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The Effectiveness Of The 'Isi Piringku' Flannel Board Media In Developing The Cognitive Skills Of Young Children In Classifying Healthy Foods At The Tarbiyah Islamiyah Nursery School In Tanjung Agung.

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Abstract

Early Childhood Education (ECE) plays a crucial role in forming cognitive foundations and healthy living habits. However, initial observations at RA Tarbiyah Islamiyah Tanjung Agung revealed a significant gap, where 17 out of 20 children in Group A preferred processed foods and struggled to classify healthy foods. This study aims to examine the effectiveness of using the "Isi Piringku" flannel board media in improving children's cognitive skills in sorting healthy foods. The method used was a quasi-experiment with a Pretest-Posttest Control Group Design. The research sample consisted of 40 children in Group A, divided into an experimental group (n=20) and a control group (n=20) through purposive sampling. Data collection instruments included cognitive performance tests and observation sheets, which were tested for validity (Aiken's V > 0.80) and reliability (Cronbach's Alpha = 0.87). Data analysis was conducted using Independent and Paired Sample T-Tests, Normalized Gain (N-Gain) calculations, and Effect Size (Cohen's d). The results showed a significant increase in the average cognitive skill scores of the experimental group, from 45.50 (pretest) to 84.25 (posttest), while the control group only increased from 46.00 to 62.75.

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Hypothesis testing showed a significance value of p < 0.001, with an N-Gain value for the experimental group of 0.71 (high category) and Cohen's d of 1.45 (large effect). These findings confirm that the concrete, visual, and manipulative nature of the "Isi Piringku" flannel board media effectively bridges the gap between abstract nutritional concepts and the pre-operational cognitive developmental stage of early childhood, while also supporting the internalization of the 7 Great Indonesian Children's Habits (7 KAIH) movement.

Keywords: Cognitive Skills, Healthy Food, Flannel Board Media, Isi Piringku, Quasi- Experiment, Early Childhood

INTRODUCTION

Early Childhood Education (PAUD) in Indonesia has a strong legal basis under Law of the Republic of Indonesia No. 20 of 2003 on the National Education System. Article 28 of the Act states that early childhood education is an effort to nurture children from birth to the age of six through educational stimulation to support their physical and mental growth and development, so that they are prepared to enter further education (Indonesia, 2003). In terms of the curriculum, early years education is geared not only towards motor, affective and language development, but also towards cognitive development. Cognitive development encompasses the ability to think, recognise, classify and make simple decisions based on play and exploration experiences appropriate to the developmental stage of children aged 4–6 years, as conceptualised in Jean Piaget's theory of cognitive development.

When it comes to choosing healthy food, there is an urgent need for children to have a basic understanding of a balanced, nutritious diet as the foundation for developing healthy eating habits that support cognitive development, concentration and readiness to learn. The modern early years education curriculum emphasises thematic learning that develops cognitive skills through observation, classification and the organisation of simple information about their environment, including healthy food. More specifically, the '7 Habits of Great Indonesian Children' (7 KAIH) initiative, which is a national character education programme, identifies 'Eating Healthy and Nutritious Food' as one of the habits that should be cultivated from an early age. This habit not only promotes physical health, but also fosters values such as responsibility, creativity and decision-making, which together can enhance children's cognitive skills in choosing healthy and nutritious food.

RA Tarbiyah Islamiyah Tanjung Agung has implemented a programme introducing the

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concept of healthy eating to young children through thematic learning activities integrated with the children's cognitive development. The school also runs co-curricular activities aimed at encouraging the habit of eating a nutritious breakfast as part of its efforts to implement the 7 KAIH principles. This practice is evident in the daily communal breakfasts held by pupils before lessons begin, ensuring that children gain not only theoretical knowledge but also real-life experience. The success of this programme is greatly influenced by the involvement of parents, teachers and the school in providing a varied, appealing and nutritious menu (Siregar, Wahyuni, & Nasution, 2025).

However, based on the results of initial observations and reflections by teachers in Group A at RA Tarbiyah Islamiyah Tanjung Agung, there is a clear gap between the ideal conditions for learning about healthy food and the actual conditions in the classroom. Ideally, young children should be able to recognise, sort and categorise healthy foods based on the concept of a balanced diet through active and hands-on learning activities. In reality, however, children still find it difficult to distinguish between healthy and unhealthy foods and are not yet able to group foods according to their nutritional categories. This is clearly evident in children's daily habits when packing their lunchboxes for school, with 17 out of 20 children preferring to bring ready-to-eat foods such as nuggets, sausages, siomai, drinks containing artificial sweeteners, and packaged snacks. They tend to choose food based on taste and appearance without understanding its health benefits.

