

The Influence of the Number Wheel APE on the Pre-mathematics Abilities of 5–6-Year-Old Children at Darul Azkiya Kindergarten

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Abstract

This research is motivated by the still-low pre-mathematics abilities of children aged 5-6 years, especially in recognizing numbers, sequencing numbers, connecting numbers with the number of objects, and doing simple counting activities. This condition indicates the need for the use of learning media that are concrete, interesting, and appropriate to the characteristics of early childhood. This study aims to determine the pre-Mathematics abilities of children aged 5-6 years before and after using the Educational Game Tool (APE) Number Wheel and to determine the effect of using the APE Number Wheel on children's pre-mathematics abilities. This study uses a quantitative approach with a one-group pretest-posttest design. The research subjects were 11 children in Group B at Darul Azkiya Kindergarten. Data collection techniques were carried out through observation and documentation using a pre-mathematics ability observation sheet. Data were analyzed using descriptive statistics, the Shapiro-Wilk normality test, and the t-test. Paired-samples t-test. The results of the study showed an increase in pre-mathematics abilities from the average pretest value of 62,73% become 87,95% on the posttest. The results of the Paired Sample t-Test obtained a significance value of $0,000 < 0,05$, so it can be concluded that there is a significant influence of the use of the APE Number Wheel on the Pre-Mathematics abilities of children aged 5-6 years at KB Darul Azkiya.

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1. INTRODUCTION

Pre-mathematics skills are a crucial aspect of early childhood cognitive development. These skills relate to a child's ability to recognize number symbols, understand the relationship between numbers and the number of objects, and perform simple arithmetic. Mastering number concepts from an early age lays the foundation for a child's understanding of mathematical concepts at a later stage. Therefore, pre-mathematics skills need to be developed through learning activities that are appropriate to the child's developmental characteristics, namely through concrete, active, and enjoyable experiences.

In reality, early childhood number recognition and simple arithmetic skills are still not optimally developed. This problem is evident in some children who have difficulty recognizing number symbols, ordering numbers, and matching numbers to the appropriate number of objects. This condition was also found based on initial observations at the Darul Azkiya Kindergarten, which found that some children aged 5–6 still have difficulty understanding number concepts and simple arithmetic. Learning activities are still dominated by assignments and the limited use of learning media, resulting in children being less active and less interested in participating in learning.

Early childhood learning requires media that can help transform abstract concepts into more concrete ones. One such medium is Educational Play Tools (EPP). EPPs serve not only as play tools but also as learning tools to stimulate children's cognitive development. Using engaging and developmentally appropriate EPPs can create a fun learning environment and increase children's engagement in the learning process.

One of the APEs that can be used to develop pre-mathematics skills is the Number Wheel. This media takes the form of a pinwheel with numbers on it that children can spin. By spinning the pinwheel, naming numbers, matching numbers to objects, and performing simple counting activities, children gain hands-on learning experiences. This allows the concept of numbers, initially abstract, to be understood through concrete and meaningful play.

Several previous studies have shown that the use of concrete learning media and educational games can help develop numeracy skills and number concepts in early childhood. Research by Marliyana, Hayati, and Nurhayati (2025) showed that the Number Wheel media influenced the early numeracy skills of children aged 4–5 years. Other research also shows that the use of engaging and interactive learning media can help children recognize numbers, understand number concepts, and perform simple arithmetic activities.

Although research on the Kincir Angka media has been conducted, this research has a different focus, namely examining pre-mathematics skills of 5–6-year-old children at KB Darul Azkiya through the use of the Number Wheel APE. The skills developed include number symbol recognition, number sensitivity, simple arithmetic operations, and addition and subtraction with the help of concrete objects. This study was conducted to provide an empirical overview of changes in children's pre-mathematics abilities before and after receiving learning using the Number Wheel APE.

