

Development of Snake and Ladders Learning Media for the Introduction and Management of Basic Emotions in Children Aged 2–4 Years

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ABSTRACT

This research aimed to develop and test the feasibility of snakes and ladders learning media to help children aged 2–4 years recognize and manage basic emotions at SPS Negeri Bale Bermain Cendkia Kemayoran. Using the Four-D model (Define, Design, Develop, Disseminate), the define stage found that 75% of children struggled to identify emotions, 80% lacked adaptive management strategies, and 70% could not express emotions proportionally. In the design stage, a jumbo floor game (200x200 cm) with supporting components was created. At the develop stage, validation by three experts (subject, media, and early childhood practitioner) scored 97.67/120 (81.39%), categorized as “Valid.” Limited trials with 30 children showed average pre-test scores of 30.33 (42%) and post-test scores of 49.07 (68%), reflecting a 26% increase and a gain score of 0.45 (“Low”). The highest improvement appeared in emotion recognition with a gain score of 0.54 (“Medium”). In the disseminate stage, socialization and implementation

assistance were conducted across early childhood institutions in Kemayoran District. Overall, this research produced valid and effective snakes and ladders media, proven to support children in recognizing and managing basic emotions through fun, interactive play.

Introduction

Emotional development in early childhood is a fundamental aspect that influences children's cognitive, social, and behavioral development in later life. At the age of 2–4 years, children begin to experience a variety of complex emotions; however, they often do not yet possess adequate abilities to recognize, express, and manage these emotions appropriately. The ability to recognize and manage basic emotions such as happiness, sadness, anger, fear, and surprise is an essential skill that needs to be stimulated from an early age to foster healthy emotional regulation. As explained by Gross (2015), emotion regulation is an internal and external process involved in monitoring, evaluating, and modifying emotional responses in order to remain adaptive. Nevertheless, conditions in the field reveal a significant gap between ideal expectations and actual practice.

Preliminary observations conducted at SPS Negeri Bale Bermain Cendkia Kemayoran in February 2025 indicated that most children aged 2–4 years still experienced difficulties in recognizing, expressing, and managing basic emotions. This condition was reflected in children's behaviors, such as their inability to express feelings appropriately and

their frequent display of maladaptive emotional responses in certain situations, including prolonged tantrums, conflicts with peers, and difficulties adjusting to new routines in the school environment. These initial findings indicate a clear need for learning media that can more effectively support the development of children's emotional skills in ways that align with their developmental characteristics.

This need was further reinforced by the results of a preliminary interview with the Head of SPS Negeri Bale Bermain Cendkia Kemayoran, Mrs. Septima Laura Hutajulu, S.Pd.SD, conducted on February 15, 2025. Based on the interview, it was revealed that the school had not yet implemented a structured program for the development of children's emotional intelligence. She explained that the limited availability of engaging and age-appropriate learning media constituted a major obstacle in introducing and systematically training children's emotional management skills. In addition, conventional methods such as storytelling and role-playing were considered less optimal, as they tend to be monotonous and less effective in maintaining children's attention.

The limited availability of interactive, engaging, and developmentally appropriate learning media for children aged 2–4 years in the introduction and management of emotions underlies the urgency of developing innovative learning media. This condition is consistent with Piaget's cognitive development theory, which states that children aged 2–4 years are in the preoperational stage, during which

learning occurs optimally through direct experiences with concrete objects and play-based activities. Moeslichatoen (2021) also emphasized that play can facilitate children's emotional growth and development.

This situation highlights a gap between ideal and actual conditions in the development of children's abilities to recognize and manage emotions at the age of 2–4 years. This gap is further exacerbated by the limited availability of learning media designed to introduce and train emotional skills in early childhood, particularly media that align with the developmental characteristics of children aged 2–4 years, who are still in the preoperational stage and require concrete, engaging learning experiences involving physical activity. As demonstrated by Hayati and Putro (2021), games that involve the use of the five senses constitute physical activities that can be used to educate and stimulate children's cognitive and emotional development.

A review of previous studies shows that several efforts have been made to develop emotion-related learning media for early childhood. The study by Aprilia et al. (2023) revealed that the use of visual media in emotional learning significantly improved children's understanding of basic emotions. Furthermore, Fransisca et al. (2020) reported that activity-based games, such as snake and ladders, are suitable for children aged 2–4 years because they stimulate various aspects of development, including cognitive, language, and social development. Another study by Rofi'ah et al. (2022) found that stimulation of emotional recognition in early childhood contributed positively to the

development of empathy and social skills. However, most of these studies primarily focused on children aged 4–6 years and employed static learning media that involved limited physical activity, which may not fully meet the developmental needs of children aged 2–4 years. For example, the study by Putri et al. (2022) focused solely on improving self-confidence in children aged 5–6 years, thereby offering limited accommodation for the developmental characteristics of younger children.