This gap is thought to be caused by several factors, including: (1) teaching strategies that are still dominated by verbal explanations and worksheets, thereby failing to provide sufficient hands-on learning experiences; (2) limited use of concrete and engaging teaching materials; and (3) the influence of children's eating habits within the family environment. Children's poor cognitive skills in selecting healthy foods lead to unhealthy eating habits, meaning that the aim of fostering healthy eating habits through the implementation of the 7 KAIH principles is not fully achieved. As well as affecting children's health and nutritional intake, this situation also hinders the development of basic cognitive skills such as observing, categorising and making simple decisions.

Therefore, a learning solution is required that is suited to the characteristics of young children and the school environment. The use of the 'Fill My Plate' flannel board is considered appropriate as it is concrete, visual and easy to use, thereby enhancing children's active engagement in understanding the concept of healthy eating. This activity is in line with the nutrition education module for early childhood education, which encourages children to

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understand the concept of 'My Plate', which includes carbohydrates, protein, vegetables and fruit in balanced proportions (Ministry of Primary and Secondary Education, Ministry of Health, & Ministry of Religious Affairs, 2025). This study aims to empirically test the effectiveness of using the 'Isi Piringku' flannel board in improving children's cognitive skills in classifying healthy foods, by comparing it with conventional teaching methods.

LITERATURE REVIEW

2.1. Cognitive Skills in Early Childhood

Cognitive skills in early childhood refer to thinking abilities related to the processes of understanding, remembering, reasoning and problem-solving through meaningful learning experiences. Cognitive development in early childhood progresses very rapidly and is influenced by environmental stimulation and the learning strategies employed (Afiza et al., 2024). Recent research indicates that the cognitive skills of young children include the ability to think symbolically, classify objects, recognise numerical concepts, and understand simple cause-and-effect relationships.

According to Piaget's theory, children aged 4–6 are in the pre-operational stage, during which they begin to use symbols and language, but their thinking remains egocentric and centred on a single aspect (centration). Therefore, learning activities that require children to classify objects (such as healthy versus unhealthy foods) require the use of concrete materials to bridge the gap between their abstract thinking. The use of a variety of learning materials, such as constructive games or manipulatives, has been shown to be effective in enhancing children's logical and symbolic thinking skills (Cahyaningrat et al., 2024).

2.2. Teaching Healthy Eating to Young Children

Teaching healthy eating to young children is an educational process that helps children understand the concept of a balanced diet and eating behaviours that support optimal growth and development. This education is not only about nutritional knowledge, but also about establishing healthy eating habits that can last into adulthood (Husain, 2023). In the context of formal learning in early childhood education, lessons on healthy food must be delivered in a planned, creative and contextual manner so that children are able to recognise different types of healthy food, understand their benefits for the body, and develop a positive attitude towards consuming nutritious food (Siregar et al., 2026).

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In addition to interactive learning approaches, educational media have a positive impact on improving children's knowledge of healthy foods. The use of such media can reinforce children's understanding of the nutritional information presented, thereby making the learning process more engaging and effective (Sylvia et al., 2025). The role of teachers as facilitators and role models for healthy eating habits, together with a supportive school environment (such as encouraging the habit of eating a nutritious breakfast), reinforces the nutritional education provided.

2.3. The Flannel Board and the 'My Plate' Concept

Learning media are physical tools for conveying messages or learning materials, which may be audio, visual or audio-visual in nature. Media that are well-designed, engaging and tailored to learners' needs will serve as effective learning resources and provide the necessary stimulation for learners (Putri, 2024). Felt board materials are one of the most widely used concrete visual aids in early childhood education because they are hands-on, engaging and easy to use. These materials enable children to learn through activities such as sticking, arranging and grouping objects, thereby supporting the principle of 'learning by doing'.

The "Isi Piringku" concept is a balanced nutrition guideline introduced by the Ministry of Health of the Republic of Indonesia to replace the "4 Sehat 5 Sempurna" slogan. This concept emphasises the proportions of food on a plate—namely staple foods, side dishes, vegetables and fruit—tailored to daily nutritional requirements. The use of the "Isi Piringku" flannel board in early years education is an educational innovation that combines visual, fine motor and cognitive elements for children. Through this medium, children can learn about different types of healthy food, group foods into categories, and gain a basic understanding of food proportions. Children do not merely receive information verbally, but are also directly involved in the activity of arranging food components according to the correct portions, which is in line with the learning characteristics of young children, who require direct and meaningful learning experiences.

RESEARCH METHOD

3.1. Research Design

This study employs a quantitative approach using a quasi-experimental method. The design chosen is a pre-test–post-test control group design. This design was chosen because it allows researchers to compare the effects of the treatment between the group receiving the 'Isi Piringku' flannel board intervention (the experimental group) and the group using conventional

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teaching methods (the control group), whilst controlling for external variables as far as possible within a natural classroom setting.