Previous studies on the Kincir Angka (Number Wheel) media, such as Marliyana, Hayati, and Nurhayati (2025), have generally been conducted with children aged 4–5 years and have focused on early numeracy in a general sense. A research gap therefore remains regarding how this medium performs with children aged 5–6 years, an age group in which pre-mathematics tasks are more complex, encompassing not only number recognition but also number-object correspondence and simple addition and subtraction. The novelty of the present study lies in its specific focus on this older pre-school age group at KB Darul Azkiya, an institution that has not previously been the subject of Kincir Angka research, and in its use of a structured eight-meeting treatment to capture the developmental trajectory of pre-mathematics ability rather than a single-session intervention.

Based on this description, this study aims to determine the pre-Mathematics abilities of children aged 5–6 years before and after using the APE Number Wheel and to determine the effect of using the APE Number Wheel on the Pre-Mathematics abilities of children aged 5–6 years at KB Darul Azkiya.

2.METHOD

This research uses an approach quantitative by type of research pre-experimental design and design none-group pretest-posttest. The research design was carried out by providing a pretest before treatment and a posttest after treatment to determine changes in children's pre-mathematics abilities after using the Kincir Angka APE.

The research was conducted in Darul Azkiya Family Planning, Sukadana Village, Terara District, East Lombok Regency. The research population was all children in group B, totaling 11 children, consisting of 4 boys and 7 girls. The research sample used saturated sampling, so all members of the population, totaling 11 children, were used as research samples.

The research instruments used were: Pre-Mathematics Ability Observation Sheet and documentation. Observations were conducted during the pretest and posttest stages to obtain data on children's pre-math abilities. Documentation was used to obtain supporting data in the form of children's activity results and documentation during the learning process.

Data analysis techniques were carried out through descriptive statistical analysis, normality test, and hypothesis test. Pre-math ability data were analyzed as percentages. A normality test was used to determine the data distribution before hypothesis testing. Based on the results of the research analysis, the pretest and posttest data were normally distributed, so hypothesis testing was conducted using Paired Sample t-Test with the help of SPSS. Decision-making is carried out at the significance level 0,05.

The treatment was carried out over eight meetings, each lasting approximately 30–35 minutes and conducted three times a week. Meetings 1–2 focused on introducing and naming number symbols 1–10 using the Number Wheel; meetings 3–4 emphasized matching numbers to the corresponding number of concrete objects; meetings 5–6 introduced simple addition using objects placed on the wheel; and meetings 7–8 introduced simple subtraction and a review activity combining all previously learned skills. Each meeting followed the same structure: opening and apperception (5 minutes), core activity using the Number Wheel APE (20–25 minutes), and closing reflection (5 minutes). This structured sequence was designed to allow the observation sheet to capture incremental changes in children's pre-mathematics ability across the treatment period.

3. RESULTS AND DISCUSSION

a. Research result

The research results were obtained from measuring children's pre-mathematics abilities before and after being given treatment using the APE Kincir Angka (number wheel) method. The research was conducted on 11 children aged 5–6 years at KB Darul Azkiya, with a *one-group pretest-posttest* Treatment was given in eight meetings, which included activities to recognize number symbols, connect number symbols with the number of objects, and perform simple arithmetic operations, as well as addition and subtraction using concrete objects.

Observation results show an increase in pre-mathematics abilities after treatment. At the pretest stage, the total score obtained by all children is 276, with an average percentage of 62,73%, which is included in the category Developing as Expected (BSH). After being treated using the APE Spinning Wheel, the total score increased to 387, with an average percentage of 87,95%, which is included in the category Very Well Developed (BSB).

In descriptive statistics, the pretest score has a minimum value of 17, maximum 29, mean 25,09, and a standard deviation of 4,011. Meanwhile, the posttest score has a minimum value of 30, a maximum of 38, a mean 35,18, and a standard deviation 3,027. Thus, the average pre-mathematics ability score increased by 10.09 points after being given treatment.

Next, the normality test was carried out using Shapiro-Wilk. The results show a pretest significance value of 0.159 and a posttest of 0,055. Both values are greater than 0.05, so the pretest and posttest data are declared normally distributed.

