

# Development of an educational board game to introduce traditional snack culture to children in RA Kuttab Labib



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## ABSTRACT

The erosion of traditional snack culture, especially among children, underscores the need for innovative educational tools to foster cultural awareness. This study aims to design an educational board game concept to introduce traditional Indonesian snack culture to children aged 4–6, targeting their developmental stage where cognitive and social skills are rapidly forming, supported by Piaget's cognitive development theory. A preliminary study and data collection were conducted at RA Kuttab Labib Bandung through observation and interviews to determine children's needs in cultural learning and the types of educational toys that are preferred and considered adequate for children. Data analysis was conducted using thematic analysis by literature studies on culture, educational toys, child anthropometry, and ergonomics. The data produced is the initial capital to design a board game with a design thinking approach that can encourage researcher innovation, but it is still based on user needs. This study contributes to the development of culturally focused learning media by providing innovative and concrete toy designs that combine traditional culinary elements with the potential to be implemented in early childhood environments to support cultural preservation and education.



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## 1. Introduction

Indonesia, as a maritime nation with more than 17,000 islands (Ministry of Marine Affairs and Fisheries, 2020), is home to extraordinary cultural diversity, including a rich heritage of traditional cuisine. Food serves not only to fulfill basic nutritional needs but also functions as a representation of global cultural identity [1]. Anthropological studies have emphasized that food is not merely a biological necessity but also a powerful social and cultural symbol [2]. Culinary traditions are often transmitted across generations, fostering a strong sense of continuity and communal identity, it holds profound meaning in both social and ritual contexts, frequently serving as the focal point of ceremonies and life-cycle events such as births, marriages, and funerals, in many cultures, food plays a central role in religious observances, where specific dishes are prepared to commemorate sacred days and reinforce collective beliefs [3]. Moreover, food functions as a medium through which social relationships are formed, maintained, and reinforced, serving as both a tangible and symbolic connector among individuals within a cultural group [4]. Indonesia's diverse regions exhibit unique culinary legacies shaped by ethnic traditions, local geography, and historical development. As reported by the Ministry of Tourism and Creative Economy, approximately 5,350 traditional dishes have been recorded across the archipelago. These food traditions, spanning ingredient choices, cooking methods, and flavor compositions, play a crucial role in expressing the cultural identity of each area. More than mere sustenance, traditional cuisine functions as a repository of cultural memory, transmitting ancestral knowledge, local values, and community beliefs from one generation to the next. Traditional regional food often becoming a cultural identity due to their

unique flavors suited to local tastes, passed down through generations, these recipes reflect local heritage and are influenced by natural resources and the surrounding environment, for example, coastal regions tend to feature seafood-based dishes, while fertile agricultural areas commonly use ingredients like rice, corn, and other crops [5]. As Utami said, what we eat shows a lot about who we are and our culture and existence [6], making cuisine like a "badge" representing the origins of someone and their cultural background, as example *Rendang*, a signature dish of the Minangkabau people from West Sumatra, is made from beef cooked with various spices and coconut milk until dry, this cooking process reflects the adaptation of food to the environment and the surrounding needs, as Minangkabau is rich in spices, making it easy to find ingredients for making *rendang*, moreover, *rendang* can last a long time, which aligns with the habit of the Minangkabau people, who often migrate to other places. Food has also become a national identity and a tool for introducing Indonesia to the world. This role makes culinary culture something that must be preserved, maintained, and cherished.

However, globalization is an inevitable phenomenon. Along with the growing development of multiculturalism in Indonesia, cultural boundaries are becoming increasingly blurred. The original elements of regional cultures are gradually being eroded by globalization, which offers boundless diversity. Research also indicates that one of the most pressing concerns of globalization is the loss of cultural authenticity. According to Suneki, globalization not only leads to a decline in appreciation for one's own culture, an essential part of national identity, but also contributes to the erosion of cultural values and the emergence of cultural acculturation, which eventually evolves into mass culture [7]. As a result, Indonesian cuisine, for instance, is gradually losing its prominence within society. In fact, people are often drawn to cultural products due to their uniqueness and authenticity, which are difficult to find elsewhere. When these elements of authenticity are diminished due to globalization, the cultural appeal of the products is also at risk of fading [8]. A study conducted in Bandung revealed that 3 out of 5 young people have experienced a shift in their food preferences, tending to choose Korean cuisine over Indonesian food, they stated that Korean food is perceived as more innovative and trendy, supported by various culinary innovations and massive promotions, in contrast, traditional foods suffer from low promotion and are considered monotonous and outdated [9]. This phenomenon is further reinforced by research conducted by Irmania, which states that teenagers consider their own country's culture ancient and unattractive [10]. This highlights how globalization influences the consumption patterns of the younger generation, who are more open to foreign cultures. Consequently, traditional local foods are increasingly viewed as less attractive because they are perceived to lack innovation, including effective promotion.

Although traditional cuisine has declined, this phenomenon has not received serious attention. Not many efforts are being made, even though this culinary and cultural heritage is increasingly threatened with extinction over time. This is an urgent issue that should be the concern of all society, particularly of the younger generation, who play a critical role in cultural preservation. Through targeted educational initiatives, such as interactive learning media, young people can actively engage in learning about and promoting Nusantara culinary heritage. Without the participation of the younger generation, the preservation of culture and local wisdom as ancestral heritage will be disrupted. Therefore, the younger generation must be the main actors in passing on the values of local wisdom in cultural preservation. In this context, introducing culinary culture from an early age is one of the initial steps that can be taken to instill knowledge and love for culture in the younger generation. It is crucial to take advantage of this developmental period because, at the age of 0-6 years, which is the golden age, the child's brain develops the fastest during its growth phase, with 80% of the brain developing at this age. The golden age is when children are readily receptive to positive stimuli and quick to recognize acknowledgments around them. At this stage, the cognitive performance of children in acquiring knowledge is remarkable; all the knowledge gained will significantly impact the child in the future [11]. This stage is characterized by a heightened sensitivity to stimuli, making it an ideal time to introduce values and knowledge that will shape a child's long-term worldview. By engaging children in the exploration of traditional foods, including their origins and cultural meanings, we provide more than just factual knowledge. In the long term, this early exposure

fosters a deeper emotional connection to heritage, which can translate into sustained interest, participation, and responsibility in preserving cultural practices as they grow older.

