IMPLEMENTATION OF STEAM- PBL LEARNING MODEL THROUGH EMOTION PUZZLE MEDIA TO IMPROVE UNDERSTANDING OF TYPES AND REACTIONS OF EMOTIONS IN CHILDREN

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Abstract*: This study was motivated by the lack of children's understanding of the types and reactions of emotions. Hence, this study aims to obtain a picture of the implementing of the STEAM-based PBL learning model through emotional puzzle media and identify children's emotional understanding. The mixed method (mixed method) concurrent embedded design method is used because it combines quantitative data and qualitative data. Participants in this study involved 10 children in group A at one of the PAUDs in Gempol District, Cirebon Regency. This study shows that the STEAM-based PBL model through emotional puzzle media goes through several stages, namely reflection, research, discovery, application, and communication. This model allows children to express ideas/concepts and opinions. In addition, children's understanding of the types and reactions of emotions has increased as evidenced by the category Starting to Develop (MB) with a percentage of 35% the category Developing Very Well with a percentage of 88%, and the category Developing According to Expectations (BSH) with a percentage of 33% to 73%. The indicator of children's self-control of emotions also increased, with a percentage of 28% from the category of Starting to Develop (MB) to the category of Developing According to Expectations (BSH), with a percentage of 63%.*

Keywords*: Early Childhood, Types of Emotions, Puzzle, Emotional Reactions, STEAM-PBL*

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Introduction

Early childhood education is a form of early childhood education on the formal education pathway that organizes educational programs for children aged 4 to 6 years (Hidayati, Djoehaeni, et al., 2023). Education in kindergarten helps students develop a variety of psychic and physical skills, including moral and religious, cognitive, linguistic, physical, motor, independence, artistic potential, and social, emotional (Mulyasa, 2012). Social-emotional development in early childhood is very important because social-emotional behavior is related to activities in life (Hidayati, Badriah, et al., 2023).

Social-emotional development in early childhood is the child's ability to manage and express positive and negative emotions in full (Nugraha & Rachmawati, 2021; Puri & Rohmalina, 2023). According to Susanto (2017), children's social-emotional development is children's sensitivity to understanding other people's feelings when interacting in daily life. Over time, children will be able to learn by interacting with their closest family, and exploring the surrounding environment. Social-emotional development is a process in which children learn to adapt to interacting with the people around them and understand situations and emotions by listening, observing, and imitating what they see (Hidayati, Badriah, et al., 2023).

The greater the pressure exerted by emotions, the more unbalanced the body is in carrying out certain activities. According to Hurlock (2015), emotions that can occur in early childhood include anger, fear, jealousy, curiosity, envy, joy, sadness, and affection. Because early childhood is a unique time with all kinds of potential (Hidayati, 2023). When children are born, they do not understand anything, including what they feel, such as joy, sadness, anger, and fear. She can only express what she feels by crying and smiling (Nugraha & Rachmawati, 2021). Therefore, he needs guidance and education from the people around him to introduce and develop his social-emotional, especially adults such as their parents and family closest to them and teachers.

Nowadays, many parents ignore the importance of children's emotional development. Parents' lack of knowledge about education and optimizing children's emotional development is certainly a problem that cannot be underestimated (Age & Hamzanwadi, 2020). Because a child's behavior is determined by the way he manages his emotions, which also affects his learning behavior (Maulinda et al., 2020; Mucherah, 2007). Parents have a responsible role in influencing their child's development and behavior.

Teachers also play an important role in children's education and emotional development, especially at school because the role and good education of teachers have a great influence on children's interactions with others (Hidayati, Badriah, et al., 2023). Teachers have many roles for children, not only teaching, but also motivating, providing information, and acting as moderators (Mulyasa, 2012). Teachers take great care to ensure that children feel supported by the school environment (Rusmayadi & Herman, 2019). Teachers teach children how to behave well, and express feelings when they are able to do something so that they feel appreciated (Hall-Kenyon et al., 2014).

From the description above, it can be seen that social-emotional development is very important to be taught for early childhood because social-emotional is the initial ability in children to interact with their wider environment. So this development must be stimulated as early as possible. Efforts that educators can make to introduce early childhood social-emotional in schools can be done through STEAM-based educational games. According to Bifadlilah &

Gandana (2023), a good learning process for early childhood is to use learning media to improve the quality of learning. In line with Hidayati & Widadiyah, (2024) and Muntomimah & Wijayanti (2021) This STEAM-based learning can improve children's reasoning skills because children will go through several stages, such as reflection, research, discovery, application, and communication. So that it can foster curiosity and encourage them to think at a higher level, which includes problem-solving, collaboration, independent learning, project-based learning, and other high-level learning.

