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The Effect of *Pempek* Culture-Based Learning Approach on Children's Ability to Recognise Numbers Aged 5-6 Years

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Abstract. The goal of this study is to find out how the Culturally Responsive Teaching (CRT) method based on pempek affects the number symbol recognition skills of children at PAUD Permata Kasih who are between the ages of five and six. To administer therapy without a control group, a pre-experiment with a one group pretest-posttest design. This was followed by a post-test. The 16 students in class B—eight males and eight girls—were the research subjects. The data obtained were analyzed using a one-sample t-test. The results of the t-test calculation show that the calculated t-value (3.28) is greater than the t-table value (1.75), thus Ha is accepted and Ho is rejected. It can be concluded that there is an effect of the Culturally Responsive Teaching (CRT) activities themed pempek at PAUD Permata Kasih. Additionally, this activity also develops other aspects such as social-emotional aspects by training children's patience in waiting in line and fine motor skills by involving the coordination of small muscle movements of the eyes and hands.

Keywords: Culturally Responsive Teaching Approach, Number Recognition Skills, Early Childhood

Introduction

Early childhood education, or PAUD, promotes the whole development of a child's personality. According to Law Number 20 of 2003 on the National Education System, PAUD is a coaching program that is offered to children from birth to age six in order to aid their physical and spiritual development through the delivery of educational stimuli. The goal is to prepare children for both official and informal educational opportunities.

Children in their early years, namely those between the ages of 0 and 6, are at a golden phase when growth happens quickly. By providing the right stimulation, parents, who are the children's primary caretakers at this point, can encourage their growth and development (Harmi et al., 2022). Religious and moral values, cognitive, physical-motor, social-emotional, language, and art are the six main facets of early childhood development, according to Permendikbud No. 146 of 2014.

One of the important aspects is cognitive development. According to Afrianti (2018), children aged 5–6 years are already at the symbolic thinking stage, where children begin to be able to solve problems, make decisions, and develop thinking skills. At this stage, children need to be stimulated to recognize various concepts such as colors, sizes, shapes, and simple mathematical concepts such as big-small, high-low, as well as the recognition of numbers and number symbols.

Permendiknas Number 58 of 2009 emphasizes the importance of the ability to recognize number symbols in children's cognitive development. One of the indicators of his achievement is

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the child's ability to count many objects from 1 to 10. The introduction of these numbers became the basis for the mastery of mathematical concepts in the future.

To achieve this goal effectively, the Culturally Responsive Teaching (CRT) approach can be used. CRT is a pedagogical approach that respects and integrates the cultural background of students in the learning process. In the context of early childhood education, this approach is important because children come from diverse cultural backgrounds and learn through experiences that are closely related to their culture.

Based on observations made by researchers in September 2024 at PAUD Permata Kasih Kindergarten B, it was found that children's ability to recognize numbers is still low. This can be seen from the lack of indicators such as counting with objects 11–20, sequencing numbers, and connecting concepts with their symbols randomly. One of the reasons is the lack of variety in learning approaches and the less effective use of media, for example, relying only on songs without visual reinforcement or hands-on practice.

Previous research has shown that CRT is effective in improving math learning outcomes. Suwarsono (2020) and Wardana et al. (2024) stated that the application of CRT in mathematics learning, also known as ethnomathematics, is able to improve understanding of basic concepts of numbers. Another study by Lusida et al. (2024) also strengthens that CRT is able to significantly improve student learning outcomes.

Based on this background, the researcher is interested in researching "The Effect of the *Pempek* Culturally Responsive Teaching Approach on the Ability to Recognize Numbers in Children Aged 5–6 Years at PAUD Permata Kasih". This study aims to determine the effectiveness of CRT in improving children's cognitive ability to recognize numbers according to their developmental age. More interesting and effective learning experiences for children at TK IT Al-Hafiz Cendekia.

