

## The use of modulo in wedding party: An ethnomathematical study in Kampung Kuta

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Received: Sep 8, 2025 | Revised: Dec 20, 2025 | Accepted: Dec 21, 2025 | Published Online: Feb 20, 2026

### Abstract

It is undeniable that mathematical concepts are integrated with cultural ideas and values in everyday life. This article explores the first area, namely basic field data collection, which was conducted to investigate the application of mathematical concepts in cultural ideas and activities, particularly in determining the appropriate time for a wedding reception. This study aims to explore forms of ethnomathematics in everyday life, ideas, and activities. Therefore, this study seeks to explore mathematical concepts in the activity of determining time, which is considered to bring good luck and taboo in wedding ceremonies that are suspected to involve mathematical concepts (such as number patterns, calendar systems, time cycle calculations, or probability principles) so that they can be solved with simpler methods. This study uses an ethnomethodological approach operationalised in a realist ethnographic design. Data collection was conducted through participant observation and in-depth interviews with the community and traditional elders in Kampung Kuta. The study results show that the Kampung Kuta community use a number system to determine the appropriate time for wedding ceremonies, based on the values of the *Saptawara* and *Pancawara* periods. Furthermore, the mathematical concept used in this number system is the modulo  $n$  congruence.

### Keywords:

Culture, Ethnomathematics, Kampung Kuta, Use of modulo, Wedding party calculation

### How to Cite:

Umbara, U., Puadi, E. F. W., & Heriyana, T. (2026). The use of modulo in wedding party: An ethnomathematical study in Kampung Kuta. *Infinity Journal*, 15(1), 201-220. <https://doi.org/10.22460/infinity.v15i1.p201-220>

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## 1. INTRODUCTION

The Sundanese are the second largest ethnic group in Indonesia and possess diverse traditions and beliefs. They possess a rich cultural heritage that is intriguing to explore. This unique Sundanese culture offers potential for integration into the school mathematics curriculum. The integration of Sundanese ethnomathematics into the curriculum has been carried out in several studies, including in the teaching of rectangles (Nugraha et al., 2020), geometry (Farokhah et al., 2017), and algebra (Supriadi, 2019) in elementary schools.

Furthermore, one tradition still preserved in Sundanese society, particularly among the indigenous people living in Kampung Kuta, is the "Nikahan" tradition. "Nikahan" is a celebration held in conjunction with a wedding party, generally held between the ages of 21 and 30. In the traditions of the Kampung Kuta community, marriage is not a simple procession, but rather a complex one, as preparations must be carried out not only by the couple but also by the entire family of the bride and groom. Therefore, the wedding ceremony has a deep philosophical meaning that reflects values such as harmony, simplicity, and respect. Marriage is closely linked to the values and norms of traditional customs that have long been practiced by the community (Muniroh et al., 2022) and are sacred (Sudirman, 2016), thus typically requiring specific rituals to be carried out by the community. The complexity of wedding ceremonies is believed to involve practices, patterns, or structures that can be analyzed as mathematical concepts, as they involve timing systems, repetitive patterns, and counting.

The ritual is a series of activities based on religious traditions that have magical power (Hafsah, 2017) which refers to collective meaning that focuses on meaning in everyday life, norms, and things that are symbolic (Barker & Jane, 2016). A ritual that is considered sacred must usually be carried out by fulfilling various rules attached to the procession. As one form of gratitude, Sundanese people generally hold wedding parties. The party held is a manifestation of a local cultural system that is believed to have been passed down from generation to generation. The manifestation of this local cultural system generally shows the existence of local wisdom of a tribe to harmonize with the surrounding environment in accordance with a view of life that is in accordance with the character and behavior of the community as its identity (Umbara et al., 2019), because each region has its own cultural way of seeing, comparing, categorizing, assessing, measuring, calculating, describing, and concluding (Rosa & Orey, 2016).

One of the distinctive characteristics of the Kampung Kuta community is the rules used to determine auspicious times for celebrations. A traditional elder is usually asked to perform calculations to determine auspicious times for the celebration, using concepts such as calculations through the Hijri calendar cycle, numerical calculations, and modular rules based on appropriate time categories for holding a wedding party. Based on this, ethnomathematics is appropriate for this research because it allows for the formalisation of activities carried out closely related to mathematics. To comprehend the link between culture and mathematics, ethnomathematics research is required (Rosa & Shirley, 2016) which can be achieved by combining anthropology, history, pedagogical, linguistics, and the philosophy of mathematics in a sociocultural setting (Rosa & Gavarrete, 2017). In other words, ethnomathematics investigates the complex linkages and correlations that exist between mathematical concepts and cultural aspects (Gerdes, 2001) that develops in a country's culture (Verner et al., 2019) such that it can be used to understand the various techniques developed by people to interact with reality in order to sustain their lives (D'Ambrosio, 2018).

An essential basis for ethnomathematics thinking is founded on two concepts: mathematics and culture as the output of human intellect on the one hand, and individual cognitive processes that process information on the other (Umbara et al., 2019). In other words, ethnomathematics emphasizes the conceptualization of mathematics as practiced in a wider variety of cultures without discrediting certain cultures (Umbara et al., 2021b) and helps the

restoration of culture's status as an intellectual instrument (D'Ambrosio & Rosa, 2017). In short, ethnomathematics refers to all of the many systems of knowledge that come from the discovery of mathematical concepts in a certain culture (Prahmana & D'Ambrosio, 2020) which can be claimed to have succeeded in erasing the gaps caused by informal education that is strict and not contextual because of its ability to develop links between social reality and mathematics (Alangui, 2010). Thus, ethnomathematics develops as a new category in the conceptual language of mathematics education, as well as a synthesis of mathematics and culture (Supiyati et al., 2019).

