Journal of Education and Learning Mathematics Research (JELMaR)

Application of "Division Counting Machine" Media for Deaf Students in Division Operation Material

Desi Amalia Romadona, Lutfiyah, Indah Rahayu Panglipur

Application of "Division Counting Machine" Media for Deaf Students in Division Operation Material

[1]Desi Amalia Romadona, [2]Lutfiyah, [3]Indah Rahayu Panglipur
Mathematics Education Study Program, Teacher Training and Education Faculty, PGRI Argopuro
Jember University, Indonesia
Email: desiamaliya2001@gmail.com

Abstract: Media is an effective tool used by teachers to support learning to convey the content of teaching materials. This study aims to determine the application of "division calculation machine" media for deaf students in division operation material. This research uses a descriptive approach with qualitative research. The data sources used are test questions, observation, interviews, and documentation. This research was conducted at SLB ABC Balung with the research subjects as many as 3 high school deaf students. The results of this study by applying the division calculation machine media used to solve division problems can help deaf students to understand the division operation material. Counting using the media "Division Counting Machine" can make it easier for students to count and make counting faster than counting manually although there is 1 student who says it is faster to use the manual than using the media but the student prefers to use the media because there is no need to count and only move the ice cream sticks. Based on this research, the media can make it easier for students to learn division and the media as a facilitator in the learning process in class.
Keywords: media, deaf, division

INTRODUCTION

Media, according to the Big Indonesian Dictionary (KBBI), is defined as a tool (means) to communicate, or located between two people. According to (Nurfadhillah, 2021) learning media is a term used by teachers during learning. Learning media, according to (Sulfa, 2022), is an effective tool to support teaching and experience that develops by encouraging students' explanations, feelings, desires, and interests. Thus, learning correspondence between educators and students can occur well through the creation or search for media by teachers and students. Learning media includes tools that are physically used to convey the content of teaching materials, according to Gagne and Briggs (Arsyad, 2013).

Children with special needs (ABK) are children with difficulties and different physical needs, emotions or characters, or conditions that make them unable to do things in the same way as other normal people, this group is often referred to as disability (Syafrudin & Sujarwo, 2019). Deafness is a hearing loss experienced by children (Khairun Nisa et al., 2018). Hearing loss or deafness is not limited to individuals who experience severe hearing loss, but also includes individuals who experience damage to their hearing. Hearing loss is categorized into mild, moderate, severe, and very severe levels (Murni, 2018). In communication, Deaf people often have difficulty in conveying and understanding messages, so they need a language that suits their needs, namely sign language (Mursita, 2015). Prasetyo (2018) also suggests that deaf people are children who experience hearing loss so that they cannot hear all sounds perfectly. As a result, the deaf have significant limitations in terms of language and communication.

Children with special needs grow and develop in different ways from ordinary children (Murni, 2018). Thus, learning for children with disabilities is different from children in general, especially in learning mathematics, where mathematics is a subject that is often considered difficult among students and society, especially deaf children. Deaf children have obstacles in understanding abstract things because of hearing limitations, on the other hand, math must be taught to all students as well as deaf

children. For this reason, media is needed in class learning to support learning, especially for deaf children.

According to the results of the researcher's interview with one of the deaf students with moderate type (understanding lip language), class XI SMA in SLB ABC Balung on Thursday, November 2, 2023 the student has a problem of not really understanding the division operation material explained by the teacher because it does not use learning media in class. The results of initial observations when students solve the problem seem lazy to solve the problem seen when given a test question, how to calculate the student by adding up the numbers until they reach the division result that matches the problem. The greater the nominal stated in the problem, the impact on solving the problem will take a long time.

The results of interviews with SLB ABC Balung teachers on Thursday, November 2, 2023 that deaf students do not really understand the division operation, which they understand to calculate division must add numbers to reach the results that match the problem and if in the problem there are numbers with large nominal then calculating becomes long which causes students to be lazy to calculate division. The absence of learning media is also one of the things that makes students not really understand the material taught because if they only rely on sign language during learning, students will find it difficult to understand the material explained.

There are many ways to calculate division operations, not only adding numbers to get results but there is also a way, namely by repeated subtraction until it runs out. Therefore, researchers want to teach how to calculate division by repeated subtraction until it runs out by utilizing aspects of intelligence that come from vision to learn mathematics, especially to learn division material, namely by using the learning media "Division Calculation Machine" where this machine is in the form of a modified board so that it can be used for division operation material. This is supported by the opinion (Panglipur, 2023) that deaf people like visuals or images that are visible by sight where indeed for these senses the subjects do not experience obstacles or limitations. As for the learning style for gross motor skills, using props and illustrations is very helpful and preferred because it is observed that it is easier to channel the intentions and goals that the subject thinks can be conveyed easily and well.

