertalite mixture, design a schedule for refilling the mixture during the show in tabular form. Also determine the total volume of the mixture required.

e. *Explaining*

The *explaining* activities develop students' ability to understand and convey information. This is important for communication skills and a deeper understanding of concepts. In explaining activities, problems can be made in the measurement domain for grade VII SMP such as explaining area calculations. The examples of problems that can be made:

1. The total area of the upper stage is the sum of the areas of the left, right and center sides. Explain how to calculate the area of each part of the stage and then sum the areas of the three parts to get the total area.

Philosophical meanings and distinctive characteristics of Ramayana ballet act two scene "Anoman Obong"

The Ramayana Ballet's second act scene "*Anoman Obong*" contains philosophical meanings conveyed to the audience such as the attitude of calmness, honesty, courage, and responsibility shown by the character Anoman is an example of a life example that needs to be imitated. Anoman's calm attitude is shown when he brings the three blind senopati out of the forest safely without rushing and panicking, this is because he understands how much magic he has. Responsible

behavior is shown when Anoman faces his enemies and dares to take risks in his duties.

Another attitude that can be used as an example related to Javanese philosophy is "*Ngluruk Tanpa Bala, Menang Tanpa Ngasorake*" which means going to war alone without bringing troops, but when winning the battle, not humiliating others. The patriotic attitude shown by Anoman is one of the superheroes favored by children. The distinctive feature of the second act is the "*Anoman Obong*" scene which is performed on an open stage with lighting arrangements creating an interesting aesthetic value and coupled with the lively fire and fireworks attraction makes tourists mesmerized. When the show is performed on the Trimurti stage (closed), the fire attraction is conveyed with the language of symbols, such as the use of property depicting fire carried by the dancers, allowing the audience to understand the property is a representation of a burning fire. Lighting arrangements also help create visual effects that support the show.



Figure 6. Operational system of setting lighting, sounds, and screens of Ramayana ballet Prambanan

The scene "*Anoman Obong*" has a special interpretation that the burning symbolizes the character of the enemy who wants to destroy the Kingdom of Alengka, and philosophically reflects Rahwana's ambition as King of Alengka who wants to rule the world. In addition, there are movements with special meanings performed by Anoman, such as offering movements aimed at asking for grace from God Almighty, as well as ulap-ulap and tawing movements that symbolize seeing something from a distance. Some movements are done to connect other movements to create an organized and conceptualized choreography.

There are four fundamental mathematical activities in the philosophical meaning and characteristics of Ramayana Ballet Prambanan second act "*Anoman Obong*" namely *counting*, *locating*, *designing*, and *explaining*. The following is a description of the four fundamental mathematical activities.

a. *Counting*

The activity of *counting* is the presence of a certain number of objects or quantities that show the activity of counting and showing the number in the following sentences;

1. The attitude characteristics of Anoman in the second act are four (calmness, honesty, courage, and responsibility),
2. Some movements are used to connect between movements, i.e. several movements to create an organized and conceptualized choreography.

b. *Locating*
The *locating* activity involves determining the position of an object in the following sentences;
1. The audience interprets that the fire that burns Anoman symbolizes the nature of the enemy character who wants to destroy the Kingdom of Lanka,
2. Anoman shows calmness when bringing the blind senopati out of the forest,
3. The fire attraction and light arrangement on the open stage are the main highlights of the performance

c. *Designing*
The *designing* activity involves creating a shape or design for an object in the following sentences;
1. The fire performance on Trimurti's stage uses the image of fire as a symbol to make it easier for the audience to understand the representation of fire.

d. *Explaining*
The activity of *explaining* is related to the existence of phenomena in the second act of Ramayana Ballet "*Anoman Obong*" in the following sentences;
1. The second act of "*Anoman Obong*" conveys philosophical meanings, such as Anoman's exemplary attitude that symbolizes positive traits,
2. The performance contains a special interpretation that the fire that burns Anoman symbolizes the character of the enemy and Rahwana's unlimited ambition,
3. Anoman's responsible and courageous attitude reflects the Javanese philosophy of "*Ngluruk Tanpa Bala, Menang Tanpa Ngasorake*", which means going to war alone without bringing an army, but when he wins the battle, he does not look down on others.
4. Anoman's values of courage and responsibility need to be absorbed by the audience as part of heroism,
5. Special movements in this act, such as offerings and "*ulap-ulap*", have symbolic meanings,
6. Characteristic of the second act is the fire attraction and the use of interesting lighting, with visual effects that support the performance on an open-air stage.

