



Effectiveness of Mentessori Multiplication Board Learning Media to Improve the Ability to Multiply 1-10 for Cerebral Palsy Children

Nadya Nurhasanah¹, Nurhastuti², Mega Iswari³, Damri⁴

¹ (Department Pendidikan Luar Biasa, Universitas Negeri Padang, Indonesia).

² (Department Pendidikan Luar Biasa, Universitas Negeri Padang, Indonesia).

³ (Department Pendidikan Luar Biasa, Universitas Negeri Padang, Indonesia).

⁴ (Department Pendidikan Luar Biasa, Universitas Negeri Padang, Indonesia).

* Corresponding Author. E-mail: ¹nadyanurhasana616@gmail.com

Receive: 11/01/2024

Accepted: 21/02/2024

Published: 01/03/2024

Abstrak

Penelitian ini dilatar belakangi dari permasalahan yang peneliti temukan di SLB N 1 Lima Kaum. Seorang peserta didik *Cerebral Palsy* yang masih belum maksimal dalam perkalian 1-10. Penelitian ini bertujuan untuk meningkatkan kemampuan perkalian bilangan 1-10 dengan menggunakan Media pembelajaran *Mentessori Multiplication Board*. Peneliti menggunakan jenis penelitian kuantitatif dengan pendekatan eksperimen dalam bentuk Single Subject Research (SSR). Dengan desain A-B-A. Data dianalisis dengan analisis visual grafik. Teknik dalam pengumpulan data berupa tes dan alat pengumpulan data soal tes. Subjek dari penelitian yaitu peserta didik *Cerebral Palsy* di kelas VIII SLB N 1 Lima Kaum. Hasil Penelitian menunjukkan bahwa media pembelajaran *mentessori multiplication board* efektif digunakan untuk meningkatkan kemampuan perkalian 1-10.

Kata Kunci: *Media pembelajaran Multiplication Board, Perkalian 1-10, Cerebral Palsy*

Abstract

This research was motivated by problems that researchers found at SLB N 1 Lima Kaum. A Cerebral Palsy student who is still not optimal in multiplication 1-10. This research aims to improve the ability to multiply numbers 1-10 using the Mentessori Multiplication Board learning media. Researchers use quantitative research with an experimental approach in the form of Single Subject Research (SSR). With A-B-A design. Data was analyzed using graphic visual analysis. Techniques for collecting data include tests and data collection tools for test questions. The subjects of the research were Cerebral Palsy students in class VIII SLB N 1 Lima Kaum. The research results show that the Mentessori multiplication board learning media is effectively used to improve the ability to multiply 1-10.

Keywords: *Multiplication Board learning media, Multiplication 1-10, Cerebral Palsy.*

Introduction

Physical impairment is a child who experiences obstacles to his movement system so that he needs special assistance to move around. This occurs during the prenatal, natal and postnatal periods (Nurhastuti & Budi, 2021). Physical impairment is another term for physical disability, various body deformities that result in abnormalities in the function of the body to carry out the necessary movements. Certain types of children with physical impairments are also accompanied by post-sensory disorders and intelligence disorders (Nurhastuti, 2019). These movement barriers or abnormalities are caused by congenital neuromuscular and bone structure disorders, disease or injury, such as cerebral palsy, polio, amputation and paralysis (Setyaningsih et al., 2014). Children with physical impairments have growth and development disorders in childhood, adolescence and adulthood and development of genetic potential is not appropriate. Most disabled children experience many motor disorders and academic disorders which will hinder the learning of disabled children (Jusriani, 2022). To overcome problems in children's learning, it must be implemented optimally. The conditions of obstacles experienced by children with physical impairments cause difficulties in completing activities that use body parts and mobility (Respati, 2021).

Cerebral Palsy is an obstacle that occurs in muscles, movement and body coordination. Children with Cerebral Palsy are an obstacle that causes very complex brain damage. Damage to children with cerebral palsy occurs at birth and after birth (Nurhastuti, 2019). Cerebral palsy (CP) is a disorder of motor development which results in difficulty in daily movement (Ardisal et al., 2019). Cerebral palsy is a type of physical and motor impairment. Students who experience cerebral palsy have motor limitations caused by brain damage. As a result, daily activities are hampered, such as walking, talking, or

carrying out other physical tasks (Taufan et al., 2018).

