



STEAM APPROACH TO IMPROVING CRITICAL THINKING SKILLS IN EARLY CHILDREN

Yetty Isna Wahyuseptiana, Dina Pertiwi Aje, Paulus Widjanarko

Early Childhood Education Teacher Education Study Program, FKIP, Slamet Riyadi University, Surakarta

yettyisnawahyuseptiana09@gmail.com, Dinapertiwi@unisri.ac.id, pauludwiiwet@gmail.com

Article history:	Abstract:
<p>Received 1st July 2022 Accepted: 1st August 2022 Published: 10th September 2022</p>	<p>Education has a role in producing superior human resources. Education needs to be adapted to the needs of students so as to create a pleasant learning atmosphere. The implementation of learning both inside and outside the classroom requires an approach that can build children's thinking power to be more systematic. An approach that can be implemented and is able to direct children to be able to explore critical thinking through the STEAM approach. The ability to think critically in early childhood will certainly be different from the ability to think critically in adults. The ability to think critically in early childhood is understood by the child's ability to respond to changes that occur in the surrounding environment, then the child is able to provide simple changes. The child begins to understand that in every life there will be many differences in the way they behave, how to communicate and how to view a problem. An approach that is able to foster children's activeness during learning so that in the learning process an active atmosphere occurs and two-way communication occurs, namely the STEAM approach. In practice, educators are required to have creativity in presenting learning activities and learning media so that there is continuity between learning materials, learning environments, and learning media. This study uses a descriptive type of research, namely to describe the extent to which the role of the STEAM approach in improving critical thinking skills in early childhood and to examine the factors that can affect the ability to think in children. This research was carried out by involving children aged 5-6 years at the Aisyiyah Al Amin Bibis Kindergarten in Surakarta City in 2022. The results of this study showed that there were still many children aged 5-6 years who needed assistance in learning that applied the STEAM approach, this is because the STEAM approach still has many meanings. Furthermore, educators at Aisyiyah Al Amin Kindergarten still need a more comprehensive understanding in implementing the STEAM approach in the learning process in the classroom or outside the classroom. There are several factors that affect the ability to think critically in early childhood, one of which is parenting applied in the family.</p>

Keywords: STEAM Approach, Critical Thinking, Early Childhood.

1. INTRODUCTION

Basically, education aims to build the civilization of a nation. The progress or failure of a nation is influenced by whether or not the nation's education is advanced. Education always develops dynamically from time to time. Quality education will produce superior human resources. In the 21st century, humans are required to have the skills to solve problems that occur, produce new solutions, communicate the results of their thoughts and be able to adapt to changes that occur significantly in the surrounding environment. These skills, of course, do not just appear but need to be trained and even introduced from an early age. With the aim that children have a picture with a heterogeneous perspective and provoke children to think critically.

Education is used as an element that needs attention, so both the government, educators, parents need to have a commitment to support the improvement of the quality of education. The level of education that forms the basis for teaching critical thinking skills for the first time is Early Childhood Education. Early childhood education is the first level of education that children will enter, therefore this level is not a level that is only a requirement for children to enter the next level, but this level becomes a foothold in shaping the character of children in the future. Apart from the various influencing factors, parents need to pay attention to children aged 4-5 years who are ready to socialize with the outside environment. This is supported by the statement of Ariyanti, T. (2016) which explains that early childhood is a

child who is in a sensitive period range which in this period in particular children will be faster in accessing their environment. Children who get an education that is in accordance with their needs will make the child experience appropriate growth and development.

According to Zakaria, A.Y. (2022) which explains that early childhood education is the key in shaping children's knowledge, attitudes and skills. With this, as parents, it is necessary to have awareness in introducing children to the environment which will later provide new experiences for children. Children who have the opportunity to gain new experiences at the level of early childhood education need to develop critical thinking skills. Critical thinking ability is a fundamental ability in solving problems. Critical thinking skills are very important for early childhood. Early age is believed to be a critical period for child development, the basis for skills and intelligence is built at that age (Hurlock 1978). The importance of early childhood arises from the evidence that shows the rapid development of the brain that occurs before the child reaches the age of five and how brain growth is influenced by the child's environment such as stimulation, nurturing and nutrition provided at home and outside the home.

Critical thinking skills can be trained and developed with appropriate learning support and can encourage children to develop abilities, especially higher order thinking skills. Critical thinking ability is the ability to analyze critically, make reasoning and conclusions and create meaning to express one's own opinion (Kubra, B. H. & Gursoy, E., 2021). In addition, children who from an early age are able to use their critical thinking skills well then help these children to be able to design and design learning activities to be more fun. Children will be more enthusiastic in going through the learning process that occurs both inside and outside the classroom environment (Fernandez-Santin, M. & Feliu-Torruella, M. 2020).

