Sosioedukasi
JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL
ISSN: 2086-6135 E-ISSN: 2541-612x
Volume 15 No. 2. Juni 2026 https://ejournal.unibabwi.ac.id/index.php/sosioedukasi/index

EXPLORATION OF CHILDREN'S LEARNING EXPERIENCES AGED 5-6 YEARS THROUGH THE STEAM APPROACH PROJECT OF MAKING CRISPY SHRIMP

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ARTICLE HISTORY
Received : 20-01-2026
Revised : 07-02-2026
Accepted : 25-04-2026

KEYWORDS
STEAM Approach,
Life Skills,
Holistic Development,
Making Crispy Shrimp,
Early Childhood.

ABSTRACT
Early childhood is a golden age where children's potential develops rapidly through appropriate stimulation. One crucial life skills rarely explored academically is cooking. This research aims to explore the implementation of the STEAM (Science, Technology, Engineering, Art, and Mathematics) approach to improving basic everyday skills through a crispy shrimp making project. This research used a qualitative design with a case study approach. Subjects included children aged 5-6 years at ABA 54 Kindergarten in Semarang. Data were collected through participant observation,in depth interviews,and activity documentation. The research results show that the crispy shrimp project successfully integrated all five aspects of STEAM. Science emerges through ingredient identification, technology through the use of cooking utensils, engineering through the sequence of cooking steps,art through the aesthetics of presentation,and mathematics through measuring ingredients. Overall,this activity proved effective as a holistic learning medium that stimulates children's curiosity,problem solving skills,and creativity. These findings confirm that the practical,project based STEAM approach not only develops cognitive and motor skills but also shapes children's character and independence,preparing them for future generations.

INTRODUCTIONS

Early childhood is a period during which a child can grow and develop rapidly. This period is called the golden age,typically spanning children aged 0-6 years. During this phase,children possess an extra ordinary ability

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to absorb information,imitate,observe accurately,and demonstrate a keen curiosity through various important questions about their surroundings. Given the significance of these developments,this golden age should be utilized optimally to explore and develop children's unique potential (Murgiyanti,2022). Mastering various skills during this period is a crucial foundation for preparing a competent generation to face future challenges (Rusmana,2021). This learning process can be carried out collaboratively,either through teacher guidance at school or parents at home. One relevant life skill to teach is cooking. It is important to emphasize that cooking learning activities for young children must be carried out under strict supervision. This is because of the use of tools or materials that could be hazardous if not supervised by a teacher,such as Sharp equipment that needs to be carefully monitored to prevent children from getting injured.

Early childhood is a valuable generation that will carry the future of the nation. They must be protected,educated,and nurtured from an early age so that later they can bring progress to the nation in a better direction (Purwadi,2022). Therefore,early childhood education plays an important role as a very crucial foundation in shaping character and maximizing the potential of each child. Education at this stage does not focus on just one aspect but encompasses six main aspects of early childhood growth and development. These six aspects include moral and religious value,physical motor skills,cognitive aspects,language,social emotional aspects,and the arts. To make the learning process more meaningful and beneficial,the material presented must be relevant to everyday life . To achieve this,one effective approach is through the application of a child centered approach (Putri et Al.,2021).

STEAM (Science, Technology, Engineering,and Mathematics) is an integrative educational framework that combines various disciplines to facilitate problem solving skills through hands on engagement (Septiani et al.,2021). By contextualizing theoretical concepts into real world applications,this approach connects abstract subject matter (theory) to real life situations experienced by children every day (Novitasari,2022). For example,when teaching the concept of “Science” in steam through the activity of cooking fried shrimp, children not only memorize chemical theory but also directly observe how shrimp change color and texture during cooking.

The implementation of STEAM fundamentally encourages the use of project based learning models,which play a crucial role in fostering children's motivation and proactive attitudes in seeking solutions across various dimensions of development (Huda et Al.,2024). Stimulating all six aspects of child development in a balanced way is key to supporting their growth and preparing them for higher levels of education in the future (Yan Yan et Al.,2019). This steam approach aligns with the concept of the Merdeka curriculum design,which focuses on deep learning,particularly through real projects,such as making crispy shrimp,which is the focus of this study (Isnaningsih & Koesmadi,2024). However,studies specifically integrating the STEAM approach with cooking activities as a means of holistically developing everyday life skills in young children are still limited. Therefore, research is needed to test the effectiveness of this approach in the context of early childhood learning. The main purpose of this study is to demonstrate the close relationship between the steam approach and the enhancement of everyday life skills in young children. The core of this approach lies in how steam can be used to develop children's abilities in the real world. One basic skill in daily life that can be developed is cooking. Cooking is a process of transforming raw ingredients into food that can be consumed (Anies Listyowati,2018).