This STEAM-based game allows children to play while learning which has a positive impact on various skills especially their social-emotional (Başaran & Bay, 2023; Hidayati & Widadiyah, 2024). For children to get a positive impact from these activities, the media used for early childhood needs to be designed very well by their developmental aspects (Hidayati, 2023). Learning media are also made with attractive and varied designs so that they can arouse children's interest in playing, such as the use of emotional puzzle learning media that introduces various expressions to improve early childhood social-emotional development.

Puzzles are a medium that is played by disassembling. By Akbar et al. (2022) Puzzle games are a type of educational game to train children's mindset in arranging pieces into a whole that has a complete shape of a certain picture that can train the level of concentration. In this study, the puzzle was modified for children's social-emotional development with puzzle images that showed emotions of joy, sadness, anger, and fear to introduce various emotions to children. So that through this STEAM-based puzzle media, children can choose the emotions they feel by sticking pieces together, and then they will decorate according to those emotions. Then the child will tell the emotional puzzle that they have arranged.

Based on the results of observations made, children in PAUD in Gempol District, Cirebon Regency, group A do not understand the types and emotional reactions so they are often impatient and even angry during learning or when playing. In addition, there are some children who have not been able to distinguish some emotions. Through this emotional puzzle media, children are expected to be more patient and can work well with their friends. Therefore, the researcher took the educational game method through the Emotion Puzzle game to introduce knowledge about emotions in children in PAUD in Gempol District, Cirebon Regency.

Method
This study uses a mixed-methods approach with *a concurrent embedded* design with the aim of introducing and providing an understanding of the types and reactions of emotions to early childhood through the media of emotional puzzles. This quantitative data is to find out children's understanding of various types and emotional reactions which is then combined with qualitative data to get an overview of the STEAM learning process through puzzle media. This data collection technique uses observation of the use of puzzle media in children who are not familiar with the types and emotional reactions in one of the PAUD in Gempol District, Cirebon Regency. The study was conducted on 10 students aged 4-5 years in group A who had problems recognizing emotions such as not knowing, understanding and controlling their own and other people's emotions.

The observations made refer to the assessment that has been set by the Ministry of Education and Culture with four criteria, namely Undeveloped-U (BB), Starting to Develop-SD (MB), Developing As Expected-DAE (BSH), and Developing Very Well-DVW (BSB) on a scale of 1-4. The data that has been collected will be analyzed using descriptive statistics with the

calculation of the percentage of children who fall into certain criteria using formulas. After the percentage is obtained, the results will be described to describe the use of STEAM-based emotional puzzle media in improving the understanding of types and reactions of emotions. The data obtained will be interpreted into categories that refer to Yoni (2010) as follows.

Interval Skor	Kategori
76%-100%	Developing Very Well-DVW (BSB)
51%-75%	Developing As Expected-DAE (BSH)
26%-50%	Starting to Develop-SD (MB)
0-25%	Undeveloped-U (BB)

Discussion

This research was conducted for one month to 10 students in one of the PAUD in Gempol District, Cirebon Regency. Based on the results of the study, the researcher found that data on the use of the STEAM-based PBL learning model through the media of emotional puzzles to improve the understanding of types and emotional reactions were obtained through both quantitative and qualitative approaches. Qualitative data was used to see the use of STEAM-based emotional puzzle media, and quantitative data was used to see children's understanding of the types and reactions of emotions.

Implementation of STEAM-based PBL Learning Model through Emotion Puzzle Media

Based on initial observations, it shows that the understanding of the types and emotional reactions of children is in the category of beginning to develop. It can be seen from some children in group A that they still seem to lack knowledge and understanding of the types of emotions. In addition, they do not know the emotions they are feeling, and they are also not able to understand and control their own emotions. This is due to the limited knowledge that children have about emotions so that this can cause small problems for themselves or those around them. Children's lack of knowledge about emotions due to parents' lack of knowledge about education and optimization of children's emotional development is certainly a problem that cannot be underestimated (Age & Hamzanwadi, 2020). Because a child's behavior is determined by the way he manages his emotions, which also affects his learning behavior (Maulinda et al., 2020; Mucherah, 2007). So to avoid problems related to emotions, researchers use learning media that are interesting to children, namely emotional puzzle media.

The use of emotional puzzle media in this study is different from the use of puzzle media in general because this emotional puzzle media uses a STEAM-based PBL learning model in its implementation. This is because the implementation of this emotional puzzle media starts from reflection, research, discovery, application and communication. In the reflection stage, this first stage identifies the initial knowledge that children have about the types and reactions of emotions using various methods, namely the conversation method, the storytelling method, and the question-and-answer method. This method of conversation is for teachers to have a conversation with children about their feelings when faced with various atmospheres. After that, the teacher will encourage the child to tell his or her experience when faced with an atmosphere (sad, happy, angry). Then, the teacher will ask and answer questions about emotions to start and connect the child's knowledge with the material to be learned.

