Jurnal Orthopaedagogia **P-ISSN: 2301-7317**

Volume 3 Nomor 4 Tahun 2025

The Effect of Number Wheel Learning Media on Improving Number Recognition Skills in Fourth Grade Students with Intellectual Disabilities at SLB Bhina Putera Surakarta in the 2024/2025 Academic Year

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Article History
accepted 10/02/2025 approved 15/4/2025 published 20/10/2025

ABSTRAK

Anak tunagrahita adalah anak yang memiliki intelegensi dibawah rata-rata sehingga berdampak pada akademik dan kesulitan dalam menjalani aktivitas. Peserta didik tunagrahita membutuhkan media dan metode yang sesuai untuk mengenal angka. Maka dari itu, media pembelajaran kincir angka mampu menjadi alternatif dalam mengatasi permasalahan tersebut. Penelitian ini bertujuan untuk mengetahui pengaruh media pembelajaran kincir angka terhadap peningkatan kemampuan mengenal angka peserta didik tunagrahita kelas IV di SLB Bhina Putera Surakarta tahun ajaran 2024/2025. Penelitian ini adalah penelitian kuantitatif dengan desain preeksperimental one-group pretest-posttest design. Teknik sampling yang digunakan adalah sampel jenuh dengan jumlah subjek 6 peserta didik. Instrumen yang digunakan berupa tes tertulis. Validitas diuji menggunakan validitas isi dengan formula Aiken's V dan uji Reliabilitas menggunakan konsistensi internal dengan formula KR-20. Penelitian ini menggunakan teknik analisis data deskriptif dan inferensial dengan aplikasi SPSS versi 25. Hasil rata-rata nilai pretest, yaitu 35 meningkat menjadi 83,33 pada posttest. Analisis data inferensial menggunakan metode non parametrik dengan uji Wilcoxon Signed Rank Test, menghasilkan nilai Z sebesar -2.214 dan Asymp. Sig (2-tailed) sebesar 0,027 dengan taraf signifikansi 0,05. Kesimpulan penelitian ini adalah media pembelajaran kincir angka terbukti berpengaruh signifikan terhadap peningkatan kemampuan mengenal angka pada peserta pada peserta didik tunagrahita kelas IV di SLB Bhina Putera Surakarta tahun ajaran 2024/2025.

Kata kunci: *Media Pembelajaran Kincir Angka, Kemampuan Mengenal Angka, Peserta*

ABSTRACT

Children with intellectual disabilities are children who have below-average intelligence, which affects their academic performance and causes difficulties in carrying out activities. Students with intellectual disabilities need appropriate media and methods to learn numbers. Therefore, number wheel learning media can be an alternative in overcoming this problem. This study aims to determine the effect of number wheel learning media on improving the ability to recognize numbers among fourth-grade students with intellectual disabilities at SLB Bhina Putera Surakarta in the 2024/2025 academic year. This study is a quantitative study with a pre-experimental one-group pretest-posttest design. The sampling technique used is a saturated sample with a total of six students. The instrument used was a written test. Validity was tested using content validity with Aiken's V formula and reliability was tested using internal consistency with the KR-20 formula. This study used descriptive and inferential data analysis techniques with SPSS version 25. The average pretest score of 35 increased to 83.33 on the posttest. Inferential data analysis used a non-parametric method with the Wilcoxon Signed Rank Test, resulting in a Z value of -2.214 and Asymp. Sig (2-tailed) of 0.027 with a significance level of 0.05. The conclusion of this study is that the number wheel learning media has a significant effect on improving the ability to recognize

numbers in students with intellectual disabilities in grade IV at SLB Bhina Putera Surakarta in the 2024/2025 academic year.
Keywords: *Number Wheel Learning Media, Number Recognition Ability, Students with Intellectual Disabilities*

INTRODUCTION

Children with special needs are children who have limitations or exceptionalities in their development process, whether physically, mentally, intellectually, socially, or emotionally. According to Khairunnisa (2018), children with special needs are a condition that differs from the average child in general. According to Pitaloka (2022), the classification of children with special needs includes the blind, deaf, physically disabled, speech impaired, autistic, emotionally disturbed, mentally retarded, and gifted children. According to Khairunnisa (2018), mentally retarded children are children who have below-average intelligence, which affects their academic performance and causes difficulties in carrying out activities.