In this study we focus on the research area that Alangui mentioned as the first area, namely the collection of basic field data. The first field of ethnomathematics studies the relationship between mathematical knowledge and information embedded in culture (Alangui & Shirley, 2017). Several researchers have documented ethnomathematics explorations in Indonesia, focusing on the relationship between mathematical knowledge and culture, particularly in determining the appropriate time for certain activities. These studies include determining the appropriate day to begin building a house in the traditional Cigugur community (Umbara et al., 2021b), determining a good day to start farming using a combination of *naktu* (value) (Umbara et al., 2021c), determining a good day to start farming using *Palintangan* in the Cigugur traditional community (Umbara et al., 2019), the use of *Pananrang* as a guideline for traditional agricultural systems to determine the appropriate planting season (Pathuddin et al., 2023), determination of Islamic holidays and traditional ceremonies at the Kasepuhan Palace in Cirebon (Syahrin et al., 2016), and determining the day for birth-death ceremonies in Yogyakarta (Prahmana et al., 2021). However, no research has been found in the literature regarding the timing of wedding ceremonies among the Sundanese community or other ethnic groups in Indonesia. Therefore, the researcher aims to explore the customs of the Kampung Kuta community in determining the timing of wedding ceremonies. To achieve these objectives, this research will be guided by the following questions: (1) Is there a number system used by the people of Kampung Kuta to determine the appropriate time for wedding ceremonies? and (2) If the people of Kampung Kuta use a number system, can these concepts or patterns be identified and structured into a mathematical model?

## 2. METHOD

This study uses an ethnomethodological approach with a realist ethnographic design. The ethnomethodological approach was chosen because the research focuses on the method of observing community social activities. Ethnomethodology is the study of people's habits using the characteristics of an organized order (Garfinkel, 2005) related to the way people make sense of everyday life, in particular the mechanisms for attaining and maintaining interactions between social encounters and the assumptions they make, the conventions they use, and the practices they adopted (Cohen et al., 2013). In this study, the principles of the ethnomethodological approach are operationalised through an analysis of time-keeping practices, the use of local language and terms reflected in time categories, implicit rules, and practical rationality employed by the Kampung Kuta community through direct interaction studies and situational observations. These principles are technically implemented using the

concepts of indexicality (contextual meaning), reflexivity (interaction shapes reality), and a collective understanding of social order.

Ethnomethodology is seen as capable of explaining reality by studying common sense which is carried out continuously through social engagement with the environment based on social concepts and interactions. Meanwhile, a realist ethnographic design was used to make this research more focused based on clear concepts to guide the research. Ethnomethodology is seen as being able to explain reality by studying common sense, which is continuously carried out through social engagement with the environment based on social concepts and interactions. Meanwhile, a realist ethnographic design is used to focus this research, based on a clear concept to guide the research based on the researcher's desire to present an objective picture of a culture/social phenomenon from a third-person perspective so as to allow for a detailed and factual description of everyday life, behavioral patterns, and community beliefs without being influenced by the researcher's personal bias.

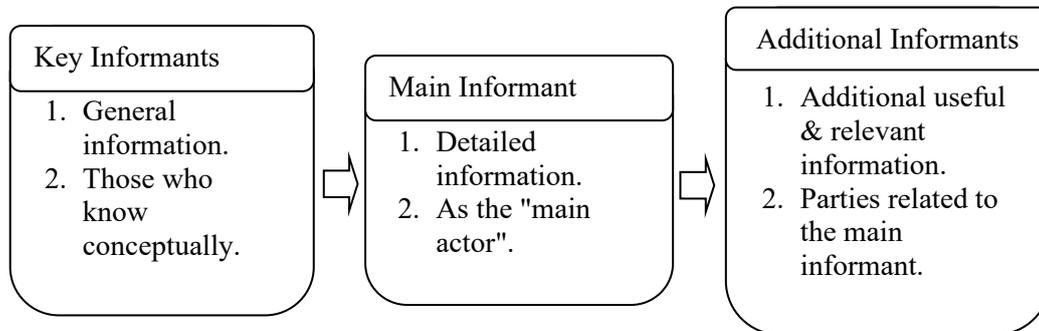
Realist ethnography is a third-person objective report on a scenario and information gathered from individuals in a location (Creswell, 2012). Ethnography was chosen as the research design because it is in line with the goal of ethnomathematics, which studies ideas, methods, and techniques in a particular culture (Rosa et al., 2016) carried out by the researcher as a third person outside the community. Technically, the realist ethnographic design in this study was carried out based on the researcher's objectivity (the researcher tried to remain neutral in presenting facts and data without personal bias), in-depth description of the findings (presented through a very detailed description of the process of determining the time of the wedding party), focus on identifying coherent cultural patterns (implemented by highlighting the patterns and structures used in determining the time of the wedding party), and expert justification (the researcher took on the role of an expert to interpret and explain the number system used in determining the right time for the wedding party).

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Data collection was conducted through in-depth interviews with the Kampung Kuta Community. The selection of research informants was non-probabilistic based on the following criteria: (1) Informants had a comprehensive understanding of the community's culture, customs, and habits; (2) Informants expressed willingness to be informants and had sufficient time to provide comprehensive information to researchers in both Sundanese and

Indonesian; and (3) Informants were members of the community who had a habit of calculating time well before undertaking certain activities or events.

Once these three criteria were met, the researchers collected information from informants sequentially and systematically based on the informant types selected according to their respective roles. Interviews were conducted according to the predetermined informant types, as shown in [Figure 1](#).