Children require diverse and engaging learning methods to effectively absorb cultural knowledge, particularly in understanding culinary culture. One effective approach is utilizing interactive educational media to optimize the achievement of learning objectives. As stated by Sari, teachers who use instructional media tend to transfer knowledge to students more efficiently [12], interactive learning media functions as a dynamic educational tool that supports two-way communication, fostering active engagement between educators and learners in order to achieve specific instructional objectives, as a medium for both delivering and facilitating the exchange of information, this interactive process enhances the quality of teaching and learning by promoting meaningful participation and collaboration, thereby contributing to the successful attainment of desired learning outcomes [13]. Consequently, there is a growing need for learning media that enables children to engage in play while simultaneously acquiring knowledge. A fun and engaging learning process not only captures children's attention but also fosters interest in specific subjects, such as culinary culture. One effective form of learning media is *Alat Permainan Edukatif* (APE), or Educational Play Tools. As play constitutes a vital aspect of childhood, integrating play-based media into educational activities is crucial. This approach allows children to explore, discover, and absorb knowledge in an enjoyable and meaningful way, thereby enhancing their enthusiasm and curiosity, particularly in relation to cultural themes. Educational toys serve as a valuable tool designed to stimulate multiple aspects of child development, supporting the learning process both in school and at home [14]. Specifically, APE can be tailored to culinary culture education by incorporating activities like simulated cooking games, interactive storytelling about traditional recipes, or hands-on tasks that mimic culinary practices. These activities not only make learning fun but also deepen children's understanding of cultural values, directly aligning to foster cultural appreciation through education.

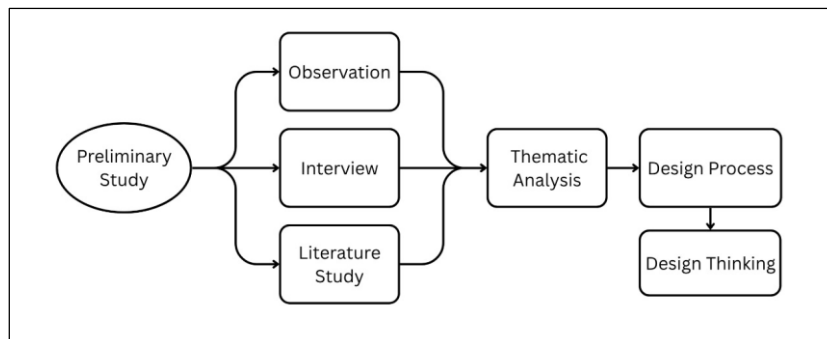
Unfortunately, educational toys that implement cultural elements for children are currently very limited. Based on surveys conducted at RA Kuttub Labib, *Pos Paud*, and Sukabirus Elementary School in Bandung, it was found that very few toys are specifically designed to support the introduction of culture. Kindergarten children usually learn about culture only through stories, songs, dialogues with teachers, role-playing, and the limited facilities available at school, such as angklung and traditional clothes. Meanwhile, cultural learning taught in elementary school focuses more on theory found in books, without enrichment through media. Therefore, this research aims to develop an innovative and educational concept for learning aids APE that can introduce traditional Nusantara culinary culture to children aged 4-6 years. This effort addresses the lack of culture-based learning media. In addition to being structured, the educational toys are tailored to meet the developmental standards and needs of motor and cognitive skills in children aged 4-6 years. It is hoped that this educational toy design will foster children's interest in learning about Nusantara's culinary culture while encouraging them to love and appreciate Indonesia's culinary heritage. The urgency of this research lies in its effort to find alternative solutions to meet the need for more interactive and engaging cultural learning media. This study presents a design concept developed in response to the declining awareness of Nusantara cuisine among the younger generation. The proposed design has undergone validation by experienced teachers and a child psychologist, confirming its feasibility, developmental suitability, and potential to support early childhood learning. Although the study focuses on the conceptual and design phase, these expert validations strengthen its relevance and possible implementation in educational settings.

## 2. Method

This research adopts a qualitative descriptive approach, which aims to explore and deeply understand social realities and phenomena in early childhood education. This method is deemed suitable because it allows researchers to observe patterns, behaviours, and cultural perceptions of young children in a natural educational setting. The researcher presents the research object in detail to fully understand its traits, nature, and patterns [15], which is suitable for this research.

## 2.1. Data Collection Techniques

Data were collected through triangulation, involving three main techniques: observation, interviews, and literature studies. These methods were systematically integrated using a convergent triangulation approach to ensure a comprehensive dataset that informs the Design Thinking process for developing an educational game introducing Indonesian culinary culture. Each method is detailed below (Fig. 1), with measures to enhance validity and reliability.



**Fig 1.** Stage of Research

Observations were conducted at Raudhatul Athfal Kuttub Labib in Bandung City, selected for its structured curriculum that incorporates Indonesian cultural education and its use of Educational Toys as learning tools. The observation focused on classroom teaching and learning processes, capturing children's behavioral characteristics, their responses to cultural learning activities, and their interactions with APE. Specific attention was given to their ability to recognize basic elements like shapes and colors, and their familiarity with Indonesian culture. Observations were conducted using a structured observation list to systematically record behaviors; this approach minimized observer bias and provided consistent data points for analysis. In-depth, semi-structured interviews were conducted on November 5, 2024, with key stakeholders, including the school principal, three teachers and parent of the student, to gain insights into classroom learning activities, the frequency and nature of cultural education, children's engagement with cultural content, and the availability and limitations of existing APE and children knowledge about culture. The interviews used open-ended questions to allow flexibility while maintaining focus on research objectives. To enhance validity, interviews were audio-recorded with consent, transcribed verbatim, and cross-checked by researchers and lecturers for accuracy. Follow-up interviews with two teachers on 21 May 2025 clarified ambiguous responses, ensuring data completeness. A comprehensive literature review was conducted to establish a theoretical foundation for this study. Sources included peer-reviewed journals, books, and prior studies on culture, art, education, design, early childhood education, and child psychology, accessed through academic databases such as Google Scholar and ResearchGate. The review prioritized sources published within the last 5 years (2010–2024), with exceptions for seminal works, to ensure relevance. To ensure data validity and reliability, multiple strategies were employed. Triangulation was reinforced with member checking, where observation records and interview findings were confirmed by teachers. Peer debriefing was conducted with academic supervisors to reduce researcher bias.