There are various approaches in developing critical thinking skills, one of which is an integrated approach with scientific disciplines for early childhood, namely learning with the STEAM approach (Science, Technology, Engineering, Art, and Mathematics). STEAM is described by Irmatani, L., *et.al* (2019) as a learning approach that is able to stimulate children's curiosity and motivation to have problem-solving skills, collaboration, independent learning through project-based learning, challenge-based learning and research. Learning with the STEAM approach requires critical thinking skills, this is because children are faced with activities that require the ability to remember, understand, apply, analyze, evaluate, design to be able to communicate what has been produced (Yuliati. S., 2013). The STEAM approach is able to fulfill children's curiosity so that children get a lot of meaningful experiences.

Based on temporary observations made by researchers, it was found that children's critical thinking skills were still low. This is marked when the child is asked to carry out plant planting activities by the teacher by utilizing items that can be used as support in planting plants. It was seen that the child was doing the activity, but when there was a discussion with the teacher who asked what would be done afterwards or if there was something planned after doing the activity. The child has not been able to decide what to do next. However, this happened not only for one or two children, but there were several children who had not responded to the questions asked. This makes researchers want to examine critical thinking skills in early childhood at the Aisyiyah Al Amin Bibis Kindergarten, Surakarta City. This study will also explain the description of critical thinking skills in early childhood at the Aisyiyah Al Amin Bibis Kindergarten, Surakarta City. Furthermore, it will also be seen to what extent the STEAM approach is able to improve critical thinking skills in early childhood and explain the factors that affect critical thinking skills in early childhood.

2. RESEARCH METHOD

This research was conducted at the Aisyiyah Al Amin Kindergarten in Surakarta. This research was conducted from February to July 2022. This study used a qualitative type of research with the aim of describing the role of the STEAM approach in improving critical thinking skills in early childhood and examining factors that can affect thinking skills in children. This study uses data sources, namely documents, written data and supporting photographs. Subjects in this study involved children aged 5-6 years. The implementation of this research is at the Aisyiyah Al Amin Bibis Kindergarten in Surakarta City in 2022. This study uses data collection techniques, namely observations of activities carried out by children during the learning process using the STEAM approach, interviews with educators to determine the role of the STEAM approach in the learning process. Learning both inside and outside the classroom, and documentation of learning activities that use the STEAM approach in delivering material to students. This study uses data analysis techniques, namely reducing data, presenting data, and drawing conclusions obtained.

3. RESULTS AND DISCUSSION



A. Research Results

This research has been carried out at the Aisyiyah Al Amin Bibis Kindergarten in Surakarta City in 2022. The choice of research location is of course at the discretion of the researcher, one of which is at Aisyiyah Al Amin Bibis Kindergarten. Most of them have applied the STEAM learning approach when the learning process was good. inside or outside the classroom. So far, the implementation of the STEAM approach has been implemented by educators in both group A and group B. But of course in this study it will be seen how far the implementation of the learning approach is so that later data will be obtained that explains the ability to think critically in children in Kindergarten. The implementation of the STEAM approach is currently in the spotlight in early childhood education institutions, including the Aisyiyah Al Amin Bibis Kindergarten, this can be seen in teacher learning starting to apply the STEAM approach in the content of the material that will be delivered to children. The teacher uses media which

of course supports the STEAM approach where the media is adapted to the needs of early childhood and the character of the child. The STEAM approach requires good cooperation from the principal, teachers, parents and children. The readiness of various elements supports the implementation of the STEAM approach in the institution. This research has examined so that Aisyiyah Al Amin Kindergarten is considered to be studied regarding the implementation of the STEAM approach in the learning process.

In conducting this study, researchers used research subjects in early childhood who were in the age range of 5-6 years. The selection of research subjects for children aged 5-6 years is due to the readiness of children to receive learning which will place more emphasis on the activeness of students in responding to learning activities delivered by educators both inside and outside the classroom. This research, of course, does not only focus on critical thinking skills that occur when children are doing learning activities but also activities carried out by children at rest are also observed by researchers. This is because researchers will see the extent to which children aged 5-6 years solve problems that occur in the environment around children so that observations are based on the beginning of the learning process until the end of the learning process. The data that will be studied is of course not sourced from children but also from data obtained from both the principal, teachers and parents. This study uses observation methods, interview methods, and documentation methods to obtain data that describes the ability to think critically in early childhood. This is because the ability to learn in class ends. Of course, in conducting this research, researchers obtained data from various informants, namely principals, teachers, students, and parents of the students themselves.

