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BARRIERS TO LEARNING MATHEMATICS IN INCLUSION CLASSROOMS: PERSPECTIVES OF DEAF STUDENTS AND TEACHERS

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Abstract

This study describe teachers and students with deafblindness perceive the difficulties of learning mathematics in the inclusive classroom. The purpose of this study was to find the problems faced by both of them when learning mathematics in the inclusive classroom. This study used a descriptive qualitative approach with data collection through observation, interviews, and documentation. Two deaf students and two maths teachers who teach in the inclusive class were involved in this study. The results of the study, it can be concluded that in the learning process in the inclusion class there are obstacles that come from internal factors, in the implementation of learning, and social factors. The lack of encouragement and interest of deaf students to learn mathematics is the main obstacle for students and teachers. Meanwhile, some of the challenges faced by students include the teacher's difficulty in choosing various learning approaches, processing materials for deaf students, each of whom has a different level of ability, the lack of availability of learning media and facilities provided by the school, and the lack of special assistant teachers at school.

Keywords: *Learning Disabilities, Math, Inclusive Class, Deaf Student, Teacher*

INTRODUCTION

The right to education is one of the most important human rights, and is guaranteed under the supervision of law for everyone, without exception. Therefore, the state is responsible for supervising violations and defending, upholding, and granting the right to education (Rahmiati et al., 2021). Given that education is one of the

The most important element in achieving the country's goals, the right to education of every citizen

must be fulfilled. Even national and international laws protect and guarantee education (Riyadi, 2021). Education is necessary for citizens to obtain an improved standard of living and get a decent life in the future (Bhabha, Giles, & Mahomed, 2020). Everyone has unique potentials and personalities instilled in them. Potential is processed until it is able to develop through education (Amaliyah & Rahmat, 2021). Regardless of the circumstances, every citizen has the right to education, especially related to inclusive education. So that every human being has the right to a proper education, including for children with special needs (ABK) (Riyadi, 2021). In line with that, the government's policy on inclusive education states that education is an important element for the Indonesia nation (Mulyah & Khoiri, 2023).

Inclusion education is education for children who experience learning disabilities due to physical, emotional, social, mental, and/or special intelligence and talents (Arriani et al., 2022). Therefore, the implementation of special education in the form of inclusive education is one of the government's efforts to improve educational services for children with special needs (Mulyah & Khoiri, 2023). Inclusive education in Indonesia has developed quite well. In December 2022, as many as 135,946 children with disabilities have participated in inclusive education (Ministry of Education and Culture, 2023).

In addition to the government that handles human rights issues for ABK, the implementation of inclusion schools itself should create a friendly, fun environment, and can encourage ABK confidence to receive a proper education in accordance with their rights. Children with special needs (ABK) are children who have special characteristics and are different from the average other children (Munawwiroh & Mintowati, 2022). With the limitations they have, it may be more difficult for them to balance other children both in terms of social, personal, or educational activities. Therefore, the right solution is needed to solve this problem, one of which is through inclusive education (Arum et al., 2020).

One of the people with disabilities is deaf children who have their own problems related to learning (Fakhiratunnisa et al., 2022). As a result, many deaf students have difficulty academically, and one of the areas where they struggle is doing math homework (homework) assigned by teachers (Guinet et al., 2023). Deaf students find challenges in the mathematics learning process, one of which is related to communication problems (Munawwiroh & Mintowati, 2022).

Deaf students are usually no different from other hearing children physically, they only sign or speak in a voice that lacks or is not articulated or speaks silently. Deaf students have hearing impairments that hinder their ability to understand language vocabulary from childhood or from birth, which makes speaking challenging for them. One technique that substantially helps deaf

children in communication (Zaenuri & Maemonah, 2021).

This research is important for teachers because it can analyze and evaluate less effective learning methods to be given to deaf children in learning mathematics. For deaf students, this research can help them self-introspect on the things that cause students' enthusiasm to learn to be hampered in mathematics learning. So, teachers can reduce learning barriers which are a big challenge as before. The role of schools is also needed in the form of providing proper infrastructure facilities for deaf students in mathematics learning.

Based on the background that has been presented, this study aims to: 1) Identify the obstacles faced by deaf students in the mathematics learning process in the inclusion classroom and 2) Explore the strategies used by teachers in minimizing these obstacles. Therefore, the researcher raised the title "Analysis of Mathematics Learning Barriers for Deaf Students in an Inclusive Class from the Perspective of Students and Teachers". So that after this research is completed, both students and teachers can evaluate the learning obstacles of students who are the main problems in this study.

