



# CARICA STRUDEL: CULINARY INNOVATION TO STIMULATE SENSORY AND FUN MATHEMATICS ABILITIES IN CHILDREN

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## ABSTRACT

The study aims to examine the educational impact of introducing Carica Strudel on sensory and mathematical abilities in children aged 4-7 years in Wonosobo. Carica Strudel represents a culinary innovation that combines carica with strudel. It is not only a local culinary dish but also has the potential to serve as an effective learning tool. The research method employed is a descriptive quantitative approach. The research sample consisted of 20 children participating in the "Jelajah Dapur: Carica Strudel" activity was organized by Teman Penjelajah Community in collaboration with Patara. Data were collected through participant observation, in-depth interviews, and document analysis. The research procedures included the preparation, implementation, and data analysis stages. The research procedures consist of three stages: preparation, implementation, and data analysis. The validity of the data is guaranteed through triangulation of sources and methods, as well as member checking. The findings of the research indicate that the introduction of Carica strudel can stimulate children's various sensory abilities, including taste, visual perception, texture, and aroma. In addition, this activity facilitates the development of mathematical skills, including measurement, basic calculations, geometry, pattern recognition, estimation, simple data analysis, and an understanding of temperature and time. Carica Strudel is not only a culinary innovation that reflects local wisdom; it can also be utilized as an engaging and meaningful learning tool for children. This research offers new insights into the integration of local culinary delights in children's education, particularly in the development of sensory and mathematical abilities

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## 1. INTRODUCTION

Wonosobo Regency, located in Central Java Province, Indonesia, has unique natural wealth, one of which is carica fruit (*Carica pubescens*), a relative of papaya that grows in the Dieng Plateau and its surroundings (Ningsih et al., 2019). The Wonosobo community has developed various processed carica products such as candied carica (carica in syrup), carica jam, carica dodol, carica chips, and so on (Mudrikah & Sucihatiningih, 2018). This is done as an effort

to preserve and introduce this local fruit. The community/UMKM/brand industry that processes carica is experiencing relatively rapid development. Patara is one of the brands that processes Dieng carica fruit with a zero-waste concept, where all parts of the carica fruit are not thrown away as waste. All parts of the carica fruit, such as seeds and fruit skin, are used to make valuable products. One of the processed carica products developed by Patara and has succeeded in attracting the attention of tourists and local people is Carica Strudel. This processed carica product combines Wonosobo's local wisdom, namely Carica, and modern cuisine, namely strudel.

In 2024, Patara will not only focus on the culinary field. One of the areas targeted for Patara's development is education. Through various collaborative activities, Patara is committed to educating and introducing Wonosobo's local cuisine to school-age children, students, and the community. Educational activities that Patara has carried out include entrepreneurship workshops, collaboration with children's communities, and so on. One of the communities that has collaborated with Patara in the field of education is the Teman Penjelajah community. This community comprises kindergarten and elementary school children aged 4-10 years. Community activities focus on optimizing children's motor, sensory, and life skills so that many activities optimize children's development.

In the learning pyramid developed by William and Shellenberger, sensory abilities are one of the foundations for achieving peak abilities, namely academic learning (Yuniati, R., & Andriani, 2017). Sensory skills are related to activities involving the five senses: sight, hearing, smell, taste, and touch (Rovasita, 2019). The development of these abilities is essential because they play a significant role in children's learning process, social interaction, and cognitive development (Alamsyah et al., 2022). In this context, Patara had the opportunity to collaborate with Teman Penjelajah through the "Jelajah Dapur: Carica Strudel" activity. This activity can be a means to stimulate sensory abilities and fun mathematics in children while introducing Wonosobo's local wisdom, namely carica. The "Jelajah Dapur: Carica Strudel" activity can encourage children with various sensory aspects, namely: 1) visual: observing the color and shape of Carica Strudel in the form of dough or when it is cooked; 2) smell: recognizing the distinctive aroma of Carica Strudel; 3) taste: identifying sweet, sour, or other flavor combinations; 4) touch: feeling the texture of the Carica Strudel dough; and 5) hearing: listening to the sound when biting or chewing Carica Strudel. Children need life skills activities to fulfill learning areas such as sensory areas, mathematics areas, science and culture areas, and language areas (Mumtazah & Romah, 2019).

