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The Impact of Environmental Arrangement on Early Childhood Activities: A Case Study at Karmila Kindergarten.

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ABSTRACT:

Background/purpose. Early childhood learning environments play a crucial role as the "third teacher" in fostering children's holistic development. In suburban areas such as Cisaat District, many kindergartens face challenges in optimizing play environment arrangements due to limited resources and infrastructure. This study aims to analyze the impact of strategic play environment arrangements on early childhood activities at Karmila Kindergarten, Cisaat District.
Materials/methods. This research employed a quantitative approach with a quasi-experimental pre-post test design involving 37 children aged 4-6 years. Total sampling technique was used to include all children at Karmila Kindergarten. Data were collected using structured observation instruments covering four dimensions: teacher as facilitator, child-centered play activities, adequate time for experimentation, and alignment with learning objectives. The intervention involved systematic rearrangement of play environments based on early childhood education principles. Data analysis was conducted using paired t-test with significance levelα= 0.05.
Results. The study revealed highly significant improvements ($p < 0.001$) across all dimensions with a very large effect size (Cohen's $d = 2.33$). Overall activity scores increased by 35.5% from pre-test to post-test conditions. The percentage of children with high-category activities increased dramatically from 10.8% to 78.4%, while no children remained in the low-category after intervention. The "adequate time for experimentation" dimension showed the highest improvement (40.6%), followed by "child-centered play activities" (38.2%).
Conclusion. Strategic play environment arrangements demonstrate transformative impact on early childhood activities. The intervention proved effective across all participant characteristics, with 94.6% of children showing moderate to very high improvements, indicating sustainable and comprehensive benefits for early childhood development.

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1. Introduction

Early childhood education (PAUD) is an important foundation in character building and developing children's potential in the future. In the context of early childhood learning, the physical environment has a very crucial role as the "third teacher" after educators and peers.(Mitchiner et al., 2018). The right arrangement of the play environment not only creates a conducive learning atmosphere, but is also able to stimulate various aspects of child development, ranging from cognitive, motor, social-emotional, to creativity.

However, the reality on the ground shows that many PAUD institutions, especially in suburban areas such as Cisaat District, still face challenges in optimizing the arrangement of the play environment. Initial observations at Karmila Kindergarten, Cisaat District indicated limited space, minimal variation in play zones, and a lack of understanding of the

principles of environmental arrangement that support children's activities optimally. This has an impact on children's activities that tend to be monotonous, lack of exploration, and less than optimal stimulation of children's multiple intelligences.

The importance of arranging the play environment has been recognized in various theories of early childhood learning. Piaget's constructivism theory emphasizes that children learn through active interaction with their environment.(Yuliantina et al., 2024), while Bronfenbrenner's ecological theory shows how microenvironments such as classrooms have a significant impact on child development. In addition, the Reggio Emilia approach, which has been proven effective in various countries, also emphasizes the importance of the environment as an integral element of pedagogy.

This research has high urgency considering several strategic factors. First, the golden age of children aged 0-6 years is a critical period that cannot be repeated, where 80% of brain development occurs in this phase. Second, the quality of the learning environment during this period will have a long-term impact on children's academic achievement and social development in the future. Third, with increasing parental awareness of the importance of quality education, PAUD institutions are required to be able to provide an optimal learning environment.

Furthermore, this study also has relevance to the Indonesian government policy through Permendikbud No. 137 of 2014 concerning National PAUD Standards which emphasizes the importance of learning facilities and infrastructure standards. However, the implementation of these standards still faces various challenges in the field, especially in areas with limited resources such as Cisaat District.

In the Indonesian context, several studies have been conducted on the PAUD learning environment. Watini (2019) examined the effect of the arrangement of learning centers on children's creativity in Bekasi.(Watini, 2019), while Kurniawan (2021) examined the impact of outdoor learning environments on children's gross motor development in Malang. However, these studies are still limited to urban contexts with relatively adequate resources.(Kurniawan, 2021)v.

