Improving absorption of students with special needs by the use of Mathematical Multi-purpose Videos

Sugiman*, A Suyitno, and E Pujiastuti
Department of Mathematics, Universitas Negeri Semarang, Indonesia

*Corresponding author: sugimanwp@mail.unnes.ac.id

Abstract. This article begins with a research collaboration between the Director of Seameo-Sen, based in Melaka Malaysia, and the Study Center in the Field of Learning for Students with Disabilities of FMIPA UNNES. The research objective to obtain the results of the analysis that revealed the use of the Multi-purpose Videos of Mathematical Teaching Aids to increase the absorption of students with special needs. The research method is with a qualitative approach. The subjects of this study taken one Malaysian Special School teacher, a Partner Researcher from Seameo-Sen, and the four of visually impaired and the mental retardation students at State Special School (SLBN) in Salatiga. Data analysis: data reduction, data presentation, data interpretation, and drawing conclusions, accompanied by class visit activities at SLBN Salatiga by applying Multi-purpose Videos of Mathematical Teaching Aids, interviews, Focus Group Discussion (FGD), and triangulation of data sources. As a result, by applying the Multi-purpose Videos of Mathematical Teaching Aids there was an increase in the absorption of SLB students. In conclusion, SLB needs to use Multi-purpose Videos of Mathematical Teaching Aids to increase the absorption of students with Special Needs in Mathematics.

1. Introduction

The background of this research, begins with a request for cooperation from the Director of the Southeast Asian Ministers of Education Organization - Regional Center for Special Education (Seameo-Sen) based in Melaka of Malaysia, to the Chair of this Research as Chair of the Study Center of the Learning of Students with Disabilities of Mathematics and Natural Sciences Faculty (FMIPA) of Universitas Negeri Semarang (UNNES), for studies together in analyzing the use of Mathematical Teaching Aids to increase Absorption Power among SLB students. The UNNES research team chose Multi-purpose Videos as its supporting of Mathematical Teaching Aids.

Students in special schools wherever they are, must empower themselves to their rational potential. If students' absorption of mathematics and other subjects could increase, this would make special school students accustomed to facing a problem, including continuing their education at a higher level [1].

Based on the background above, the problem formulation is: How do we get the results of the analysis that reveals the use of the Multi-purpose Videos of Mathematical Teaching Aid to increase the absorption of SLB students through collaborative research between UNNES and Seameo-Sen Melaka, Malaysia? The objective of this study was to obtain the results of the analysis that revealed the use of the Multi-purpose Videos of Mathematical Teaching Aid to increase the absorption of SLB students through collaborative research between UNNES and Seameo-Sen Melaka, Malaysia.
SLB (Special Education School) is a special school for Students with special needs. While it must be slowed down according to the degree of student disability, it is important to support government's efforts to increase the standard of learning in special schools. Rising student absorption requires this quality enhancement. Thinking absorption is an ability to consider and reason in answering difficult question and solving a case or problems to enhance the quality of learning [2].

Teachers’ ability to ask questions and compile a Lesson Plan based on the relevant curriculum includes elements of thinking skills that are an absolute must. The teachers who are qualified to ask questions and are able to prepare appropriate teaching aids will be able to increase their students’ absorption and are expected to be able to solve problems in their lives after completing their education in special schools [3,4].

Mathematics learning media can be in the form of manipulative teaching aids which have 5 features, namely: (1) teaching aids that can be used in groups or individually; (2) it is possible to change or modify the use of teaching aids according to their designation; (3) a variety of different information can be linked to the application; (4) it can be used for problem solving; (5) can speed up the absorption of students to learn a formula or concept. Students may be inspired to be imaginative by the advent of interesting learning [5]. In the future, ingenuity for special school graduates, including labor demand, is required. Manipulative teaching aids are required to provoke the imagination of students as well as to interest special school students in mathematical thought.

Multi-purpose Videos in mathematics learning can be made using Information Communication and Technology (ICT). All aspects of human life have been invaded by ICT itself, even in the field of SLB education as in Figure 1.

![Multi-purpose Video with Sign Language](image)

**Figure 1.** Multi-purpose Video the teaching aids are displayed along with the use of Sign Language

The role of ICT in making Multi-purpose Videos is very significant in the world of education, not just for universities alone but also for SLB education [6]. There are now many different educational services, both formal and non-formal to develop for special school students. In the cognitive development of SLB children, it is necessary to provide an understanding of basic mathematics such as shapes, sizes, patterns, solving problems, numbers, and counting needs to be provided. It is very important to master basic math skills because they are found in children’s real lives. ICT can be used in different media such as the making Multi-purpose Videos [7]. Multi-purpose Videos such as fingers and toes, clothing, as well as vibrant and different sizes of tableware, blocks, even trees, different animals and filled with voices or Sign language, can be used to imagine the child’s own body. There are now several simple CD/DVD mathematics learning courses that are appealing and freely accessible on the market. As an educator, it remains just how to choose what is suitable and friendly for SLB kids so that learning becomes exciting and enjoyable.

By using both manipulative teaching aids and teaching aids oriented and contextualized with student reasoning, learning that makes a learning environment useful and enjoyable for learners will enhance
student absorption for the better [8]. Teachers and students need to be equipped with knowledge that must be consistent with current needs [9]. If what is faced is CwD in special schools, the teacher needs to master learning that trains students to improve their interest. This means that the CwD mathematics learning method that uses teaching aids needs to take place in a friendly environment and mathematics looks easy.