Based on this research gap, the development of a snake and ladders learning medium in the form of a floor game becomes highly urgent. The snake and ladders game developed in this study demonstrates novelty and uniqueness in several aspects. First, it is specifically designed for children aged 2–4 years by taking into account their cognitive, motor, and social-emotional developmental characteristics. This aligns with the theory proposed by Satriana et al. (2022), which emphasizes that the selection of learning media should consider factors such as learner characteristics, teaching–learning strategies, and assessment procedures. Second, the game is interactive and involves physical activities such as jumping and walking on a large game board, which corresponds to the learning needs of children aged 2–4 years who learn best through movement and physical engagement. Third, the game integrates visual, verbal, and kinesthetic elements to accommodate various learning styles among children.

The snake and ladders game was selected as a learning medium in

this study for several reasons. First, it is a familiar and enjoyable game for children. Second, it has simple rules that are easy for children aged 2–4 years to understand. Third, the game can be modified to incorporate learning points related to emotions, such as recognizing facial expressions, identifying situations that trigger certain emotions, and applying simple strategies to manage emotions. Fourth, the game can be played in groups, thereby providing opportunities for children to interact with peers and learn from shared experiences. This rationale is consistent with Elfiadi (2016), who stated that games involving joint activities with peers are appropriate forms of play for early childhood.

Another reason this product is suitable for developing children's basic emotional management skills is that the snake and ladders game combines traditional play elements with emotional learning concepts. Through this game, children can learn to recognize various types of emotions, express their feelings, and understand ways to manage emotions in different situations. In addition, the game encourages social interaction among children, which can enhance their ability to empathize and communicate with others. This is in line with the findings of Safari and Oktaviani (2019), who demonstrated that snake and ladders games were effective in improving children's social abilities from the category of "not yet developed" to "very good" and "as expected."

The distinction between learning media developed in previous studies and the medium developed in this study lies in the focus and

learning approach. Previous studies generally developed emotion-related learning media that were visual and static in nature, such as flashcards or storybooks, which focused on improving children's understanding of basic emotions without directly involving physical activity (Ulfa, 2020). While such media have been shown to be effective in enhancing emotional recognition, they remain limited in facilitating active engagement among young children.

In contrast, the learning medium developed in this study takes the form of a snake and ladders game designed to provide interactive and enjoyable learning experiences through movement and social interaction. The design of this medium considers core principles of early childhood learning, namely that learning should be concrete, enjoyable, and meaningful. Through this approach, children can learn to recognize and manage emotions through contextual and direct play experiences. This active learning approach is considered more effective for early childhood, as supported by the findings of Khomsin and Rahimmatussalisa (2021), who stated that learning media in the form of games are more easily accepted and understood by children.

Within the context of character development, this snake and ladders game also serves as a medium for instilling positive values such as empathy, tolerance, patience, and self-control. Through the game, children learn to understand others' feelings, respect differences, wait for their turn patiently, and regulate their emotions when facing challenging situations. Vygotsky believed that through play, children

have opportunities to explore deeply and attend to details that capture their interests (Wiresti & Na'imah, 2020).

Based on these considerations, this study is expected to produce a learning medium that is not only innovative and effective but also sustainable and adaptable to various early childhood learning contexts. Consequently, this research is anticipated to make a significant contribution to improving the quality of early childhood education in Indonesia, particularly in the domain of social-emotional development.

Methods

This study employed a research and development (R&D) approach using the Four-D model (Define, Design, Develop, and Disseminate) to develop a snake and ladders learning medium for the introduction and management of basic emotions in children aged 2–4 years. In its implementation, this study applied a mixed-methods approach by collecting and analyzing both qualitative and quantitative data to support each stage of the media development process.

The study was conducted at SPS Negeri Bale Bermain Cendkia Kemayoran, where most of the children came from families with lower–middle socioeconomic backgrounds. A total of 30 children participated in the study, which was considered sufficient to provide a representative overview of how the snake and ladders game media could be utilized to support the introduction and management of basic emotions in children aged 2–4 years. The data collection instruments used in this study included observation, interviews, expert validation

questionnaires, performance-based pre-tests and post-tests, as well as documentation and field notes.