Cerebral Palsy children who experience physical and intellectual disorders will find it difficult to master counting skills because the child experiences abnormalities in their motor skills and intelligence (Sakti, 2020). Cerebral Palsy children's limited ability to carry out activities causes children to have consequences for their difficulties in following academic lessons, including mathematics lessons, in this case multiplication (Jusriani, 2022). With the rapid progress of science and technology, humans must continuously update their knowledge and skills. This knowledge and skills are mostly obtained through multiplication calculations (Ahudulu, 2020). Parents play a very important role in the independence of Cerebral Palsy children and can find out the child's potential (Nurhastuti et al., 2022). For this reason, the obstacles experienced by Cerebral Palsy children require the role of parents to be able to maximize learning, one of which is mathematics learning (Nurhastuti et al., 2019).

Good skills in understanding basic mathematical concepts need to be understood from childhood. If these abilities are not optimal, then the child will certainly have difficulty in the next material. For example, the addition operation. If he cannot understand multiplication 1-10, it will affect the more difficult level (Mahdi et al., 2018). One of the materials in learning mathematics arithmetic operations is the multiplication arithmetic operation (Sari & Iswari, 2019).

Counting consists of addition, subtraction and multiplication. The material calculated is the basic abilities that are expected to be mastered in the next material. This material is basic learning material, so when providing it it must also be in accordance with the students' abilities. (Iswari & Nurhastuti, 2000). Multiplication is the mathematical operation of multiplying one number by another number

(Maulana et al., 2020). This operation is one of the four basic operations in elementary arithmetic (the others are addition, subtraction, and division). Multiplication is a short and easy way to write and do addition (Rahmawati & Sari, 2022). It can be interpreted that multiplication is a sum written briefly. For example, 4 times 2 means 2 plus 2 plus 2 plus 2 or 4 2s added together. In everyday life when taking medication written in a doctor's prescription, for example taking medication 2 times a day means 1 in the morning plus 1 in the afternoon, in mathematical language 1 plus 1 or 2 times 1. Multiplication is a mathematical operation of calculating one number with another number. Simply put, multiplication is repeated addition (Yuliana, 2016).

Based on a preliminary study that was carried out at SLB Negeri 1 Lima Kaum, first the author made observations by interviewing class teachers and found students who experienced obstacles in learning, namely students with the initials A in class VIII. The problem with these students is, firstly, it is difficult for the students to understand the material given by the teacher when studying in class, secondly for their writing skills, if children are asked to write they are very slow or slow because their hands are stiff so they have difficulty holding a pencil or pen, thirdly for the counting operation of multiplication 1-10 he can already say how to multiply numbers, he still makes mistakes in multiplying, for example the numbers 1×1 , 1×2 , 1×3 , he can, but in higher questions the value of the numbers is like 7×8 , 8×6 , 8×9 , 9×7 , he was already dizzy himself. For the methods and media used by teachers regarding student problems, namely always repeating the multiplication material and for the multiplication media itself, namely the multiplication smart board, or you can also add using a stick or abacus and usually the students are the ones who prepare for learning multiplication and for the media.

Learning to read usually uses a blackboard or directly in students' books.

The author conducted an assessment of fine motor development on student A and found that the student had difficulty performing fine motor movements of the right hand. When the left hand writes, the right hand cannot be placed on the table, the child's left hand cannot make heavy movements, but the child is still able to grasp and shake hands when he can't lift, and the child's left hand can still be used like a person. In general and for activities that involve two hands children need help such as scissors and lifting chairs.

The author carried out an assessment related to multiplication of numbers 1-10 starting from multiplication of sequential numbers to multiplication of random numbers and obtained the results that student A scored low on the questions that had been given. This is because the student has difficulty remembering the material that has been explained and has difficulty understanding it. When the author conducted an assessment on the students, the parents of the participants were taught to say that the children had difficulty remembering multiplication questions or had difficulty remembering high numbers. For this reason, a solution is needed to overcome this problem so that students have adequate abilities to solve multiplication problems.