Since the data are normally distributed, hypothesis testing is carried out using a paired-sample t-test. The test results obtained a value of Mean Difference; the significance value is $0.000 < 0.05$, H_0 is rejected, and H_1 is accepted. Thus, there is a significant influence of the use of the APE Kincir Angka on the Pre-Mathematics abilities of children aged 5–6 years at KB Darul Azkiya.

b. Discussion

Improving pre-mathematics skills improved from 62.73% to 87.95%. The results showed that the use of the APE Number Wheel can help children develop their number recognition and simple arithmetic skills. This improvement was also confirmed by the results of the paired-samples t-test with a significant value $0.000 < 0.05$, so the changes in abilities that occurred before and after treatment showed significant differences.

This improvement is related to the characteristics of the Number Wheel APE, which provides children with opportunities to learn through hands-on play. During the activity, children not only receive explanations from the teacher but also participate in turning the wheel, naming the resulting numbers, connecting numbers to the number of objects, and

counting using concrete objects. These activities provide a more concrete and interactive learning experience for children.

The results of this study are in line with research by Marliyana, Hayati, and Nurhayati (2025), which shows that the number wheel media affects the early arithmetic skills of children aged 4–5 years. The study also used a paired-sample t-test and obtained results that showed the influence of the Number Wheel media on children's counting abilities.

Viewed through the lens of child development theory, this improvement can be explained by Piaget's concept of the preoperational-to-concrete-operational transition, in which children aged 5–6 begin to grasp number conservation and simple logical operations more readily when concepts are anchored in tangible, manipulable objects rather than verbal explanation alone (Noviana, 2025). The Number Wheel APE provides exactly this kind of concrete anchor, allowing children to physically act on numbers rather than merely receive them abstractly. The findings are also consistent with Vygotsky's sociocultural theory, particularly the notion of the zone of proximal development: during the activity, the teacher's guidance in operating the wheel and prompting children to name and match numbers functioned as scaffolding that gradually shifted toward independent performance across the eight meetings. This suggests that the effectiveness of the Number Wheel APE is not solely a function of the medium's concreteness but also of the structured social interaction embedded in its use, and this interaction warrants closer examination in future research.

Thus, the results of this study reinforce previous findings that engaging, concrete, and play-based learning media can be an alternative for developing children's early math skills. The Kincir Angka (Ranking Numbers) APE provides children with the opportunity to gain hands-on learning experiences, making learning numbers and simple arithmetic more engaging, interactive, and meaningful.

4. CONCLUSION

Based on the results of the study, it can be concluded that there is a significant effect of the use of the Kincir Angka APE on the pre-mathematics ability of children aged 5–6 years at KB Darul Azkiya (significance value $0.000 < 0.05$), and that this medium is a viable learning tool for improving children's number recognition and simple counting skills. For future research, it is recommended that subsequent studies employ a control-group design and a larger sample to strengthen the generalizability of these findings, and that they examine the sustained, longer-term effects of Number Wheel-based learning on children's pre-mathematics ability beyond the immediate post-treatment period.

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6. BIBLIOGRAPHY

- Ahlul Jannah, U. A. S., Hasanah, M., Namilah, I., Firmansyah, R., & Makki, M. I. (2025). Inovasi pembelajaran anak usia dini melalui media Kincir Ria Matematika di TK At-Tien Sumber Gayam Pamekasan. *Ardhi: Jurnal Pendidikan Anak Usia Dini*, 3(4), 68–76. <https://doi.org/10.61132/ardhi.v3i4.1409>
- Arumsari, A. D., Setyawan, D., & Dzulkifli, D. (2024). Peningkatan perkembangan kognitif anak usia dini (AUD) melalui alat permainan edukatif (APE) papan berhitung. *Mulawarman: Jurnal Pendidikan Anak Usia Dini*, 7(2), 164–170. <https://doi.org/10.31293/mv.v7i2.8314>