## 2.2. Data Analysis Technique

This method was chosen because it offers a careful, reflective, flexible, empathetic, and adaptable approach to understanding complex human experiences [16]. This method fits well with the design process used in this research, which is Design Thinking. It especially supports empathize, define, and ideate phases because it is flexible, reflective, and focused on understanding people's experiences. Due to resource constraints, a manual, paper-based cross-referencing method was used for convergent triangulation. The data from observation, interviews, and literature were not analyzed in isolation. Instead, they were systematically integrated using a convergent triangulation approach to draw a comprehensive picture. Themes emerging from classroom behavior and interview transcripts were cross-validated with literature insights to strengthen consistency. For example, if children's engagement with

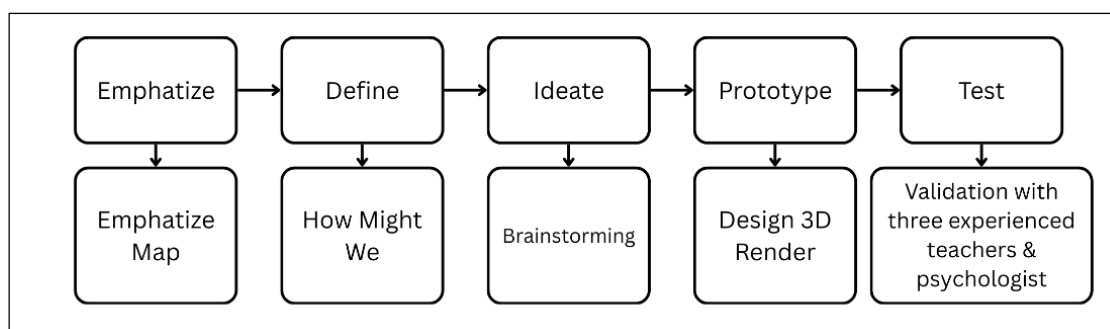
traditional foods was noted in both observations and interviews, this was matched with pedagogical frameworks found in recent literature. This cross-analysis ensured that the triangulated data guided the design process in a grounded and evidence-based manner.

### 2.3. Scope Justification

The study centered on Raudhatul Athfal Kuttub Labib, selected as a representative case due to its established cultural education program and diverse student demographics, reflecting typical characteristics of early childhood education settings in urban Indonesia. While a single-site study limits generalizability, this focus enabled in-depth data collection critical for the exploratory nature of this qualitative research. While this site provided rich contextual data, future research should include multiple schools across urban and rural settings to strengthen external validity and explore cultural diversity in educational toy design preferences across Indonesia.

### 2.4. Design Method

The design method used in this research is the design thinking method. Design thinking is an iterative process where researchers try to understand users, challenge assumptions, and redefine problems to find alternative solutions that might not be apparent at the initial understanding. This method is used because it focuses on an approach based on the needs of prospective users, namely children aged 4-6 years, including identifying and fulfilling unmet user needs. This method enables researchers to develop solutions based on user needs and existing problems, while also empowering them as designers to innovate and express their creativity and ideas. All five stages of Design Thinking are incorporated, with clear implementation details to ensure rigor and empirical validation (Fig. 2).



**Fig 2.** Stage of Design

- **Empathize:** The first stage of design thinking is Empathize. Researchers will get to know, understand, and think from the point of view of the prospective users, namely, children. Through the observational and interview data previously conducted, researchers can more easily position themselves as children and understand what cultures they like, the cultural activities they want to do, the difficulties they experience, and their learning preferences. This is useful for designing an approach suitable for implementing to effectively meet the objectives.
- **Define:** Define is an advanced stage when the product developer understands the problems and needs of the user and describes what they get as the basis for making the product [17]. The researcher will identify the core problems obtained from the Empathize data at this stage. This problem data will then form the basis for formulating potential ideas or solutions to be designed in the next stage to solve the identified core problems. The researcher uses the HMW (How Might We) method at this stage to find potential solutions.
- **Ideate:** The ideate stage is the stage where ideas or solutions are found for the problems discovered. The solution will be the basis for the development of the system/product to be created [18]. At this stage, the researcher will determine the final solution to the problems identified in the previous stage.



- Prototyping: In design thinking, the prototype stage is where the researcher produces models of the ideas selected in the ideate stage. At this stage, the prototype developed in digital form is a 3D render design that visually represents the formulated design solution concept.
- Test: Ideally, the testing phase involves iterative trials with target users. However, due to time constraints and institutional policies regarding research with children, this study utilized expert validation instead. The prototype was reviewed by two early childhood educators and one child psychologist. While this approach does not replace direct testing with users, it aligns with design-based research principles, where expert reviews serve as initial validations. A follow-up user trial is planned for future study stages and will be scheduled for implementation in the near term. Feedback from the expert reviewers was coded and integrated into the refinement of the toy design, and their input will inform the next iteration of the prototype [19].

To further strengthen empirical grounding in the design process, future research will include usability testing of the prototype with children aged 4–6 in supervised settings. This empirical phase will gather feedback on interaction, engagement, and cultural comprehension, ensuring the product design is not only theoretically relevant but also practically effective in meeting the learning goals.

### 3. Results and Discussion

#### 3.1. Implementation of Culinary Culture for Children Aged 4-6 Years in School

Observations conducted at RA Kuttat Labib Bandung revealed that elements of traditional Indonesian culture are introduced to students in the second semester through a thematic unit titled *Negaraku*. The cultural content delivered includes traditional values, manners, folklore, regional clothing, and the introduction of local languages such as Sundanese. Instructional methods include storytelling, worksheets, and role-playing. These methods help children comprehend aspects of Indonesian culture, for instance, the use of traditional tools like rice pounders (*alu* and *lesung*), regional language differences, and traditional farming activities like rice planting. However, due to limited learning media and reliance on worksheets that are easily forgotten, teachers often must repeat the same materials to reinforce understanding. Observations also noted that while children show strong engagement with physical educational tools, they struggle to maintain focus when exposed to theoretical content delivered via paper-based methods. This finding aligns with Piaget's theory of cognitive development, particularly the Pre-Operational Stage in early childhood where children's thinking is dominated by what is directly seen and experienced rather than by logical principles, at this stage, children are still developing abilities such as semantic function, decentering, and conservation, which limits their capacity to process abstract information [20], such as written theory on worksheets. The clear gap between the effectiveness of hands-on media and traditional paper-based learning reflects this developmental limitation, reinforcing the need for interactive, sensory-rich learning tools.