The stages of developing the snake and ladders emotional learning media followed the Four-D model, which consists of Define, Design, Develop, and Disseminate. At the define stage, an in-depth analysis was conducted to determine the needs and foundations of media development. This stage included initial analysis, learning needs analysis, and curriculum analysis. At the design stage, the media design concept was formulated, including the preparation of design concepts, initial sketches or prototypes, determination of learning strategies, identification of features and elements to be used, and the development of usage guidelines. At the develop stage, the media prototype was produced based on the design developed in the previous stage, followed by expert validation involving feedback, suggestions, and assessments. Revisions were then made based on the feedback obtained from the experts. Finally, the disseminate stage involved the distribution and broader introduction of the learning media that had been developed and validated.

Data analysis in this study was conducted using both quantitative and qualitative approaches, adjusted to the type of data obtained at each stage of the Four-D development model (define, design, develop, and disseminate). Qualitative data were collected through interviews, observations, and documentation during the needs analysis stage and limited trials. Qualitative data analysis was carried out through data

reduction, data display, and conclusion drawing, as proposed by Miles and Huberman (1994). Quantitative data were obtained from expert validation assessments and from the results of the children's performance-based pre-tests and post-tests conducted before and after using the learning media. Data from the expert validation questionnaires were analyzed using descriptive statistical techniques in the form of percentages to determine the feasibility of the media based on the assessed aspects. To measure the effectiveness of the learning media, a comparative analysis between pre-test and post-test scores was conducted using a performance-based assessment approach evaluated through holistic and analytic rubrics. The data analysis technique employed to determine effectiveness was gain score analysis, which calculates the difference between post-test and pre-test scores.

Result and Discussions

This research on the development of snake and ladders learning media for the introduction and management of basic emotions in children aged 2–4 years employed the Four-D model (Define, Design, Develop, and Disseminate) and was conducted at SPS Negeri Bale Bermain Cendkia Kemayoran.

Define Stage

At the define stage, the results of the initial analysis revealed an urgent need to develop learning media that could assist children aged 2–4 years in recognizing and managing basic emotions in an enjoyable and interactive manner. The learning needs analysis indicated that the

required learning media should be concrete, involve children's physical activities, be attractive and engaging for children aged 2–4 years, facilitate the introduction of basic emotions, provide opportunities for children to practice emotional management, and be usable both at school and at home.

These needs were supported by the results of preliminary observations conducted in February 2025 at SPS Negeri Bale Bermain Cendkia Kemayoran. Of the 32 children observed, 22 children (68.75%) still had difficulty identifying the emotions they experienced, 25 children (78.12%) were not yet able to express their feelings verbally in an appropriate manner, and 28 children (87.5%) had not demonstrated adaptive emotional management strategies when facing frustrating situations. These conditions were evident in children's behaviors, such as frequent prolonged tantrums, conflicts with peers, and difficulties adapting to new routines in the school environment.

Design Stage

At the design stage, the learning media were developed based on the identified learning needs. The media took the form of a jumbo snake and ladders floor game measuring 200 cm × 200 cm, as well as a regular snake and ladders game in A3 size. The media concept was designed to facilitate two main aspects: the introduction of basic emotions (happiness, sadness, anger, and fear) through images of facial expressions and emotion-triggering situations, and the management of basic emotions through simple strategies represented within the



Subsequently, pre-tests and post-tests were administered to measure children’s abilities to recognize and manage emotions before and after using the emotional snake and ladders learning media. The pre-test results are presented in Table 1.

Table 1. Pre-test Results

Assessed Aspect	Average Score	Maximum Score	Percentage (%)	Category
Emotion recognition	12.5	24	52	Fair
Emotion management	10.3	24	43	Poor
Emotional self-regulation	8.7	24	36	Poor
Total	31.5	72	44	Poor

The pre-test results indicate that children’s abilities to recognize

and manage basic emotions were still in the poor category. Specifically, children demonstrated better performance in emotion recognition (52%) compared to emotion management (43%) and emotional self-regulation (36%). This suggests that while children possessed a basic ability to recognize emotions, they still faced challenges in managing emotions and regulating themselves emotionally. The post-test results are presented in Table 2.