METHOD

This type of research uses a descriptive approach with a qualitative research type. Descriptive research is a type of research that aims to collect information about a symptom when research is conducted by describing phenomena that occur in a real, actual, realistic, and real way (Fitri et al., 2021). Qualitative research consists of explaining the phenomena that occur (descriptive) and interpreting the meaning contained behind the phenomena seen (Prof. DR. Sugiyono, 2019). Descriptive qualitative is a term used in qualitative research for a descriptive study (Yuliani, 2017).

This research was conducted at SLB ABC Balung Jember Regency, this research was obtained from the results of 2 meetings. The source of data in this study is high school students with moderate deafness. The data in this study are in the form of test results as a reference for students to use the "Division Counting Machine" media consisting of 2 grade 10 students and one grade 11 student, each sample is all deaf students in class C SLB ABC Balung. In this study using time triangulation, it is used to validate data related to changes in a process and human behavior changes over time (Sutriani & Octaviani, 2019).

RESULT AND DISCUSSION

This research analyzes some high school deaf students who are less fluent in division arithmetic operations due to the absence of supporting media for learning in

class, from this background the "Division Calculation Machine" media will be applied to help students explore division arithmetic operation material. The data used are observation results, interview results, and test results where this research was conducted for 2 meetings obtained from 3 deaf students consisting of 1 grade 10 student we call S1, and 2 grade 11 students we call S2 and S3.

Figure 1. S1 Activities Using The "Division Counting Machine" Media
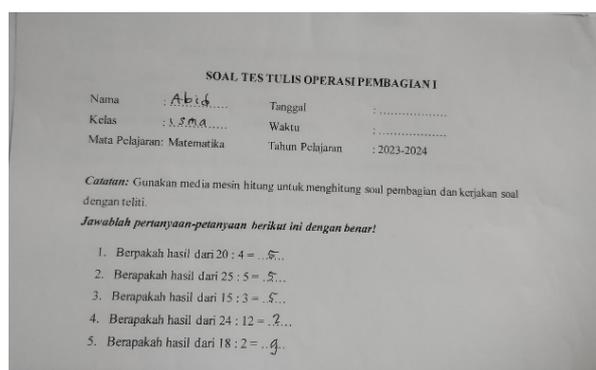

Figure 2. The Results of S1's Work

Based on Figure 1, it can be seen that S1 uses the "Division Calculation Machine" media. At the beginning of the meeting S1 was given an explanation of the use of media that would be used to calculate division according to the material studied. After being given an explanation of the use of the media S1 was asked to try once to use the media before being given a problem, it was still a little confused with the sequence of steps to use the media. When given one more explanation of the steps of using the media S1 immediately responds to using the media, it can be evidenced by Figure 2 where S1 works on the questions given from number 1 to 5 all right without any problems when working with the media. Providing material twice due to communication constraints between S1 and researchers, where researchers are not fluent in sign language.

Based on the results of S1's interview, that S1 already understands the use of the media "Division Calculation Machine" although there were obstacles at the beginning because he still did not understand during the first explanation and after being given a second explanation he really understood the steps of using the media. According to S1 this media can help calculate division to be easier than calculating manually but takes a little longer because it has to move the ice cream sticks from the Dividend column to the Divisor column but S1 prefers to use the media because it does not need to calculate and calculate division material to be easier even though S1 feels a little tired to move the ice cream sticks.

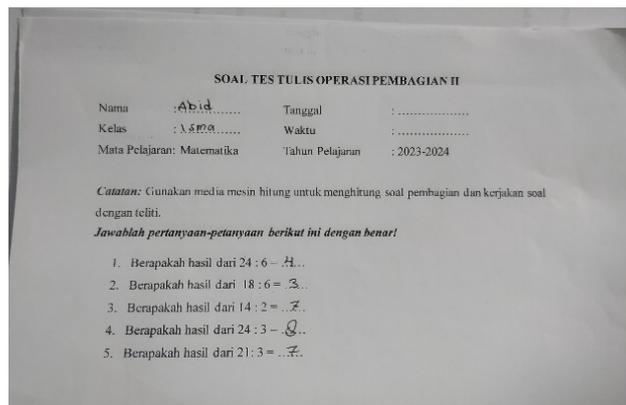**Figure 3.** S1 Activities Using The "Division Counting Machine" Media

Figure 4. The Results of S1's Work

In Figure 3 above is the second meeting at a different time and day. On this occasion students were treated the same as the previous meeting, starting from being given an explanation of the steps after which they were asked to try 1 time using the media before being given a different problem with the same problem weight as the previous meeting until the interview at the end after being given the test questions. The results of giving the same treatment S1 was able to use the media smoothly just like the previous meeting. There were no obstacles when working on the questions given and S1 was immediately enthusiastic in working on the questions given. S1 worked on questions number 1 to number 5 happily because he liked counting using the "Division Counting Machine" media.