According to Apriyanto in Maranata, et al. (2023), intellectually disabled children face obstacles in cognitive development and adaptive behavior in their daily lives. As a result of these conditions, intellectually disabled children experience difficulties in academic learning (language and mathematics). One aspect of cognition that needs to be learned so that it can be applied in daily life and facilitate learning to count is numbers. The National Association for Education of Young Children (2021) argues that recognizing numbers is very important for developing numerical literacy, logical and critical thinking, and increasing children's confidence in facing demands at school. This opinion is reinforced by Khoiriyyah (2018), who argues that the ability to recognize numbers is very important because it is the basic foundation of mathematics.

In practice, students with intellectual disabilities need appropriate media and methods to learn numbers because they have difficulty understanding abstract concepts. Therefore, concrete objects, easy-to-understand language, a pleasant atmosphere, and interesting learning media are needed so that the material can be easily absorbed. Based on observations conducted at Bhina Putera Special School in Surakarta, it was found that six fourth-grade students with intellectual disabilities had difficulty remembering, pointing, counting, sequencing, and writing numbers 1 to 20 correctly. This is due to the lack of innovative learning media in schools. As a result, teachers find it difficult to teach advanced mathematics material such as arithmetic, so that the students' mathematics scores are low and do not meet the Minimum Completion Criteria (KKM). Therefore, appropriate measures are needed to overcome this problem. The use of number wheel learning media can be an alternative in overcoming this problem.

Based on research conducted by Yustika (2024), interactive learning media can help improve cognitive abilities and memory in students with intellectual disabilities. Research by Geme, et al. (2024) and Harpini (2024) also shows that number wheels are one type of educational game that can help students learn numbers. Research by Pragesti & Budi (2024) reinforces this opinion by stating that rainbow wheel media is effective in improving the ability to recognize numbers in children with low intellectual abilities because this media is attractive and colorful, making it easy for children to understand and more enthusiastic about learning. Thus, the number wheel learning media is a learning media that can improve number recognition skills, increase enthusiasm and motivation to learn among students because of its attractive form and provides a direct experience when spinning the wheel.

Based on the above background, the researcher was interested in studying the use of number wheel learning media among fourth-grade students with intellectual disabilities at SLB Bhina Putera Surakarta. This research provides novelty in terms of the subject and scope of material used in the research. The research question is: Does

the use of number wheel learning media affect the improvement of number recognition skills in fourth-grade students with intellectual disabilities at SLB Bhina Putera Surakarta in the 2024/2025 academic year? Therefore, the purpose of this study is to determine the effect of using number wheel learning media on improving number recognition skills among fourth-grade students with intellectual disabilities at SLB Bhina Putera Surakarta in the 2024/2025 academic year. This study is also expected to contribute to guiding teachers and schools in determining the appropriate alternative learning media for students with intellectual disabilities in improving their number recognition skills.

METHOD

This study used a quantitative approach with a preexperimental one-group pretest-posttest design (Sugiyono, 2023). The variables in this study were independent variables, such as the number wheel learning media, and dependent variables, such as the ability to recognize numbers. The sample studied in this research consisted of all six students with intellectual disabilities in grade IV at SLB Bhina Putera Surakarta, using a saturated sampling technique. This study used a data collection technique in the form of a written test consisting of 10 mathematics questions, with scores calculated using the following formula:

$$Score = \frac{Obtained\ Score}{Maximum\ Score} \times 100$$

The assessment formula in this study, according to Azwar (2021), is as follows:

Table 1. Assessment Criteria

Formula	Category
X ≤ μ - 1,5 σ	Very Low
μ - 1,5 σ < X ≤ μ - 0,5 σ	Low
μ - 0,5 σ < X ≤ μ + 0,5 σ	Moderate
μ + 0,5 σ < X ≤ μ + 1,5 σ	High
X > μ + 1,5 σ	Very High

This research instrument uses two assessment categories, namely Azwar's theory (2021) and the Minimum Passing Criteria (KKM) determined by SLB Bhina Putera Surakarta. The assessment categories according to Azwar (2021) are as follows:

Table 2. Assessment Categorization

Value Range	Category
<30	Very Low
31 – 45	Low
46 – 65	Moderate
66 – 80	High
>80	Very High

Meanwhile, the minimum passing grade criteria determined by SLB Bhina Putera Surakarta for mathematics is 65. This study used content validity testing, which was then validated by experts and Aiken's V formula, while reliability testing used internal

consistency testing using the KR-20 formula. The data analysis technique used is descriptive and inferential statistical analysis with a non-parametric method using the Wilcoxon Signed Rank Test with the SPSS version 25 application.