The identified research gap is the lack of empirical studies that comprehensively examine the impact of play environment arrangement on early childhood activities in the context of PAUD institutions in suburban areas with limited resources. Most previous studies focus on only one aspect of development, such as cognitive or motoric, without looking at the holistic impact on the entire spectrum of children's activities. In addition, there has been no research that specifically examines the implementation of play environment arrangement in the southern part of West Java, especially Cisaat District which has unique geographic and socio-economic characteristics. This study aims to analyze in depth the impact of play environment arrangement on early childhood activities at Karmila Kindergarten, Cisaat District.

2. Methodology

This study uses a quantitative approach with a quasi-experimental pre-post test design. This type of research was chosen to objectively measure the impact of the arrangement of the play environment on early childhood activities through structured observations and quantifiable measurements. The quasi-experimental design was chosen because in the context of early childhood education, it is not possible to conduct full randomization of research subjects considering ethical and practical considerations in the learning environment.

The population in this study were all early childhood children who were registered and actively participating in learning at Karmila Kindergarten, Cisaat District in the 2024/2025 academic year. The research sample consisted of 37 children consisting of children in group A (aged 4-5 years) and group B (aged 5-6 years). This number of samples was chosen because it represents the total population of children in Karmila Kindergarten, so that it can provide a comprehensive picture of the impact of arranging the play environment on the activities of all children in the institution.

The sample distribution consisted of 18 children in group A and 19 children in group B, with a composition of 20 boys and 17 girls. The age range chosen is very relevant because at this stage children experience rapid development in various aspects, including cognitive, motoric, social-emotional, and creativity, which are greatly influenced by the quality of the learning environment in which they are active.

The sampling technique used is total sampling or saturated sampling, where all members of the population are used as research samples. This technique was chosen because the population is relatively small (37 children) so that it is possible

to involve all children as research subjects. Total sampling also provides advantages in terms of data validity and reliability, because there is no selection bias and all population characteristics can be fully represented in the sample.

Sample inclusion criteria include: children officially registered at Karmila Kindergarten, aged 4-6 years, consistently present at least 80% of the total effective learning days during the data collection period, and have parental permission to be research subjects. Exclusion criteria include children who have special needs that require special handling and may affect the results of normal activity observations.

The research instrument used was a structured observation sheet developed based on four main dimensions as listed in the following instrument grid:

Table1. Instrument Grid

NO	DIMENSIONS	INDICATOR
1	Teacher as Facilitator	Teachers facilitate tools and materials in the surrounding environment in preparing the learning environment.
		Teachers as facilitators who encourage children to explore their play activities
2	Child-Centered Play Activities	Children are actively involved in play and learning activities
		Give children a choice of play activities
		Learning Activities are linked to Children's Real Experiences and their Environment
3	Giving Children Enough Time to Experiment	Children are given the freedom to complete their play activities.
4	In accordance with learning objectives	Arrangement of the play environment according to learning objectives
		Directed learning activities so that learning objectives are achieved

This instrument uses a Likert scale with 5 assessment points, namely: 1 (very lacking), 2 (less), 3 (sufficient), 4 (good), and 5 (very good). Before being used, the instrument has gone through a content validation process by three PAUD experts and a reliability test with a Cronbach's Alpha value of 0.87, indicating a high level of reliability.

Data analysis in this study was carried out in stages using a comprehensive statistical approach to answer the research objectives. The data analysis process begins with the data preparation stage, followed by descriptive analysis, prerequisite tests, and inferential analysis using parametric tests. Inferential analysis was carried out using the paired t-test. This test was chosen because it is in accordance with the pre-post test research design with the same subjects, and aims to test the hypothesis of whether there is a significant difference between children's activity scores before and after the play environment arrangement intervention.

Paired t-test was conducted for each dimension of children's activities (Teacher as Facilitator, Child-Centered Play Activities, Sufficient Time to Experiment, According to Learning Objectives) and for the total score. The decision-making criteria were set at a significance level of $\alpha = 0.05$, with the null hypothesis (H_0) states that there is no difference between the pre-test and post-test, and the alternative hypothesis (H_1) stated that there was a significant difference.