Table 3. Fundamental math activities philosophical meanings and distinctive features of Ramayana Ballet Prambanan second act "*Anoman Obong*"

Counting	Locating	Designing	Explaining
Count the number of characteristics and movements	Positioning is like coming out of the forest and on the Open Stage.	Designing props like fire images	Describe Anoman's attitudes as a role model, meaningful movements by Anoman dancers, and the characteristics of the "*Anoman Obong*" scene.

The following are presented problems for each fundamental mathematics activity on the aspects of the philosophical meaning and characteristics of the Ramayana Ballet Prambanan second act scene "*Anoman Obong*" which can be given to VII grade junior high school students in mathematics learning.

a. *Counting*
Counting activities help students develop basic numeracy skills that are essential in math. By counting, students learn to organize numerical information and identify patterns. In counting activities, problems can be created in the number domain and algebraic domain for grade VII SMP such as operations in numbers. Examples of problems that can be created:
1. Count the number of movements used to connect between movements in the choreography.
2. List the characteristics of Anoman's stance in the second act!
3. If in the second act each movement takes 4 minutes and the total duration of the conceptualized choreography is 30 minutes, how many movements are used? Make an algebraic equation and calculate the number of movements used.

b. *Locating*
The *locating* activities help students understand the concepts of location and position in a geographical or spatial context. This is useful in developing map reading skills and understanding relationships between places. In the locating activity, problems can be made in the geometry domain for grade VII SMP such as location coordinates, and determining the placement of properties. The examples of problems that can be made:
1. During the fire attraction, the fire is lit at two points on the stage that are 8 meters to the left and 3 meters up from the starting point (0,0). The second point is 12 meters to the right and 2 meters down from the first point. Calculate the total distance from the starting point to the end point along the stage.
2. In a performance, fire-shaped props are placed at five different locations on the ….22stage. If the distance between each prop is 5 meters and two of the props are 20 meters apart, how far would it take to get from the first to the last prop if it had to pass through all the props?

c. *Designing*
The *designing* activities involve creativity and critical thinking in creating something. This is important in developing designing skills that can be applied in various projects or practical tasks. In the designing activity, problems can be created in the geometry domain for grade VII junior high school such as designing a property layout for a fire attraction. Examples of problems that can be made:
1. You have to place five props depicting fire on a covered stage (Trimurti) at equal distances along the width of the stage which is 10 meters wide. If the distance between the props should be 1 meter, what is the distance from the first prop to the last prop?

d. *Explaining*
Explaining activities develop students' ability to understand and convey information. This is important for communication skills and deeper understanding of concepts. In explaining activities, problems can be created in the number domain for grade VII, such as explaining the design of stage settings

with spotlights for lighting performances using number operations. The examples of problems that can be made:

1. An open stage is 10 meters wide and 12 meters long. If you want to place spotlights as lighting for the show along the long edges of the stage with a distance of 2 meters between each light, explain how you will distribute the lights and calculate the number of lights needed on each side of the stage length!

Dancer training at Ramayana ballet Prambanan

Before the COVID-19 pandemic, Ramayana performances in the second act of "*Anoman Obong*" involved around 150 dancers. However, after the COVID-19 pandemic until now, there are only 16 dancers left to perform on the Open Stage and a maximum of 8 dancers on the Trimurti Stage (closed). In this second half performance, there are innovations and variations in movements such as the insertion of acrobatic movements and semi-contemporary techniques in certain scenes. Despite the changing times and market demands, the choreographic movements retain their originality.

