# *Analysis of Mathematics Learning for Deaf Students at Sunan Muria Kudus Extraordinary School*

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***Abstract***

This study aims to determine the process of learning mathematics in deaf students. This includes an analysis of the curriculum, assessment, learning difficulties, and strategies to overcome these difficulties. The research method employed is descriptive qualitative, where data collection was conducted through interviews and direct observation. The results of this study indicate that the mathematics learning process of deaf students can't be equated with students in general. Consequently, the curriculum and assessment must be modified according to the needs of deaf students. The difficulties experienced by deaf students in the mathematics learning process include low interest in mathematics, difficulty focusing, lack of language understanding, etc. To minimize these difficulties, it is essential to provide support and assistance from parents and educators to ensure that deaf students can learn effectively and develop their language skills.

***Keywords:*** *Deaf Students; Learning Difficulties; Mathematics Learning Process.*

**Abstrak**

Adanya penelitian ini bermaksud untuk mengetahui proses pembelajaran matematika pada peserta didik tunarungu, yaitu mencakup analisis kurikulum, assesmen, kesulitan belajar, serta upaya meminimalisir kesulitan tersebut. Adapun metode penelitian yang digunakan ialah metode deskriptif kualitatif, dimana pengumpulan data pada penelitian ini diperoleh melalui wawancara dan observasi langsung. Hasil penelitian ini menunjukkan bahwa proses pembelajaran matematika peserta didik tunarungu tidak bisa disamakan dengan proses pembelajaran matematika peserta didik pada umumnya. Kurikulum dan asesmen harus dimodifikasi sesuai dengan kebutuhan peserta didik tunarungu. Adapun kesulitan yang dialami peserta didik tunarungu pada proses pembelajaran matematika diantaranya adalah rendahnya minat pada matematika, sulit fokus, kurangnya pemahaman bahasa, dan lain sebagainya. Untuk meminimalisr kesulitan tersebut dibutuhkan dukungan dan bantuan dari orang tua maupun guru agar peserta didik tunarungu dapat belajar secara optimal dan mengembangkan kemampuan berbahasa mereka.

**Kata Kunci:** Peserta Didik Tunarungu; Kesulitan Belajar; Proses Pembelajaran Matematika.

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## INTRODUCTION

Every individual has the right to have access to quality education. This is a basic right that guarantees the survival and development of every human being. The government is obliged to guarantee equal access to education for all citizens, including those who have special needs.

One group of individuals with special needs is the deaf. Deafness is a condition where there is hearing loss which is classified into two types, namely deafness and hearing loss. Deafness describes a condition where the ability to hear is completely lost due to severe damage to the sense of hearing. Hearing loss indicates that the ability to hear is still there, even though the sense of hearing is damaged, and can be helped with hearing aids if necessary (Christine, 2016) .

The limitations experienced by deaf students result in obstacles in their language development (Laely, 2019). To achieve a decent life, both physically and mentally, deaf students need special guidance and education. Such conditions of course have their implications in the learning process, especially in mathematics learning. Being the basis of all knowledge, mathematics is very important to teach to normal students and those with special needs, including deaf students. The abstract nature inherent in mathematics often gives rise to complicated speculation in its understanding.

Therefore, the writing of this article aims to examine: 1) How is the mathematics learning process for deaf students, 2) How is the curriculum for deaf students learning, 3) How is the assessment for deaf students, 4) What are the learning difficulties of deaf students in the mathematics learning process, and 5) How do the efforts to minimize the difficulties of deaf students. Previously, there have been studies that discuss similar topics, namely those conducted by Guinet, et al. (Guinet, et al., 2023). The research only discusses the mathematics learning process for deaf students. Research conducted by Damayanti, et al. (Damayanti, et al., 2022) also discusses similar topics. The research only focuses on identifying and analyzing the difficulties experienced by deaf students in learning mathematics.

The novelty of this research lies in the incorporation of aspects that have not been covered in previous research, resulting in an article that provides a thorough understanding of the mathematics learning process of deaf students that includes the curriculum, assessment, learning difficulties they face, and efforts to minimize these difficulties.

## RESEARCH METHODS

This type of research is descriptive research because it describes or explains the mathematics learning process of deaf students. If we look at it from an approach perspective, the approach that is suitable to use is a qualitative approach. Data was collected through interviews with two teachers from the Sunan Muria Kudus Extraordinary School, namely Mrs. Atik and Mrs. The research location is at the Sunan Muria Kudus Extraordinary School located on Jl. Dawe - Gebog No. KM 1, Madu, Cendono, Kec. Dawe, Kudus Regency, Central Java 59353. This research focuses on SLB Sunan Muria Kudus because it contains students with special needs, namely those who have hearing impairments or are also known as deaf. The implementation of this research took place on Tuesday, April 23 2024, 07.00 - 11.00 WIB with a focus on how deaf students learn mathematics and the difficulties they experience.