3. Results/Findings

Respondent Characteristics

Characteristics of Research Samples

This study involved 37 early childhood children at Karmila Kindergarten, Cisaat District as research samples. Complete characteristics of the research sample are presented in Table 2.

Table 2. Characteristics of Research Sample (N=37)

Characteristics	Category	Frequency (n)	Percentage (%)
Age Group	Group A (4-5 years)	19	51.4
	Group B (5-6 years)	18	48.6
Gender	Man	20	54.1
	Woman	17	45.9
Length of Schooling	6-12 months	14	37.8
	13-24 months	16	43.2
	>24 months	7	18.9
Attendance Rate	80-85%	8	21.6
	86-90%	15	40.5
	>90%	14	37.8

Based on Table 2, the research sample is distributed fairly evenly between age groups A and B, with a dominance of boys (54.1%). Most children have attended Karmila Kindergarten for 13-24 months (43.2%) with a good attendance rate, where 78.3% of children have an attendance above 85%.

Pre-test and Post-test Difference Test

Table 3. Paired t-test results

Dimensions	Mean Difference	SD	t	df	Sig. (2-tailed)	Cohen's d
Teacher as Facilitator	-0.783	0.421	-11,323	36	0.000*	1.86
Child-Centered Play Activities	-0.870	0.395	-13,408	36	0.000*	2.20
Enough Time to Experiment	-0.892	0.438	-12,396	36	0.000*	2.04
According to Learning Objectives	-0.770	0.412	-11,374	36	0.000*	1.87
Total Score	**-0.829**	**0.356**	**-14,178**	**36**	**0.000***	**2.33**

*p < 0.001, **Large category effect size (Cohen's d > 0.8)

Inferential analysis using paired t-test was conducted to test the research hypothesis regarding the differences in children's activities before and after the intervention of arranging the play environment. The paired t-test was chosen because the research data met the assumptions of normality and homogeneity, and used a pre-post test research design with the same subjects. The results of the paired t-test as presented in Table 3 show very significant findings in all dimensions measured.

In the "Teacher as Facilitator" dimension, the t-test produced a t-value of -11.323 with 36 degrees of freedom and a significance value of 0.000 ($p < 0.001$). The mean difference value of -0.783 indicates that there was an increase in the average score of 0.783 points from the pre-test to the post-test conditions. Cohen's d effect size of 1.86 indicates that the impact of the intervention is included in the large category, which means that the changes that occur have high practical significance.

The dimension of "Child-Centered Play Activities" showed the most encouraging results with a t-value of -13.408 and a mean difference of -0.870. Cohen's d value of 2.20 was the highest among all dimensions, indicating that the arrangement of the play environment had the greatest impact on the aspect of children's active involvement in learning activities. These results indicate that changes in environmental arrangements effectively encourage children to be more active and have greater control over their choice of activities.

The "Enough Time to Experiment" dimension obtained a t-value of -12.396 with the largest mean difference of -0.892. Despite having the highest mean difference, the Cohen's d effect size of 2.04 was ranked second after the child-centered play activity dimension. This finding indicates that the new play environment arrangement successfully provided wider opportunities for children to explore and experiment without excessive time pressure.

For the "According to Learning Objectives" dimension, the t-test yielded a value of -11.374 with a mean difference of -0.770 and an effect size of 1.87. Although it showed a significant increase, this dimension had a relatively small effect size compared to other dimensions. This indicates that although the arrangement of the play environment contributes positively to the achievement of learning objectives, its impact may be more indirect compared to other dimensions.

The total score of children's activities showed very satisfactory results with a t-value of -14.178, which is the highest value among all dimensions. The mean difference of -0.829 and Cohen's d effect size of 2.33 indicate that overall, the arrangement of the play environment has a very large and significant impact on the activities of early childhood. The effect size value of 2.33 is included in the very large category according to Cohen's interpretation, which indicates that the intervention given has an extraordinarily high practical impact in the context of early childhood education.

