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The Impact of Toy Exploration Activities on Critical Thinking and Speaking Skills in 3-4 Years Old Children

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ABSTRA

This study analyzes the impact of toy exploration on the critical thinking and speaking skills of children ages 3-4. Understanding how toy explorations influences these abilities is crucial for parents and educators to support children's cognitive and communication development effectively. This study processes data using a quasi-experimental approach using JASP. There are 29 participants in this study, and the sample is made up of kids between the ages of 3 and 4. With the experimental group achieving higher ratings of 6.46 and 9 than the control group, the data show that the p-score was less than 0.001. It can be inferred that toy exploration activities have an impact on children's critical thinking and speaking skills between the ages of three and four.

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INTRODUCTION

Early childhood development is one of the important aspects in the process of human growth and development (Andrini, 2016). Critical thinking skills and speaking skills are key abilities that must be developed in the future. Critical thinking skills enable children to analyze, evaluate, and make decisions based on the information they receive. The ability to speak is related to a child's ability to express ideas, feelings, and needs clearly and effectively (Schulz, 2012). Toys are an important factor in stimulating a child's growth and development (Lillard, 2019). Through toys, children can reach each stage of development according to their developmental age and form things that are inseparable from the world of children (Lillard, 2019). When children engage in play activities, they will hone those six aspects. Critical thinking skills are cognitive abilities that enable children to analyze information, evaluate evidence, and make decisions that are not biased. Critical thinking skills can be developed from an early age by providing appropriate challenges, such as through educational games that require children to use logic, analyze patterns, or construct specific structures (Schulz, 2012). The ability to think critically in early childhood is the foundation for more complex problem-solving skills in the future (Schulz, 2012). Children who are able to think critically at an early age tend to be more prepared to face academic challenges, evaluate information independently, and make consistent and varied decisions. Toy exploration is a model of learning in play-based learning that is student-centered. Toy exploration helps children develop critical thinking and speaking skills in early childhood, because through toys, children can learn while playing, interact with objects directly, and develop communication skills through enjoyable activities. According to Trawick-Smith (2020), educational toys such as building blocks and puzzles can help children develop

critical thinking skills because these toys encourage them to solve problems and make decisions. Exploration of toys also plays a role in the development of children's speaking skills. Stages in toy exploration that play a role in the development of a child's speaking ability. The preparation stage, the initial exploration stage, the directed exploration stage, the interaction-collaboration stage, and the reflection stage are. Preparation: the teacher prepares toys or learning aids that are appropriate for the learning objectives and the child's age. Beginning: the child is introduced to the prepared toys and given the freedom to explore the toys according to their own desires. Directed: guidance or instructions to stimulate the child's thinking process. Interaction and Collaboration: Children are encouraged to interact and collaborate with peers or caregivers. Reflection and Evaluation: But the child causes the child's feelings during play, the child's market, or the challenges they face. Reflection is a moment where children and educators together reflect on the activities that have been carried out. Reflection is helping children become aware of their play experiences, strengthening their understanding of friends, shaping the learning gained from toy exploration, and discussing its benefits, such as how children learn to think creatively, solve problems, or share with themes. Reflection is a stage that together helps children create shared opportunities and understand the thought processes that have been facilitated through toy exploration.

The urgency of this research lies in the importance of understanding the extent to which toy exploration, specifically the types of toys used such as blocks, puzzles, green beans, stick patterns, cutting paper, tasos. This influences the development of these essential skills in early childhood. However, there has not been much research specifically exploring the relationship between toy exploration and critical thinking and speaking skills in early childhood, particularly in the age range of 3-4 years. Parents and educators need to have a better understanding of the types of toys that can support the development of children's critical thinking and speaking skills, so they can make the right choices in toy exploration

RESEARCH METHOD

The research method used in this study is quasi-experimental research with a control group. Experimental research involves examining the variables involved in the study to determine the influence of the chosen treatment. This study uses a nonrandomized pretest-posttest control group, which includes both experimental and control groups. The aim of this research is to determine the influence of the chosen treatment on the participants' behavior. The experimental research design involves manipulating conditions that are consistent with the research needs. In this case, two groups of participants were divided into two groups: experimental and control groups. The experimental group was given the chosen treatment, while the control group did not receive the chosen treatment. The study then conducted a posttest to assess the participants' ability to think critically and form opinions about the chosen treatment.