From the student problems described previously, the author provides a solution to improve the ability to multiply numbers 1-10 through the Montessori Multiplication Board learning media (Saputro & Nikmah, 2023). This learning media has various elements such as a multiplication question board, a multiplication question answer board. The advantages of the Montessori Multiplication Board learning media are that it has an attractive shape, trains children's memory, stimulates children to think with existing answers (Saputro & Nikmah, 2023). From this solution, the

author made material for research and entitled The Effectiveness of Montessori Multiplication Board Learning Media to Improve Multiplication 1-10 for Children with Physical Impairment (Single Subject Research in Class VIII SLB Negeri 1 Lima Kaum).

Method

The research approach used is quantitative with the Single Subject Research (SSR) type of research. SSR is used as an experimental design that examines the causal relationship between variables. The choice of this type of research is adapted to the research objective of determining the effectiveness of an independent variable in the form of intervention (Mentessori Multiplication Board Learning Media) on the dependent variable of the behavioral target to be achieved (Multiplication Ability 1-10) by providing intervention repeatedly, one by one on the sub variables (Marlina, 2021). In this research, SSR is used to display individual differences in students regarding their ability to multiply 1-10 obtained using the Mentessori Multiplication Board learning media, because the analysis used in SSR uses individual data analysis.

The A-B-A design in this Single Subject Research (SSR) research is divided into 3 stages, namely the research design used is a revelation design type A-B-A. This research design was used because there is strengthening evidence that the intervention (treatment) provided has had a positive impact on the target behavior that will be achieved. In this design, at the basal level (A1) stage, the researcher carries out initial measurements of the students' ability to multiply 1-10 (target behavior) before being given treatment/intervention from the researcher continuously and within the specified time. Then, in stage (B) students are given treatment by applying the Mentessori Multiplication Board learning media in their learning activities. After the treatment has been given, the stages in the

baseline (A2) are given to measure/validate the achievement of the 1-10 multiplication ability (target behavior) achieved by students using the Mentessori Multiplication Board (treatment) learning media provided. Baseline (A2) as a control to determine the conclusion of the intervention given regarding changes related to the ability to Multiply 1-10 (target behavior) after being given treatment (Kratochwill, 2013).

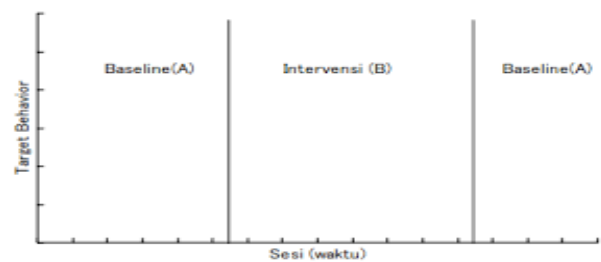


Figure 1 Graph of research procedures
Single Subject Research (SSR)

Result and Discussion

In the research, which was carried out in 15 meetings, there were 3 stages to obtain data, namely: baseline 1 (A1) was carried out in 4 meetings, (B) intervention was carried out in 8 meetings, and (A2) baseline 2 was carried out in 3 meetings.

Baseline 1 (A1) data was obtained from observations of students with cerebral palsy in their ability to multiply numbers 1-10. In the Baseline condition, it was carried out 4 times with percentages of 10%, 20%, 20%, 20% with 3 assessment aspects: saying, answering, writing. As for Intervention (B), it was carried out 8 times with percentages of 40%, 50%, 70%, 70%, 80%, 90%, 90%, 90%. Finally, in Baseline A2, there are percentage results of 80%, 80%, and 80%.

Based on data collected at 3 stages, namely baseline A1, Intervention B, and baseline A2, the researcher ended the observation because the data had stabilized at the last 3 meetings at baseline (A2).