METHOD

This study examines the *barriers to learning mathematics in the inclusion classroom: the perspectives of deaf students and teachers*. In accordance with the focus of the research taken, this study uses a qualitative approach that is descriptive. Qualitative research is a type of research in which the research will emphasize on holistic descriptions (Fadli, 2021). This research approach was chosen by researchers because it can help them make observations and analyze the results. Researchers are trying to get accurate information to be used as a basis for assessing the difficulty of learning mathematics for deaf students in the school. To collect data, observations, interviews, and documentation are used.

Observation is the process of direct observation of the subject and its environment with the specific goal of finding and predicting how certain behaviors will appear (Adhandayani, 2020).

Not only people can see, but also other natural objects. Researchers can use observation to learn about the subject's behavior and its meaning. In this study, observations were made directly during the interview to find out the overall condition and behavior of the subjects. Observations of the subject, the subject's behavior during the interview, the subject's interaction with the researcher, and other matters deemed relevant can provide additional information about the interview results.

Researchers also used interviews to collect data in addition to observation. The question and answer process that can be carried out face-to-face or without face-to-face through telecommunication media to obtain data is known as an interview (Trivaika & Senubekti, 2022).

When researchers want to conduct preliminary studies to determine what problems should be researched, then researchers can use interviews as a data collection method. This also applies if the number of informants requested is few or not many and the researcher wants to know more about the problem from the more informant informants.

Although the interviews conducted are free interviews, the researcher also provides systematic interview guidelines that will be used as a reference during the interview. This interview is called a semi-structured interview (Kakilla, 2021). Researchers conduct interviews to obtain research data. Some were interviewed face-to-face and interacted directly with informants, while others were through Whatsapp. The interviews were held on November 17 and 20, 2023 at the State High School Library located in the north of the Special Region of Yogyakarta, on November 30, 2023 via Whatsapp, and on December 8, 2023 at the school's lobby.

Documentation is a source of data used to complement research including written sources, films, images (photographs), and monumental works. Researchers will find that the documents used to obtain the data in this study include handwriting and books.

The research data subjects in this study involved two students with deaf disabilities who were students from high school and two teachers who educated in the inclusion class. In this school, there are three students with deaf disabilities, all of whom are in grade 10. One of the three students had a decibel of 90. The list of interviewed informants is presented in Table 1.

Table 1. List of Research Sources

Name of Resource Person	Information
Inisial A. H. F	Deaf students with high motivation and enthusiasm for learning
Initial F	Deaf students with low motivation and enthusiasm for learning
Initials A. A	Teachers in Inclusion Classes
Inisial I. H. A	Teachers in Inclusion Classes

Data Analysis

After obtaining all the information needed to solve the problem being studied, the next research process is data analysis. The accuracy of the conclusions is greatly influenced by the

sharpness and accuracy of the analytical tools used (Millah et al., 2023). The data of this study came from documentation and direct observation at school, as well as interviews with two deaf students and two teaching teachers. The data is written in the form of a descriptive narrative to tell the subject's experience.

This analysis aims to describe the incident, which is factual and accurate regarding the facts that occurred during the research carried out in one of the high schools in the north of the Special Region of Yogyakarta.

Data Validity

Checking the validity of data in qualitative research is one of the most important processes in presenting descriptive research results (Sa'adah et al., 2022). The validity of the data depends on several standards. Credibility, transferability, dependability, and confirmability are the criteria used in this study (Mekarisce, 2020). Source triangulation is a technique to test the validity of data carried out by

measure and compare data obtained from one informant with data obtained from other informants. The purpose of source triangulation is to obtain data that is really valid and in accordance with the facts and what is going on in the field (Sa'adah et al., 2022).

RESULTS AND DISCUSSION

Based on interviews and observations that have been conducted, it can be known how learning obstacles are experienced by deaf students in inclusion classes. The following are the results of the research on obstacles to learning mathematics in inclusion classes: the perspectives of deaf students and teachers.

1. Learning Barriers

1. Students' Interest in Learning Mathematics

Based on the results of interviews with two deaf students, it shows that students' study habits and motivation related to mathematics learning are the two main factors that cause students' interest and enthusiasm to learn mathematics is low. The motivation given to students from teachers, parents, and educational institutions is not enough to support and arouse students' interest in learning mathematics. Which should be biased to make deaf students develop their potential through the educational process (Amaliyah & Rahmat, 2021). Many students consider mathematics to be a difficult and boring subject, as they see it as only concerned with numbers, formulas, and calculation operations because students tend to enjoy activities outside of the classroom, such as sports (Hasanah et al., 2024).

From the perspective of the inclusion class teachers, data was obtained that the learning interest of deaf students in mathematics lessons is still somewhat less seen when learning in the classroom is not very enthusiastic and the results are also quite low.