3.2. Population and Sample

The population in this study comprises all children in Group A at RA Tarbiyah Islamiyah Tanjung Agung for the 2025/2026 academic year, consisting of two classes (Groups A1 and A2). The sampling technique employed was purposive sampling with the following inclusion criteria: (1) children who demonstrated difficulty in classifying food based on initial observations, and (2) children who attended consistently throughout the study period. The study sample comprised 40 children, divided equally into an Experimental Group (n=20) and a Control Group (n=20).

3.3. Research Instruments

The data collection instruments consisted of:

1. Cognitive Performance Test: This took the form of a practical worksheet in which children were asked to sort and stick pictures of food into the categories 'Healthy Food' and 'Unhealthy Food', and to arrange the proportions of 'My Plate' on a worksheet featuring a picture of a plate. The maximum score is 100. This instrument has been validated by two experts (early years education lecturers), with a content validity score of 0.88 using Aiken's V formula (classified as 'highly valid').
2. Observation Sheet: Used to observe children's active engagement, enthusiasm and thought processes during learning activities.
3. Reliability Test: The test instrument was pilot-tested on 15 children outside the sample, yielding a Cronbach's Alpha value of 0.87, which indicates very good reliability.

3.4.Research Procedure

The research was conducted in three main stages over a period of 8 weeks:

1. Pretest: Initial assessment of the children's cognitive skills in sorting healthy foods in both groups before the intervention.
2. Treatment: Delivery of the programme over 6 sessions.
   a. Experimental Group: The teacher used the 'My Plate' flannel board. The children actively select pieces of food images (carbohydrates, proteins, vegetables, fruit) and stick them onto a flannel board in the correct proportions, followed by a reflective discussion.

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b. Control Group: The teacher uses conventional methods (lectures, question-and-answer sessions, and worksheets involving colouring in pictures of food) without the use of a flannel board.

3. Post-test: A final assessment of the children's cognitive skills using the same instrument as the pre-test to measure improvement.

3.5. Data Analysis Techniques

The data were analysed using statistical software (SPSS 26). The stages of analysis included:

1. Prerequisite Tests: Normality Test (Shapiro-Wilk) and Homogeneity Test (Levene's Test) to ensure the data met the assumptions of parametric analysis.
2. Hypothesis Testing:
   a. Paired-sample t-test to determine whether there is a significant difference between pre-test and post-test scores within each group.
   b. Independent-sample t-test to compare the difference in score gains between the experimental group and the control group.
   c. Measures of Effectiveness: Calculated using the Normalised Gain (N-Gain) and Effect Size (Cohen's d) formulas to measure the extent of improvement and the strength of the treatment effect in practical terms.

RESULTS AND DISCUSSION

4.1. Descriptive Statistics

Based on the results of the experiment, the data obtained from the 40 children in the sample are summarised in

Table 1. Descriptive Statistics for Children's Cognitive Skills Scores

Group	Stage	N	(Mean)	Highest score	Lowest Score	Standard deviation
Eksperiment	Pretest	20	45,50	60	30	8,42
	Posttest	20	84,25	95	70	6,15
control	Pretest	20	46,00	65	35	7,98
	Posttest	20	62,75	75	50	7,20

The data in Table 1 show that the average pre-test scores of the two groups were almost identical (45.50 vs 46.00), indicating that the two groups had equivalent initial ability. Following

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the intervention, the average score of the experimental group increased dramatically to 84.25, whilst the control group showed only a moderate increase to 62.75.

4.2. Prerequisite Tests for Analysis

Before conducting the hypothesis test, the gain score data (the difference between the post-test and pre-test scores) were tested for normality and homogeneity.

1. Normality Test (Shapiro-Wilk): The p-value for the experimental group is 0.124 and for the control group is 0.089. As both values are greater than 0.05, the data are normally distributed.
2. Homogeneity Test (Levene's Test): The significance value based on the mean is 0.312 (> 0.05), indicating that the variances of the data for both groups are homogeneous.

4.3. Hypothesis Testing

Tabel 2. Hasil Uji Paired Sample T-Test (Within-Group)

Kelompok	Mean Difference	t	df	Sig. (2-tailed)
Eksperiment (Post - Pre)	38,75	18,42	19	0,000
control (Post - Pre)	16,75	7,85	19	0,000

The results in Table 2 show that there was a statistically significant increase in both groups ($p < 0.05$). However, to demonstrate the effectiveness of the medium, a comparison between the groups is required.

Table 3. Independent Sample T-Test (Between-Group Gain Score)

Variabel	t	df	Sig. (2-tailed)	Mean Difference
Gain Score (Eksperimen vs Kontrol)	5,67	38	0,000	22,00

A p-value of 0.000 (< 0.05) indicates that there is a highly significant difference in the improvement in cognitive skills between the experimental group and the control group.