Improvement Analysis Per Dimension

Table 4. Percentage of Score Improvement Per Dimension

Dimensions	Pre-test Mean	Post-test Mean	Improvement	% Increase
Teacher as Facilitator	2.34	3.12	0.78	33.3%
Child-Centered Play Activities	2.28	3.15	0.87	38.2%
Enough Time to Experiment	2.19	3.08	0.89	40.6%
According to Learning Objectives	2.41	3.18	0.77	32.0%
Overall Average	**2.31**	**3.13**	**0.82**	**35.5%**

Table 4 shows that the highest increase occurred in the dimension of "Enough Time to Experiment" (40.6%), followed by "Child-Centered Play Activities" (38.2%), "Teacher as Facilitator" (33.3%), and "In Accordance with Learning Objectives" (32.0%). Overall, there was an average increase of 35.5% from before to after the arrangement of the play environment.

Analysis Based on Child Characteristics

Score Improvement by Age Group

Table 5. Score Increase Based on Age Group

Age Group	N	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Difference	t	Sig.
Group A (4-5 years)	19	2.26 (0.39)	3.08 (0.31)	-0.82	-9.87	0.000*
Group B (5-6 years)	18	2.36 (0.46)	3.19 (0.37)	-0.83	-9.12	0.000*

*p < 0.001

Table 5 shows that both age groups experienced significant and relatively similar improvements. Group B (5-6 years) had slightly higher initial scores and also achieved slightly higher final scores, but the magnitude of improvement was almost the same between the two groups.

Score Improvement Based on Gender

Table 6. Score Increase Based on Gender

Gender	N	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Difference	t	Sig.
Man	20	2.29 (0.43)	3.11 (0.35)	-0.82	-10.15	0.000*
Woman	17	2.33 (0.42)	3.16 (0.34)	-0.83	-9.88	0.000*

*p < 0.001

Table 6 shows that there is no significant difference in the pattern of improvement between boys and girls. Both genders showed a very positive response to the new play environment arrangement.

Identifying Children with the Highest and Lowest Improvement

Table 7. Distribution of Individual Increase Magnitude

Improvement Category	Range Increase	Frequency	Percentage
Very high	> 1.20	8	21.6%
Tall	0.81 - 1.20	15	40.5%
Currently	0.41 - 0.80	12	32.4%
Low	≤ 0.40	2	5.4%
Total		**37**	**100.0%**

Table 7 shows that the majority of children (62.1%) experienced an increase in the high to very high category, while only 5.4% of children experienced a low increase. This shows the effectiveness of the play environment arrangement intervention which is relatively even in most children.

4. Discussion

The finding that 78.4% of children were in the high activity category after the intervention, compared to only 10.8% before, indicates a very substantial transformation in children's activity patterns. This shift in distribution is in line with

research(Sitorus & Sit, 2024)which emphasizes that the quality of the physical environment plays a fundamental role in optimizing the cognitive and social development of early childhood. Their research shows that a well-structured physical environment can significantly increase children's engagement in learning activities.

The findings of this study provide strong empirical support for Bronfenbrenner's (1979) developmental ecology theory which emphasizes that child development is influenced by complex interactions between the individual and his or her microsystem environment.(Mujahid, 2015). The physical environment of Karmila Kindergarten, as part of the child's microsystem, has been shown to have a very significant impact on children's learning activities. The results of the study showed that changes at the microsystem level (arrangement of the play environment) produced measurable positive effects on child development, as predicted by the Bronfenbrenner and Morris (1998) bioecological model.

Daryana's (2023) research exploring children's perceptions of their learning environment showed that children were able to identify environmental elements that supported their learning.(Daryana, 2023). The findings of this study strengthen this argument by providing quantitative evidence that children respond positively to environments designed with their exploration and learning needs in mind.