In cooking activities,children are introduced to the stages of food preparation. Children are actively involved,starting from recognizing various types of ingredients to be processed,learning how to prepare these ingredients into a dish ready to be consumed,and participating in the process of tasting and evaluating the food that has been cooked (Firmawati, A. n., Amini, S., & Khotimah,2023). Direct and tangible involvement in these cooking activities will create a high sense of joy and enthusiasm in children (Amaros, Y., & Rohita,2018). From this activity,children not only gain enjoyment,but can also produce tangible work. This of course will enrich their knowledge and experience in creating. In addition,this activity also plays an important role in shaping and fostering children’s liking and preferences for various food flavors (Agustina, W , Sufa, F. F., & Setiawan,2022). Children

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can evaluate and explore the results of the cooking using their own sense of taste. Considering the importance of the golden period,integrating life skills such as cooking with a steam approach is an effective strategy to holistically develop six aspects of a child's development, preparing them to become a generation of the nation with character and potential.

RESEARCH METHODS

This research method uses a qualitative approach with a detailed case study method. The case study approach was chosen because it allowed for a holistic and detailed exploration of the learning experiences of children aged 5-6 years through the implementation of a STEAM (Science, Technology, Engineering, Art, and Mathematics) project, which influenced their learning experiences in the classroom. The primary focus of this study was the processing of food (fried shrimp) as a contextual learning medium for children. The research was conducted at TK ABA 54,located on Srikaton Timur I street,RT 05 RW 05,Ngaliyan District,Semarang city. The subjects of this study consisted of 15 children in one class who participated in cooking activities.

The primary focus of this study was to equip children with the skills to recognize and process raw materials into food,in order to foster independence and interest in assisting parents with household activities. To ensure data validity,the researcher employed technical triangulation. Data were collected through three main techniques to maintain the credibility of the research results. Data collection techniques consisted of interviews, observation,and documentation. Interviews were conducted through questions posed to children related to the material on cooking crispy shrimp. This structured question and answer technique was used with students to explore their perceptions and understanding of the process of making crispy shrimp. Observations were conducted directly to observe children's participation in understanding the material on marine life (shrimp),as well as practical skills during the implementation of the cooking project in class. Documentation was used to collect visual evidence and field notes as an authentic record of the entire series of children's learning activities during the project. The integration of these techniques was carried out with the aim of strengthening the validity of the data so that the results are easy to understand. The data collected from the three techniques were then reduced,presented narratively,and conclusions were drawn to provide a comprehensive picture of the effectiveness of the STEAM project in early childhood learning.

RESULTS AND DISCUSSION

Crispy Shrimp Cooking Activity

TK ABA 54 is a kindergarten educational institution under the auspices of an Islamic foundation, namely Aisiyah / Muhammadiyah. This school was officially established on August 2,2010. As a school institution located in the city of Semarang,this research was conducted on Wednesday, 4 November 2025,with a focus on developing children's skills and knowledge through cooking activities. This activity begins with an apperception stage,aimed at building an initial understanding between the children and the material they are going to study,which is about describing shrimp. The teacher invites the children to engage in an in depth introduction to shrimp. This introductory material covers descriptive aspects such as the type,shape,and color of shrimp. Additionally,an in depth understanding of the natural habitat of shrimp is also explained to provide initial insight before moving on to the practical cooking activities.

After the introduction phase,the activity continued by utilizing technology as a learning medium. The children were invited to watch a tutorial video on how to cook crispy shrimp. The use of visual media is considered crucial,as emphasized by Suliani (2025),because videos can provide direct step by step guidance,which can stimulate enthusiasm and be sure that children can follow the cooking process in an orderly and structured manner. The video watching session serves as a visualization before starting hands-on practice. After watching the video,the teacher

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prompted interaction by asking leading questions to assess the children's understanding and personal experiences. An example of a question asked is, " Today we are going to make crispy shrimp,has anyone ever eaten shrimp?" The responses from the children to this question show a variety of experiences related to shrimp. Some children shared their experiences of eating shrimp when taken to a restaurant by their family,while others mentioned having had shrimp cooked by their mothers at home. This interaction is important to assess prior knowledge and make the children feel connected to the learning topic (Blegur & Tlonaen,2017).

