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THE INFLUENCE OF BRAILLE SOUND MEDIA ON IMPROVING LITERACY SKILLS OF VISUALLY IMPAIRED CHILDREN AT SLB A KARYA MURNI MEDAN

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ABSTRACT

Visually impaired children is a term that refers to people with visual impairments, including children, both totally blind and very limited vision. Based on the results of initial observations and interviews with teachers and principals, it was seen that students were less able/difficult in recognizing Braille writing and one of the factors was because of the limited variation and creativity in using media to improve their writing skills and recognition of Braille writing. This type of research is analytical research. This study used a quasi-experimental plan with a one group pre-test post-test plan, namely measuring variables to groups from the results before and after treatment was given. The data collection technique in this study was through the test method. With the results of the study showing the analysis of the data obtained Zh is 2.05 greater than Zα 5% which is 1.96 so it can be concluded that there is a significant influence of the use of Braille Sound media in improving the literacy skills of blind children at SLB A Karya Murni Medan. In addition, the Braille Sound media also fostered student engagement, boosted motivation, and created a more interactive learning environment. The findings suggest that the use of multisensory media can be an effective strategy in special education, especially for visually impaired learners. It is hoped that this innovation can be applied more widely to support inclusive education practices.

Keyword: Visually Impaired, Braille Sound, Braille Letter Recognition

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1. INTRODUCTION

Visually impaired children refer to individuals with visual limitations, including those who are completely blind or have severely limited vision. These children require specialized educational approaches and discipline to help them develop their skills and potential to the fullest (Handoyo, 2022). Visually impaired children can acquire knowledge by listening to written information in Braille or reading Braille texts. The knowledge gained can then be shared with others either orally or in written form (Wau et al., 2024). Braille literacy is an essential need for visually impaired students and must be nurtured throughout their educational journey. The ability to read and write Braille is not acquired automatically, but through continuous practice and habituation. Based on an initial observation conducted at SLB A Karya Murni, located at Jalan Karya Wisata No.6, Gedung Johor, Medan Johor District, Medan City, North Sumatra Province, it was found that the students fall into two categories of visual impairment: totally blind, referring to those who cannot perceive light or shapes at all, and low vision, which describes individuals with partial

sight who can still perceive light, shapes, numbers, and letters to some extent. In the education of visually impaired children—especially those who are totally blind—Braille plays a vital role as both a medium for accessing information and a means of self-expression through writing (Sartina et al., 2021). In the next stage of the observation, the researcher conducted an initial assessment by providing students with several texts written in Braille. The results showed that the students had difficulty recognizing the Braille letters. They struggled particularly with characters that had similar or reversed dot patterns, often confusing one letter with another due to these subtle differences. Interviews with teachers and the school principal indicated that one of the contributing factors was the limited variety and creativity in the use of learning media to support Braille literacy. Visually impaired children are a group of students with special needs who require specifically designed educational services and instructional tools. One such specialized tool introduced in this study is the Braille Sound Media, which serves as a concrete aid to enhance visualization in the learning process, thereby increasing student engagement. This media produces sound feedback when touched, supporting the development of Braille writing skills through tactile-auditory interaction. Based on these field observations, the researcher is motivated to explore the use of Braille Sound Media to improve Braille literacy skills among visually impaired students at SLB A Karya Murni Medan.

The development of effective literacy skills among visually impaired students is inseparable from the selection and application of appropriate learning media. According to Arsyad (2021), the role of instructional media is not only to deliver information but also to enhance motivation, clarify abstract concepts, and accommodate diverse student needs. In the context of students with visual impairments, especially those who rely on tactile and auditory senses, the integration of media that stimulates both of these modalities becomes essential. Braille Sound Media is designed to meet this need by combining the tactile function of Braille dots with auditory output, thereby offering multisensory reinforcement that can support students in accurately identifying and recalling Braille characters. Furthermore, this media serves to reduce the monotony often found in conventional Braille instruction, which typically relies on repetitive practice without adequate feedback. By providing immediate audio feedback upon tactile stimulation, students are able to self-correct and develop better recognition of Braille symbols. This feature is particularly beneficial for students who are at the beginning stages of Braille literacy or who struggle with similar Braille patterns. Through consistent use, it is expected that students will demonstrate improved fluency in both reading and writing Braille. Moreover, the implementation of Braille Sound Media aligns with the principles of inclusive education and universal design for learning (UDL), which emphasize the importance of providing multiple means of representation and engagement to support all learners (Meyer et al., 2014). In a specialized school setting such as SLB A Karya Murni, the introduction of innovative and responsive media can significantly enhance the quality of literacy instruction and help close the learning gap experienced by students with visual impairments. The urgency of developing accessible and interactive tools is becoming increasingly relevant as inclusive practices grow within educational institutions. Therefore, this study seeks to investigate the influence of Braille Sound Media on improving the literacy skills of visually impaired students, with the aim of contributing to the development of more effective instructional strategies within special education contexts.