The process of training and regeneration of Ramayana Ballet dancers, especially for the characters of Wanara (monkey warriors), monkeys, and Anoman, is carried out from generation to generation. Roro Jonggrang Foundation which is under the auspices of Pura Pakualaman and Surakarta Palace became one of the contributors of dancers for Ramayana Ballet Prambanan performances. Rehearsals are held regularly once a week on Sundays according to each age class. If the performance is approaching in May, then the preparation for rehearsals begins about two to three months earlier and is carried out every Monday, Wednesday and Friday at the Ramayana Ballet Plataran or in the parking lot, but for Sundays the rehearsals are held at the studio. In addition, in mid-April, a training camp (TC) was held, where the selected dancers practiced for one full day. The dancers also practiced accompanied by Javanese gamelan music or "*tempuk gending"* which means the combination of dancers and musicians for a performance to be able to empathize with each other, in addition to being able to set the tempo and atmosphere of the show to become synergized.

Regeneration of dancers after COVID-19 has experienced a few obstacles, namely considering the number of dancers available. Some special traditions or habits are carried out before the Ramayana Ballet performance begins, first conducting joint prayer activities as an opening. Second, every May a "*selametan*" event is held on an open stage filled with tumpen cutting and prayers together and there are several offerings. The purpose of this event is to ask for safety so that no unwanted accidents occur during the performance and ask for the blessing of God Almighty. Similar traditions are also carried out in several other dance studios that fill the performance with different places, such as in the dressing room. While in November, the event is held on the Trimurti stage (closed).

There are six fundamental mathematical activities in the training of dancers of Ramayana Ballet Prambanan in the activities of *counting*, *locating*, *measuring*, *designing*, *playing*, and *explaining*. The following is a description of the six fundamental mathematical activities in the training of dancers trained in the Ramayana Ballet second act scene "*Anoman Obong*".

a. *Counting*
The *counting* activity is the presence of a certain number of objects or quantities. In addition, there is quantification that shows the activity of counting and shows the number in the following sentences;
1. In the "*Anoman Obong*" scene, only Anoman and a few giants perform,
2. The post-pandemic regeneration of dancers has been hampered with only 16 dancers left on the open stage and 8 dancers on the closed stage (Trimurti),
3. This performance has innovations and variations of movements, such as the insertion of acrobatic movements and semi-contemporary techniques in certain scenes,
4. Several other dance studios also perform similar traditions with the same purpose.

b. *Locating*
The *locating* activity involves determining the position of an object in the following sentences;
1. After the pandemic, 16 dancers remained on the open stage and 8 dancers on the closed stage (Trimurti),
2. Rehearsals are held every Monday, Wednesday, and Friday at the Ramayana Ballet Plataran or parking lot, and Sunday at the studio,
3. A "*selametan*" event is held every May on the open stage,
4. The venue can be different, such as in the dressing room,
5. In November, the event is held on a closed stage (Trimurti).

c. *Measuring*
The activity of *measuring* has the object of measurement in time in the following sentences;
1. Before the Covid-19 pandemic, around 150 dancers were involved in the second act of "*Anoman Obong*",
2. After the pandemic, there are now only 16 dancers on the open stage and 8 dancers on the closed stage (Trimurti),
3. Dancer rehearsals usually last for 3 hours in the afternoon, with Javanese gamelan music or "*tempuk gending*" to harmonize the dancers and musicians and set the tempo and atmosphere of the performance.

d. *Designing*
The *designing* activity involves creating a shape or design for an object in the following sentences;
1. The event involves making tumpeng and praying together, and there are some offerings.

e. *Playing*
The activity of *playing* there are rules that must be followed such as the rules set until now related to dancers in Ramayana Prambanan in the following sentences;
1. Training and regeneration of dancers is carried out from generation to generation, especially for the characters of Wanara, Kera, and Anoman,

2. The Roro Jonggrang Foundation, which is under the auspices of Pura Pakualaman and the Surakarta Palace, is one of the contributors of dancers for Ramayana Ballet Prambanan performances,
3. Regular rehearsals are held once a week on Sundays, according to age class,
4. Intensive rehearsal preparation begins 2-3 months before the performance in May, namely January or February,
5. Rehearsals are held every Monday, Wednesday, and Friday at the Ramayana Ballet Plataran or parking lot, and on Sundays at the studio,
6. In mid-April, a full-day training camp (TC) is held,
7. Before the performance, there is a tradition of praying together as an opening,
8. Every May, a "*selametan*" event is held on the open stage.

f. *Explaining*

The activity of *explaining* is an explanation related to the existence of phenomena in the training of Ramayana Ballet Prambanan dancers in the following sentences;

1. Despite changing times and market demands, the choreographic movements retain their authenticity,
2. The afternoon rehearsal lasts for 3 hours with Javanese gamelan music, aiming for the dancers and musicians to synergize and set the tempo and atmosphere of the performance,
3. The "*selametan*" event aims to ask for safety and blessings from God to avoid accidents during the performance.