**Figure 1.** Types of informants based on their respective roles (Umbara et al., 2023)

Based on these three types of informants, the key informants were determined to be the traditional leader, the primary informants were two individuals, consisting of a traditional elder and a caretaker, and the additional informants were families in the community planning a wedding reception, consisting of two family members. During the interviews, the researcher asked questions about experiences, behaviours, knowledge, constructs, and contrasts. Contrasting questions were posed to respondents to differentiate one thing from another, thus enabling cross-checking (triangulation). Throughout the process, the researcher collected information from these informants sequentially, starting with the key informant, then the primary informant, and then the additional informant. The interview protocol for each of the three types of informants was conducted differently, depending on their individual characteristics. Interviews with key informants initially involved informal conversations. At this stage, the researcher asked questions about their background, behaviours, and demographics. These types of questions were used to explore the knowledge systems held by the majority of the community, their common customs, environmental support, and their beliefs about wedding timing activities by answering questions about knowledge and construct formation.

In subsequent stages, the researcher alternated between interview guides and standardised open-ended interviews. Both interviews were conducted using knowledge-based and construct-building questions about community customs in determining the right time for marriage. Meanwhile, interviews with main informants and additional informants used questions about experiences, behaviours, knowledge, constructs, and contrasts. These questions aimed not only to gather information but also to observe how informants constructed explanations, justified practices, and distinguished between legitimate and illegitimate rules in social interactions within the Kampung Kuta community. This approach enabled the researcher to challenge existing assumptions and gain a deeper understanding of differing worldviews by mapping the boundaries of internal logic and reducing ethnocentric bias to encourage the disclosure of the internal categories and frameworks of the Kampung Kuta

community. The questions posed to both informants focused on how to prepare for marriage, customs, and the procedures used by the community to calculate and determine marriage timing. This multi-stage interview strategy contributed to the credibility, reliability, and confirmability of the research data. Based on these general questions, the stages of this research were structured by adopting the ethnomathematics research design used by Alangui (Umbara et al., 2019), the research stages are arranged in [Table 1](#).

**Table 1.** Ethnomathematics research design

<b>Generic Question</b>	<b>Initial Answer</b>	<b>Critical Construct</b>	<b>Specific Activity</b>
Where to find the focal point of ethnomathematics studies in the indigenous community of Kampung Kuta.	Cultural activities in a cultural setting, namely establishing an appropriate time for the wedding party.	Culture	Conduct interviews with people who know how to choose the time for holding a wedding party.
How to see the focus of ethnomathematics research on the indigenous community of Kampung Kuta.	Explore and investigate the QRS (Qualitative, Relational, and Spatial) components in choosing the time for holding a wedding party.	Alternative Thinking	Determine what QRS ideas are contained in the activity of determining the time for holding a wedding party.
What is it (finding possible mathematical concepts).	Alternative Conceptual Proof	Philosophical Mathematics	Identifying the factors that justify customary rules in determining the time for holding a wedding party, both from the perspective of science and customary beliefs.
What does it imply (create a mathematical model based on the findings)?	Significant cultural and mathematical value	Methodology anthropology	Explain the relationship between two types of knowledge (mathematics and culture). In the process of determining the time at a wedding party, a new mathematical idea was discovered.

All informants were interviewed three times at different times and locations, with each interview lasting no less than two hours. Interviews were transcribed and analyzed following the coding process in [Figure 2](#).

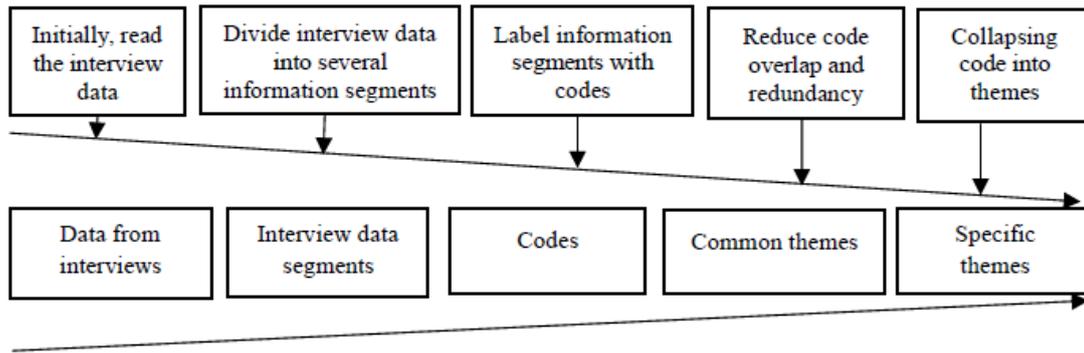


Figure 2. Data coding process (Umbara, 2024)

During the coding process, when the researcher found differences in mathematical ideas and activities across the three informants, the researcher cross-checked the data against other sources using triangulation techniques, ultimately allowing the researcher to compile categories by identifying patterns. Based on this, technically, the data analysis techniques used in this study were content analysis, triangulation, and pattern finding techniques. The use of these three data analysis techniques was implemented to ensure the validity and reliability of the research data. The data analysis process is shown in Figure 3.