The following is a summary of the percentages in 3 conditions: Baseline (A1), Intervention (B), Baseline (A2):

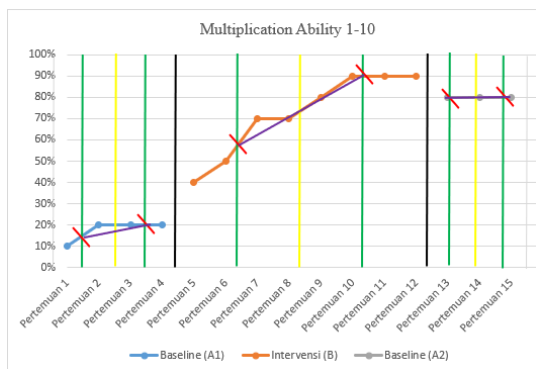


Figure 2 Graph of Directional Trend Estimates

Information:	
Baseline Data (A1)	—
Intervention Data (B)	—
Baseline Data (A2)	—
Change in Conditions	—
Directional Trend Estimation	—
Split Middle	—
Mid Date	—
Mid Rate	—

In Figure 2, based on the data written in the graph, it shows that there is an influence on changes in the ability to multiply numbers 1-10 for children with cerebral palsy after being given treatment.

Table 1. Recapitulation in Conditions

No	Condition	A1	B	A2
1	Condition Length	4	8	3
2	Directional Trend Estimation	(+)	(+)	(=)
3	Stability Trends	Unstable 0%	Unstable 38%	Stable 100%
4	Data Trace Trends	(+)	(+)	(=)
5	Stability Level and Range	Variable 10% - 20%	Variable 40% - 90%	Variable 80% - 80%
6	Data Change Level	20 - 10 = 10 (+)	90 - 40 = 50 (+)	80 - 80 = 0 (=)

Table 2. Recapitulation between Conditions

No	Condition	A1 / B / A2
1	The number of variables changed	1
2	Change in directional trend	(+) (+) (=)
3	Changes in stability trends	Unstable - Unstable
4	Level of change a. B/A1 state change level b. Level Change condition B/A2	40% - 20% = 20% 80% - 40% = 40%
5	Data Overlap A. Percentage of overlap in A1 with B B. Percentage of overlap in A2 with B	0% 12.5%

The problems in this research were in participants who grew up with Cerebral Palsy in Class 8 SLB Negeri 1, five groups who experienced difficulty in Multiplication of Numbers 1-10.

The aim is to discuss the effectiveness of the Mentessori Multiplication Board learning media to improve the ability to multiply numbers 1-10 in children with cerebral palsy who attend SLB Negeri 1 Lima Kaum. Multiplication of numbers is the activity of multiplying positive integers with other positive numbers and even between positive numbers and negative numbers. Multiplication of numbers is given the symbol x between the two integers (Andi Suaeni, 2020). According to (Marfuah,

2019) multiplication of numbers aims to improve students' own abilities to better understand and understand how to multiply numbers correctly.

In this research, students are taught to be able to carry out multiplication activities of numbers 1-10. Multiplication of numbers consists of 3 stages, namely students are able to name the numbers and symbols in the problem, both students are able to answer the multiplication questions and students are able to write down the results of the answers to the questions. To help the multiplication learning process, researchers are interested in using a concrete media, namely the Mentessori Multiplication Board learning media.

The Mentessori Multiplication Board learning media is a learning media in the form of a box made from a thick board containing question numbers and answer numbers (Saputro & Nikmah, 2023). Mentessori Multiplication Board is anything that can be used to express a desire and stimulate students' thoughts, feelings, attention and abilities so that it can encourage the learning process and explain or realize a mathematical concept (Wahyudi, 2019).

Based on the results of research to improve multiplication of numbers 1-10 in grade 8 children at SMPLB SLBN 1 Lima Kaum using the Mentessori Multiplication Board learning media. The research was conducted in 15 meetings with 3 conditions: first, Baseline (A1) was held in 4 meetings. The second intervention (B) was carried out in 8 meetings and the third baseline (A2) was carried out in 3 meetings. In the pre-intervention condition (A1), the students' abilities were stable at the second to fourth meetings with a percentage of 20%. Meanwhile, during intervention (B), students' abilities were stable at the 10th to 12th meeting with a percentage of 90%. In the post-intervention condition (A2), students' abilities were stable at the 13th to 15th meeting with a percentage of 80%.