In the research stage, children explore the surrounding environment to get the information they need related to the material to be taught, namely the types and reactions of emotions. At this

stage, children will be invited to observe various types and reactions of emotions through learning videos which are then followed by a question and answer process about the content contained in the video. Then, the teacher will read a story titled "Perasaanku" by Sudeepta Rao, which tells the story of a child who is not able to express his feelings. Then the teacher will ask the following questions: "Will you find out what feelings the girl feels?" and "How does the girl cope with these feelings?". After that, the teacher will invite the child to observe the images of feelings or emotions contained in the storybook. Then, the teacher encourages the child to find the answer to the question given earlier.

In the Discovery stage, children will compile emotional puzzles according to their understanding and imagination obtained through observation results in the research stage. At this stage, children are free to choose the necessary tools and materials according to their imagination. The teacher will facilitate the child by providing various tools and materials that the child is likely to use. Next in the Application stage, children will complete a project to compile an emotional puzzle using the tools and materials they have chosen before. At this stage, the child will also test the emotional puzzle that he has made, such as whether his expression has shown an expression of anger, sadness, or others.

After the Application stage, continue to the Communication stage. At this stage, each child will be asked to tell about the emotional puzzle that they have made before in front of the class. The goal is for teachers and other friends to know the meaning of the emotional puzzle. In addition, it also trains children to be confident in the work that has been made before.
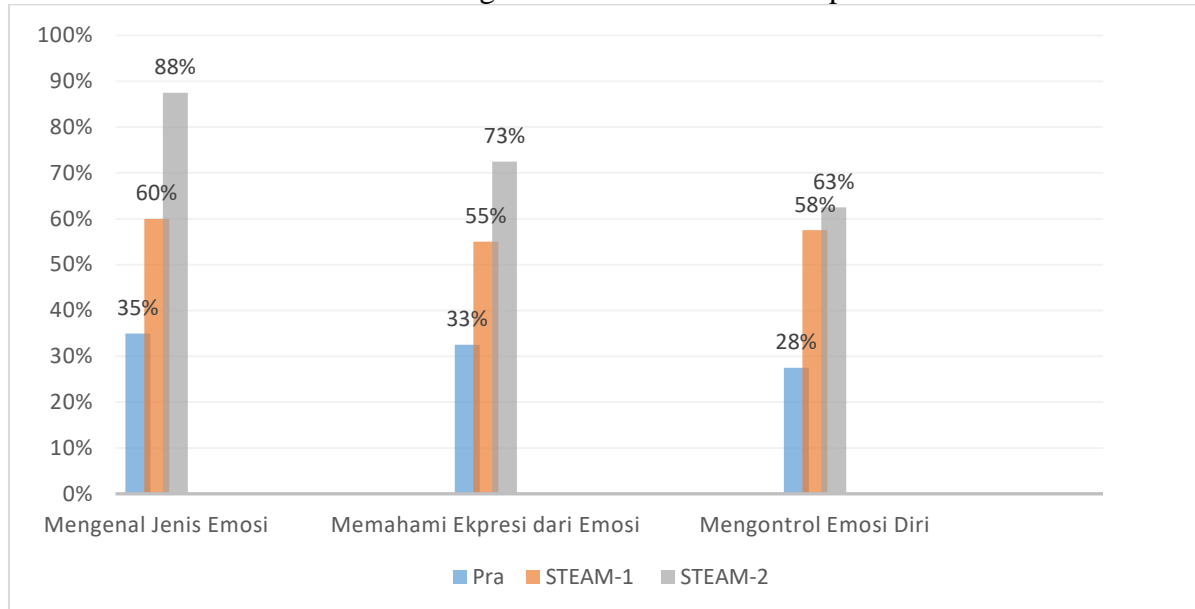
Improving Understanding of Types and Reactions of Emotions through STEAM-Based Emotional Puzzle Media

Based on the problems that have been described previously, the following are the results of research on understanding the types and reactions of early childhood emotions through emotional puzzle media in one of the PAUD in Gempol District, Cirebon Regency by using a checklist to find out the conditions before and after the use of STEAM-based emotional puzzle media. The data that has been collected will be processed and analyzed using descriptive statistics. Observation data on understanding the types and reactions of emotions using STEAM-based emotional puzzle media through the following table 1.