Despite ongoing efforts to introduce culture in education, children's understanding of traditional culinary culture remains limited. A preliminary survey conducted with 22 children aged 4-6 at RA Kuttat Labib revealed that 80% could identify foreign foods like pizza, donuts, and jelly, widely available in urban environments, but only 20% recognized traditional dishes. Foreign foods are more recognizable due to their frequent presence in everyday environments, including at school, as the teacher said, traditional foods are hard to find these days. Furthermore, findings indicate that children in RA Kuttat Labib are exposed to traditional culture only within the school environment, as parents tend to focus more on foundational academic skills such as reading, writing, and arithmetic at home. Yet, parental knowledge and involvement are crucial in shaping children's early development, particularly their understanding and appreciation of culture. Rohita emphasized that the level of parental knowledge significantly affects the effectiveness of educational stimulation provided to children [21]. Despite the acknowledged importance of parental involvement, the introduction of local culture during early childhood remains predominantly the responsibility of educators, with minimal participation from families. This lack of engagement places children at risk of becoming

disconnected from their regional roots, thereby weakening national cultural identity, especially given that Indonesia's national heritage is deeply rooted in its diverse local traditions [22]. These insights underscore the strategic importance of early childhood education institutions in the preservation and transmission of cultural heritage. Practically, the findings reveal an urgent need for culturally responsive learning tools that are both developmentally appropriate and engaging for young learners. Improving the quality, creativity, and accessibility of cultural education media can significantly strengthen cultural comprehension, particularly in cases where reinforcement at home is limited. Although the school has not yet formally introduced traditional culinary culture, teachers expressed confidence that it would not pose a challenge. This is because students regularly participate in cooking class sessions, which can serve as an effective foundation for incorporating food-related topics into the learning process.

Observations show that learning media play a crucial role in supporting early childhood learning activities. Teachers at RA Kuttab Labib mentioned that children show greater enthusiasm and curiosity when engaged in practical learning using interactive and visual-based media, such as images, shapes, and toys, as well as special sessions like a cooking class. Popular learning tools include puzzles, blocks, and matching games, which involve three-dimensional, tactile, and visual interaction. This preference is consistent with the cognitive characteristics of children aged 4–6 years, who are in Piaget's Pre-Operational Stage, a period when learning is most effective through concrete experiences and sensory engagement. At this stage, children rely heavily on visual cues, symbolic representation, and manipulative play to construct knowledge, making abstract or text-based instruction less effective. Teachers also emphasized that the integration of media in instructional methods not only facilitates understanding but also improves attention span and memory retention. As a result, the school consistently incorporates educational media in all subjects to support and enrich the learning process. Therefore, teachers continuously strive to provide teaching media and interactive activities that create an enjoyable learning environment. When children feel happy, their enthusiasm for learning increases, allowing knowledge to be absorbed more naturally. Fun and engaging instructional methods not only capture students' attention but also enhance their concentration and support better knowledge retention, when students enjoy the learning process, they are more likely to participate actively, which leads to deeper understanding and longer-lasting memory of the material [23], this is in line with research showing that a joyful and stimulating learning environment plays a crucial role in fostering creative thinking, accelerating cognitive development, promoting positive peer interaction, and building resilience in both children and adolescents, and to achieve this, educators are encouraged to move beyond monotonous and repetitive teaching methods, and instead embrace positivity, variety, and creativity in their pedagogical strategies [24], by doing so, they ensure that the learning process remains dynamic, meaningful, and developmentally appropriate for young learners, ultimately enhancing engagement, motivation, and long-term educational outcomes.

Educational Toy is this school's primary medium for learning activities. The APE available is also diverse, ranging from puzzles and unit blocks to grouping play tools. The most frequently used APE in this school is puzzles. The teachers at this school stated that puzzles are the most popular games among the students. However, despite the variety, it was found that there are no learning media or APEs that specifically focus on cultural themes, especially culinary culture. Teachers stated that the lack of learning media about culture significantly impacts the cultural learning process. There is limited availability of culture-specific tools automatically hinders and does not maximize the cultural introduction learning process. With the limited facilities available, the school hopes to add to its APE collection, especially those with cultural themes, to introduce local wisdom values to children from an early age. Thus, it can be concluded that children need APE to support the learning process more optimally. The most important thing in learning about culture is to provide an interesting approach that can leave a memorable new experience for children. This can be a potential reason because culture is full of diverse stories, which will increase their curiosity. Implementing culture with the right approach for them can be done by creating interactive learning media that emphasizes lots of visual images and shapes. Based on literature studies, it was found that educational play equipment suitable for children aged 4-6 years includes those that can coordinate eye and hand, sequence or classify based on

characteristics, and can be played with friends. Examples include puzzles, blocks, number cards, letter cards, and grouping play equipment.

3.2. Thematic Analysis Process

3.2.1. Data Familiarization

The researcher reviewed observation notes, interview transcripts (November 5, 2024, and May 21, 2025), and literature summaries (2020–2024), noting children’s puzzle engagement, limited culinary knowledge, and insights from Piaget’s Pre-Operational Stage.

3.2.2. Initial Code

The coding process was done manually by highlighting segments related to children's responses to media, teaching methods, parental involvement, and gaps in cultural content. From the observation results, it was found that children showed high engagement with interactive media and limited knowledge about culinary, which then led to the theme of preference for interactive learning and a lack of understanding of culinary culture. Interviews revealed the need for culture-specific media and limited culinary knowledge, thus emphasizing the importance of interactive and culturally contextual media. Meanwhile, the literature review showed that sensory-based tools are effective in learning and the importance of early cultural education, which supports the need for educational tools that are appropriate to the child's developmental stage and culturally contextual.

3.2.3. Theme Reviewing

The initial codes obtained were then grouped into broader themes that reflected both pedagogical needs and user experiences. Three main themes that emerged were, (1) preference for interactive learning, where children were shown to be more interested and engaged through visual and tactile aids than through traditional worksheets; (2) limited knowledge of culinary culture, as indicated by children’s tendency to be more familiar with global foods than traditional dishes; (3) need for culture-specific media, where visual and tactile materials were deemed important for effectively teaching culinary culture to young children.

3.2.4. Defining Themes

Thematic elements were reviewed and cross-compared with Piagetian theory and relevant educational media literature to ensure both theoretical alignment and internal coherence. Specifically, the theme of engagement with shapes and colors supports children’s cognitive development during the Preoperational Stage (ages 2–7), as described in Piaget's theory. At this stage, children learn most effectively through concrete experiences, symbolic play, and physical interaction [25]. The preference for sensory-rich tools, such as colorful visuals and manipulatives, aligns with their developmental needs, reinforcing the importance of media that stimulate both visual and tactile engagement.

3.2.5. Reporting

At the reporting stage (Table 1), there was a convergence of findings where all sources expressed a preference for the use of interactive tools in cultural education. This finding was reinforced by the complementary aspect of the interviews, which revealed a lack of media that specifically represented local culture. Although there were several forms of cultural education that had been implemented, there was a discrepancy in the focus of the material, namely the lack of attention to the culinary aspect as part of the cultural heritage that should be introduced more widely.