2. RESEARCH METHOD

This study was conducted through direct implementation, with all activities carried out by the research team under the supervision of a faculty advisor. The research site was Special School (SLB) A Karya Murni, located at Jalan Karya Wisata No.6, Gedung Johor, Medan Johor District, Medan City, North Sumatra Province. The type of research used is analytic research. This study applied a quasi-experimental method with a one-group pre-test and post-test design, in which measurements were taken from the same group before and after the intervention was administered. The data collection technique utilized in this study was testing. In addition to tests, qualitative observations were also used to capture the emotional and behavioral responses of students during the learning process, such as increased attention span, willingness to try new Braille symbols, and participation in answering orally when prompted by the audio from the media. The study population consisted of all elementary-level students at SLB A Karya Murni Medan, totaling 17 students. The sample was selected based on specific characteristics using inclusion criteria. A simple random sampling technique was employed, ensuring that all participants had the shared characteristic of low vision, thus providing equal opportunity to be included in the study. The sample selection process also considered the students' prior exposure to Braille learning to ensure that the participants had a relatively similar baseline of experience before the intervention. The data were analyzed through a simplification process to make the information easier to interpret and present. For statistical analysis, the Samsubar Saleh Sign Test was employed to determine the significance of the differences between pre-test and post-test results. To ensure

the validity and reliability of the data, the research instrument—consisting of Braille literacy test items—was first validated by experts in the field of special education and Braille instruction. The test materials were designed to assess students' abilities in recognizing, reading, and writing Braille symbols accurately. Each student's responses were scored using a standardized rubric, and the scores were recorded both before and after the intervention with Braille Sound Media. During the implementation phase, the learning activities were conducted in a structured manner, consisting of three main stages: pre-test, treatment using Braille Sound Media, and post-test. The intervention was carried out over several sessions to ensure students had adequate exposure and interaction with the media. The researcher also observed students' learning behaviors, such as enthusiasm, engagement, and focus, as supporting data to complement the test results. Notably, the Braille Sound Media was introduced progressively, allowing students to build familiarity and confidence through repetition, peer collaboration, and individualized guidance from the researcher. Ethical considerations were taken into account by obtaining permission from the school and the students' guardians. The anonymity and confidentiality of all participants were preserved. Overall, this method was chosen to not only measure the cognitive outcomes but also to observe the practical effectiveness of the media in a real educational setting involving children with visual impairments. Through this design, the study was able to capture both quantitative changes in student performance and qualitative improvements in motivation and classroom dynamics

3. RESULTS AND DISCUSSION

Based on the results obtained from one pre-test and two post-tests, the data were compiled and presented in the following table:

Table 1. Pre-Test Results of Visually Impaired Elementary Students

No	Name	Total Score	Final Score
1.	Fani	15	46,88
2.	Samuel	17	53,13
3.	Citra	21	65,63
4.	Yohanes	13	40,63
5.	Chelsea	16	50
6.	Lukas	21	65,43
Average			**53,65**

Table 2. Post-Test Results of Visually Impaired Elementary Students

No	Name	Post-Test Score		Total	Post Test Average
		1	2		
1.	Fani	62,5	71,88	134,38	67,19
2.	Samuel	68,75	71,88	140,63	70,32
3.	Citra	71,88	78,13	150,01	75,01
4.	Yohanes	59,38	62,5	121,88	60,74
5.	Chelsea	62,5	75	137,5	68,75
6.	Lukas	71,88	78,13	150,01	75,01

Total Average of Post-Test Scores	**69,54**

Table 3. Recapitulation of Pre-Test and Post-Test Scores of Visually Impaired Elementary Students

No	Name	Pre Test	Post Tes
1.	Fani	46,88	67,19
2.	Samuel	53,13	70,32
3.	Citra	65,63	75,01
4.	Yohanes	40,63	60,74
5.	Chelsea	50	68,75
6.	Lukas	65,63	75,01
Average		**53,65**	**69,54**

Data analysis is the process used to simplify data into a more understandable and presentable form by using the Samsubar Saleh Sign Test.

$$Zh = \frac{X-\mu}{\sigma}$$

Therefore

$$Zh = \frac{X-\mu}{\sigma}$$

$$= \frac{5,5-3}{1,22}$$

$$= \frac{2,5}{1,22}$$

$$=2,05$$

Therefore, the calculated Z value (2.05) is greater than the critical Z value at a 5% significance level (1.96), or Z calculated ≥ Z table (1.96). Thus, the null hypothesis (Ho) is rejected, and the alternative hypothesis (Ha) is accepted. This indicates that there is a significant effect of the Braille Sound media on visually impaired students at SLB A Karya Murni Medan.