Materials and Methods

This quantitative, pre-experimental study at PAUD Permata Kasih intends to ascertain the impact of a culturally relevant, pempek-based teaching strategy on the number symbol recognition skills of preschoolers, ages 5 to 6. This method alludes to the positivist paradigm, which places a strong emphasis on measurement, cause-and-effect, theory testing, and observation. The research design uses a one-shot case study, which is to provides treatment (X) followed by observation of the results through post-test (O). The research was carried out in February 2025/2026 at PAUD Permata Kasih, located in Permata Baru Village, Ogan Ilir, South Sumatra. The subject of the study was one class B, consisting of 16 children (8 boys and 8 girls). All of the students in class B made up the study population, and since the complete population was sampled, saturation sampling was the method employed. The study's dependent variable (Y) is the capacity to identify numerical symbols, whereas the independent variable (X) is the culturally sensitive pempek teaching methodology. This study aims to see the extent to which local culture-based approaches, such as *pempek*, can improve basic mathematics skills in early childhood through learning activities that are relevant to the child's cultural background.

Results and Discussion

Results

Post-Treatment Description (post-test)

The post-test findings used to assess the impact of the Pempek Culturally Responsive Teaching (CRT) method on the capacity to identify the number of children in PAUD Permata Kasih who are between the ages of five and six provide the basis for the data description in this study. The instrument used is a checklist observation sheet through direct observation. The post-test results showed a variation in scores, where 3 children got a score of 100, 2 children scored 94, 2 children scored 86, and the rest varied between 85 to 33. This data is then presented in the frequency distribution table in Table 4.1, while the details of each child's grades can be seen in Table 1.

Table 1.
Frequency Distribution of the Ability to Recognize the Number of Children Aged 5-6 Years at PAUD Permata Kasih

Interval Classes	Frequency	Relative Frequency
82 -100	9	56%
63-81	4	25%
44-62	2	12%
25-43	1	7%
Total	16	

Based on the data in Table 4.1, it can be observed that in the first score range, which is 82-100, there are 9 children (56%) who are included in the category of very good development (BSB). Meanwhile, in the second score range, 63-81, there were 4 children (25%) who were included in the category of developing according to expectations (BSH). After that, in the third value range, 44-62, there were 2 children (12%) who were included in the category of starting to develop (MB). In the last score range, 25-43, there was 1 child (7%) who was included in the undeveloped category (BB). Thus, the information from Table 4.1 can be realized in the form of a bar graph, as follows:

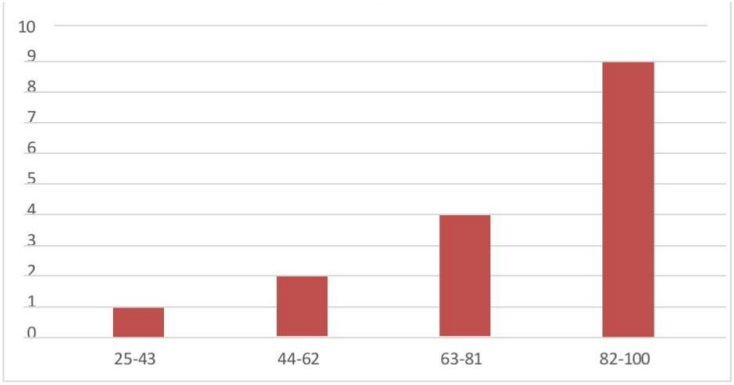

Figure 1.
The Ability to Recognize the Number Symbol of Children Aged 5-6 Years at PAUD Permata Kasih

Final Data Description

The average post-test score was used to determine the study's findings. An instrument consisting of an observation sheet with one indication and ten sub-indicators was used to gather data. The impact of Pempek's Culturally Responsive Teaching (CRT) approach on the number recognition skills of children aged 5–6 years at PAUD Permata Kasih was assessed by a post-test conducted following the implementation of the therapy.

This study involved a sample of 16 children aged 5 to 6 years from PAUD Permata Kasih. The main focus of this study is children's cognitive development, with measurements using intermediate classes in the Developing According to Expectations (BSH) category**.** The range of values obtained ranges from 63 to 81, where the number 63 is used in the analysis. Next, the researcher analyzed the post-test score, the final results of which can be found in Appendix 6. From these results, the average post-test score was $\tilde{x}$ = 77.94 and the standard deviation was Sde = 18.22. With the highest score of 100, while the lowest score is 33.

Validity Test

The following table presents the results of the validity test, which was conducted using Pearson Product-Moment with a significance level of 5% using program version 29

Table 2.
Instrument Validity Test Results

No. Item	Nilai r_{hitung}	Nilai r_{tabel}	Keterenga n
Item 1	0,748	0,632	Valid
Item 2	0,698	0,632	Valid
Item 3	0,835	0,632	Valid
Item 4	0,883	0,632	Valid
Item 5	0,696	0,632	Valid
Item 6	0,813	0,632	Valid
Item 7	0,846	0,632	Valid

Based on the information in the table, a trial was conducted to test the validity of the instrument used in measuring the ability of children aged 5-6 years to recognize numbers, showing that the seven research instruments used were valid because of the results of the test of the calculation in the *table.* The validity calculation process uses the SPSS application version 29 with *the Pearson product-moment* formula.