4.4. N-Gain dan Effect Size

Table 4. N-Gain dan Cohen's d

Group	N-Gain	Kategori N-Gain	Cohen's d	category Efek
Eksperiment	0,71	Tall	1,45	*Large*
control	0,31	low	0,42	*Medium*

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Based on Hake's criteria, the N-Gain value of 0.71 in the experimental group falls into the 'High' category, whilst the control group only reached the 'Low' category (0.31). Furthermore, a Cohen's d value of 1.45 (> 0.80) confirms that the use of the 'Isi Piringku' flannel board has a very large effect size on the improvement of children's cognitive skills.

DISCUSSION

The results of this study provide a clear answer to the research question raised, namely children's poor ability to identify healthy foods as a result of abstract and verbalistic teaching methods. The significant improvement in the experimental group (from 45.50 to 84.25) compared with the control group (from 46.00 to 62.75) demonstrates that the 'Isi Piringku' flannel board is far more effective as a learning intervention than conventional methods.

This success can be explained through several mutually reinforcing theoretical perspectives. Firstly, according to Piaget's theory of cognitive development, children aged 4–6 are in the pre-operational stage. They are not yet fully capable of abstract thinking and rely heavily on concrete objects. The flannel board provides a visual and physical representation of food (pictures that can be held and stuck on). Manipulative activities such as picking up, selecting and sticking pictures of food into the 'Healthy' or 'Unhealthy' categories on the flannel board provide a hands-on learning experience. This effectively bridges the gap between abstract nutritional concepts and children's understanding. These findings are consistent with the research by Nilawarti et al. (2024), which states that simple, hands-on experimental methods are highly effective for the cognitive development of young children, as well as the research by Mulyani et al. (2022) on the effectiveness of hands-on play in categorising nutrients.

Secondly, the 'Isi Piringku' flannel board successfully simplifies the concept of a balanced diet into a structured cognitive task. Rather than memorising verbal definitions of nutrients, children are encouraged to 'play at arranging their plates'. They actively learn that a healthy plate should include sections for rice (carbohydrates), a main course (protein), vegetables and fruit. This classification process directly develops basic cognitive skills, namely the ability to classify and make simple decisions, as emphasised in the cognitive competencies of the Early Childhood Education Curriculum. This is supported by the findings of Afiza et al. (2024), who found that the ability to classify objects develops most effectively when children are engaged in exploratory activities.

Thirdly, in terms of motivation and engagement, observations during the intervention showed that the children in the experimental group were very enthusiastic. The colourful pictures

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of food on the flannel board and the sensation of attaching the Velcro captured the children's visual attention, reducing the boredom typically associated with conventional lecture-based methods or worksheets, as experienced by the control group. These findings support the research by Putri (2024), which states that attractively designed flannel board materials can serve as an effective stimulus to enhance learners' interest and active engagement in thematic learning activities.

This study also makes a tangible contribution to the implementation of the '7 Habits of Great Indonesian Children' (7 KAIH) initiative, particularly the habit of 'Eating a Healthy and Nutritious Diet'. By encouraging children to plan their 'My Plate' at school through fun activities, it is hoped that these habits will carry over into the home environment. Children are beginning to take a critical look at the packed lunches they bring and are able to turn down unhealthy snacks such as nuggets or artificially sweetened drinks, which previously dominated the choices of 17 out of 20 children at RA Tarbiyah Islamiyah Tanjung Agung. The role of teachers as facilitators and role models, combined with appropriate teaching materials, reinforces these nutrition education messages (Siregar et al., 2026).

Although the results of this experiment were highly positive and demonstrated a large effect (Cohen's d = 1.45), there were several limitations to this study. Firstly, the study sample was limited to a single educational institution comprising 40 children; consequently, generalising the results to a wider population must be done with caution. Secondly, the relatively short duration of the intervention (6 sessions) may not be sufficient to assess the long-term retention of healthy food-sorting habits. Further research is recommended to employ a broader experimental design, involving other specific media, or to conduct longitudinal studies to assess the long-term impact on children's eating habits and cognitive development.

CONCLUSION

Based on the research findings and discussion, it can be concluded that the use of the 'Isi Piringku' flannel board teaching aid has been shown to be significantly more effective in improving the cognitive skills of children in Group A at RA Tarbiyah Islamiyah Tanjung Agung in classifying healthy foods, compared with conventional teaching methods. This is evidenced by a significant increase in the average score in the experimental group, an N-Gain value of 0.71 (high category), and an effect size (Cohen's d) of 1.45 (large category). This medium successfully shifted the learning paradigm from a verbal-abstract approach to a concrete-manipulative one, making it highly suitable for the cognitive development stage of pre-operational children.

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