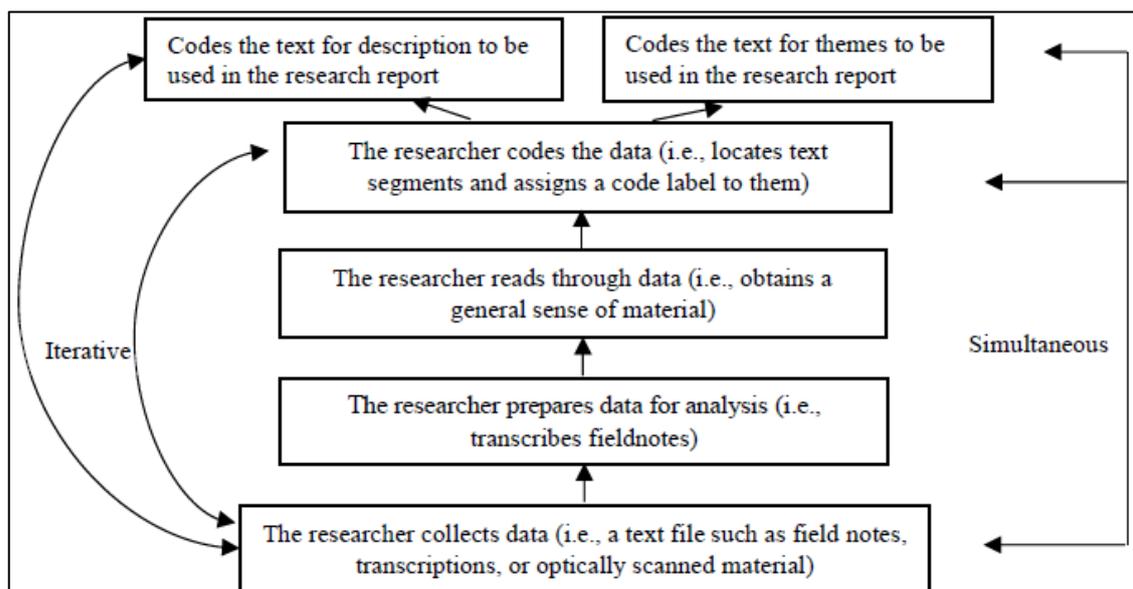


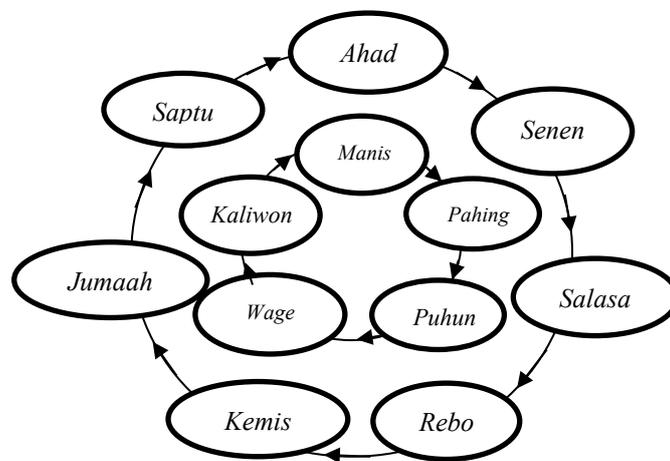
Figure 3. The process of data analysis (Umbara, 2024)

### 3. RESULTS AND DISCUSSION

#### 3.1. Results

The indigenous community of Kampung Kuta is one of several Sundanese communities that still adheres to ancestral traditions. The timing of wedding ceremonies is used as a benchmark for determining the day of the celebration. The calculations are based on the Javanese and Hijri calendars. The Javanese calendar combines the lunar cycle, the weekly period, and the market period. A year consists of 12 months: *Sura*, *Sapar*, *Mulud*, *Silihmulud*,

*Jumadil Awal, Jumadil Akhir, Rajab, Rewah, Puasa, Sawal, Hapit, and Rayagung*. Each month has 29 or 30 days. *Saptawara* is another name for a week, which consists of seven days (a seven-day cycle). The names of the days included in the *Saptawara* period are: *ahad* (as Sunday), *senen* (as Monday), *salasa* (as Tuesday), *rebo* (as Wednesday), *kemis* (as Thursday), *jumaah* (as Friday), and *saptu* (as Saturday). Furthermore, *pancawara* is another name for a week consisting of five days (five-day cycle). *Pancawara* is also called market days because it was originally the operational days of traditional markets in ancient times. The names of market days included in the *pancawara* period consist of *Manis*, *Pahing*, *Puhun*, *Wage*, and *Kaliwon*. Based on these two periods, one day has two kinds of names attached to it. For example: *Ahad Manis*, *Senen Pahing*, *Rebo Puhun*, *Kemis Wage*, *Jumaah Kaliwon*, *Saptu Manis*, and so on. The pair of *Saptawara* periods (day cycle) and *Pancawara* periods (market cycle) are shown in [Figure 4](#).



**Figure 4.** The cycle of the *saptawara* period and the *pancawara* period (Umbara et al., 2019)

Based on [Figure 4](#), it can be understood that the *pancawara* period repeats every five days while the *saptawara* period is every seven days and is a single unit, for example: *Senen Manis*, *Salasa Pahing*, *Rebo Puhun*, *Kemis Wage*, *Jumaah Kaliwon*, *Saptu Manis*, *Ahad Pahing*, and others. This rule is explained by the informant and is listed in the Javanese calendar used by the people of Kampung Kuta as a benchmark in carrying out various activities. Meanwhile, in mathematics this cycle can be interpreted as a relationship between two sequential sets, where in one day (*saptawara*) there is one market (*pancawara*). Both are paired sequentially so that they can be defined, for example, A is the *saptawara* set and B is the *pancawara* set, then it can be written  $A = \{Senen, Salasa, Rebo, Kemis, Jumaah, Saptu, Ahad\}$  and  $B = \{Manis, Pahing, Puhun, Wage, Kaliwon\}$ . More formally, we have definitions, for A and B are set. The Cartesian products of A and B are sets of all ordered pairs  $\{A \times B = a,b | a \in A, b \in B\}$ . Thus, one cycle will have 35 days. Some of the names of the months used by the community are almost identical to those used in the Javanese and Hijri calendars, which can be categorized as a representation of the concept of cultural acculturation. Based on the interview results, the values of the *Saptawara* and *Pancawara* periods are shown in [Table 2](#).