From the results of the interview conducted the second time after being given the problem, S1 said that there were no obstacles like the previous meeting that had to explain the steps using the media because S1 still remembered the explanation of the material at the previous meeting. Even if not reminded, S1 can still use the media. According to S1 this media is very helpful to understand the division material. S1 stated that with this media calculating division material becomes easier and more fun. S1 also said that he preferred to use the media rather than calculating manually even though it took longer to use the media than calculating manually.

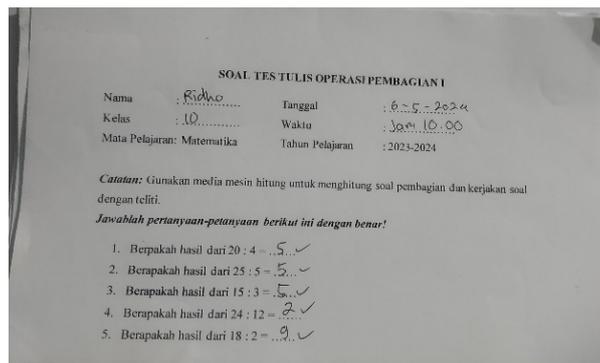**Figure 5.** S2 Activities Using The "Division Counting Machine" Media

Figure 6. The Results of S2's Work

The picture above is the first meeting with S2. At first, S2 was given an explanation to use the "Division Calculation Machine" media. When given an explanation of the steps for using the media, S2 was very attentive from start to finish. After that S2 was asked to try using the media and S2 turned out to be able to use the media smoothly even though slowly but surely S2 could finish when trying the media for the first time. When given the test questions S2 can slowly work on the questions to completion and can be seen from the results of the test questions in Figure 6 S2 is very thorough as evidenced by the check mark on each question number. S2 always gives a check mark every time he finishes working on a problem using the media. This is done to mark that the problem has been calculated using the media and the numbers on each problem will not be confused with other problem numbers.

The results of S2 interviews conducted after being given test questions, S2 understood the steps of using the media with 1 explanation at the beginning. There were no obstacles when using the media or working on the questions, everything was done smoothly even though it was done slowly. According to S2, this media can also help and make it easier to understand the division operation material and with this media can calculate it easier and faster than calculating manually. S2 prefers to calculate division using the media compared to manually because if using the media there is no need to calculate anymore but only move the ice cream sticks.

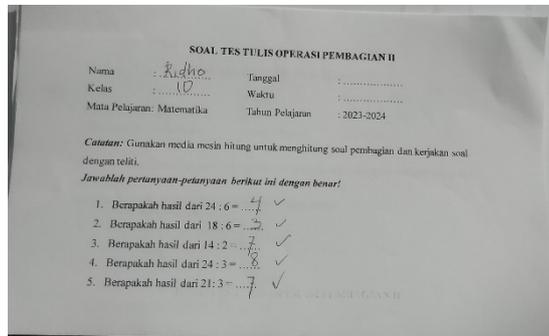**Figure 7.** S2 Activities Using The "Division Counting Machine" Media

Figure 8. The Results of S2's Work

In Figure 7 is the second meeting with S2 at a different time and day from the previous meeting. At this meeting S2 was treated the same as the previous meeting, namely given an explanation again about the use of the "Division Calculation Machine" media after that S2 was asked to try the media and work on test questions and interviews when finished doing the test. When given an explanation once S2 was immediately able to try the media. When the test questions were given, S2 smoothly worked on the test questions using the media, there were no errors from the steps of using the media and the test questions were all correct.

The results of the interview also said S2 understood the steps of using the media. S2 felt that there were no obstacles when working on problems using this media, in fact, the existence of this media really helped S2 in understanding the material about the division operation. Not only that, S2 also said that with this media, calculating becomes faster than manually and prefers to calculate using the "Division Calculation Machine" media.