RESULTS AND DISCUSSION

This study was divided into three stages: a pretest, followed by the intervention or treatment, and finally a posttest. The pretest in this study was conducted once on Friday, May 16, 2025, followed by eight interventions, and a posttest once on Wednesday, May 28, 2025.

Pretest

The pretest was conducted to determine the subjects' ability to recognize numbers 1 to 20 before being given intervention or treatment. The following are the pretest results:

Table 3. Pretest Scores

No.	Nama / Inisial	Nilai *Pretest*	Kategori
1.	AD	20	Very Low
2.	AL	60	Moderate
3.	BM	30	Very Low
4.	JF	20	Very Low
5.	RF	20	Very Low
6.	SM	60	Moderate
Rata-rata nilai *pretest*		**35**	**Rendah**

Based on Table 3, the average score obtained from six students with intellectual disabilities in grade IV at SLB Bhina Putera Surakarta was 35. The highest pretest score was 60, and the lowest score was 20.

Intervention or Treatment

The intervention in this study was divided into eight sessions, as follows:
Session 1: The researcher gave a general introduction to the number wheel learning media. Session 2: The researcher again explains the numbers on the number wheel learning media. Then the students spin the number wheel again and say the numbers that appear in the holes on the number wheel.
Session 3: Students try the number wheel learning media and write down the numbers before and after the numbers that appear on the number wheel media.
Session 4: Students spin the number wheel again and write down the numbers that appear in the holes on the blackboard.
Session 5: After spinning the number wheel, students are asked to write down the numbers that appear in the holes on the blackboard.
Session 6: Students perform all activities, namely spinning, counting the numbers that appear in the holes of the number wheel, writing down the numbers before and after the numbers that appear, and writing down the numbers on the board in the correct order.
Session 7: Students recall and are reinforced to further understand the material.
Session 8: Students are reinforced with light practice questions before taking the post-test.

Posttest

The posttest aims to determine the effect of the intervention, namely the number wheel learning media, on improving the ability to recognize numbers 1 to 20. The following are the posttest scores:

Table 4. Posttest Score Data

No.	Nama / Inisial	Nilai *Posttest*	Kategori
1.	AD	80	High
2.	AL	100	Very High
3.	BM	80	High
4.	JF	70	High
5.	RF	80	High
6.	SM	90	Very High
Rata-rata nilai *posttest*		83,33	Very High

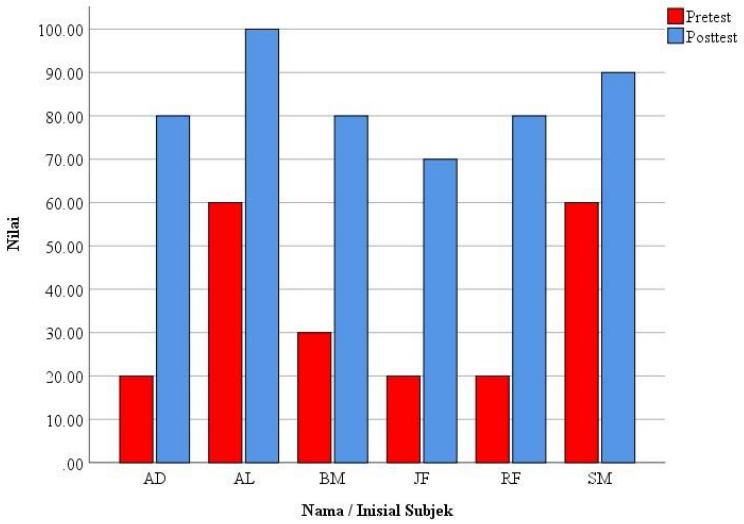
Based on Table 4, the average score obtained from the six subjects was 83.33. The highest posttest score was 100, and the lowest posttest score was 70.