Entering the practice stage ,the children are moved to a specially prepared area where the tools and ingredients for cooking are neatly arranged. Then the teacher explains each piece of equipment that will be used. The introduced tools include a spoon as a measuring tools for ingredients,a bowl as a container for making dough,tongs useful for transferring shrimp coated with batter into the fryer,a skimmer used to drain oil from the fried shrimp,and a frying pan as the main cooking medium for frying shrimp. Next,the teacher presents a list of ingredients needed to make crispy shrimp, namely shrimp as the main ingredient, wheat flour, cornstarch, breadcrumbs, eggs, salt, water, and oil for the frying process.

Figure 1.1 The Process of Making Crispy Shrimp

Before starting cooking activities,the aspect of cleanliness must be emphasized. Children are required to wear gloves first as an effort to protect their hands and keep them clean and sterile during the food preparation process. After all preparations are complete,the teacher begins to distribute tasks evenly to the children,starting by giving an example first to ensure each child understands their task. This division of roles involves various stages of the cooking process,such as a child pouring the ingredients according to the measurements,another stirring the mixture evenly,another coating the shrimp with the wet batter,another covering the battercoated shrimp with breadcrumbs as the outer layer,and finally,a child putting the shrimp into the fryer to be cooked,of course under close supervision of the teacher. The children follow the instructions given by the teacher in an orderly manner,so the cooking activity runs smoothly. After cooking,all dirty items are cleaned together until everything is clean. Then,the children wash their hands after the activity and take a break to eat together. Implementing a handwashing routine after cooking is an essential form of education for clean and healthy lifestyles for young children. Through consistent practice,this activity is expected to foster a strong health conscious character that is embedded in children's daily lives. Consistency in this activity aims to ensure healthy living behaviors become an automatic habituation,positively impacting children's future physical well being (Chang et al.,2022).

Benefits of STEAM For Young Children

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The integrated STEAM learning approach,which stands for Science, Technology, Engineering,Art,and Mathematics,can be effectively implemented through cooking activities for early childhood. This crispy shrimp making activity shows that cooking learning experiences can significantly influence various aspects of children's growth and development. This cooking activity has been proven to stimulate strong enthusiasm and curiosity in children (Aas Hasanah,Ajeng Sri Hikmayani,2021). The children's enthusiasm is evident from their active involvement in activities and the many questions they ask. Their stimulated curiosity leads to various specific questions,such as, " Miss,why doesn't this stick?" related to the flour coating activity on the shrimp. " Miss,how much flour should we pour?" Questions about measurement and quantities. " Miss,it will be fried later,right?" This question relates to the sequence and finally process of the activity. The fact that the children express that they feel happy,not bored,and very curious about the entire cooking process shows this. This cooking learning experience directly influences aspects of children's development through the steam approach,as follows :

1. Science
   Science is an activity carried out through experimentation to achieve desired results (Sadiah,N. H., & Lestari,2020). They learn to identify the characteristics of shrimp and other ingredients used,such as texture,color,and smell. They also identify changes in ingredients during the cooking process,from preparation to the reaction of the batter when fried. This activity trains children's cognitive abilities in classifying materials and understanding causality (cause and effect). This activity develops observation, classification,and understanding of cause and effect as the foundation of scientific thinking in children.
2. Technology
   The technological aspect in this context refers to the use of simple tools. Technology is applied through the use of basic cooking utensils such as spoons for stirring,a bowl as a container,and a strainers/colander for draining oil. Children not only use these tools but also understand their specific functions in making their work easier. This demonstrates their understanding of technology as a tool for solving problems or achieving goals.
3. Engineering
   The technical aspect is related to the process of design,planning,and problem solving. Children are trained to organize the steps of the cooking process logically and sequentially. Furthermore,a crucial aspect of engineering is the ability to find solutions when faced with obstacles or failure. Although some children may experience difficulties,their efforts to try again or find alternative solutions,such as when the flour didn't stick to the shrimp, demonstrate technical thinking. This activity fosters planning, problem solving,and perseverance,which are core skills in engineering.
4. Art
   Art is related to aesthetic,self expression,and communication. Art is a form of creativity that aims to produce works of art (Rachmah, L. l., Farantika, D., & Prawinda,2022). In this activity, children express themselves through the way they present their dishes,making them look appealing,even though the results may not be perfect. The artistic aspect is also reflected in the children's ability to express the taste of the food they taste (for example, "delicious", " savory", or "salty") and their ability to express their cooking experiences expressively with others, which is a form of communication. In this context,art serves as a medium for self actualization and interpersonal communication. This activity allows children to appreciate aesthetic value,the subjectivity of taste,and develop communication skills as a form of self expression.
5. Mathematics
   Mathematics is integrated through measurement activities and the introduction of basic concepts. Mathematics is a science that focuses on numerical concepts and plays an important role in everyday life (Pegia, F. n., Suharta, I. G. P., & Supir,2024). In cooking activities,children are practically involved in