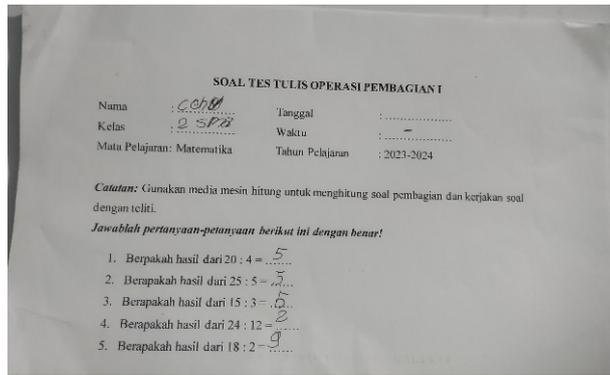**Figure 9.** S3 Activities Using The "Division Counting Machine" Media

Figure 10. The Results of S3's Work

Figure 9 above is S3 activities using the media "Calculation Machine Division". It appears that S3 is very enthusiastic about the media, even before starting the explanation of the steps to use the media S3 is impatient about it. When given an explanation of the steps of using the media S3 really pay close attention to how to use the media. When S3 was asked to try using the media, S3 was very happy to try using the media and it turned out that S3 could immediately use the media. When given the test questions S3 happily do the questions using the media. S3 works on test questions correctly and faster than S1 and S2 can be seen from Figure 1.10 which is the result of working on the S3 test questions.

From the results of the interview S3 said he was very happy to use the media "Calculation Machine Division" because so far he had never learned math using the media but only used the blackboard as a learning tool. There are no obstacles when working on problems using the media. According to S3, the existence of this media can help understand the material about division operations and make calculating division easier. S3 prefers to calculate using the media because it is considered faster and does not need to calculate again.

Figure 11. S3 Activities Using The "Division Counting Machine" Media
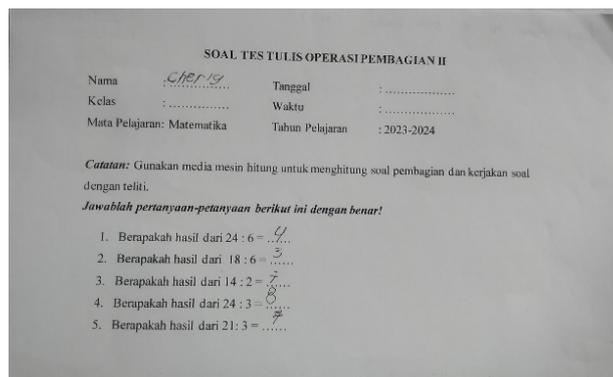

Figure 12. The Results of S3's Work

In the picture above is the second meeting with different times and days and the same treatment as the previous meeting. Where S3 is given a re-explanation of the steps to use the media, it turns out that S3 still remembers the explanation of the previous meeting so that when asked to try first to use the media S3 refused and asked to immediately work on the problem because he felt he could use the media. When working on the test questions S3 was able to work correctly and smoothly without any obstacles and obstacles.

The results of the S3 interview understand using the media because they still remember the previous meeting. There are no obstacles when working on the problem because this media is very helpful S3 in understanding the division operation material that makes calculating division becomes easier and faster. S3 prefers to use the media rather than the manual can be seen S3 is always enthusiastic about the existence of the media.

From the results of the explanation above, applying the division calculation machine media used to solve division problems can help deaf students to understand the division operation material. This is shown by students being able to use the media smoothly without any obstacles. Calculating with the "Division Calculation Machine" media can make it easier for students to calculate and make calculating faster than calculating manually although there is 1 student who says it is faster to use manually than using the media but the student prefers to use the media because there is no need to calculate and only move the ice cream sticks. (Oktavianingtyas, 2015) in his research said that media or props can be a solution to increase teacher and student activity to attract student attention so that it can facilitate learning. One way to improve student learning outcomes is to use counting aids. Learning media serves as an effective tool to convey information and make it easier for teachers to provide information to students (Anggraeni, 2019). Deaf students must be able to think creatively to understand the material according to (Lutfiyah, 2023) in her research, one way is to use learning media.

The learning style of deaf students by utilizing aspects of intelligence that come from vision to learn mathematics. Using learning media for deaf students is usually visual and kinesthetic which is supported by (Panglipur, 2023) where deaf students like visual images that are visible to vision where for these senses deaf students do not experience obstacles or limitations. Students with a visual learning style are more easily involved and understand objects displayed in the learning process (Shomad, 2021). For this reason, the application of the "Division Calculation Machine" media is very helpful for deaf students in utilizing vision to learn mathematics, especially on division operation material.