Comparison of Pretest and Posttest Scores

The comparison of pretest and posttest scores is used to compare the scores obtained before and after the intervention. The following table shows the comparison of pretest and posttest scores:

Table 5. Comparison of Pretest and Posttest Scores

No.	Name / Initials	Pretest Score	Posttest Score	Difference
1.	AD	20	80	60
2.	AL	60	100	40
3.	BM	30	80	50
4.	JF	20	70	50
5.	RF	20	80	60
6.	SM	60	90	30



Picture 1. Histogram of Pre-test and Post-test Score Comparison

Table 5 and Picture 1 show that there was a difference in the scores of grade IV students with intellectual disabilities before and after receiving 8 interventions in the form of number wheel learning media, reflecting an increase in pre-test and post-test scores.

Hypothesis Test Results

The data analysis technique in this study used the Wilcoxon Signed Rank Test to determine the difference in students' abilities before and after receiving intervention in the form of number wheel learning media. The following are the results of the Wilcoxon Signed Rank Test analysis:

Table 6. Data Analysis with the Wilcoxon Sign Rank Test

Ranks

		N	Mean Rank	Sum of Ranks
Posttest – Pretest	Negative Ranks	0[a]	.00	.00
	Positive Ranks	6[b]	3.50	21.00
	Ties	0[c]		
	Total	6		

a. Posttest < Pretest
b. Posttest > Pretest
c. Posttest = Pretest

Based on Table 6, it can be seen that the negative ranks in N, mean rank, and sum of ranks are 0, which means that none of the research subjects experienced a decline in their scores. The positive ranks in N show a number of 6, which means that all 6 research subjects experienced an increase in their scores on the posttest compared to the pretest. Ties in the table above show a number of 0 in N, which means that no subjects received the same score on the pretest and posttest. The number 3.50 in the mean rank table indicates an increase in the average score of the subjects by 3.50, and 21.00 in the sum of ranks table.

Picture 7. Statistical Analysis Results

Z	-2.214[b]
Asymp. Sig. (2-tailed)	.027

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

Based on Table 7, the Wilcoxon Signed Rank Test (Z) value is -2.214 and the significance value or Asymp. Sig (2 tailed) is 0.027 with a significance level (α) of 0.05. Because the significance value is less than 0.05, H0 is rejected and Ha is accepted. The significant difference between the pretest and posttest scores shows that the number

wheel learning media has a positive effect on improving the ability to recognize numbers in fourth-grade students with intellectual disabilities at SLB E Bhina Putera Surakarta. The number wheel media is able to make students enthusiastic about participating in learning and playing with the number wheel in turns. This is in line with the opinion of Geme et al. (2024), who stated that a game-based learning approach is considered more enjoyable and provides direct experience to students. The number wheel is also effective in supporting children's cognitive development. Similar research was also conducted by Pragesti & Budi (2024), which showed that rainbow wheel media can be used effectively to improve number recognition skills in students with low intelligence (intellectually disabled). Rainbow wheels are a medium similar to the number wheel media used in this study.

Learning activities to recognize numbers using number wheel learning media make students actively involved cognitively and motorically during learning. This is in line with Nabila's (2023) opinion that by combining visual elements, pattern recognition, fine motor development, active involvement, as well as motivation and enjoyment, number wheel games can be an effective tool in improving counting skills. The number wheel learning media can also improve social skills, make students more focused during number learning, and increase the learning motivation and ability of students with intellectual disabilities in recognizing numbers 1 to 20.

CONCLUSION

Based on the results and data analyzed and described in the previous chapters, it can be concluded that the use of number wheel learning media has an effect on improving the ability to recognize numbers in fourth-grade students with intellectual disabilities at SLB Bhina Putera Surakarta in the 2024/2025 academic year. The results of this study provide theoretical implications as reference material regarding the use of number wheel learning media and reinforce constructivist learning theory and theory regarding the function of learning media. This study also provides practical implications for the ease of learning to recognize numbers 1 to 20 and increasing the enthusiasm of students with intellectual disabilities. Number wheel media can also be an alternative for teachers in teaching mathematics to recognize numbers 1 to 20. This study also provides suggestions for teachers to be able to utilize the number wheel as an alternative learning media and to be able to develop the number wheel. Future researchers are advised to develop this study by expanding the research subjects and developing the number wheel using stronger and more durable materials, so that the number wheel is more durable and not easily damaged when used.

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