Tabel 1. Reporting table

Theme	Observation	Interview	Literature	Synthesis
Preference for interactive learning	High engagement was observed in the use of interactive media-based tools, particularly puzzles.	Kids prefer puzzles, visual tools	Sensory tools suit the Pre-Operational Stage [20]	Interactive media is essential.
Limited culinary culture knowledge	Know such jelly, pizza, and burger, not traditional foods	No culture-specific tools; global food provides and familiarity	Cultural exposure needed [22]	Limited culinary exposure.
Need for culinary-specific tools.	Prefer a tactical toys puzzle.	Need visual, cultural media.	Visual, hands-on tools enhance learning in young children	Board games need tactile elements.



### 3.2.6. Application to Design Thinking

In the implementation stage of the Design Thinking process, a number of previously discovered themes form the basis for each step. In the Empathize stage, a preference for interactive media and limited public knowledge about culinary culture were identified. This led to the formulation of the problem in the Define stage, namely, how can we design a board game that is rich in sensory stimulation to introduce Indonesian culinary culture? Furthermore, in the Ideate stage, the idea of a game with food-shaped elements and flashcards emerged. This idea was then realized in the Prototype stage through the development of a 3D render with tactile and colorful components. In the Test stage, the concept of this board game was validated through evaluation by experts to ensure its suitability for educational and cultural purposes.

### 3.2.7. Validation

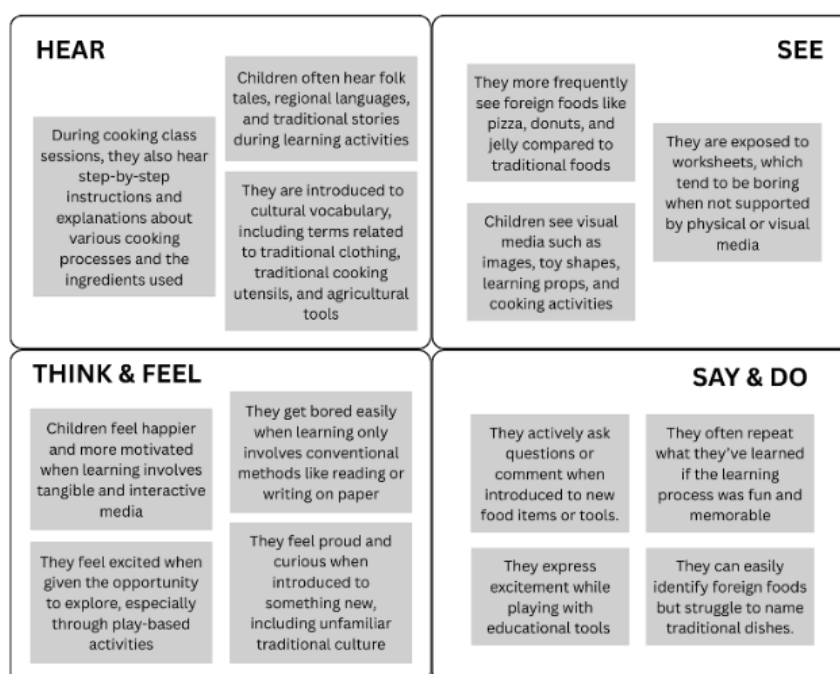
To ensure the validity of the thematic analysis, member checking was conducted on May 21, 2025, with teachers at Kuttub Labib, who verified themes related to board games, puzzles, and game plots or mechanisms. In addition, a peer review process was also carried out by involving a product design lecturer who reviewed the relevance and accuracy of the codes and themes that had been identified. Thus, this thematic analysis not only reveals gaps in current early childhood cultural education, but also directly shapes the design needs of the educational toys being developed..

## 3.3. Design Process

This section will show the process of designing products using the design thinking method.

### 3.3.1. Emphatize

At this stage, data from observations and teacher interviews help position the researcher in the user's perspective. Observations focused on children's play and learning habits, their cultural knowledge, the learning environment, available facilities, and current teaching practices. Teacher interviews were conducted to explore teaching methods, needs in delivering culinary culture content, and suggestions for alternative educational toys. Teachers' insights, based on their direct experience and understanding, serve as a reliable reflection of the children's needs. Based on the findings from observations and interviews, the researcher compiled all insights into the following empathy map in [Fig. 3](#).



**Fig 3.** Empathy Map of Children

Based on the findings from the empathy map, researchers identified that children showed a strong interest in educational toys, with the main factors that attracted their attention being interactivity and visual elements such as color and shape. In familiar games, children tend to

explore and experiment. For example, when playing animal puzzles, they often mix pieces, such as combining a frog's body with a bird's head. Their interest was even higher in new games because they were basically attracted to activities that were new and entertaining. On the other hand, children were generally not familiar with traditional foods and were more familiar with globally popular foods such as donuts and jelly. In addition, children really enjoyed learning facilities that allowed them to learn while playing and gave them new experiences and nuances in the learning process. Based on the data collected, several problems were identified. Children showed a particular interest in types of toys such as puzzles, building blocks, and matching games, because these are the types of toys most often available in the school environment. They also prefer learning media that emphasize visual aspects, such as appearance, color, and shape. However, the absence of media specifically used to introduce culture causes cultural learning in schools to be less in-depth. Children do not understand the essence of the culture being taught, so the values in arts education tend to be neglected or lose their meaning. This stage concludes that children aged 4-6 years need culture-based learning media that focus on visuals and shapes to support their cultural learning, which has not been maximized. This approach makes it easier for children to understand the lessons and supports teachers and schools in providing optimal cultural learning media to enhance classroom learning activities.

3.3.2. Define

This stage is carried out after the problem identification process in the Empathize stage. At this stage, the researcher also uses the How Might We (HMW) technique to help identify core problems and formulate design solutions to those problems. This approach allows the researcher to develop questions that encourage ideas according to context and needs. Hence, every problem identified in the identification stage can be systematically resolved (see Table 2).

Tabel 2. HMW method

How	Might
How might we introduce traditional culinary foods to children who have no prior knowledge of them, engagingly and educationally?	Use an approach suitable for the child's age. Children love to play, so create educational media in the form of interactive toys with a visual approach that directly introduces them to unique food shapes. Make the introduction fun, tactile, and tied to memorable experiences. This way, children can be curious about attractive and exciting traditional foods.
How might we design interactive toys that spark children's curiosity about different cultures and make learning about them like a new adventure?	Creating interactive educational toys, such as board games. Board games are familiar to children, and currently, many board games don't seem to be dedicated to introducing culinary culture to children. Therefore, this innovation can provide new experiences for children. Other supporting components, like 3D puzzles, where children assemble iconic food dishes from different cultures, can be interesting.
How might we teach children about culinary culture in a fun and meaningful way, helping them connect with and appreciate cultural diversity?	Exploring various traditional cuisines from across Indonesia will broaden their horizons about the diversity and richness of cultural values in Indonesia, helping children better understand and appreciate each culinary culture they learn.