In reality, no comprehensive research has examined the effectiveness of the "Jelajah Dapur: Carica Strudel" life skills activity. Life skills are simple activities such as washing, cooking, cleaning the room, watering plants, and so on (Hardianti & Kristiana, 2024). These simple activities can affect children's motor skills. The results of a comprehensive study on the effectiveness of the "Jelajah Dapur: Carica Strudel" life skills activity can provide valuable insights for the development of local wisdom-based learning methods, support efforts to preserve regional culinary heritage, strengthen children's learning foundations through sensory stimulation, and introduce pre-mathematics activities. This case study examines the sensory abilities of children aged 4-7 years through the "Jelajah Dapur: Carica Strudel" activity. In addition to reviewing children's sensory abilities, activities that align with fun mathematics for children are also studied. This research can be a means of introducing the potential of local wisdom to children as well as a fun and meaningful learning tool. The results of this study are expected to provide

significant contributions in several aspects, namely: 1) development of local wisdom-based learning methods for children, especially at an early age and early childhood; 2) strategies for preserving and promoting regional culinary heritage; and 3) a better understanding of children's sensory development and mathematical abilities in the context of local culture. Therefore, this study is relevant in the context of child development and cultural preservation in Wonosobo and can provide valuable insights for similar efforts in other regions in Indonesia.

## **2. METHODS**

This study uses a descriptive quantitative approach (Alfatih, 2021). Descriptive quantitative was chosen to gain a specific understanding of the Jelajah Dapur: Carica Strudel activity and its impact on children's sensory abilities. The study subjects were children aged 4-7 years in Wonosobo, with a sample of 20 children who were members of the Jelajah Dapur: Carica Strudel activity held by the Teman Penjelajah Community. Data sources consist of primary data and secondary data. Primary data comes from field observations and interviews with sample parents during the activity. At the same time, secondary data is in the form of worksheet documents filled in by children. Data collection techniques use participant observation, in-depth interviews, and documentation. Research instruments include observation guidelines, interview guides, and photos/videos. The research procedure consists of: a) the preparation stage, including: activities to prepare research instruments, obtain research permits, and collaborate with Carica Strudel producers, namely Patara; b) the implementation stage, including: the process of introducing Carica Strudel, observations, and interviews during the process; and c) data analysis stage, including: reduction, data display and data interpretation (Sugiyono, 2019). Data validity is applied through source triangulation, comparing data from children, parents, and the Teman Penjelajah Community. Triangulation of methods, namely cross-checking the results of observations and interviews and member checking in the form of verification of data interpretation with five parents. The collected data are analyzed using descriptive techniques. The research data will be reduced according to the formulation of the problem and presented in the form of tables/diagrams/graphs. The diagrams/tables/graphs are interpreted in depth.

## **3. RESULTS AND DISCUSSION**

Carica Strudel is a typical dish that combines the natural wealth of Dieng with traditional European culinary techniques. One of the local ingredients of Dieng that has the potential to be developed into a superior culinary product is carica. Carica has a unique, slightly sour, sweet taste. This fruit is then used as the main ingredient in making Carica Strudel. Strudel is a pastry from Central Europe, especially Austria and surrounding countries. The name strudel comes from German, which means whirl, referring to the layers of dough that rotate inside it (Yuliana, 2022). The main characteristic of strudel is that it is a fragile and layered dough with various sweet or savory fillings. The filled dough is then rolled and baked until brown and crispy outside. Traditional strudel fillings are apples, raisins, and walnuts, while modern variations include various fruits, creams, or savory fillings such as meat and vegetables. Innovations in strudel fillings continue to develop, including sweet-salty combinations. This filling innovation was developed by Patara, namely making strudel filling from local fruit, namely carica.

Carica Strudel's uniqueness can be introduced through educational programs. Several studies have been conducted to introduce and educate various local culinary delights. These studies include: introducing lumpia and gudeg in the form of audiovisual media (Umi Farinda & Khaerunnisa, 2023), compiling a digital painting illustration book, "Culinary Experience of Malang" to introduce various culinary delights typical of Malang (Asmawan, 2019), and developing a webtoon comic "Wisata Pasar Kangen" as a medium for introducing culinary delights typical of Yogyakarta (Algiyanie et al., 2023). Local culinary education is commonly done through media development such as videos, books, or comics. Jelajah Dapur: Carica Strudel introduces a more interesting way to introduce children to the concept of international culinary while still respecting local ingredients. This activity provides information related to Carica Strudel, and children also actively participate in cooking classes. This can be an effective learning tool about geography (in the form of introducing the place where carica grows), history (the history of strudel), as well as mathematics and science (related to measuring the need for ingredients, baking time, and carrying out activities sequentially and systematically). In the Jelajah Dapur activity: Carica Strudel, children showed various responses. Children's reactions to Carica Strudel are explained in Figure 1 as follows.