The implementation of this research contains several stages, namely planning, implementation and evaluation. At the planning stage, the teacher first designs a daily activity plan which will later use the STEAM approach to the learning process. Of course the teacher will adjust to the theme that will be conveyed to the child. In addition, teachers also need to coordinate or discuss by involving colleagues. This is with the aim of realizing learning designs that are in accordance with the needs of children and can develop critical thinking skills. In the learning scenario, the material that will be delivered to children can be integrated with various disciplines, namely science, technology, engineering, art and mathematics. In referring to science, children are asked to conduct experiments related to science. For example, children conduct experiments to recognize the concept of objects that can float, objects that can sink, objects that can float, the concept of objects that can produce heat energy, and others. In the study of technology, teachers can provide understanding to children about the use of technology that is never separated from everyday life. Furthermore, in technical studies, teachers can ask children to do simple experiments using tools that can be assembled and later can help complete homework or simple work. While in the study of art, the teacher can ask children to do activities related to art, for example the activity of mixing primary colors and secondary colors, making simple motifs using pieces of banana stems, making pencil cases using used goods. Finally, in the study of mathematics, children were asked to carry out pattern-making activities, grouping objects based on size, shape. The implementation of learning activities using the STEAM approach for children aged 5-6 years at the Aisyiyah Al Amin Bibis Kindergarten in Surakarta City are as follows:

No	Activity	Observation results	Documentation
1	Block Play Activities	<ul style="list-style-type: none"> - Science : Children make several shapes of buildings using blocks - Technology: Children use blocks to make simple buildings - Engineering: Children do the creation of the buildings that have been designed - Art: Children recognize the colors on the blocks and decorate the buildings that have been designed - Math: Children group the same colors and the same shapes on the blocks 	
2	Pattern Making Activity Using Loose Part	<ul style="list-style-type: none"> - Science: Children make various types of patterns that will be used - Technology: Children make patterns using scissors, pencils, glue, and paper - Engineering: Children make creations of existing patterns - Art: Children make patterns using different colors - Mathematics: Children do grouping on patterns based on size and color 	

3	Activities to Make Crafts Using Loose Parts	<ul style="list-style-type: none"> - Science : Children make various crafts using used materials and natural materials such as cardboard, stones, dry leaves, cans and bottles - Technology: Children use materials that are mostly the result of technology - Engineering: Children make craft designs by involving their creativity - Art: Children decorate handicrafts to make them look attractive - Mathematics: Children can do activities to mention the number of materials that have been used to make crafts 	
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This study uses observations and interviews, while the results of observations and interviews obtained are as follows:

1) Observation Results

The results of the observations obtained explain that when designing the daily learning activity plan the teacher conducts discussions with colleagues first. This is in order to obtain agreement regarding understanding in using the STEAM approach in the learning process. In addition, when the learning process takes place, children are seen to respond more quickly to the material presented by the teacher. It is different when the teacher uses a child's worksheet in explaining a concept, the child is more comfortable doing their own activities and the learning atmosphere is not awakened. The teacher is seen giving warnings to children who do not pay attention to the material presented if during the learning process the teacher uses more children's worksheets. During the learning process, there are achievements to be achieved but have not been achieved. This is because every child asks for attention from the teacher. Achievements that are still pending are continued by the teacher for the next meeting. However, when the STEAM approach is implemented, the class looks more organized in the learning atmosphere, it is easier for children to focus their attention on the teacher when the teacher conveys an overview of the activities that children need to do. In addition, the classroom atmosphere is more filled with various children's works, of course this is the most important point because children can develop critical thinking skills where when children feel that their thoughts need to be displayed or conveyed to teachers and friends, children are more daring to make it happen. The classroom becomes more fun and children feel comfortable to be in class. In the learning process, the teacher seems to give more questions to children and these opportunities make the child initially do not want to communicate with his friends but after that the children respond to each other's answers given by their friends. Two-way communication is built during the learning process.

The learning process that uses STEAM also presents a disciplined attitude in children, this is because children are getting used to thinking systematically. In reviewing the problems that occur, the teacher seems to invite children to participate actively so that children are more confident in expressing their opinions. When the teacher asked each group, it seemed that the children began to be confident in expressing their opinions, although sometimes there was still a dominance of certain children who expressed their opinions. However, this is part of the learning process, which later it is hoped that other children will also take part in solving problems and presenting effective and efficient solutions. The STEAM approach also presents learning activities that are carried out in a collaborative manner, which collaboratively here can help children who are still not used to being active in the learning process. In addition, collaborative learning is also a bridge for children to exchange ideas and help each other if there are children who do not understand what the teacher is saying. This of course makes children more helpful and there will be no competition between children's abilities. Competition between children in the learning process is certainly not good and will create a gap between intelligent children and children who are still in the process of getting to a more mature understanding.