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measuring ingredients,such as determining how many spoons of flour,how much salt,or how much water is needed to make the right dough. These activities also engage their ability to identify shape (for example,the shape of shrimp and containers) and measure ingredients (concepts of simple volume and mass). These activities strengthen numerical literacy and spatial awareness. Practical measurement provides a concrete understanding of the concepts of quantity and ratio,which are key elements in logical mathematical thinking from an early age.

Based on the results of research conducted on 15 children who participated in the crispy shrimp cooking project activity,the results showed that most children showed effective development in the STEAM aspects. Based on this,it can be concluded that the STEAM based crispy shrimp making project activity is considered effective,because more than 75% of children showed development in the good to very good category in most aspects. This activity not only improves children's motor and cognitive skills,but also trains cooperation, independence,and critical thinking skills through concrete and fun learning experiences.

Overall,the activity of making crispy shrimp becomes a rich and integrated learning medium. It supports the notion that enjoyable and practical learning experiences are integrated through the steam approach. Steam is key to stimulating curiosity,enhancing problem solving skills,and developing various cognitive,motor,and socio emotional aspects in early childhood. It is important to understand that learning and playing activities can help children build a foundation of skills for their future. One of the crucial roles of teachers is to enhance critical thinking and creativity in early childhood. Critical thinking greatly assists children in taking action. Before engaging in an activity, children will ask questions about things they do not yet understand to their parents and teachers. This process allows children to assess situations,perform analysis,and evaluate something before doing it (Kusuma et al.,2023). This critical thinking ability also has the potential to improve children's fluency in speaking and thinking. To hone these skills, children should be given access to a wide learning space,both in terms of learning resources and an unrestricted environment (Rahmasari et Al.,2021).

Meanwhile ,creativity is defined as the ability to create based on a child's imagination (Roostin,2020). This ability naturally emerges and develops while the child is playing and learning. Activities that can provide both a sense of calm and excitement in children are known to be very effective in stimulating and developing their creativity (Zonalisa Fhatri et al.,2024). In short,providing an environment that supports exploration and questioning will strengthen a child's ability to analyze and evaluate,while calming activities will trigger their imaginative creative power. Both skills are important assets for the holistic development of a child.

CONCLUSION

Based on the research results and discussion, it can be concluded that the implementation of the STEAM (Science, Technology, Engineering, Art, and Mathematics) approach through crispy shrimp cooking activities at TK ABA 54 Semarang has proven effective in optimizing various aspects of early childhood development. The study shows that using visual media in the form of tutorial videos can enhance children's focus and procedural understanding before moving on to hands-on practice. Integratively, the STEAM approach provides children with the opportunity to explore science concepts through introducing the characteristics of ingredients, understand the function of technology through simple cooking tools, and sharpen engineering and mathematical thinking through problem-solving processes and measurement of quantities. In addition, this activity significantly enhances critical thinking skills, as evidenced by the high curiosity and courage of children in asking analytical questions. Aspects of creativity and self-expression also develop through the process of creating and communicating their work. Overall, this fun and structured hands-on learning method not only builds children's cognitive and motor skills but also shapes independence and social skills through teamwork and responsibility for environmental cleanliness.

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The successful implementation of STEAM in this cooking activity has several important implications for early childhood educators. Teachers need to shift their paradigm from simply providing instructions to being facilitators who stimulate children's curiosity through open ended questions,thus stimulating their natural critical thinking skills. The use of video tutorials demonstrates that the appropriate integration of digital Technology can make it easier for children to visualize complex procedures before they dive into practice. Teachers are required to be more creative in seeing the learning potential in everyday activities (such as cooking). This shows that difficult materials such as science and mathematics can be presented in a light and fun way without losing their academic essence. Teachers must be able to manage safety and hygiene aspects during the practice,while instilling the value of environmental responsibility in children after the activity is completed. To enrich the literature and future educational practice,further research is recommended to test the effectiveness of the STEAM approach in other types of cooking that involve more complex chemical reactions (for example,the fermentation process in making donuts or the changes in state in making ice cream) to deepen its scientific aspects.

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