## RESULTS AND DISCUSSION

The research questions in this study include: 1) How is the mathematics learning process for deaf students? 2) How is the curriculum for deaf students learning? 3) How is the assessment for deaf students? 4) What are the learning difficulties of deaf students in the mathematics learning process? 5) How do the efforts to minimize the difficulties of deaf students? The following research results were obtained:

**Mathematics Learning Process for Deaf Students**

Deaf students experience hearing difficulties. The impact of this hearing barrier also means that some deaf students also experience barriers to speaking. Of course, the mathematics learning process for deaf students cannot be the same as the mathematics learning process for ordinary students. At Sunan Muria Kudus Extraordinary School, the number of deaf students in one group consists of 7 students who are a mixture of students in grades 3, 4 and 5. This is right with central regulations which state that one teacher in Extraordinary School can only teach a maximum of 8 to 9 students (Setiawan, 2019). Mixing classes has become commonplace in special schools, one of which is Sunan Muria Kudus Extraordinary School. Class mixing can occur because there is still a minimum number of teaching staff at Sunan Muria Extraordinary School.

In the process of learning mathematics for deaf students, the first thing that must be considered is how to communicate (Salsabila, 2022). The way to communicate with deaf students is to use sign language. So teachers for deaf classes, both in special schools and inclusive schools, must master sign language first. Based on the results of an interview with Mrs. Atik as a deaf class teacher at Sunan Muria Kudus Extraordinary School, not all the teachers there are graduates of the Special Education department. So to understand sign language, a teacher can learn autodidactically or take part in various training.

In general, the stages of mathematics learning for deaf students consist of three phases (Nuryanti, 2019), namely:

1. Learning Planning Stage, At this stage, the accompanying teacher must adjust the lesson material so that deaf students can understand the concepts to be taught. Apart from that, accompanying teachers must teach students how to explain mathematics subject matter in detail and be ready to provide additional explanations for deaf students who still need help.
2. Learning Implementation Stage, At this stage, the accompanying teacher must facilitate deaf students in understanding the learning material. Accompanying teachers must also provide opportunities for deaf students to

be actively involved in the learning process, and open up opportunities to ask questions if there is still material that makes students confused.

3. Learning Assessment Stage, The assessment is carried out by the students by the accompanying teacher by referring to the Minimum Completeness Criteria or Learning Goal Achievement Criteria. Assessment includes assessing the attitudes, knowledge and skills of deaf students to ensure they have achieved the expected standards.

The mathematics learning process for deaf students generally also utilizes learning media (Siregar & Ananda, 2023). Learning media is equipment that is used as an intermediary by educators in explaining subject matter to students, with the hope that students can more easily understand the material. The types of learning media are very diverse. Learning media in terms of type can be classified be: 1) Visual media, which includes books, modules or PowerPoint shows, PDFs, flipbooks and so on. 2) Audio media, which includes telephone, radio, and so on. 3) Audiovisual media, which includes power points with the addition of sound effects, interactive learning videos, etc. (Ummah, 2021). Of the various types of learning media, the type of media that is suitable for use by deaf students is visual media.

Visual media itself can be in the form of 2-dimensional media and 3-dimensional media. One example of 2-dimensional media is in the form of images. For example, in subtraction material, the teacher can describe there are 8 balls, then put them in bag 3 and the teacher can ask the students how many balls are left. Apart from 2-dimensional visual media, teachers can also use 3-dimensional visual media such as tools for learning media. Based on the results of an interview with Mrs. Atik as a deaf class teacher at Sunan Muria Kudus Extraordinary School already has a variety of tools for mathematics learning media. However, for some mathematics materials there are still no learning media tools available.

From the results of observations of mathematics learning for deaf classes at Sunan Muria Kudus Extraordinary School, it can be seen that the abilities of students in grades 3, 4 and 5 are not the same even though the learning is

combined in one class. Mrs. Atik as the accompanying teacher said that 3 classes were combined into 1, the questions given to students were at different levels. The observation results can be detailed as follows:

**Table 1. Comparison of Deaf Students Abilities Based on Class**

| Class | Information |
|---|---|
| Grade 5 | Can do questions related to addition operations, subtraction operations, mixture operations, and multiplication. |
| Grade 4 | Still confused about the multiplication operation. |
| Grade 3 | There are still students who are confused about the subtraction operation. |

**Curriculum for Deaf Students Learning**

The curriculum currently used at SLB Sunan Muria is the independent curriculum. The curriculum structure in SLB refers to the general school structure, but is modified and adapted to the needs of students. This curriculum includes functional skills as well as subjects that support students needs (Hasibuan et al., 2020).