In the study, it was found that there are several factors that cause different critical thinking skills between children. For example, parents' occupations, parents' education level, and parenting applied by parents in the family, children's readiness to participate in learning activities and children's physical condition also play a role in the level of critical thinking skills. This time it was found that parents' occupations, parents' education level and parenting patterns applied in the home and the condition of children's readiness to participate in the learning process were factors in influencing critical thinking abilities. In this case, the teachers at the Aisyiyah Al Amin Bibis Kindergarten institution make these factors a challenge that needs to be solved in order to minimize the impact that will occur later. One of the strategies implemented by the teachers at the institution is to actively update knowledge related to early childhood development so that they know which parts of growth and development need to be improved in order to produce superior quality human resources. As well as the teacher making changes to the learning model that will be implemented during the learning process, of course, before implementing the learning model the teacher reviews through workshop activities, scientific discussions.

2) Interview Results

The researcher also conducted interviews with educators regarding the implementation of the STEAM approach during the learning process. An explanation was obtained from the educator who explained that there were differences in learning conditions when using the STEAM approach with the percentage often during the learning process. Educators also saw that the children looked active and responded to the material presented by the teacher. The teacher also sees that the STEAM approach presents collaborative learning activities where educators also know that collaborative learning will help children who still do not understand the material presented. In addition, it also builds communication between children where the communication that is built can realize various ideas or ideas in solving problems. Educators also feel that when designing learning that uses the STEAM approach, educators need to study first so that later there will be integration of material with various disciplines. Prior to implementation, the teacher will conduct simple discussions with colleagues and create a lively learning climate and the exchange of opinions will certainly build a critical attitude, open to differences in perspectives. Thus the teacher will be more developed and will more easily adapt to changes in knowledge that are always happening around.

B. DISCUSSION

The implementation of the learning process using the STEAM approach in Aisyiyah Al Amin Bibis Kindergarten shows an influence on critical thinking skills in children aged 5-6 years. Children who learn using the STEAM approach ask more questions to educators. For example, why did this happen? How about using something else? The comparison shown by using this thing and that thing is different, which one is better, mother?. These varied questions certainly need to get a response from educators. This is because the age range of 5-6 years is a time when children's curiosity is very high. With the help given answers that can give satisfaction to the child, it will help the child to have developed knowledge and experience. It will be different from children who always ask questions but do not get a good response from teachers or parents, then the knowledge and experience that should be gained will be forgotten.

In line with the opinion expressed by Irmatani.L, et al (2019) that the STEAM approach is an approach that is able to stimulate children's curiosity and motivation in learning new things both related to science, technology, engineering, art and mathematics. This certainly shows that the STEAM approach is able to attract children's attention so that children give positive responses. In addition, the STEAM approach is able to make children able to formulate problems by showing an active attitude to ask educators, and analyze problems so that they present solutions to problems by showing an attitude of discussing with friends in groups. The solutions presented by the children show that the children have shown developed critical thinking skills, this is indicated by the various solutions. Children not only have the same perspective, but children see problems from various perspectives and children do not blame their friends' opinions, of course this shows that children are able to analyze which stages of analyzing are part of critical thinking skills (Sun, H., et.al., 2022).). The application of the STEAM approach also provides an active learning atmosphere between educators and students. In addition, learning so far is still dominated by a learning approach that uses children's worksheets. Of course, this approach is more oriented towards giving assignments and there are very few children to make observations and examine problems independently.

4. CONCLUSION

Based on the results of the research that has been carried out, it can be concluded that the implementation of the application of the STEAM approach can contribute to developing critical thinking skills in children at the Aisyiyah Al Amin Bibis Kindergarten institution in Surakarta City. Furthermore, the application of the STEAM approach in learning activities certainly provides opportunities for students to be able to think critically so that later students can decide on a choice of problems that occur in the surrounding environment. In addition, critical thinking skills that are well developed in children can make children have an attitude of confidence in their abilities so that this is the first step for children to be able to adapt to changes that occur in the environment. In addition, the application of the STEAM approach in the learning process certainly requires teachers to be more skilled in designing creative and innovative learning, this is of course to create the next generation of the nation that is able to compete healthily in realizing ideas that aim to build the environment.

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