Based on the results of data analysis, it is proven that the Mentessori Multiplication Board learning media can improve the ability to multiply numbers 1-10 for children with cerebral palsy. This is proven by the child's condition during and after being given intervention in the form of Mentessori Multiplication Board Learning Media which has improved. Where in the pre-intervention condition (A1), data was obtained that the students' abilities were stable with a mean level of 17.5. Furthermore, in the intervention condition (B), data was obtained that students' abilities had increased and were stable with a mean level of 72.5. Then, in the intervention condition (A2), data was obtained that students' abilities were stable with a mean level of 80.

Based on the results of the presentation presented above, the results obtained from using the Mentessori Multiplication Board learning media can improve the ability to multiply numbers in children with cerebral palsy at SLB Negeri 1 Lima Kaum.

Conclusion

Based on the explanation above, it can be concluded that the use of the Mentessori Multiplication Board learning media can improve the ability to multiply numbers 1-10 for children with cerebral palsy in class VIII SLB N 1 Lima Kaum. To optimize learning, it requires consistency for both students and teachers throughout the learning process.

Bibliography

- [1] Ahudulu, S. N. (2020). Penggunaan Media Gambar Dalam Meningkatkan Kemampuan Berhitung Perkalian Bilangan Asli Pada Siswa Kelas II SDN 01 Duhiadaa. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, 4(1), 45. <https://doi.org/10.37905/aksara.4.1.45-50.2018>
- [2] Andi Suaeni. (2020). *PENINGKATAN*

- KEMAMPUAN BERHITUNG PENJUMLAHAN. July, 1–23.
- [3] Ardisal, A., Sopandi, A. A., & Taufan, J. (2019). *ADAPTIF BAGI ANAK CEREBRAL PALSY. III*, 39–42.
- [4] Faira, Y., & Nurhastuti, N. (2022). Efektifitas Penggunaan Multimedia Interaktif dalam Peningkatkan Pembelajaran Bangun Datar Bagi Siswa Tunadaksa. *Jurnal Penelitian Pendidikan Khusus*, 10, 7–14.
- [5] Iswari, M., & Nurhastuti. (2000). *Determinasi Gerak Dasar dan Irama di Dalam Kegiatan Belajar dan Mengajar Bilangan Cacah 0-20 Anak Tunagrahitan Kelas D.2 DI SLB Perwari Kota Padang*.
- [6] Jusriani. (2022). *Gambaran Tingkat Kemampuan Fungsional Berdasarkan Karakteristik Anak Cerebral Palsy Yang Mendapatkan Pelayanan Fisioterapi Di Kota Makassar*. <https://repository.unhas.ac.id/id/eprint/28261/>
- [7] Kratochwill, T. R. (2013). *Single subject research: Strategies for evaluating change*. Academic Press.
- [8] Mahdi, A., Yusuf, R., & Efrina, E. (2018). *Numbered Head Together untuk Meningkatkan Kemampuan*. *Jurnal Pendidikan Kebutuhan Khusus*.
- [9] Marfuah. (2019). *MODEL RME BERBANTUAN PERKALIAN JARIMATIKA PADA KELAS V SD NEGERI CEBONGAN 02 SALATIGA SEMESTER II TAHUN 2018 /2019*.
- [10] Marlina, M. (2021). *Single Subject Research: Penelitian Subjek Tunggal*.
- [11] Maulana, I. M., Yaswinda, Y., & Nasution, N. (2020). Pengenalan Konsep Perkalian Menggunakan Media Rak Telur Rainbow pada Anak Usia Dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 4(2), 512. <https://doi.org/10.31004/obsesi.v4i2.370>
- [12] Nurhastuti, & Budi, S. (2021). *Pendidikan Anak Tunadaksa (Issue 0274, pp. 1–13)*. <https://www.rajagrafindo.co.id/produk/pendidikan-anak-tunadaksa-dr-nurhastuti-s-pd-m-pd-ns-setia-budi-s-kep-m-kep/>
- [13] Nurhastuti, Kasiyati, Zulmiyetri, & Irdamurni. (2019). Need assessment of parents of children with cerebral palsy observed from family counselling. *International Journal of Innovation, Creativity and Change*, 5(6), 197–207.
- [14] Nurhastuti, N. (2019). *Perspektif Pendidikan Anak Tunadaksa (Bahan Ajar)*.
- [15] Nurhastuti, N., Kasiyati, K., Zulmiyetri, Z., Iswari, M., Irdamurni, I., & Oktaviani, J. N. (2022). *The Effectiveness of Family Counseling Based on the Quality of Family Life to Increase the Independence of Cerebral Palsy Children During the COVID-19 Pandemic*. 668, 121–124.
- [16] Rahmawati, L., & Sari, A. D. I. (2022). ANALISIS KEMAMPUAN PEMECAHAN MASALAH DAN MINAT BELAJAR MATEMATIKA MATERI PERKALIAN PESERTA DIDIK KELAS III MI NURUL ULUM WONOSARI GRESIK. *Jurnal Al-Fatih*, 5(2), 270–289.
- [17] Respati, I. D. (2021). KEMAMPUAN BELAJAR SISWA TUNADAKSA MELALUI SISTEM BELAJAR DARI RUMAH DALAM PEMBELAJARAN PENJAS MENURUT PERSPEKTIF ORANG TUA SISWA DI SLB MARSUDI PUTRA 1 BANTUL. *Skripsi*, 53(February), 2021. <https://doi.org/10.1080/09638288.2019.1595750><https://doi.org/10.1080/17518423.2017.1368728><https://doi.org/10.1080/17518423.2017.1368728><https://doi.org/10.1016/j.ridd.2020.103766><https://doi.org/10.1080/02640414.2019.1689076><https://doi.org/>
- [18] Sakti, A. A. A. (2020). *PENINGKATAN HASIL BELAJAR MATEMATIKA MELALUI*