3.3.3. Ideate

One of the core issues identified in the previous step was the lack of engaging, culturally relevant educational media for early childhood. To address this, the chosen solution is to design an educational tool that combines board games with 3D puzzles. A board game is played on a board using pieces and following the rules of the layout on the board. Sometimes, board games are also equipped with various objects and components [26]. Board games train children's thinking processes to generate many ideas, be innovative, and develop strategies, thus fostering new soft skills [27]. Through interactive board games, children can actively engage and have fun while learning, creating an interest in learning about culture. This makes the cultural learning process natural and effective. As stated by Koivisto in Kesuma, game boards can attract attention and curiosity. People who play will experience how they master competence, are directly involved in the game, generate intrinsic motivation, and increase activity [28]. In addition to board games, another component included in this toy is a 3D puzzle. Puzzles offer many benefits as educational toys.

They not only train problem-solving skills by encouraging children to think creatively and approach challenges from different perspectives but also enhance hand-eye coordination and develop fine motor skills [29] ability to solve problems can also enhance their cognitive skills, both in intelligence and creativity, in solving their problems [30]. While board games offer a structured, rule-based environment conducive to learning, 3D puzzles add a tactile, hands-on element that supports sensory engagement and concept retention, particularly effective for children in the pre-operational stage of development. By incorporating 3D puzzle pieces in the form of traditional Indonesian snacks and meals, the game not only introduces children to local culinary culture in a playful and interactive manner but also builds their familiarity and emotional connection to cultural symbols from an early age. By integrating these two toys, children gain a more comprehensive learning experience. They learn about local culture, explore, think creatively, strategically, and collaborate. This aligns with the book titled "*Karakteristik Peserta Didik Abad-21*," which mentions that the evolving 21st-century competencies indeed require learners to develop strong characteristics in creative thinking, critical thinking, problem-solving, communication, and collaboration to support competitiveness in the modern digital world [31]. Thus, board games and three-dimensional puzzles are a combination that makes them relevant toys in preparing children to face the challenges in the future. Several aspects must be considered when designing a toy to ensure it functions as desired. The design aspects analyzed are in line with the design principles in Heljakka's study on Canete, which concludes the importance of toys being safe, age-appropriate, aesthetic, enjoyable, educational, and sustainable [32], see Table 3.

**Tabel 3.** Design Aspect and Specific

Aspect	Specific
Safety	The rounded-edge design ensures a comfortable grip and is easy for children to hold, while the sturdy wooden material resists breakage. The pieces are painted with safe, non-toxic colors, making them durable and child-friendly. Children should also be accompanied by an adult when playing with this toy.
Age Appropriate	The design focuses on simplicity. The product is sized to fit comfortably in a child's hand, making it easy to grab and hold. It includes visual guides and cards designed for easy understanding, along with simple rules that are flexible and easy to follow, considering the users of this toy are young children, ensuring an intuitive and enjoyable play experience.
Aesthetic	The design uses a playful, bright, harmonious color palette that's visually engaging for children while incorporating realistic colors that closely resemble the original appearance of each food item. This balance of vibrant and authentic colors helps make the game both educational and visually appealing without overwhelming.
Enjoyable	The components are designed to be highly interactive, encouraging children to engage actively with each part of the toys. This board game includes interactive 3D wooden puzzles that are fun for children to assemble. The game encourages healthy competition with a winner and runner-up concept, making it more exciting.
Educational	Ideally, toys designed for early childhood should be educational to support children's growth and broaden their horizons after playing with them. Academic toys are tools that toy designers create to support children's learning processes through play. Examples include board games, educational cards, and puzzles [33].
Sustainable	The selected material is of high quality, ensuring durability and minimizing potential waste.

This toy concept is a creative innovation that differentiates this product from existing products to introduce the culture and the world of toys. Existing products in 3D puzzles or cut-out toys are only in the shape of vegetables, fruits, and ingredients like fish and eggs. However, this toy transforms the shapes into traditional Indonesian food. This approach engages rich culinary heritage and creates a creative breakthrough for the lack of toy media to teach culture.

### 3.3.4. Prototyping

At this stage, the researcher is focusing on the design of the board game and puzzle, including the supporting components of the board game itself. The researcher will explain the form of the designed board game and how it works. Visual aspects of the game components will have a significant impact on the function of this toy. Therefore, it is crucial to create accurate visualizations, choose appropriate materials, and determine the dimensions and proportions of the toy that allow it to have a detailed design and good result, which will be explained in Table 4.

Tabel 4. Visual Aspect of Educational Board Game

Concept	Detail
Shape	The board game consists of two main parts: first, the game container, designed in a round shape inspired by the "tampah" used for arranging food in traditional markets. This design also introduces local elements. The container for the puzzle is lined with a cushion blanket sewn into a pattern of small triangles inspired by banana leaves, often used as a base for serving traditional snacks. These two components bring an authentic and aesthetic touch of traditional elements to the toy design. Second, the game board is attached to the back of the container lid. Additionally, the 3D puzzle pieces are shaped to resemble the actual appearance of the food. Other supporting components include square flashcards with rounded corners, achievement cards, game pieces, a spin wheel, and a fabric pouch to place each puzzle piece according to its parts to keep it organized and in its respective groups.
Material	The board game container uses rattan material. Rattan is chosen because it is natural, doesn't contain harmful chemicals, is lightweight, durable, eco-friendly, and easy to maintain [23]. The base of the container uses fabric printed with a banana leaf pattern. The game board, puzzle, coins, spin, and pieces are made of pine wood material. This material is chosen because of its smooth texture, shiny surface, low oil content, easy availability, and firm structure [34]. The toy is coated with natural paint according to SNI 8161:2015 standards, which is water-based, non-chemical, has good adhesion, is anti-fungal, and uses UV printing for details in design. The flashcards and achievement report board use art carton material with matte lamination and a fabric pouch.
Dimension	The container is round with a diameter of 40 cm and a height of 10 cm. The bottom of the container is 8 cm high, and the lid is 2 cm high. This large size allows children to access every part of the game and play freely and easily. The cards are 8x8 cm with 310 gsm thickness. The puzzle pieces are adjusted to follow the shape of the original food, with each puzzle piece measuring 5x5 cm, following the guidelines in the "APE Aman Bagi Anak Usia Dini" manual based on the Minister of Education and Culture Regulation No. 11 of 2020 about the Operational Instructions for Education DAK. This way, the puzzle pieces are designed considerably smaller than the original food size, making them safer when cut into several pieces. The game pieces are 5 cm in height with a diameter of 3 cm, and the spin wheel has a diameter of 15 cm and a thickness of 0.5 cm.
Color	The color of the board game is chosen based on the natural color of the rattan material. In contrast, the colors for the supporting components of the toy are bright and solid, highlighting essential elements to ensure they remain harmonious. Interaction with bright colors and intense visual stimulation helps to strengthen and expand children's sensory abilities at crucial stages of their development [35]. Additionally, the color selection for the food puzzles uses the original colors observed from the food items, but with styling and adjustments according to the paint and base materials used.
Proportion	The board game has a container and a lid that store the toys. The other supporting components include 10 traditional food shapes in the form of puzzles, each consisting of 2 sets (20 total puzzles), two pawns, 10 guide cards, 20 coins, two achievement cards, one spin wheel, and 10 pouches.