Table 2. Post-test Results

Assessed Aspect	Average Score	Maximum Score	Percentage (%)	Category
Emotion recognition	19.8	24	83	Very Good
Emotion management	17.2	24	72	Good
Emotional self-regulation	14.5	24	60	Fair
Total	51.5	72	72	Good

The post-test results show a significant improvement in children's abilities to recognize and manage basic emotions. Overall, children's performance improved from the "Poor" category (44%) to the "Good" category (72%). The greatest improvement occurred in the aspect of emotion recognition, which increased from 52% to 83% (Very Good), followed by emotion management, which increased from 43% to 72% (Good), and emotional self-regulation, which increased from 36% to 60%

(Fair).

To determine the effectiveness of the emotional snake and ladders learning media in improving children's abilities to recognize and manage basic emotions, gain score analysis was conducted. The results are presented in Table 3.

Table 3. Gain Score Results

Assessed Aspect	Pre-test Score (%)	Post-test Score (%)	Gain Score	Improvement Category
Emotion recognition	52	83	0.65	Moderate
Emotion management	43	72	0.51	Moderate
Emotional self-regulation	36	60	0.38	Low
Total	44	72	0.50	Low

Based on the gain score analysis, the emotional snake and ladders learning media demonstrated varying levels of effectiveness across different aspects. The highest improvement was observed in emotion recognition, with a gain score of 0.65 (Moderate), followed by emotion management with a gain score of 0.51 (Moderate), and emotional self-regulation with a gain score of 0.38 (Low). Overall, the effectiveness of the emotional snake and ladders learning media was categorized as Low, with a gain score of 0.50.

These findings indicate that the emotional snake and ladders learning media were more effective in enhancing children's abilities to recognize basic emotions than in improving emotion management and emotional self-regulation skills. This outcome is understandable, as emotion recognition is a foundational skill that is more easily developed in children aged 2–4 years, whereas emotion management and self-regulation are more complex skills that require longer periods of development.

Disseminate Stage

The final stage of the Four-D model was dissemination, which involved distributing and introducing the emotional snake and ladders learning media to a broader audience. This stage was carried out through socialization activities within early childhood education clusters in Kemayoran District, as well as through implementation assistance in early childhood education institutions.

The results of this study demonstrate that the development of snake and ladders learning media for the introduction and management of basic emotions in children aged 2–4 years was successful in producing a valid and effective product. These findings align with Piaget's theory of cognitive development, which states that children aged 2–4 years are in the preoperational stage, during which they learn optimally through direct interaction with concrete objects and play-based activities (Santrock, 2018). The emotional snake and ladders learning media developed in this study provided concrete learning experiences through

physical activities and visual representations of emotional expressions, thereby facilitating children's understanding of abstract emotional concepts.

The improvement in children's ability to recognize basic emotional expressions (from 52% to 83%) supports Goleman's (2020) theory of emotional intelligence, which emphasizes that the ability to recognize one's own emotions and those of others is a fundamental component of emotional intelligence. According to Goleman, emotional recognition serves as the foundation for the development of emotional intelligence, which plays a critical role in children's future success.

The findings of this study also support the results of Rofi'ah et al. (2022), who found that structured stimulation of emotional recognition in early childhood contributes positively to the development of empathy and social skills. In their study, children who received structured emotional stimulation demonstrated a 38.5% increase in empathy compared to the control group. In comparison, the present study showed higher improvements in emotion recognition (31%) and emotion management (29%), indicating the effectiveness of a play-based learning approach.

Furthermore, the study by Aprilia et al. (2023) on the use of visual media in emotional learning for early childhood reported a 27.3% increase in children's understanding of basic emotions. The present study demonstrated a higher improvement of 31% in emotion recognition, suggesting that the integration of visual elements with

physical activities in the snake and ladders game yielded more optimal outcomes than the use of visual media alone.

The development of the emotional snake and ladders learning media introduced several innovations that made significant contributions to the introduction and management of emotions in early childhood, as evidenced by the improvement in children's emotional abilities. These results are consistent with the findings of Fransisca et al. (2020), who reported that snake and ladders games are effective in stimulating cognitive, language, and social development in children aged 2–4 years.

Conclusion

Based on the results of this research on the development of snake and ladders learning media for the introduction and management of basic emotions in children aged 2–4 years at SPS Negeri Bale Bermain Cendkia Kemayoran, it can be concluded that the process of developing the snake and ladders learning media was successfully implemented through the four stages of the Four-D model (Define, Design, Develop, and Disseminate) and was deemed valid. The effectiveness of the snake and ladders learning media for the introduction and management of basic emotions in children aged 2–4 years showed positive results, although it was categorized as "Low." Nevertheless, the media was able to significantly improve children's abilities to recognize and manage basic emotions within a relatively short intervention period of two weeks.

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