- Asmathul, A., & Rahmi, P. (2025). Penerapan alat permainan edukatif papan berhitung untuk meningkatkan kemampuan berhitung anak di PAUD Ceria. *Jurnal Citra Pendidikan Anak*, 8(2), 587–600. <https://doi.org/10.31326/jcpaud.v8i2.2406>
- Diyenti, A. K. (2021). Meningkatkan minat mengenal konsep bilangan melalui metode bermain alat manipulatif. *Jurnal Family Education*, 1(1). <https://doi.org/10.24036/jfe.v1i4.11>
- Febrisia, T., & Hardianto. (2023). Perkembangan *Bosy Book* untuk meningkatkan kemampuan berhitung pada anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 7(4), 4741–4751. <https://doi.org/10.31004/obsesi.v7i4.4837>
- Humaida, R. T., & Suyadi. (2021). Pengembangan kognitif anak usia dini melalui penggunaan media game edukasi digital berbasis ICT. *Aulad: Journal on Early Childhood*, 4(2), 78–87. <https://doi.org/10.31004/aulad.v4i2.98>
- Indriana, N., Oktari, R., & Putri, R. F. (2025). Upaya meningkatkan kemampuan berhitung anak PAUD melalui media memancing angka. *Jurnal Citra Pendidikan Anak*, 4(1), 15–21.
- Kamtini, & Aprian, K. (2023). Kegiatan pembelajaran sains terhadap perkembangan kognitif anak usia 5–6 tahun. *Paedagogi: Jurnal Anak Usia Dini dan Pendidikan Anak Usia Dini*, 9(2), 241–252. <https://doi.org/10.24114/paedagogi.v9i2.49931>
- Marliyana, D., Hayati, S., & Nurhayati, I. (2025). Pengaruh media Kincir Angka terhadap kemampuan berhitung permulaan pada anak usia 4–5 tahun di TK PGRI Cilegon. *Incrementapedia: Jurnal Pendidikan Anak Usia Dini*, 7(2), 26–31. <https://doi.org/10.36456/incrementapedia.vol7.no2.a10709>
- Nafsia, A., Gulo, O., & Meo, M. V. (2025). Implementasi permainan Kincir Angka dalam meningkatkan kemampuan mengenal angka anak usia 5–6 tahun di TKN Dolumolo. *Jurnal Citra Pendidikan Anak*, 4(3), 316–324. <https://doi.org/10.38048/jcpa.v4i3.4353>
- Noviana, D. (2025). Perkembangan kognitif anak usia dini dalam perspektif Jean Piaget dan Lev Vygotsky. *Jurnal Pelayanan Bimbingan dan Konseling*, 8(2), 80–88. <https://doi.org/10.20527/jpbk.2025.8.2.17001>
- Rahmadhani, E., & Surbakti, A. H. (2022). Analisis kemampuan berpikir logis anak usia dini melalui permainan Montessori. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(5), 5079–5090. <https://doi.org/10.31004/obsesi.v6i5.1894>
- Royani, I., & Suryana, D. (2023). Peningkatan kemampuan konsep bilangan melalui bermain ular tangga pada anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 7(1), 17–26. <https://doi.org/10.31004/obsesi.v7i1.3480>
- Saudia, B. E. P., & Wardani, W. (2022). Pengaruh stimulasi APE Magic Book terhadap perkembangan kognitif anak prasekolah. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(6), 7214–7222. <https://doi.org/10.31004/obsesi.v6i6.2324>
- Setianingrum, I., & Azizah, N. (2022). Teams Games Tournament untuk meningkatkan kemampuan mengenal lambang bilangan pada anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(1), 315–327. <https://doi.org/10.31004/obsesi.v6i1.1268>
- Sipahutar, R. J., Simatupang, D., & Situmorang, S. M. A. (2023). Stimulasi kognitif anak usia dini melalui pemrograman komputer menggunakan ScratchJr. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 7(6), 7464–7475. <https://doi.org/10.31004/obsesi.v7i6.4682>
- Sitorus, A. S., & Yunus, I. (2025). Pembuatan alat permainan edukatif Tikar Pelangi. *JERKIN: Journal of Education Research and Innovation*, 4(1), 3728–3738. <https://doi.org/10.31004/jerkin.v4i1.1931>
- Sombo, O., Ene, A., Meno, O., et al. (2026). Implementasi media Kincir Angka pada anak usia 4–5 tahun pada perkembangan aspek kognitif di TKK Negeri Bogenga. *Jurnal Citra Multidisiplin*, 1(2), 187–196. <https://doi.org/10.38048/jcm.v1i2.6598>