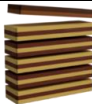







This toy, “Susun Rasa,” consists of four main components: a container, a game board, a puzzle, and flashcards. All components, from the largest to the smallest, are made according to the formulas in Tables 3 and 4, aligning with analysis, research, SNI standards, and existing regulations. The storage container for the game components, shown in Fig. 4, also functions as an integral part of the game since its lid serves as the game board. The container is large enough to make it easy for children to access each part of the game. On the game board located on the back of the container lid, there are 10 names of regions in the archipelago spread across Indonesia, chosen by the researcher and arranged in a circle following the shape of the container.



Fig 4. 3D Render Board Game Design

The 3D wooden puzzle comprises 10 representations of traditional foods from various regions of the Indonesian archipelago (Table 5). Each item is designed as a single set of puzzle pieces to support ease of play and introduce variation. The selection criteria included the popularity of each dish in its respective region, as well as its distinctive shapes and colors, which aim to introduce children to the richness of Indonesian culinary heritage. Visual diversity, particularly in form and color, was intentionally emphasized to stimulate children’s sensory engagement and sustain their attention during play.

Tabel 5. Puzzle 3D Description.

Puzzle Shape	Food Name	Regions of Origin
	Putu Bambu	Jawa (Java)
	Pancong	Betawi (Jakarta)
	Kue Lapis Lampung	Lampung
	Kue Bingka	Kalimantan Selatan (South Kalimantan)
	Ulat Sagu	Papua
	Kue Mangkuak	Sumatera Barat (West Sumatra)
	Es Pisang Ijo	Sulawesi Selatan (South Sulawesi)
	Kue Cerocot	Nusa Tenggara Barat (West Nusa Tenggara)
	Kue Bhoi	Aceh
	Kue Kaliadrem	Bali

Another essential component of the board game is the game piece shown in Fig. 5. There are two game pieces because the maximum number of players for this toy is two children accompanied by their parents. Children move their game pieces by spinning the arrow on the spin wheel, which shows the number indicating the steps they can take.



Fig 5. Rendered Spin Wheel (Left) and Game Piece (Right)



The flash card design shown in Fig. 6 contains content that explains the name of the food, an illustration of the food, the region of origin, and a description of the taste. They will serve as guides about the food children receive while playing board games and as picture guides when assembling the puzzle. The layout should be clear and easily read, with large, contrasted letters [32]. Each player who completes one puzzle will receive a coin Fig. 6, which they will later collect by attaching it to the achievement card.



Fig 6. Flash Cards Design

The achievement system is designed to motivate and reward children for completing each puzzle activity. As illustrated in Fig. 7, after successfully solving a puzzle, a player will receive a gold coin token as a tangible reward. These coins can then be attached to their personal Achievement Board, which displays their name and age. This visual representation of progress encourages a sense of accomplishment and fosters intrinsic motivation, particularly effective in early childhood learning environments. The use of collectible coins also introduces an element of gamification, making the educational experience more engaging and goal-oriented.



Fig 7. Coin Design (Left) and Achievement Board (Right)

### 3.3.5. User Flow

Based on the analysis, a product workflow for the *Susun Rasa* educational board game has been developed, as depicted in Fig. 8. The workflow, as seen in Fig. 8, outlines the systematic integration of all components, including interactive board game mechanics, 3D puzzles shaped like traditional foods, and illustrative flashcards, to ensure effective implementation in teaching culinary culture to children aged 4-6. Each element is purposefully designed to align with early childhood developmental needs and national toy design standards, facilitating engaging and meaningful learning experiences. The workflow was refined based on constructive feedback from teachers at RA Kuttab Labib, focusing on usability, educational impact, age-appropriate interaction and avoid complicated rules because children tend to avoid activities that require prolonged concentration and effort, as difficult tasks can make the game less engaging during classroom learning, as children easily lose interest, which may hinder their optimal development [36]. The integration of tangible elements like puzzles and flashcards also provides a multi-sensory learning experience, which is particularly effective for this age group. Furthermore, the simplified structure of gameplay encourages independent exploration while maintaining enough structure to guide learning. Validation through iterative discussions with these educators ensured that the workflow supports practical classroom application and enhances cultural learning objectives.