**Table 2.** Order of days (*saptawara* period) and *pasar*an days (*pancawara* period) and their values

<i>Saptawara</i> period	
The name of <i>hari</i> /day	Value/ <i>Naktu</i>
<i>Ahad</i> (Sunday)	5
<i>Senen</i> (Monday)	4
<i>Salasa</i> (Tuesday)	3
<i>Rabu</i> (Wednesday)	7
<i>Kemis</i> (Thursday)	8
<i>Jumaah</i> (Friday)	6
<i>Saptu</i> (Saturday)	9
<i>Pancawara</i> period	
The name of <i>pasar</i> an	Value/ <i>Naktu</i>
<i>Manis</i>	5
<i>Pahing</i>	9
<i>Puhun</i>	7
<i>Wage</i>	4
<i>Kaliwon</i>	8

The values inherent in the *Saptawara* and *Pancawara* periods are then used by the Kampung Kuta community as a formula to determine categories that are in accordance with their beliefs. Based on the results of interviews with informants, it was provided that the calculation to determine the category of the day is based on the combined value associated with the name of the day (*Saptawara* period) and the name of the *pasar*an (*Pancawara* period). The people of Kampung Kuta use the value of time in decision-making to determine the category of the day using the calculation formula, as follows.

$$A = \frac{Ns + Np}{4}$$

Explanation:

A : Day categories at the wedding party

Ns : Values in the *Saptawara* period

Np : Values in the *Pancawara* value

\*) The date chosen for the wedding reception is the remainder of the division

After using the formula, it produces a remainder. The remainder of the division is categorized into several criteria to determine the days that can be selected for the wedding party. The categories of criteria for the days that can be selected for a wedding can be seen in [Table 3](#).

**Table 3.** Criteria for determining wedding day categories in indigenous communities in Kampung Kuta based on interviews with respondents

The criteria of categories day	Remaining of division	The meaning
<i>Nini</i>	1	<i>Nini</i> (as: grandma); Symbolizes generosity to others, for example: feeding others in need.
<i>Aki</i>	2	<i>Aki</i> (as: grandpa); Symbolizes dependence on something, for example expecting one's needs to be met by someone else.
<i>Indung</i>	3	<i>Indung</i> (as: Mother); Symbolizes abundant sustenance or being able to have worldly wealth.
<i>Bapa</i>	0	<i>Bapa</i> (as: father); Symbolizes the incompatibility between speech and action (nonsense).

As explained previously, the criteria used to determine an auspicious day for a wedding consist of four criteria. Note that the combination of the *Saptawara* and *Pancawara* periods in the formula above is divisible by 4. Therefore, the formula for determining the day category for a wedding party can be simplified mathematically by using the concept of modulo  $n$  congruence, which in this case applies modulo 4. Academic mathematics recognizes this as congruence, which can be defined as: an integer  $a$  and an integer  $b$  are said to be congruent modulo  $n$  if and only if they both give a remainder when divided by  $n$ , where  $b, n \in \mathbb{Z}$ . It is symbolically expressed as  $a \equiv b \pmod{n}$  so that the mathematical model can be formulated as follows.

$$a \equiv c \pmod{4} \text{ or } a = 4q + c$$

Where  $a$  is the determinant of the *Saptawara* and *Pancawara* criteria,  $q$  is a variable that describes the sequence of numbers to facilitate the determination of the criteria, while  $c$  is the remainder of the division. For example, using  $b$  to determine the day category for a wedding party, then:

- (1) For those with no remaining division/0 (*bapa*), then:

$$b \equiv 0 \pmod{4} \text{ or } b = 4q+0$$

The criteria of *bapa* meet the equation:

$$b = 4q$$

$$\text{If } q = 1, \text{ then } b = 4(1) \rightarrow b = 4$$

$$\text{If } q = 2, \text{ then } b = 4(2) \rightarrow b = 8$$

$$\text{If } q = 3, \text{ then } b = 4(3) \rightarrow b = 12$$

- (2) For the remaining division 1 (*nini*), then:

$$b \equiv 1 \pmod{4} \text{ or } b = 4q+1$$

The criteria of *nini* meet the equation:

$$b = 4q+1$$

$$\text{If } q = 1, \text{ then } b = 4(1) + 1 \rightarrow b = 5$$

$$\text{If } q = 2, \text{ then } b = 4(2) + 1 \rightarrow b = 9$$

$$\text{If } q = 3, \text{ then } b = 4(3) + 1 \rightarrow b = 13$$

- (3) For the remaining division 2 (*aki*), then:

$$b \equiv 2 \pmod{4} \text{ or } b = 4q+2$$

The criteria of *aki* meet the equation:

$$b = 4q+2$$

$$\text{If } q = 1, \text{ then } b = 4(1) + 2 \rightarrow b = 6$$

$$\text{If } q = 2, \text{ then } b = 4(2) + 2 \rightarrow b = 10$$

$$\text{If } q = 3, \text{ then } b = 4(3) + 2 \rightarrow b = 14$$

- (4) For the remaining division 3 (*indung*), then:

$$b \equiv 3 \pmod{4} \text{ or } b = 4q+3$$

The criteria of *indung* meet the equation:

$$b = 4q+3$$

$$\text{If } q = 1, \text{ then } b = 4(1) + 3 \rightarrow b = 7$$

$$\text{If } q = 2, \text{ then } b = 4(2) + 3 \rightarrow b = 11$$

$$\text{If } q = 3, \text{ then } b = 4(3) + 3 \rightarrow b = 15$$

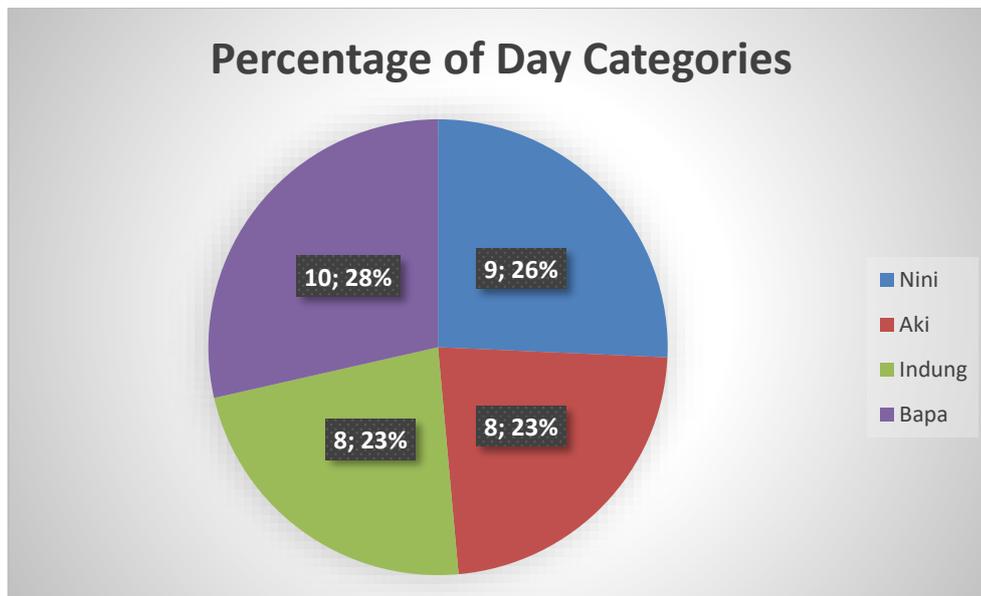
Based on the beliefs of the Kampung Kuta, the *indung* criterion (remainder of the number = 3) is the best day to hold a wedding party, hoping it will run smoothly, without obstacles, and bring blessings to the bride and groom throughout their lives. In addition to the

*indung* criterion, the *nini* criterion (remainder of the number = 1) is also used by them as an alternative day to hold a wedding party, hoping the husband and wife will be generous to others. In community practice, the remainder value is obtained from manual calculations using the formula mentioned above. Furthermore, to facilitate understanding of the relationship between the *saptawara* and *pancawara* periods in determining the timing of a wedding, the researcher presents the calculation results based on the modulo 4 concept in the matrix shown in [Table 4](#).

**Table 4.** Results of determining day categories for wedding parties in Kampung Kuta

<i>Saptawara</i> period and their values		<i>Pancawara</i> period and their values				
		<i>Manis</i>	<i>Pahing</i>	<i>Puhun</i>	<i>Wage</i>	<i>Kaliwon</i>
		5	9	7	4	8
<i>Ahad</i>	5	10	14	12	9	13
<i>Senen</i>	4	9	13	11	8	12
<i>Salasa</i>	3	8	12	10	7	11
<i>Rebo</i>	7	12	16	14	11	15
<i>Kemis</i>	8	13	17	15	12	16
<i>Jumaah</i>	6	11	15	13	10	14
<i>Saptu</i>	9	14	18	16	13	17

Based on [Table 4](#), it is known that there are 8 main days (*indung* criteria) that can be chosen as the best time to hold a wedding party, namely: *senen puhun*, *salasa wage*, *salasa kaliwon*, *rebo wage*, *rebo kaliwon*, *kemis puhun*, *jumaah manis*, and *jumaah pahing*. Meanwhile, the number of alternative days (*nini* criteria) is 9 days, which consist of: *ahad wage*, *ahad kaliwon*, *senen manis*, *senen pahing*, *kemis manis*, *kemis pahing*, *jumaah puhun*, *saptu wage*, and *saptu kaliwon*. Furthermore, to make the percentage composition of the day categories clearer, the calculation results are shown in [Figure 5](#).



**Figure 5.** Percentage of day categories for holding wedding party in Kampung Kuta.

Based on [Figure 5](#), the community's habit of using the *indung* criteria as the main criteria (23%) and the *nini* criteria as an alternative criterion (26%), so that both have a

percentage of 49%. Thus, the criteria for days that are considered inauspicious (considered bad or avoided) for holding a wedding party are the most dominant choices among the days that are considered auspicious, namely the *bapa* criteria (28%) and the *aki* criteria (23%), so that the total of both is 51%.

### 3.2. Discussion

The values associated with the *saptawara* and *pancawara* are symbols that provide a standard configuration. These values are used to determine the most appropriate time for a wedding party. The compilation of [Table 4](#) is intended to make it easier to understand how these calculations are used by the community. The matrix can help to explain the link between day criteria and predefined criteria (Umbara et al., [2021b](#)). The results of the exploration of mathematical concepts in the activity of determining auspicious times for weddings conducted by the Kampung Kuta community indicate that they utilize mathematical concepts in their lives. Some of the mathematical ideas discovered in this study include number operations, remainder theorems, sets, relations, congruence, modulo, and, of course, mathematical modeling used to facilitate community determination of day criteria.