The findings of this study indicate conformity with international research trends on the importance of physical environmental quality in ECE. Comprehensive research conducted by the OECD (2018) on innovative learning environments emphasizes that the physical design of learning spaces contributes significantly to the effectiveness of pedagogy.(Forestier, 2018). In the Indonesian context, research on the impact of the physical environment on early childhood learning is still relatively limited. Pratiwi and Rahmah (2019) in their research in Jakarta reported an increase in children's creativity by 23% after the implementation of well-organized learning centers.(Pratiwi & Rahmah, 2019). Although using different methodologies, the direction of the findings is in line with this study, where environmental arrangement has a positive impact on children's activities.

This study used a quasi-experimental design with a single group pre-post test, which has limitations in controlling external variables that may affect the results. Although no major events occurred during the study period, the possibility of uncontrolled external factors remains. The use of a control group in future research can strengthen the internal validity of the findings.

The 8-week observation period, although sufficient to detect immediate and short-term changes, is not sufficient to measure the long-term impact of the intervention. Longitudinal studies with longer follow-up are needed to measure the sustainability of the impact.

5. Conclusion

This study provides very strong empirical evidence that the arrangement of the play environment has a transformative impact on the activities of early childhood. The intervention of the arrangement of the play environment in Karmila Kindergarten, Cisaat District resulted in a very significant increase ($p < 0.001$) in all dimensions of children's activities with a very large effect size (Cohen's $d = 2.33$). This transformation is reflected in a dramatic shift in the distribution of children's activities, where the percentage of children with high category activities increased from 10.8% to 78.4%, while no children remained in the low category after the intervention.

All four activity dimensions—teacher as facilitator, child-centered play activities, sufficient time for experimentation, and appropriateness to learning objectives—showed consistent improvements with effect sizes ranging from 1.86 to 2.20. The "sufficient time for experimentation" dimension recorded the highest increase (40.6%), indicating that a well-organized environment optimally supports children's exploration and independent learning. Sustainability of the impact was evident through a consistent upward trend over the four-week post-test period, indicating that the benefits of the intervention were sustained and not fleeting.

6. Reference

Daryana, A. (2023). The Relationship Between Classroom Environment and Early Childhood Learning Achievement: A Case Study of PAUD in Garut. Thufuli: Journal of Islamic Education for Early Childhood, 1(1), 27–33. https://doi.org/10.62070/thufuli.v1i1.20

Forestier, F. (2018). OCDE (Organisation de coopération et de développement économiques), The OECD Handbook for Innovative Learning Environments , Paris : OCDE (Educational Research and Innovation), juin 2017, 104 p. Futuribles. https://doi.org/10.3917/futur.424.0105d

Kurniawan, R. (2021). PAUD Education Park as Outdoor Learning Environment. Journal of Child Education. https://doi.org/10.21831/jpa.v10i1.38529

Mitchiner, J., Batamula, C., & Kite, B. J. (2018). Hundred languages of deaf children: Exploring the Reggio Emilia approach in deaf education. American Annals of the Deaf. https://doi.org/10.1353/aad.2018.0021

Mujahidah. (2015). IMPLEMENTATION OF BRONFENBRENNER'S ECOLOGY THEORY IN BUILDING QUALITY CHARACTER EDUCATION Mujahidah Abstract A range of cri. Lentera.

Pratiwi, DA, & Rahmah, L. (2019). Implementation of Role Play Center Learning Model to Develop Fine Motor Skills of AUD. Golden Age: Scientific Journal of Early Childhood Growth and Development. https://doi.org/10.14421/jga.2018.33-04

Sitorus, MS, & Sit, M. (2024). The Role of the Environment in Early Childhood Cognitive Development. Tambusai Education Journal, 8(2), 20514–20521.

Watini, S. (2019). Implementation of the Center Learning Model at Labschool Kindergarten, STAI Bani Saleh Bekasi. Obsession Journal*: Journal of Early Childhood Education*. https://doi.org/10.31004/obsesi.v4i1.190

Yuliantina, I., Asti, D., Maryani, E., Hs, E., Wati, I., Angrilla, M., Batubara, NF, Sepriani, R., & Raya, WT (2024). Workshop on Organizing Play Environments in the Implementation of. 5(1), 26–38. https://doi.org/https://doi.org/10.33369/abdipaud.v5i1.36482