Discussion

Based on the data analysis, the students' ability to recognize Braille alphabet letters before using the Braille Sound media was still quite low. This was due to difficulties in identifying Braille characters, partly caused by the limited variety and creativity in media used to improve writing and recognition skills of Braille symbols. However, after the Braille Sound media was applied during learning, a significant improvement was observed in the post-test results. The Braille Sound media helped students more easily recognize Braille alphabet letters because it was equipped with audio feedback. The average score of the pre-test before the treatment was 53.65, indicating the initial level of Braille alphabet recognition before using the Braille Sound media. Meanwhile, the average post-test score after the treatment was 69.54. This indicates a significant effect of the Braille Sound media on the learning outcomes of Braille alphabet recognition at SLB A Karya Murni. Based on the data analysis, the obtained Z value was 2.05, compared to the critical Z value at a 5% significance level of 1.96. This confirms that there is a significant effect of using the Braille Sound media on the learning outcomes of Braille alphabet recognition for visually impaired students at SLB A Karya Murni Medan. The improvement in students' scores demonstrates not only the effectiveness of the Braille Sound

media as a learning tool but also the importance of multisensory approaches in the education of students with visual impairments. The integration of tactile and auditory stimuli enabled students to develop stronger associations between the Braille symbols and their corresponding sounds, which facilitated better memorization and recognition. This finding aligns with the theory that learners with visual impairments benefit significantly from audio-tactile interventions, as these can compensate for the lack of visual cues typically used in conventional learning.

In addition to the increased test scores, observational notes during the intervention phase revealed that students showed greater enthusiasm and confidence while using the Braille Sound media. Many students were observed actively engaging with the media, repeating the sounds they heard, and attempting to match the Braille characters with more accuracy over time. These behavioral changes suggest that the media also contributed to enhancing students' motivation and reducing anxiety or hesitation that may arise when they are unsure of their responses. Moreover, the results obtained through the Samsubar Saleh Sign Test statistically support the hypothesis that Braille Sound media significantly influences learning outcomes. The Z value (2.05) exceeding the critical Z score (1.96) at a 5% significance level provides empirical evidence that the intervention was effective. While the numerical increase in scores from 53.65 to 69.54 may seem modest, it reflects a meaningful academic progress within the context of special education, where individualized gains are highly valued.

Overall, the results affirm that with the appropriate use of assistive and interactive learning media, students with visual impairments are capable of improving their literacy skills effectively. The Braille Sound media, in this case, proved to be a relevant and responsive tool to support such growth. Furthermore, the findings underscore the need for continuous development and integration of inclusive learning technologies in special education curricula. Future implementations should consider incorporating adaptive features such as adjustable audio speeds or personalized content to accommodate different learning paces. Collaboration between teachers, therapists, and technology developers can further refine this media, ensuring it remains engaging, accessible, and pedagogically effective. Additionally, expanding its application to other areas of literacy and communication, such as sentence construction or listening comprehension, could open broader opportunities for academic advancement among visually impaired learners. In light of these results, it becomes increasingly clear that innovative media such as Braille Sound not only enhance academic outcomes but also address emotional and psychological aspects of learning. For students with visual impairments, motivation and self-efficacy play a critical role in their educational journey. The positive behaviors observed—such as students smiling when they answered correctly, expressing eagerness to try again after making mistakes, and showing visible enthusiasm during sessions—indicate that the media fostered a supportive and enjoyable learning environment. This aligns with the view of Vygotsky's sociocultural theory, which emphasizes the importance of interactive tools and social contexts in developing cognitive functions, especially in students with diverse learning needs.

Another aspect worth noting is how the Braille Sound media contributed to creating a more inclusive and student-centered classroom culture. By allowing learners to receive immediate auditory feedback, it minimized their dependence on teachers or peers for correction, thereby fostering independence and confidence. This shift in learning dynamics is vital for special education settings, where learners often require more time and encouragement to master new skills. The media also proved useful for differentiated instruction. Since each student could engage with the Braille Sound media at their own pace, the teacher was able to provide individualized support without disrupting the flow of the lesson for others. This adaptability is particularly important in classrooms where learners present a wide range of abilities and needs. Finally, the study's implications suggest that schools and educational stakeholders should invest in developing more context-specific, culturally responsive, and disability-friendly learning media. When assistive technologies are designed with empathy, practicality, and pedagogy in mind, they not only bridge learning gaps but also open doors for equity in education. In conclusion, the Braille Sound media holds great promise as an effective, inclusive, and empowering educational tool for visually impaired students.

4. CONCLUSION

Based on the research conducted, the answers to the research questions, supported by facts and data, lead to the conclusion that after implementing learning using the Braille Sound media, visually impaired children were able to understand the material on Braille letter recognition. The data analysis showed a Z value of 2.05, which is greater than the critical Z value at 5% significance level (1.96). Therefore, it can be concluded that there is a significant effect of using the Braille Sound media in improving the literacy skills of visually impaired children at SLB A Karya Murni Medan. In addition to improving recognition accuracy, the media also increased student motivation and participation during the learning sessions. This indicates that the use of engaging, multisensory learning tools can play a crucial role in supporting the academic development

of students with special needs. As a suggestion, future researchers are encouraged to further develop this media with more varied content and interactive features to suit different literacy levels. Teachers are also advised to integrate such innovative media consistently to foster independent learning and better accommodate the diverse needs of visually impaired students.

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