The results showed that the Kampung Kuta community's habit of using days based on the *indung* and *nini* criteria, with both criteria accounting for 49% (23% *indung* criteria and 26% *nini* criteria). Thus, days based on the *bapa* and *aki* criteria were the most dominant criteria, accounting for 51% (28% *bapa* criteria and 23% *aki* criteria) of the days considered auspicious for weddings. This high percentage contrasts with the percentage of auspicious days used by the Cigugur Indigenous Community in another study, which was 65.72% (Umbara et al., [2021b](#)). This occurs because the Cigugur Indigenous Community uses three criteria: one primary criterion and two alternative criteria, while the Kampung Kuta community only uses two. However, the results of this study complement the results of other studies conducted in the Naga Village Community which uses modulo 3 to initiate various activities (Umbara et al., [2025](#)).

Furthermore, other research findings generally show that Sundanese people are generally accustomed to performing mathematical calculations, modelling, and anticipating phenomena (Abdullah, [2017](#)), estimating, measuring, and making patterns appear (Muhtadi et al., [2017](#)) which can be classified into the fundamental dimensions of universal mathematics (Umbara et al., [2021b](#)) which are used to initiate their various activities (Umbara et al., [2019](#)). Furthermore, several studies that have produced several mathematical ideas relevant to this research have also been conducted by other researchers, such as the use of Javanese *Primbon* for matchmaking (Utami et al., [2019](#)), the use of *Palintangan* by the Sundanese people (Umbara et al., [2019](#)), determining auspicious days for starting house construction (Umbara et al., [2021b](#)), determining wind direction in seeking fortune (Umbara et al., [2021a](#)), determining the best time for planting (Umbara et al., [2021c](#)), determining the timing of the *Tedhak Siten* traditional ceremony in Javanese society (Wiryanto et al., [2022](#)), the use of *Pananrang* in determining the planting season by the Bugis people (Pathuddin et al., [2023](#)), and the use of *Pranatamangsa* in determining the season and carrying out birth-death ceremonies in Yogyakarta (Prahmana et al., [2021](#)).

The study's findings support the view that counting and recording time (calendar) are excellent examples of ethnomathematics (D'Ambrosio, 2006). The activities of calculating are closely related to beliefs and reflect careful planning. The mathematical ideas and practices practiced by the community include inclusive enumeration. Inclusive enumeration is a census that is typically conducted by the community to count calendar days. Enumeration activities are considered as ancient in mathematical practice. According to Eves (1964), based on archaeological evidence, people have been conducting censuses since 50,000 years ago (Umbara et al., 2021b).

The study findings show that mathematical concepts cannot be separated from the lives of ordinary people, especially when performing computational tasks. All human actions, both consciously and unconsciously, are based on calculations that are in accordance with the natural conditions of its inhabitants such as the activities of estimating, measuring, and making patterns (Muhtadi et al., 2017), the use of units of measurement, mathematical modeling, and the use of clock symbols (Abdullah, 2017), decomposition of number (Umbara, 2024), and the application of the distribution properties of multiplication, the concept of identity and inverse (Muzdalipah & Yulianto, 2018). This is consistent with the viewpoint that ethnomathematics is a study of diverse methods of generating epistemological reflections on the nature of mathematical knowledge in practical, social, and cultural dimensions (Albanese et al., 2017) which refers to activities related to mathematics in various contexts that are close and visible to everyone (Cervantes-Barraza & Araujo, 2023). The practical dimension relates to the capacity of ethnomathematics as a tool for understanding and controlling the reality of mathematical knowledge held by a cultural group. The social dimension is the knowledge system, including the rules and symbols used by a community for communication. Meanwhile, the cultural dimension can be understood as mathematical knowledge passed down from generation to generation by a group as an effort to preserve culture. Consequently, mathematics can be justified as having social and cultural value (Noyes, 2012), so that it may be explained as knowledge inherent in human activities (Nurhasanah et al., 2017).

From a cultural perspective, the calculations carried out by a society are closely related to a collective belief system that reflects the strength of the belief system, thus becoming a catalyst and a glue. Beliefs about determining auspicious days for holding a wedding party influence how people determine their wedding date, at least they have guidelines about the ideal time for holding the party by prioritising the principle of caution. The calculation activity reflects caution in planning activities and is closely related to the belief system of the community (Umbara et al., 2025). Collectivist cultural patterns emphasise the needs and goals of a group (Schommer-Aikins, 2004). Meanwhile, a shared belief system is an authoritative force that can act as a catalyst and glue that unites a society over time (Jenkins-Smith et al., 2014). The belief system is a cultural value that is adhered to by society so that even though the results of the calculations are only predictions that are not necessarily true, they are still believed by society as a value of the culture itself. As a consequence of this calculation, the Sundanese believe to the point of opposing reasonable considerations because they hope to obtain the desired results and are granted bodily and mental bliss (Suryaatamana et al., 1992). This belief grew because society understood it as a spiritual value. It is important to emphasise that spirituality refers to the belief in the presence of supernatural forces and the influence of

religion on people's lives (Darley & Blankson, 2020). Therefore, these cultural values contain good qualities that are still firmly held by the community (Hanafi et al., 2020).

On the other hand, from the standpoint of mathematics, numeracy skills are one of the important talents of society, with the majority of them serving to assist other mathematical abilities. Bishop clearly classifies counting activities into six dimensions of universal basic mathematical activities (Umbara et al., 2021d). Through these ethnomathematics, the results of the study present a distinct viewpoint on conceptual mathematics that is embedded in a universal part of the holistic culture. Researchers in ethnomathematics investigate how various cultural groups perceive, express, and use concepts, procedures, and approaches that are recognized as mathematical practices and hence more intriguing than formal mathematics, which may be cold and harsh at times (Rosa et al., 2016). However, ethnomathematics also contributes to academic mathematics by comprehending and overcoming the frequently perceived divide between mathematics and ordinary life (Deda et al., 2024; Kusuma et al., 2024; Nursyahidah et al., 2025; Rodríguez-Nieto et al., 2025; Utami et al., 2020).