Table 1. Experimental research design (Jannah, 2016)

Group	Pretest	Treatment	Posttest
E	O_1	X	O_2
K	O_3	–	O_4

Description:
O1 : Experimental group pretest
O2 : Experimental group posttest
O3 : Control group pretest
O4 : Control group posttest
X : Treatment (treatment) gardening activities in the experimental group
E : Experimental group
K : Control group

- : Conventional learning

The experimental research design uses a control group time series experiment non-randomized. This process involves comparing the mean difference between experimental and control groups, revealing that the variable with the least influence on the variable with the most influence. The study also considers factors such as proactive history, maturity, bias, and implementation of the study.

Maturation is a physical and psychological change that occurs gradually, and the results depend on the participants' experience and the researcher's ability to apply the chosen treatment. Bias selection is a differential bias, which occurs when researchers use specific criteria to evaluate experimental and control groups. Imitation treatment is a condition where the control group does not implement the chosen treatment. This can affect the results of the experiment. Posttest is conducted to determine and measure the effect of treatment in the form of toy exploration on critical thinking skills and speaking abilities in children aged 3-4 years. The data obtained from the pretest and posttest results of the experimental and control groups were subsequently analyzed to see the n-gain values. The writing of the research results and the drawing of conclusions are findings made during the research. This research was conducted at Chung-Chung Christian School. research subjects (respondents) who represent those needed to participate in the study. This research was conducted from October 1, 2024, to January 10, 2025.

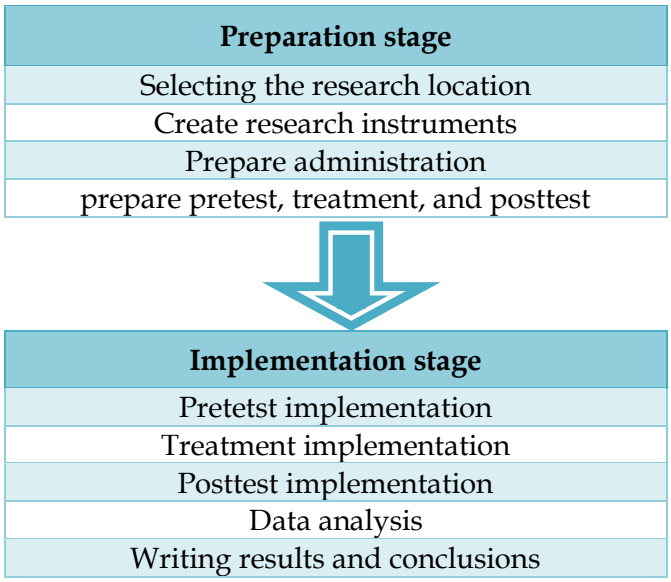

Figure 1. Research stage

RESULTS AND DISCUSSION

This study comprises three phases: 1) engaging the instructor as both researcher and participant, 2) validating the research instrument as a tool for critical thinking, and 3) verifying the research instrument itself. The teacher's competencies were evaluated based on the study, encompassing their teaching experience and proficiency in instructing research at PAUD. The researcher's competencies were evaluated by expert judgment, with the first two possessing knowledge in developmental psychology and the latter two in education. The second part encompassed the teacher assuming the role of researcher, engaging 15 youngsters in a school project. The study encompasses five phases: 1) engaging the research subject and experimental and control groups, 2) performing a data pre-test, 3) involving the experimental group, 4) executing a data post-test, and 5) assessing the data. The data pre-test evaluates the efficacy of the investigation across all subjects.

Table 2. Instrument critical thinking skill test (Facione, 2016)

Variable	Dimension	Indicator	Items
Critical Thinking Skills	Identifying problems	1. Children can identify difficulties while engaging in play activities, such as completing puzzles or constructing with blocks.	4
	Findings solutions	2. Children endeavors to resolve the issues that arise during the game.	4
	Evaluating actions	3. Children appraises and analyzes the efficacy of the acts undertaken during play.	4
	Thinking Flexibily	4. Children exhibits cognitive flexibility and explores alternative strategies when the initial option becomes ineffective.	4
	Creative problem-solving	5. Children employ imagination or creativity to devise novel solutions.	4