- KANTONG BILANGAN PADA MURID CEREBRAL PALSY KELAS DASAR III DI SLB NEGERI 1 BULUKUMBA. http://eprints.unm.ac.id/25362/1/JURNAL_askar_fix-dikonversi.pdf
- [19] Saputro, H. B., & Nikmah, H. U. (2023). PENGEMBANGAN ALAT PERAGA PEMBELAJARAN MATEMATIKA BERBASIS MONTESSORI PADA MATERI PERKALIAN UNTUK SISWA KELAS II SD. *Angewandte Chemie International Edition*, 6(11), 951–952., 7(1), 5–24. <file:///C:/Users/acer/Downloads/5610-13-18983-1-10-20230627.pdf>
- [20] Sari, R. J., & Iswari, M. (2019). Meningkatkan Kemampuan Penjumlahan Melalui Media Dadu Bagi Anak Tunagrahita Ringan. 7, 166–171.
- [21] Setyaningsih, R., Mariza, A., Hastuti, L. S., Harahap, S. A., Puspitosari, A., Parinduri, S. A., & Prasetyaningsih, R. H. (2014). *Pendidikan Anak Berkebutuhan Khusus*. <https://www.poltekkes-solo.ac.id/cni-content/uploads/modules/attachments/20230411142334-EDITOR-BOOK> CHAPTER PENDIDIKAN ABK-Juli 2022.pdf
- [22] Taufan, J., Ardisal, & Damri. (2018). PELAKSANAAN PEMBELAJARAN PENDIDIKAN JASMANI ADAPTIF BAGI ANAK CEREBRAL PALSY DI SEKOLAH DASAR PENYELENGGARA PENDIDIKAN INKLUSIF. <https://doi.org/https://doi.org/10.31227/osf.io/za8jc>
- [23] Wahyudi, A. (2019). Pengembangan alat peraga pembelajaran matematika materi perkalian berbasis montessori: Indonesia. *Jurnal Manajemen Pendidikan Islam Al-Idarah*, 4(2), 33–39.
- [24] Yuliana. (2016). Peningkatan Kemampuan Operasi Hitung Perkalian Melalui Metode Jarimatika Pada Anak Tunanetra Kelas VI Akselerasi di SLB A Yaketunis Yogyakarta. *Skripsi*, diterbitkan. Universitas Negeri Yogyakarta

Author Profile

Nadya Nurhasanah, Departemen Pendidikan Luar Biasa 2020-2024 Fakultas Ilmu Pendidikan , Universitas Negeri Padang.