The results presented here also demonstrate the importance of exploring the mathematical concepts used by communities. The close association of local cultural values with mathematical concepts suggests that the two are strongly integrated. In everyday life, mathematics is employed to address human needs (Umbara et al., 2019). This demonstrates that ethnomathematics theoretically entails an examination of how human communities develop methods, styles, arts, and strategies for doing and knowing, learning and explaining, coping with situations, and resolving natural and socio-cultural environmental challenges (D'Ambrosio, 2018). This demonstrates that ethnomathematics can foster creativity, uphold cultural dignity, and provide a comprehensive humanitarian perspective. This is reflected in the perspective of the Kampung Kuta community who still uphold the sacredness of wedding ceremonies thus highly valuing the principles of caution, adherence to cultural rules, and careful timing of the wedding party. Thus, this is consistent with ethnomathematics' core purpose of constructing a society devoid of aggressiveness, hubris, intolerance, discrimination, injustice, prejudice, and hatred of others (D'Ambrosio & Rosa, 2017) as well as the potential to create social justice (Purniati et al., 2022).

Based on the mathematical concepts used in the previously reviewed numeracy activities, there is an opportunity to adopt academic mathematical concepts that can be adopted into mathematics learning in schools. Among the academic mathematical concepts that can be adopted into mathematics learning in schools include the concepts of numbers and their operations, sets, relationships, congruence, modulo, and mathematical modeling that can be implemented simultaneously. This is intended as one of the efforts to revitalize the learning approach carried out by maximizing teacher efforts in bridging mathematics with the realities of everyday life and student perceptions. From the perspective of educators, the ethnomathematics approach can revolutionize their thinking and perspectives (Fouze & Amit, 2018), so it is suggested that teachers can be helped to develop awareness of the ethnomathematics approach, especially in creating a more flexible and student-centered pedagogical approach (Sunzuma & Maharaj, 2019). As a result, children can understand how learning mathematics is intertwined with their culture.

Finally, we would like to clarify that this article is considered incomplete, especially in terms of its implications for the learning process in mathematics classes. However, we believe this article contributes to helping other mathematics researchers and teachers, particularly in Indonesia, understand why many research projects framed as ethnomathematics programs seem to have different goals and implications for education. This is due to differences in research contexts and sociocultural needs. The findings of this study can be applied or adapted to mathematics learning, for example, through culturally based activities that teach the concepts of modulo, congruence, and relevant mathematical modelling, such as systems of linear equations. In other words, this interpretation provides a possible way to integrate these differences and utilise them in future revitalisation of mathematics learning. This is due to differences in research contexts and the needs of the sociocultural environment. This interpretation provides a possible way to integrate the differences and utilize them in the revitalization process of learning mathematics in the future.

#### 4. CONCLUSION

The community's activity in Kampung Kuta of determining the timing of wedding party based on certain categories is a unique way of predicting the future, reflecting their beliefs which can be linked to the mathematical concept of modulo  $n$  congruence. This practice embodies the community's hopes and beliefs, framed within noble cultural values passed down through generations as a cultural heritage linked to mathematical ideas and concepts. The mathematical concepts and techniques that have been firmly held and used by the community for generations can be viewed from two different perspectives. The first perspective can be seen from the cultural dimension, which can be described as local genius that fulfills a holistic understanding of culture, enabling the smooth continuity of a cultural event. This holistic concept encompasses both knowledge systems and belief systems (religion). According to this holistic approach, the community's knowledge and capacity to apply mathematical ideas and procedures are related to what is currently considered acceptable wisdom. The second perspective can be classified into the dimension of fundamental mathematical activity, which involves detailed and comprehensive mathematical modeling through the use of modulo concepts.

The mathematical model produced in this study has been demonstrated by the researcher in matrix form. This is a simple form of a method for calculating and determining the categories of wedding party days, which was initially done by calculating the number of days in the saptawara period and the market in the pancawara period, dividing that number by 4, and determining the day criteria based on the remainder of the division. Based on this, the results of this study can provide benefits for the Kampung Kuta Community in determining time based on categories more quickly and accurately using the matrix that has been prepared by the researcher. Furthermore, we have specifically shown that the activity of determining the time of the wedding reception is related to number operations, remainder theorems, modulus, congruence, and mathematical modelling relevant to formal mathematics. Therefore, the results of this study also have great potential to be used as a context for mathematics learning, both in the context of developing didactic designs and in integrating ethnomathematics as a contextual problem in the mathematics learning process, so further

research is needed. We recognise this as a limitation of this study. Based on this, the limitations of this study need to be followed up for further research regarding the implications of developing didactic designs and ethnomathematics approaches in mathematics learning that are appropriate to the topic.

### Acknowledgments

The author would like to express appreciation and gratitude to the Ministry of Higher Education, Science, and Technology for the Research Grant Fund provided in this research through the "*Penelitian Fundamental Reguler* (PFR)" scheme in 2025.

### Declarations

- Author Contribution : UU: Conceptualization, Visualization, Writing - original draft, and Writing - review & editing; EFWP: Supervision, and Validation; TH: Formal analysis, and Writing - review & editing.
- Funding Statement : This research was funded by the Ministry of Higher Education, Science, and Technology of the Republic of Indonesia for its support and funding under the PFR (*Penelitian Fundamental Reguler*) scheme in 2025.
- Conflict of Interest : The authors declare no conflict of interest.
- Additional Information : Additional information is available for this paper.

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