(Hadaina & Astawan, 2021; Kementrian Pendidikan Nasional RI, 2014; Madyawati et al., 2016)

Table 3. Instrument speech and language assesmen

Variable	Dimention	Indicators	Items
Speaking Skills	Diverse vocabulary usage	1. Children uses a variety of vocabulary according to the context of play.	4
	Use of Simple Sentences	2. Children uses simple sentences to convey ideas or instructions.	
	Clarity of Pronunciation	3. Children are able to pronounce words clearly so that they can be understood.	
	Storytelling Ability	4. Children are able to recount play experiences or describe games.	1
	Creativity in Problem Solving	5. Children use imagination or creativity to find new solutions.	7

(Kementrian Pendidikan Nasional RI, 2014; Madyawati et al., 2016; Maulana & Handayani, 2022)

In critical thinking skills, the gain score between the experimental group and the control group appears different. The experimental group's gain score was 6.46 and the control group's was 1.21. The pre-test score data of the experimental group had an average of 9.06 and the average post-test data was 15.53. In the control group, the average pre-test score was 11.92 and the average post-test score was 13.14. This already shows that there is an increase in critical thinking skills in the experimental group after being given toy exploration treatment. The following is the data presentation

Table 4. Description of data on critical thinking skills of experimental and control groups

No	Subject	Control group			No	Subject	Experiment group		
		Pre	Post	Gain			Pre	Post	Gain
1	SH	11	14	3	15	WM	5	8	3
2	BT	8	11	3	16	DM	11	15	4
3	JS	10	13	3	17	KH	5	12	7
4	ZH	10	13	3	18	JT	11	15	4

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No	Subject	Control group			No	Subject	Experiment group		
		Pre	Post	Gain			Pre	Post	Gain
5	KE	11	15	4	19	KG	9	16	7
6	AJ	12	12	0	20	NH	11	18	7
7	BW	11	12	1	21	JY	11	19	8
8	JH	16	16	0	22	TY	10	16	6
9	LJ	17	17	0	23	MW	8	15	7
10	HK	15	15	0	24	SS	10	19	9
11	BP	12	12	0	25	RL	6	14	8
12	DH	11	11	0	26	AH	8	15	7
13	IY	11	11	0	27	JM	11	18	7
14	BV	12	12	0	28	QW	10	16	6
					29	CC	10	17	7
Mean		11,92	13,14	1,21	Mean		9,06	15,53	6,46

In speaking skills, the gain score between the experimental group and the control group appears different. The experimental group's gain score was 9 and the control group's was 1.87. The pre-test score data of the experimental group had an average of 9.26 and the average post-test data was 18.26. In the control group, the average pre-test score was 10.07 and the average post-test score was 11.92. This already shows that there is an increase in speaking skills in the experimental group after being given toy exploration treatment. The following is the data presentation.

Table 5. Description of skills to recognize size concepts in experimental and control groups

No	Subject	Control group			No	Subject	Experiment group		
		Pre	Post	Gain			Pre	Post	Gain
1	SH	15	15	0	15	WM	5	5	0
2	BT	10	12	2	16	DM	8	18	10
3	JS	11	13	2	17	KH	5	20	15
4	ZH	7	11	4	18	JT	7	18	11
5	KE	9	14	5	19	KG	10	20	10
6	AJ	9	13	4	20	NH	15	19	4
7	BW	9	12	3	21	JY	10	19	9
8	JH	7	11	4	22	TY	10	19	9
9	LJ	8	9	1	23	MW	9	19	10
10	HK	9	9	0	24	SS	14	20	6
11	BP	12	12	0	25	RL	5	20	15
12	DH	15	15	0	26	AH	5	19	14
13	IY	10	11	1	27	JM	14	19	5
14	BV	10	10	0	28	QW	11	19	8
					29	CC	11	20	9
Average		10,07	11,92	1,87	Average		9,26	18,26	9

The mean value on the pre-test results of critical thinking skills is 10.448, the minimum value is 5 and the maximum is 17, and the standard deviation is 2.70. The post-test data on critical thinking skills had a mean of 14.379, a minimum value of 8 and a maximum of 19, and a standard deviation of 2.691. The mean gain score was 3.91, with a minimum score of 0 and a maximum score of 9, with a standard deviation of 3.105. Data on speaking skill has a pre-test mean of 9.655, a minimum score of 5 and a maximum of 15, and a standard deviation of 2.991. The post-test data on speaking skills has a mean of 15.207, a minimum value of 5 and a maximum of 20, and a standard deviation of 4.370. The mean gain score is 5.552, with a minimum score of 0 and a maximum score of 15, with a standard deviation of 4.815.