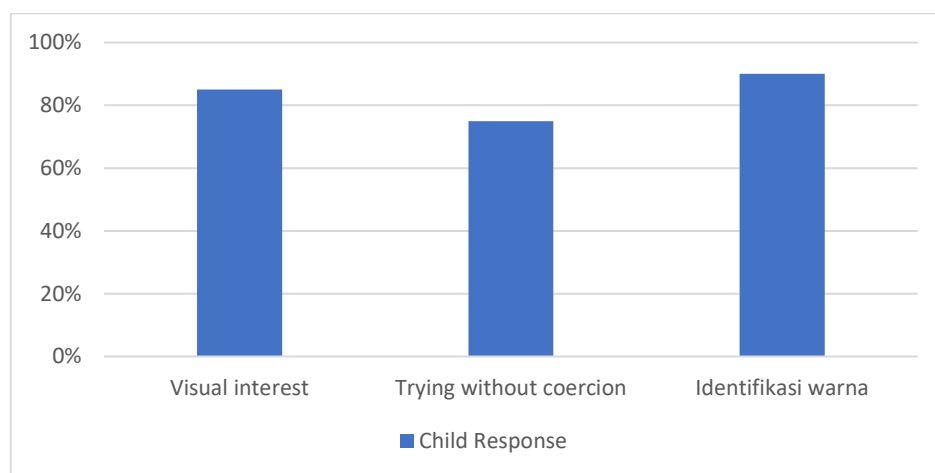


Figure 1. Children's Response to Carica Strudel

Figure 1 shows that 85% of children have a visual interest in Carica Strudel. Carica Strudel's appearance is considered very attractive to most children. This visual interest is due to the beautiful color combination between the golden pastry skin and the yellow carica filling. The unique shape of the rolled strudel can also be a factor that attracts children's attention. Good food presentation is important in attracting children's interest. Carica Strudel has excellent potential as a learning tool or introduction to new foods for children. The visual aspect can be a practical introduction to introducing new foods to children. The child's response is also shown by the child's willingness to try Carica Strudel, which is 75%. This percentage is relatively high because, in general, children are often hesitant to try new foods. The child's willingness to try Carica Strudel can be influenced by the child's sensory functions, such as smell, sight, and touch. Children's sensory development will develop well because they get good and optimal stimuli by involving all five senses (Wahyuni

& Azizah, 2020). Figure 1 also shows that 90% of children can identify the yellow color of carica fruit. Almost all children who participated in the activity could recognize the yellow color of carica fruit in strudel. High color identification ability indicates that carica fruit has a color that is easy to identify. At the age of 4-7 years, children generally have a good ability to distinguish colors. Carica Strudel can be an effective tool to teach children about color combinations. The data shows that Carica Strudel has excellent potential as a multisensory learning tool for children. The combination of visual appeal, willingness to try, and high color identification ability support Carica Strudel as an effective medium for various child development activities, from introducing new foods and learning colors to complex sensory stimulation.

The data on children's sensory abilities through the introduction of Carica Strudel are as follows.

### **1. Taste Sensory Ability**

The results showed that 80% of children could recognize the sweet taste, and 60% could detect the sour taste typical of carica fruit. This is an interesting finding because it shows the development of children's ability to distinguish tastes. Sweet taste is more straightforward to recognize because children like it, and it is often found in everyday foods. However, the ability of 60% of children to detect the sour taste typical of carica shows good development in distinguishing more complex tastes. The tart taste of carica is relatively different from the sour taste of oranges or lemons, while children more often taste the sourness from oranges/lemons than carica. The fact that 60% of children like the taste of Carica Strudel shows that the combination of sweet and sour flavors in this food has succeeded in attracting children's tastes. This can also be an effective strategy to introduce new flavors to children without causing rejection.

### **2. Texture Sensory Ability**

As many as 65% of children can distinguish the crunchy texture of the pastry skin, while 75% recognize the soft texture of the carica filling. The velvety texture of the carica filling is more straightforward to acknowledge because children often encounter this texture in everyday foods such as porridge or fruit puree. Meanwhile, the crunchy texture of the pastry skin is a new experience for some children in the Wonosobo area. Some children have not been exposed to textured foods like strudel. However, 65% is a pretty good number, indicating that children can identify and enjoy the variety of Carica Strudel textures. The texture and visualization of Carica Strudel are shown in Figure 2. as follows.