Normality Test

The purpose of normality is to find out if anything is analyzed following a normal distribution. In this study, the researchers used *the Chi-Square* test to test normality, with detailed calculations that can be found in Appendix 6. The results of *the Chi-Square* statistical test can be seen in Tables 4.4 and 4.5.

Then the data obtained is presented in the form of a frequency distribution, which can be seen in Table 3:

Table 3.
Data Normality Testing with Chi-Square Formula

Interval Classes	$f0$	Real Limits	*Z-Score*	Class Limits	Class Area Interval	fh
		100,5	1,23	39,07		
82-100	9	81,5	0,19	07,53	31,54	5,04
63-81	4	62,5	-0,84	29,95	-22,42	3,58
44-62	2	43,5	-1,89	47,06	-17,11	2,73
25-43	1	24,5	-2,93	40,83	6,23	0,99

Discussion

The research conducted at Permata Kasih Kindergarten titled "The Influence of Pempek's Culturally Responsive Teaching (CRT) Approach on the Ability to Recognize Numbers in Children Aged 5–6 Years" explores how culturally grounded materials enhance early numeracy skills. The use of local cultural elements such as pempek as contextual learning media aligns with the Culturally Responsive Teaching (CRT) approach, which seeks to bridge students' cultural backgrounds with academic content (Azizah & Fathurrahman, 2024; Fitriani et al., 2024). This method has been shown to improve student engagement and understanding by making learning more relatable and meaningful (Dr. Triningsih, 2023).This study utilized quantitative methods, including normality and t-tests, to evaluate the effect of the CRT-based intervention, following standard practices in educational research (Akbar et al., 2024). The instrument used was a structured observation sheet based on three key indicators encompassing ten numeric-related activities, each assessed through a four-point scale.

The first indicator assessed children's ability to recognize and sequence numbers 1–10. Results showed that most children performed well, with 10 out of 16 scoring the highest (4) in ordering numbers, suggesting strong early numerical cognition. Similar results were seen in related tasks involving numeral recognition and odd number identification, indicating increased familiarity with number concepts after the CRT intervention (Handayani, 2021).The second indicator involved object-based number recognition. Nine children demonstrated independent competence, which highlights improved number-object association—a foundational aspect of early math skills (Dilah et al., 2021; Husin & Yaswinda, 2021).

The third indicator focused on comparative and classification skills. Children successfully distinguished more and fewer objects, grouped items based on quantity, and sorted sets from 1–10. This reflects higher-order thinking abilities such as comparison and categorization, key

aspects of cognitive development in early childhood (Afrianti, 2018; Habsy et al., 2023).Overall, the data indicates that the CRT approach—particularly one grounded in students' cultural environment—enhances early numeracy by promoting engagement, relevance, and contextual understanding (Lusida et al., 2024; Lubis & Pohan, 2023). Learning strategies that are culturally and contextually relevant not only support cognitive development but also foster positive attitudes toward learning (Harmi et al., 2022; Fajri et al., 2022).In conclusion, this research adds to the growing body of evidence supporting the use of culturally responsive strategies in early education, showing how local culture can be an effective vehicle for foundational skill development.

Conclusion

An experimental quantitative approach using a one-shot case study design was used in this investigation. Purposive sampling procedures were used to determine the research sample. There were sixteen responders in all, and the study was conducted at PAUD Permata Kasih. The study's and analysis's findings demonstrated how the culturally sensitive pempek teaching method affected the young students' (ages 5–6) number recognition skills at PAUD Permata Kasih. This is explained by conducting a hypothesis test using the t-test by obtaining the value of tcount = 3.28 and t-table = 1.75, where if tcount > t-table then H0 is rejected, Ha is accepted. The way to obtain the t-table in degrees of freedom (df) can be obtained from n-1, so it is known that t-table = 1.75. Therefore, it can be concluded that using the culturally responsive teaching approach affects the ability to recognize the number of children (5-6) years old at Permata Kasih PAUD Kindergarten.

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