The following is a summary of mathematical fundamental activities in the training of dancers at Ramayana Ballet Prambanan.

Table 4. Fundamental math activities of Ramayana ballet Prambanan dancers training

Counting	Locating	Measuring	Designing	Playing	Explaining
Count the number of scenes and dancers	Determine the position of objects in various locations such as the stage, studio, dressing room, and Trimurti stage	Estimated number of dancers and size of rehearsal time	Follow the rules regarding dancer regeneration and regular practice	Designing objects such as tumpeng making	Explains why the choreographed movements are kept authentic, the training with Javanese Gamelan music, and the purpose of the "*selametan*" event.

The following are presented problems for each mathematical fundamental activity on the aspect of training Ramayana Ballet Prambanan dancers that can be given to VII grade junior high school students in mathematics learning.

a. *Counting*

The *counting* activities help students develop basic numeracy skills that are essential in math. By counting, students learn to organize numerical

information and identify patterns. In counting activities, problems can be created in the number domain and algebraic domain for grade VII SMP such as operations in numbers. Examples of problems that can be created:

1. Before the COVID-19 pandemic, there were 150 dancers involved in Ramayana performances. After the pandemic, there were 16 dancers left for the Open Stage and 8 dancers for the Trimurti stage. Calculate:
   a. Total dancers remaining after the pandemic.
   b. Number of dancers missing from the show after the pandemic.
2. Dancer rehearsals are held every Sunday on a regular basis. Approaching the performance in May, rehearsals are held every Monday, Wednesday, and Friday, as well as Sundays at the studio. If the rehearsal starts two months before the performance in May, calculate:
   a. The number of rehearsals on Mondays, Wednesdays and Fridays in those two months.
   b. Total rehearsals for two months including rehearsals every Sunday.
3. If there are 5 raksaksa performing with Anoman, how many dancers are there in the "*Anoman Obong*" scene?
4. In May, there is a "*selametan*" event held on an open stage and filled with tumpeng cutting. Suppose the cost of tumpeng cutting is x and the cost of praying together is 5 times the cost of tumpeng cutting. If the total cost of the "*selametan*" event is 8 times the cost of cutting tumpeng, how much is the cost of praying together and cutting "*tumpengan*"?

b. *Locating*

The *locating* activities help students understand the concepts of location and position in a geographical or spatial context. This is useful in developing map reading skills and understanding relationships between places. In the locating activity, problems can be made in the geometry domain for class VII SMP such as the coordinates of the dancer's location on the stage. The examples of problems that can be made:

1. On the performance stage, there are four points where the dancers are located as follows: Point A: (2, 3); Point B: (6, 3); Point C: (6, 7); Point D: (2, 7). These points form a rectangle. Find the coordinates of the center of the rectangle!
2. If two points of the dancer's exercise are located at (2, 3) and (10, 7), calculate the coordinates of the midpoint between the two exercise locations!

c. *Measuring*

The *measuring* activities teach students measurement skills that involve the use of units and measuring instruments. This is important in math, as well as everyday life. In the measuring activity, problems can be created in the measurement domain for grade VII SMP such as measuring the distance of the dancer's location and measuring the distance traveled during the exercise:

1. In a dancer rehearsal, there are two main rehearsal locations at coordinates (3, 4) and (7, 8). Calculate the distance between the two training locations.
2. A dancer performs an exercise by moving from point (1, 2) to point (4, 6) and then to point (7, 2). Calculate the total distance traveled by the dancer.

d. *Designing*

The *designing* activities involve creativity and critical thinking in creating something. This is important in developing design skills that can be applied in various projects or practical tasks. In the designing activity, problems can be created in the geometry domain and number domain for grade VII SMP such as determining the size and number of tumpeng and determining the number of tumbeng and offerings. Examples of problems that can be made:

1. If one event requires 5 tumpeng and 3 types of offerings, how many tumpeng and offerings are needed for 4 events?
2. At a "selametan" event on an open stage, the tumpeng prepared is cone-shaped with a height of 30 cm and a base diameter of 20 cm. If the tumpeng is divided into 8 equal pieces, what is the height of each piece of tumpeng when cut vertically from the top to the bottom?
3. At a celametan event, 3 tumpengs are prepared and each tumpeng has 15 different offerings. If there are 90 people present, how many offerings can be distributed to each person if all the offerings from the three tumpengs are distributed equally?
4. At a communal prayer event, each table is filled with 8 types of offerings. If there are 5 tables to be set, how many offerings must be prepared in total?

e. *Playing*

Playing activities help students understand the concept of play in the context of time and frequency. It also teaches the importance of schedules and routines. In the playing activity, problems can be created in the number domain for class VII SMP such as determining the number of tumpeng, determining the number of exercises, and determining the exercise time. The examples of problems that can be made:

1. At a celametan event, tumpeng is prepared for 90 people. If the tumpeng is divided into 12 equal parts and each part is filled with 5 types of offerings, how many total offerings are there if each type of offering is divided equally into each part?
2. How many training camps are conducted in 3 months (12 weeks)?
3. If the training camp (TC) lasts for 10 hours starting at 08:00, what time does the training camp (TC) end?

f. *Explaining*

The *explaining* activities develop students' ability to understand and convey information. This is important for communication skills and deeper understanding of concepts. In explaining activities, problems can be created in the number domain for grade VII, such as explaining comparison and explaining averages. Examples of problems that can be made:

1. Dance practice is held every afternoon and lasts for 3 hours. If the rehearsal is held 4 times a week, how many total rehearsal hours are there in one week? Explain the calculation steps!
2. If the dance practice is held every afternoon for 3 hours and is done 4 times a week, calculate the total hours of practice in two months!
3. In each practice session, 6 Javanese gamelan songs are played. If the rehearsal lasts for 3 hours and one tembang or song takes 35 minutes, what

is the total time used to play gamelan songs in one rehearsal session? Explain the calculation steps.

Conclusion

Ramayana Ballet Prambanan is a performance that combines art, drama and traditional Javanese dance. The uniqueness of this performance is that the dialog in the drama is poured into gesticulation movements that have meaning, especially in the body attitude, hand and head movements of the dancer. This performance features flexible wayang wong, accompanied by sinden songs and Javanese gamelan. The interview data and observation data are grouped into four data classes, namely; (1) the history of Ramayana Ballet Prambanan, (2) the performance of Ramayana Ballet Prambanan second act "*Anoman Obong*", (3) the philosophical meaning and characteristics of Ramayana Ballet Prambanan second act "*Anoman Obong*", and (4) the training of Ramayana Ballet Prambanan dancers.

Based on the analysis of fundamental mathematical activities, counting activities can be found in all data classes, and can be made into a problem context for teaching in the number domain and algebra domain. Locating activity can be found in all data classes, and can be made into a problem context for teaching in the geometry domain. Measuring activity can be found in all data classes, and can be made into a problem context for teaching in the measurement domain and algebra domain. The designing activity can only be found in the second, third and fourth data classes, and can be made into a problem context for teaching in the geometry domain, number domain and the domain of data analysis and uncertainty. Playing activities can be found in all data classes, and can be made into problem contexts for teaching in the number domain and data analysis and uncertainty. The explaining activity can be found in the first and fourth data classes, and can be made into a problem context for teaching in the number domain and measurement domain.

References

Alvian, D.N., Agustito, D., Arigiyati, T.A., Harini, E., & Widodo, S.A. (2021). Identifying geometrical objects in Sumur Gumuling Tamansari: An ethnomathematics analysis. *Journal of Physics: Conference Series*, *1778*(1), 012021. https://doi.org/10.1088/1742-6596/1778/1/012021

Barton, W. D. (1996). *Ethnomathematics: Exploring cultural diversity in mathematics* (Dissertation, The University of Auckland, New Zealand).