The existence of special needs program subjects is intended to help students optimize the students' sensory functions and overcome students' limitations. For deaf students themselves, the special needs program is focused on developing communication, as well as sound and rhythm perception.

**Assessment for Deaf Students**

There are several assessments for students with special needs. Among them are assessments carried out at the beginning of the learning year. The assessment takes the form of giving test questions, then the teacher also makes direct observations. In the observation process there is a separate guide. One of the guidelines that has been used by Sunan Muria Extraordinary School is ABK Semar which is an innovation from Sebelas Maret University. This initial assessment aims to categorize which class the student will enter. Apart from that, there are also interviews with student parents which are conducted periodically so that student parents also understand the development of their children.

Assessment in mathematics subjects itself includes formative and summative assessments, namely in the form of giving questions. The math questions given to each deaf student may be different. This is because basically the implementation of assessments for students with special needs must be adjusted to the characteristics and obstacles experienced by these students (Baniaturrohmah et al., 2023).

**Learning Difficulties of Deaf Students in the Mathematics Learning Process**

After conducting interviews with mathematics teachers at Sunan Muria Kudus Extraordinary School, several factors were found that could cause deaf students to experience difficulties in the mathematics learning process (Anditiasari, 2020), including the following: (1) Students have low interest in mathematics subjects. According to the mathematics teacher for the deaf class at SLB Sunan Muria, some deaf students have low interest in mathematics subjects. This can be seen from students' expressions when learning mathematics. On average, students show displeased faces; (2) Students find it difficult to focus on the mathematics lesson being taught. Difficulty focusing is the main obstacle that students often experience, especially in learning mathematics. Difficulty focusing on mathematics lessons being delivered by the teacher is basically caused by the weakness of deaf students in hearing processing. The process of communicating using sign language requires a fairly high level of focus. (3) The level of intelligence of students is below average. Typically, not all deaf students have a low level of intelligence. However, the limited hearing of deaf students means that their stage of intelligence development is not the same as that of normal students in general. Hearing limitations cause deaf students to experience difficulties in sorting information in detail. This of course has an impact on the mathematics learning process; (4) Students' ability to understand the material is still lacking. Even though the teacher has explained the mathematics material in a coherent manner, it turns out that there are still many students in the deaf class who cannot understand the material being studied. This is because the average deaf student still feels less confident and afraid, especially when asked by the teacher to solve

questions. Apart from that, the low intelligence of deaf students can also be a factor causing students' difficulty in understanding the material; (5) Students don't understand the language being taught. One of the reasons why deaf students experience difficulties in solving mathematical problems is because these students do not understand the language used to communicate. This lack of understanding regarding language is caused by disturbances in students' sense of hearing. Apart from not understanding the language, deaf students also experience difficulties in conveying meaning.

**Efforts to Minimize the Difficulties of Deaf Students**

By understanding the difficulties faced by students with special needs in learning mathematics, parents educators also need to implement appropriate efforts to help overcome these difficulties and improve student learning outcomes. In general, the mathematics learning process is often a challenge for many students. To minimize the difficulties they face, there are several efforts that can be made by parents, educators and educational institutions (Rachmawati, 2018).

One way for deaf students to participate in learning well is through problem solving because it is fun and easy to solve the problems given. By developing problem solving skills, students not only learn to solve math problems, but also prepare themselves to face challenges in the real world that require effective analysis and problem solving skills (Panglipur, 2023).

Apart from that, there are various other efforts that teachers can make to minimize students' difficulties in the mathematics learning process (Nofiaturrahmah, 2018), including through: (1) The material is delivered using sign language which is simple and easy for deaf students to understand, (2) Integrating mathematics learning with examples that are related to everyday life, (3) Prepare learning media, especially in the form of visual media that is compatible with the material.

## CONCLUSION

Deafness is a condition where there is hearing loss. The impact of this hearing barrier also means that some deaf students also experience barriers to speaking. The mathematics learning process for deaf students cannot be equated with the mathematics learning process for ordinary students. There are 3 stages of mathematics learning for deaf students, namely learning planning, learning implementation, and learning assessment. The curriculum for deaf students adapts to the needs of students with special needs, with slight modifications from the usual curriculum, namely functional skills and subjects that support these needs. The learning assessment includes formative and summative assessments in the form of giving questions. Based on interviews with mathematics teachers at Sunan Muria Kudus Extraordinary School, factors that cause deaf students to experience difficulties in learning mathematics include low interest in mathematics and a lack of understanding of the language. This condition means they need special assistance from teachers during the learning process. Support and assistance from teachers is really needed so that deaf students can learn optimally and develop their language skills.

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