Table 1. Understanding the Types and Reactions of Emotions Using Emotional Puzzle Media

No	Name	Pra		STEAM 1		STEAM 2	
1	R	42%	MB	58%	BSH	75%	BSH
2	Ra	50%	MB	75%	BSH	92%	BSB
3	De	33%	MB	50%	MB	58%	BSH
4	A	25%	BB	33%	MB	58%	BSH
5	R	25%	BB	50%	MB	75%	BSH
6	S	25%	BB	58%	BSH	75%	BSH
7	MS	33%	MB	75%	BSH	92%	BSB
8	DR	25%	BB	50%	MB	67%	BSH
9	K	25%	BB	50%	MB	67%	BSH
10	NN	33%	MB	75%	BSH	83%	BSB

The number of children who meet the criteria BB, MB, BSH, and BSB is further calculated to analyze the data shown in Table 1. Then, the percentage of the number of children who meet each criterion and the level of learning activities is shown in Graph 1.

Graph 1 Understanding the Types and Reactions of Emotions Using Emotional Puzzle Media

Looking at graph 1, it shows that children's understanding of the types and reactions of emotions falls into the category of Beginning to Develop (MB) for the indicator of recognizing the type of emotion with a percentage of 33%, with 6 children in the Undeveloped (BB) category, and 4 children in the Developing Beginning (MB) category. Then for the indicator of understanding the expression of children's emotions is in the category of Beginning to Develop (MB) with a percentage of 33%, with 7 children in the Undeveloped (BB) category, and 3 children in the Undeveloped (BB) category. Meanwhile, the percentage of 28% with the category of Starting to Develop (MB) is an indicator of controlling self-emotions, with 9 children in the Undeveloped (BB) category, and 1 child in the Starting to Develop (MB) category. Therefore, the understanding of the types and emotional reactions of children in group A in one of the PAUD in Gempol District, Cirebon Regency is in the category of Beginning to Develop.

Understanding the types and emotional reactions of children is based on the category of Starting to develop, so the researcher uses a STEAM-based PBL learning model through the media of emotional puzzles to improve the understanding of types and emotional reactions in children. The use of the STEAM-based PBL learning model through the media of emotional puzzles can help improve the understanding of types and reactions of emotions in children as seen from graph 1, namely the indicator of recognizing the type of emotion is in the Very Good Developing (BSB) category with a percentage of 88%, as many as 5 children are in the Developing According to Expectations (BSH) category, and 5 children are in the Very Good Developing (BSB) category. In the indicator of understanding the expression of emotions, children also experienced an increase compared to before with a percentage of 73%, with 3 children obtaining the category of Developing as Expected (MB), 5 children obtaining the category of Developing as expected (BSH), and 2 children in the category of Developing Very Well (BSB). Then in the indicator of controlling children's emotions, they are in the category of Developing According to Expectations (BSH) with a percentage of 63%, with 5 children

getting the category of Developing According to Expectations (MB), and 5 children getting the category of Developing According to Expectations (BSH).

Based on this, the STEAM-based PBL learning model through the media of emotional puzzles can significantly improve the understanding of types and emotional reactions in early childhood. Increased understanding in children occurs in each indicator. The indicator of recognizing the type of children's emotions has increased from the category of Developing Beginning (MB) with a percentage of 35% to the category of Developing Very Good with a percentage of 88%. Then in the category of understanding the expression of emotions, there was also an increase from the category of Starting to Develop (MB) with a percentage of 33% to 73% with the category of Developing According to Expectations (BSH). In the indicator of controlling children's emotions, there was also an increase with a percentage of 28% with the category of Starting to Develop (MB) to the category of Developing According to Expectations (BSH) with a percentage of 63%.

This shows that learning with the STEAM-based PBL learning model can provide stimulus to children and support children to recognize types of emotions, understand the expression of emotions, and control emotions in themselves. In line with Hidayati & Widadiyah (2024) and Muntomimah & Wijayanti (2021) This STEAM-based learning can foster curiosity and encourage them to think higher-level, such as problem-solving, collaboration, independent learning, projects, and other higher-level learning. This is because children will observe, question, gather information, and communicate.

Conclusion
The STEAM-based PBL model through the media of this emotional puzzle goes through several stages, namely *reflection, research, discovery, application* and *communication*. This model provides an opportunity for children to express ideas/ideas and opinions. The use of emotional puzzle media in the STEAM-based PBL learning model can improve children's understanding of types and emotional reactions. This is evident in the category of Starting to Develop (MB) with a percentage of 35% to the category of Developing Very Good with a percentage of 88%, and in the category of Developing as Expected (BSH) with a percentage of 33% to 73%. Children's self-control indicators also increased, with a percentage of 28% from the category of Starting to Develop (MB) to the category of Developing According to Expectations (BSH), with a percentage of 63%. This shows that the STEAM-based PBL learning model with emotional puzzle media can provide the right stimulus in developing an understanding of types and emotional reactions in children.

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