2. Implementation of Mathematics Learning

Based on the results of interviews with two deaf students, it shows that mathematics teachers are not able to explain the material, especially for deaf students. The school only has one accompanying teacher (GPK) and only comes once a week on Fridays. This is shown by the results of teacher interviews, as follows:

> "*There is only one person here. Came here once a week on Fridays. And the math schedule is not Friday. So I communicate as much as I can. For example, when I work on number 1, I show the number 1."*

An important component in the implementation of inclusive schools, one of which is the capacity and readiness of mature teachers to face inclusive classes (Wardany & Ulfa, 2022). In line with that, another article reveals a similar point that teachers must have support from schools through training on inclusive learning technically to solve existing problems (Mumpuniarti & Lestari, 2019).

Teachers are required to be ready to adapt to various characters and circumstances possessed by students (Nurhakim & Furnamasari, 2023). One of the external factors that cause one of the obstacles when teachers teach mathematics in inclusion classes is the lack of special assistant teachers (GPK) and teachers who have participated in special training before (Hartadi et al., 2019). As well as the lack of communication skills of teachers in explaining mathematics material (Viero & Sari, 2023). This causes deaf students to have difficulties both in following and understanding learning and interacting with their peers (Guinet et al., 2023).

In the implementation of learning in the inclusion class, teachers have carried out all the stages that have been determined. However, teachers still experience obstacles in choosing learning methods that are less varied, the processing of materials to be provided to deaf students who each have different levels of ability, the lack of availability of student learning media and infrastructure provided by the school, and the lack of a special number of accompanying teachers in the school. Teachers' teaching skills also have an impact on learning in inclusive classrooms (Adewumi & Mosito, 2019). In addition, the completeness of the infrastructure provided by the school also has an impact on supporting the implementation of inclusive education (Suvita et al., 2022).

> *"For this class, I apply it differently from other classes. In other classes I talk a lot, but for*

this class, I really have to write it, for example, there is a symbol that we usually only voice, but for this class I write it on the side with parentheses."

From the results of the interview, it can be concluded that deaf students have difficulty learning mathematics, there are a lot of foreign terms and symbols that do not exist in real life and this cannot be explained with teaching aids. The lack of teaching aids provided by the school as a driver of students' success in understanding mathematics material. There are too few special assistant teachers for deaf students. As well as quite difficult communication between teachers and students in explaining mathematics material.

1. Social Environmental Factors

The social environment is also one of the main influencing factors in the student mathematics learning process (Kusmaryono, 2023). In line with that, the interaction between deaf students and other students went well, able to establish social contact and communication (Augustin, 2020). In addition, social interaction in inclusive classes can also improve the language skills of deaf students (Novialassafitri et al., 2021). Based on the observations that the researcher has made, the researcher found that one of the deaf students has a good relationship and is able to communicate with his other friends. However, one other student tends to be more reserved and does not interact much with others. With their limitations in communicating which makes it difficult for them to interact more with other people, both teachers and other friends. So that when experiencing difficulties in learning mathematics, the student rarely asks both his friends and teachers. This is what causes one of the deaf students to tend to be more quiet in class.

1. Teacher Learning Strategies

The learning strategy that has been carried out by teachers in the implementation of learning for deaf students is to place deaf student seats on the front bench so that students can reach the teacher and can more easily pay attention to what is explained by the teacher, while minimizing students' incomprehension in understanding the material given. If students still feel confused and do not understand, teachers will share material notes online via *whatsapp* in the form of *pfd* or share *youtube* links for further explanations. Teachers also give longer deadlines than other normal students when collecting assignments. Usually, teachers provide an additional three days specifically for deaf students. The difficulty of deaf students in learning mathematics is in learning abstract subject matter.

CONCLUSIONS AND RECOMMENDATIONS

In the implementation of mathematics learning in inclusion classes, there are various things that are factors that hinder the effectiveness of learning activities, especially mathematics learning.

Starting from the lack of motivation and enthusiasm of students in learning mathematics. Teachers experience obstacles in the selection of learning methods that are less varied, the processing of materials to be given to deaf students who have different levels of ability, the lack of availability of student learning media and infrastructure provided by the school, and the lack of a special number of accompanying teachers in the school. Communication between teachers and deaf students is still limited in language. So it is difficult for teachers to explain in detail about new, more complex materials.

Several strategies have been used by teachers in minimizing obstacles to learning mathematics for deaf students, starting from placing deaf students' seats on the front bench, share special notes online, as well as give a longer deadline than other normal students when concluding assignments.

With this research, we all know how the obstacles to learning mathematics for deaf students in inclusion classes are from the perspective of deaf students themselves and from the perspective of teachers. This research is expected to be a research recommendation for other research and researchers can develop further research.

The limitations of this study lie in the research subjects that only include deaf students and teachers in one specific inclusion school. Therefore, the results of this study cannot be generalized to the wider population or to the context of inclusion education in other schools. The implication of this limitation is that future research will need to involve a more diverse sample of different inclusion schools with different backgrounds and characteristics to improve the generalization of the findings.

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