Table 6. Descriptive statistics of cooperation ability and skills to recognize size concepts

	Pre-Critical thinking	Post-Critical thinking	Gain critical thinking	Pre-Speaking skill	Post-Speaking skill	Gain Speaking skill
Valid	29	29	29	29	29	29
Missing	0	0	0	0	0	0
Mean	10.448	14.379	3.931	3.931	15.207	9.655
Std. Deviation	2.707	2.691	3.105	3.105	4.370	2.991
Minimum	5.000	8.000	0.000	0.000	5.000	5.000
Maximum	17.000	19.000	9.000	9.000	15.000	15.000

The findings shows that toy exploration significantly affects three to four-year-old children's speaking and critical thinking skills at the same time. Toy exploration accounts for 58% of the total variance in speaking and critical thinking skills, with an adjusted R2 value of 0.58. These findings suggest that the toy exploration-based learning strategy promotes the development of two important abilities at the same time in addition to improving individual skills.In line with Piaget's constructivist ideas, toy exploration fosters the growth of speaking and critical thinking through practical experiences. In addition to analyzing problems and coming up with answers, kids who participate in activities like role-playing, puzzle assembly, and constructing block structures also use language to explain and debate their methods. Verbal and cognitive capabilities become closely linked as a result of this interaction. By encouraging children to apply reasoning and analysis, exploration activities help them develop critical thinking abilities. Children must comprehend cause-and-effect linkages and assess different strategies when attempting to solve problems like stacking blocks to make them sturdy. At the same time, kids frequently ask questions, explain their behavior, or talk about tactics with adults or their peers. By increasing their vocabulary and improving their speaking abilities, this improves their educational experience.

Toy exploration speeds up the development of these two abilities, which is explained by Vygotsky's hypothesis of the zone of proximal development (ZPD). Children frequently need minimal assistance from peers or adults during exploratory social interaction activities in order to comprehend new ideas or work through more challenging difficulties. Through discussion and teamwork, this technique improves children's speaking abilities while also strengthening their critical thinking skills. This conclusion is supported by earlier study by Rowe and Weisleder (2018), which demonstrates that children who regularly explore with toys improve their language skills more quickly because they are exposed to a variety of verbal interaction scenarios. Furthermore, educational games like puzzles and blocks aid in the simultaneous development of children's language, analytical skills, and problem-solving abilities, according to research by Trawick-Smith et al. (2020). In role-based toy exploration activities, the relationship between speaking and critical thinking becomes more evident. Children must, for instance, use critical thinking to make decisions in a doctor-patient role-play while also communicating to their peers to justify their actions. Children can naturally combine linguistic and analytical talents because to this process.

CONCLUSION

The findings of this research shows that toys exploration activities has impact on the critical thinking and skills and speaking skills were carried out with a t-test value of cooperation skills with a value of $p < 0.001$, proving that $p < 0.05$ and indicating that there was a difference in gain score between the experimental group and the control group. In the t-test skills to recognize size concepts shows a value of $p < 0.001$, proving that $p < 0.05$ and means there is a difference in gain score between the control group and the experimental group. This means that there is an impact of toys exploration activities on the critical thinking skills and speaking skills in children 3-4 years old.

These result suggest that incorporating toy exploration activities into early childhood education enhance critical thinking and speaking abilities. Educators and curriculum developers might consider integrating such activities to foster these skills effectively at crucial developmental stage. The study's scope may be limited by factors such as the sample size, geographic location, and cultural context, which might affect the generalizability of the findings. Additionally, the study primarily focused on children aged 3-4 years, which may or might not be reflect the impact on other age groups. Future studies should explore the long-term effects of toy exploration activities on cognitive and language development. It would be beneficial to conduct research across diverse populations and settings to validate these findings further. Additionally, investigating the influence of different types of toys and exploration methodologies could offer deeper insights into optimizing educational strategies for young children.

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