CONCLUSION

Based on the results of research conducted at SLB ABC Balung, it can be concluded that the application of "Division Counting Machine" media to deaf students in division operation material can facilitate students in learning division. Media as a facilitator in the learning process in class. With the media can also help students with disabilities, especially deaf students to more easily understand the division operation material. The appearance, design, and matching colors on the media attract the attention of students with disabilities, especially deaf students, to try using the media so that classroom learning becomes more fun and not bored quickly and students understand the material taught more quickly.

REFERENCES

Anggraeni, D. (2019). Peningkatan Hasil Belajar Operasi Hitung Perkalian Menggunakan Media Pembelajaran Corong Berhitung Pada Siswa Tunarungu Kelas Dasar Iii Di Slb Wiyatadharma 1 Sleman. *Jurnal Widia Ortodidaktika Vol*, 8(6), 595–606.

Arsyad, S. (2013). A Genre-Based Analysis on Discussion Section of Research Articles in Indonesian Written by Indonesian Speakers. *International Journal of Linguistics*, 5(4), 50. https://doi.org/10.5296/ijl.v5i4.3773

Fitri, R., Sultan, M. A., & Tuken, R. (2021). Analisis Kesulitan Belajar Siswa dalam Pembelajaran Daring pada Masa Pandemi COVID-19 di UPTD SDN 125 Barru. *Jurnal Literasi Digital*, 1(3), 180–185. https://doi.org/10.54065/jld.1.3.2021.70

Khairun Nisa, Mambela, S., & Badiah, L. I. (2018). Karakteristik Dan Kebutuhan Anak Berkebutuhan Khusus. *Jurnal Abadimas Adi Buana*, 2(1), 33–40. https://doi.org/10.36456/abadimas.v2i1.a1632

Lutfiyah. (2023). *The Level of Dyscalculia in Children with Special Needs in Understanding Mathematical Concepts : Learning Difficulties Experienced. 9*(2), 696–705.

Murni, I. (2018). Memahami Anak Berkebutuhan Khusus. *Goresan Pena Anggota IKAPI*, 344.

Mursita, R. A. (2015). Respon Tunarungu Terhadap Penggunaan Sistem Bahasa Isyarat Indonesa (Sibi) Dan Bahasa Isyarat Indonesia (Bisindo) Dalam Komunikasi. In *Inklusi* (Vol. 2, Issue 2, p. 221). https://doi.org/10.14421/ijds.2202

Nurfadhillah, S. (2021). *Media Pembelajaran di Jenjang SD* (R. Awahita (ed.)). CV Jejak.

Oktavianingtyas, E. (2015). Media Untuk Mengefektifkan Pembelajaran Operasi Hitung Dasar Matematika Siswa Jenjang Pendidikan Dasar. *Pancaran Pendidikan*, 4(4), 207–218.

Panglipur, I. R. (2023). Analisis Gaya Belajar dan kemampuan Literasi Matematika Pada Tuna Rungu. *Math-Edu: Jurnal Ilmu Pendidikan Matematika*, 8(April), 37–46. https://jurnal.unimor.ac.id/index.php/JIPM/article/view/4231

Prasetyo, J. B. (2018). Peningkatan Hasil Belajar Operasi Hitung Pengurangan Dengan Media Sempoa Pada Siswa Tunarungu Kelas Dasar II di SD Negeri Pojok Sleman Yogyakarta. *Jurnal Widia Ortodidaktika*, 7(2), 168–177.

Prof. DR. Sugiyono. (2019). Pengantar Metodologi Penelitian Kualitatif. *Metodologi Penelitian Kualitatif*, 53(9), 1689–1699.

Shomad, Z. A. (2021). *Prosiding Seminar Nasional Pascasarjana Identifikasi Gaya Belajar Siswa Tunarungu Tanpa Gangguan Kecerdasan.* 1236–1240. http://pps.unnes.ac.id/prodi/prosiding-pascasarjana-unnes/1236

Sulfa. (2022). Analisis Penggunaan Video Youtube Pada Pembelajaran Matematika Peserta didik Kelas VIIIUPTD SMP 23 BARRU. *Iain Pare Pare*, 33(1), 1–12.

Sutriani, E., & Octaviani, R. (2019). Keabsahan data. *INA-Rxiv*, 1–22.

Syafrudin, T., & Sujarwo, S. (2019). Pengembangan Bahan Ajar Untuk Pembelajaran Matematika Bagi Siswa Tunarungu. *Suska Journal of Mathematics Education*, 5(2), 87. https://doi.org/10.24014/sjme.v5i2.8170

Yuliani, W. (2017). METODE PENELITIAN DESKRIPTIF KUALITATIF. *QUANTA*, 1(1), 1–10. https://doi.org/10.22460/q.v1i1p1-10.497