Figure 2. Texture and Visualization of Carica Strudel

### 3. Sensory Ability Aroma

As many as 80% of children can detect the distinctive aroma of carica fruit, which is the highest percentage among the sensory abilities tested. This is due to the firm and unique aroma of carica and the fact that children's sense of smell is generally more sensitive. As many as 70% of children said they liked the aroma of Carica Strudel, indicating that it is pleasant for most children. The aroma of food is often the first factor that influences a child's desire to try new foods.

### 4. Vocabulary Development

An average increase of 3-5 new words related to food descriptions is a significant finding. This shows that the sensory experience with Carica Strudel stimulates children's senses and encourages their language development. New words such as "crunchy," "soft," "sour," or "fragrant" help children express their experiences more specifically. This ability is essential for children's cognitive and language development.



Figure 3. Jelajah Dapur Activity: Carica Strudel

In addition to improving children's sensory abilities, the Jelajah Dapur Activity: Carica Strudel activity can also be a fun way to learn mathematics. The study results showed that fun cooking activities can also improve children's mathematical abilities, such as geometry, measurement, patterns, number sense, and so on (Mirawati et al., 2018). The mathematical skills developed in the Jelajah Dapur: Carica Strudel activity include the following.

1. **Measurement.** Children learn about various measurements and simple tools used to make Carica Strudel. Children can try measuring themselves using easy tools such as cups or spoons, while more complicated measurements can be done by giving demonstrations. Several types of measurement activities in making Carica Strudel are explained in Table 1.

Table 1. Measurements in Making Carica Strudel

No	Measurement Type	Measuring Instrument	Unit
1.	Measuring milk/water needed to make dough	Measuring cup	mL
2.	Measuring the weight of necessary flour	Bread scale	kg/gram
3.	Measuring the amount of sugar required	Tablespoon/teaspoon	tbsp/tsp
4.	Measuring the length and width of Carica Strudel packaging	Ruler	cm

2. **Basic Calculations and Operations.** When making dough or filling strudel, children can do addition calculations such as counting the number of Carica Strudel successfully created or the number of eggs needed.
3. **Geometry and Shape.** Making Carica Strudel involves various geometric shapes: rectangles, circles, and triangles. For example, rectangles (pastry sheets), triangles (how to fold pastry sheets), and circles (carica fruit pieces).
4. **Patterns and Sequences.** The stages of making Carica Strudel consist of several logical sequences. This encourages children's ability to think sequentially and systematically.
5. **Estimation and Prediction.** Children can learn to make predictions, such as estimating the baking time of the strudel or determining the number of strudels made with the amount of dough available.
6. **Simple Data Collection and Analysis.** Children can learn simple data collection, such as recording the number of strudels produced or other children's taste preferences.
7. **Temperature and Time.** Making Carica Strudel requires baking so children can become acquainted with the concepts of temperature and time. For example, children can observe the temperature and time needed to bake a strudel.

Integrating cooking activities with fun mathematical concepts can develop a deeper understanding of how mathematics is applied in everyday life. A hands-on approach can also increase children's motivation to learn mathematics. The Jelajah Dapur Activity: Carica Strudel received several positive testimonials from participants, which are explained in Table 2.

Table 2. Testimonials from Activity Participants *Jelajah Dapur: Carica Strudel*

No	Activity Participant Code	Testimony
1.	CS – 001	Happy, the taste of Carica Strudel is very delicious
2.	CS – 002	I learned how to make Carica Strudel. The children liked this activity.
3.	CS – 003	It was very exciting! I learned how to make strudel and other carica dishes. Carica Strudel is an interesting innovation.
4.	CS – 004	Happy because I gained experience and knowledge about Wonosobo's memorable souvenirs, Carica Strudel, and others
5.	CS – 005	It was fun because I got the experience of making Carica Strudel. There are lots of prizes too.
6.	CS – 006	Happy. Especially when forming the strudel. It smells good when baking, and it tastes good.

#### 4. CONCLUSION

Carica Strudel is a culinary innovation that integrates local ingredients (carica) and international recipes (strudel). Along with the educational program prepared by Patara, Carica Strudel is not only a typical Wonosobo culinary but has a broader educational impact. The Teman Penjelajah Community collaborated with Patara to create the Jelajah Dapur: Carica Strudel activity to improve the sensory abilities of children aged 4-7 years while implementing fun mathematics. The sensory skills stimulated in this activity include taste sensory abilities, visual sensory abilities, texture sensory abilities, and aroma sensory abilities. Meanwhile, the mathematical skills developed include measurement, basic calculations and operations, geometry and shapes, patterns and sequences, estimation and prediction, simple data collection and analysis, and temperature and time. The Carica Strudel innovation is not only limited to local culinary wisdom but can be used as a fun and meaningful learning tool for children.

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