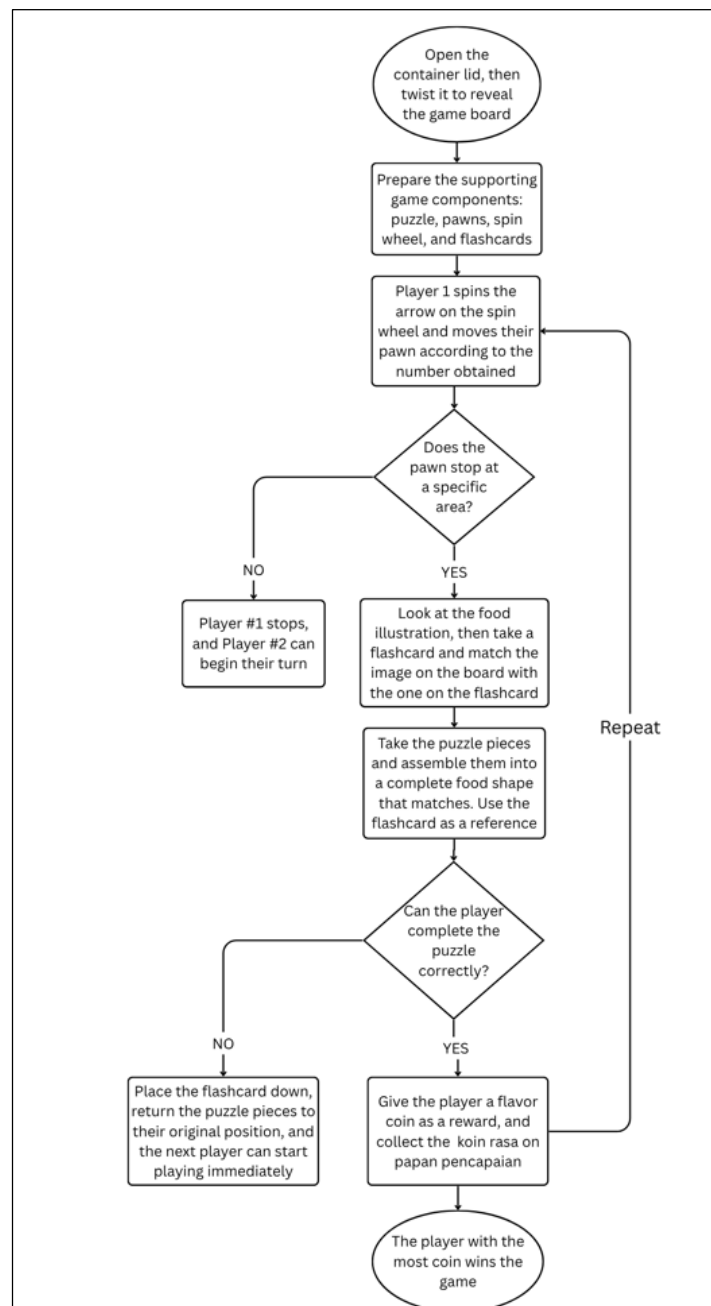


Fig 8. User Flow

### 3.3.6. Test

This test represents the validation phase. The validation process was carried out thoroughly with experienced educators. The design, system workflow, and gameplay were reviewed and approved by three teachers: Mrs Tuti Suartini, with 6 years' experience as a teacher, Mrs Rifdah Ayu Santika, S.I.Kom, with 2 years' experience as a teacher, and Mrs Anita Dhimiyan, Ss, with 6 years' experience as teacher. To validate the Susun Rasa board game that has been developed, a scoring assessment was conducted by three teachers. Each teacher evaluated the final game design based on four main aspects, namely effectiveness, aesthetics, proportion, and function, using a 5-point Likert scale (1 = Very Poor to 5 = Very Good). The effectiveness aspect assesses the extent to which the game is easy for children to use and understand. Aesthetics includes visual appeal, including the use of color, design, layout, and quality of illustrations. Proportion evaluates the suitability of the size, shape, and structure of the game to the characteristics of early age users. Meanwhile, the function aspect measures the educational value of the game and the extent to which the game meets the learning objectives that have been designed. Each

teacher provided a score for all four aspects, with a maximum total score of 20. The results are summarized in [Table 6](#).

**Tabel 6.** Scoring of Susun Rasa by Teachers

Teacher's Name	Function (1-5)	Effectiveness (1-5)	Aesthetic (1-5)	Proposition (1-5)	Total Score (20)
Mrs Rifdah	4	4	5	4	17
Mrs Tuti	4	4	3	4	15
Mrs Anita	5	5	5	4	19
Average score	4.3	4.3	4.3	4	<b>16.9</b>

The design of *Susun Rasa*, evaluated by the teachers, received an average score of 16.9 out of 20, indicating that the learning media is considered effective, visually appealing, well-proportioned, and functional for early childhood education purposes. Mrs. Rifdah confirmed that the game components are suitable for children's cognitive and motor skill levels. She also emphasized that the game is easy to explain, allowing children to play independently after a single demonstration. This feedback supports the game's effectiveness and ease of implementation in a real classroom setting. In addition, Mrs. Rifdah provided constructive suggestions, including the idea of separating food illustrations and names on the flashcards to encourage more interactive and quiz-style gameplay. However, she also noted that the current version is already appropriate, as complex learning tools may lead to boredom or frustration in children. In addition to input from educators, an expert evaluation was conducted by Mrs. Tiara Delia Madyani, S.Psi., M.Psi., Psikolog, an educational psychologist. This step provided valuable insights into the psychological appropriateness of the game for early childhood development. A structured validation sheet using a 1–5 scale was employed to assess eight key aspects, including cognitive, motor, emotional, and social factors. As shown in [Table 7](#), the game scored particularly well on visual appeal (5) and cultural relevance (4), while areas such as motor stimulation and clarity of instructions scored slightly lower (3), indicating room for improvement. The overall score was 29 out of 40, yielding a 72.5% appropriateness rate. This suggests the game is well-aligned with developmental needs for children aged 4–6, offering educational value in a playful format. The psychologist noted minor refinements—such as improving the consistency between illustrations and puzzle visuals—to enhance children's focus and reduce potential confusion.

**Tabel 7.** Psychologist's evaluation

Aspect Assessed Description	Score (1-5)
Appropriateness of the game for children aged 4–6 years	4
Supports fine motor development	3
Stimulates social and emotional interaction	3
Uses attractive and child-friendly colors and visuals	5
Game instructions and flow are easy for children to understand	3
Presents relevant cultural content (Nusantara culinary) that enriches children's knowledge	4
Encourages curiosity and motivation to learn	4
Does not cause confusion, frustration, or fear during play	3
Total score	29

#### 4. Conclusion

This research highlights the decline in children's knowledge of traditional culinary culture because of limited exposure and non-optimal cultural education, particularly in the culinary field. The lack of engaging and appropriate educational media further contributes to this issue. Research in early childhood education shows that interactive, visual, and tactile learning tools can support developmental needs in children aged 4–6 during their critical formative years. To respond to this challenge, this study proposes the design of *Susun Rasa*, an educational toy in the form of an interactive board game combined with 3D puzzles featuring traditional Indonesian foods. The product is developed based on early childhood learning principles, ergonomic considerations, and national toy safety standards. It seeks to function as a culturally rich learning medium that encourages children to explore the diversity of Indonesian culinary

heritage. While the design process was informed by observations, educator feedback, and validation with a psychologist, further empirical testing is needed to measure the toy's impact on learning outcomes. Therefore, this study proposes *Susun Rasa* as a promising concept. Future research is recommended to conduct trials and assessments to evaluate its cognitive, motor, and social impact in real classroom settings.

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### Declarations

- Author contribution** : JH: observation, conducting interviews and literature study, collecting data, analyzing the data, developing concepts and design, writing the article; NFB: research idea, advisor.
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- Conflict of interest** : The authors declare no conflict of interest.
- Additional information** : No additional information is available for this paper.

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