Bishop, A. J. (1988). Mathematics education in its cultural context. *Educational Studies in Mathematics*, *19*(2), 179–191. https://www.jstor.org/stable/3482573

Borba, M. C. (1990). Ethnomamathematis and education. *JSTOR*, *10*(1), 39–43. https://www.jstor.org/stable/40247974

Brandt, A., & Chernoff, E. J. (2015). The importance of ethnomathematics in the math class. *Ohio Journal of School Mathematics*, *71*(71), 31-36.

Cimen, O. A. (2014). Discussing ethnomathematics: Is mathematics culturally dependent? *Procedia - Social and Behavioral Sciences*, *152*, 523–528. https://doi.org/10.1016/j.sbspro.2014.09.215

D'Ambrosio. (1985). Ethnomathematics and its place in the history and pedagogy of mathematics. *JSTOR*, *5*, 44–48. https://www.jstor.org/stable/40247876

Fitriyah, A., & Fitriani, U. (2021). Ethnomatematics: Exploring the fundamentally mathematical activities and concepts of syawalan in Kaliwungu Kendal. *Journal of Physics: Conference Series*, *1882*(1), 012049. https://doi.org/10.1088/1742-6596/1882/1/012049

Magnusson, L. O. (2023). Digital technology and the subjects of literacy and mathematics in the preschool atelier. *Contemporary Issues in Early Childhood*, *24*(3), 333–345. https://doi.org/10.1177/1463949120983485

Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). London: SAGE Publications, Inc.

Nugrahani, F. (2014). *Metode penelitian kualitatif dalam penelitian pendidikan bahasa* (Vol. 1). Solo: Cakra Books.

PUSMENDIK. (2020). *Desain pengembangan soal AKM*. Jakarta: Badan Penelitian dan Pengembangan dan Perbukuan Kementerian Pendidikan dan Kebudayaan. https://pusmenjar.kemdikbud.go.id/akm

Richardo, R., Wijaya, A., Rochmadi, T., Abdullah, A. A., Nurkhamid, N., Astuti, A. W., & Hidayah, K. N. (2023). Ethnomathematics augmented reality: Android-based learning multimedia to improve creative thinking skills on geometry. *International Journal of Information and Education Technology*, *13*(4), 731–737. https://doi.org/10.18178/ijiet.2023.13.4.1860

Rosa, M., & Orey, D. C. (2011). Ethnomathematics: The cultural aspects of mathematics. *RLE: Revista Latinoamericana de Etnomatemática*, *4*(2), 32–54.

Runtu, P. V., Pulukadang, R. J., Mangelep, N. O., Sulistyaningsih, M., & Sambuaga, O. T. (2023). Student's mathematical literacy: A study from the perspective of ethnomathematics context in North Sulawesi Indonesia. *Journal of Higher Education Theory and Practice*, *23*(3), 57-65. https://doi.org/10.33423/jhetp.v23i3.5840

Rusli, R., & Safaah, T. N. (2023). Research trend on ethnomathematics from 2012 to 2022: A bibliometric analysis. *Indonesian Journal of Science and Mathematics Education,* *6*(1), 37-47. https://dx.doi.org/10.24042/ijsme.v6i1.14794

Sari, N., Saragih, S., Napitupulu, E. E., Rakiyah, S., Sari, D. N., Sirait, S., & Anim, A. (2023). Applying ethnomathematics in learning mathematics for middle school students. *Acta Scientiae*, *25*(5), 250–274. https://doi.org/10.17648/acta.scientiae.7690

Sugiyono, S. (2014). *Memahami penelitian kualitatif* (1st ed.). Bandung: Alfabeta.

Widada, W., Nugroho, K. U. Z., Sari, W. P., & Pambudi, G. A. (2019). The ability of mathematical representation through realistic mathematics learning based on ethnomathematics. *Journal of Physics: Conference Series*, *1318*(1), 012073. https://doi.org/10.1088/1742-6596/1318/1/012073

Yılmaz, N. (2020). Making the association between culture and mathematics education. In M. Zayyad & A. A. Unsal (Eds.), *Education research highlights in mathematics* (pp. 81-104). Karatay/Konya: International Society for Research in Education and Science (ISRES) Publishing.