Special School students will enjoy their learning through an interesting and enjoyable learning process or learning experience. It is noted that learning perceptions that draw the attention of students have a positive impact on student motivation [10,11]. Furthermore, the student absorption growth metrics are including (1) students want to learn; (2) in the learning process, students tend to be involved; (3) students appear delighted to engage in the learning process with Multi-purpose Videos; (4) it seems that students have the confidence to ask questions related to the learning content; and (5) the value received by students is in line with the teacher intended value [11,12].

2. Methods
A qualitative approach was taken in this research. The subjects of this reasearch are 1 Research Partner from SEAMEO-SEN in Melaka-Malaysia, 1 Malaysian Extra-Ordinary School teacher, the four of visually impaired and the mental retardation students at State Special School (SLBN) of Salatiga and 1 SLBN teacher in Salatiga during this research.

2.1 Analysis of Research Data
Analysis of research data: data reduction, data exposure, data interpretation, and drawing conclusions, which are accompanied by class visits in special schools, interviews, focus group discussions (FGD), and triangulation of data sources [14,15].

2.2 Main Research Activities
It was held in Indonesia (SLBN in Salatiga and at UNNES) and because of the Covid-19 Pandemic, FGD to seek additional data input for the research team, was conducted through a Webinar involving the Director of the Southeast Asian Ministers of Education Organization - Regional Center for Special Education (Seameo-Sen), Melaka Malaysia, special school teacher in Malaysia, and Director of Special Education Ministry of Education and Culture of RI.
Its main activities:
1) Preparing a Multi-purpose Videos of Mathematical Teaching Aid Prototype that has been tested in research in 2019 at SLBN Salatiga, to be discussed with Seameo-Sen, a special school teacher in Malaysia, and the Director of Special Education of the Indonesian Ministry of Education and Culture.
2) Analyzing basic ideas on how to improve absorption in special schools in mathematics through FGD with Seameo-Sen Melaka Malaysia, special school teachers in Malaysia, and the Director of Special Education of the Indonesian Ministry of Education and Culture.
3) Analyzing the application of the Multi-purpose Videos of Mathematical Teaching Aid to support the increased absorption of SLB students in learning mathematics.
4) Providing exercises for math problems whose solutions require a Multi-purpose Videos of Mathematical Teaching Aid to analyze the increase in the students absorption of SLBN.
5) Conducting further overseas cooperation assessments which were expected to improve the quality of SLB learning at a broader level.

3. Results and Discussion
Based on the data obtained from the qualitative method on the subject of this study, an analysis has been produced that reveals the use of Multipurpose Video for Mathematics Teaching Aid to Increase Absorption of SLB Students through collaborative research between UNNES and Seameo-Sen Melaka, Malaysia. According to the stages of the research method, the results are as follows.
1) Research Subject 1: Director of Seameo-Sen Melaka, Malaysia. The research team has obtained input data related to the use of Multi-purpose Videos of Mathematics Teaching Aid to Improve Absorption
of Special School Students. After data reduction, data exposure, interpretation, and triangulation of input data are performed, the results were: (1) Teachers need to master the use of Multi-purpose Videos of Mathematical Teaching Aids. (2) Students need to have or hold/practice Multi-purpose Videos of Mathematical Teaching Aids.

2) Research Subject 2: One Special School (SLB) teacher in Malaysia. The research team has obtained input data related to the use of Multi-purpose Videos of Mathematics Teaching Aid to increase Absorption of SLB students. The results: (1) The teacher needs to master the material related to the use of the Multi-purpose Videos of Mathematical Teaching Aid. (2) Students need to be trained so that they can practice Multi-purpose Videos of Mathematical Teaching Aids.

3) Research Subject 3: One teacher of SLBN of Salatiga and its students. The research team obtained the data of observations and interviews. After data reduction, data exposure, interpretation of data findings, and triangulation of the input data are carried out, the results of the application of the Multi-purpose Videos of Mathematics Teaching Aids to improve Absorption of SLB Students were as follows: (1) The Multi-purpose Videos of Mathematical Teaching Aid was very suitable and can improve the absorption of SLB students. (2) Agree that students need to be trained first so that they can practice and become familiar with the use of Multi-purpose Videos of Mathematical Teaching Aids. (3) Students were very happy and enthusiastic about using the Multi-purpose Videos of Mathematical Teaching Aid.

SLBN students, with all their specific needs to improve absorption of students capacity. SLB teachers are not allowed to teach in SLB only verbally and directly provide questions to solve. The teacher needs to apply a teaching aid that can increase the absorption of SLBN students in learning. One of them is through the use of a Multi-purpose Videos of Mathematical Teaching Aids.

One of the ways that SLB students' absorbency can be developed is through learning mathematics assisted by mathematical teaching aids which are packaged through learning that attracts SLB students. In learning practice, it means that the teacher must be able to create a pleasant atmosphere and the subject matter can look easy to students.

In general the role of mathematics learning aids to increase students' absorption, the teaching aids used must be able to (1) overcome the differences in personal experiences of special school students; (2) overcoming the limitations of space, time, and sensory power; (3) make concrete abstract mathematical concepts; (4) clarify the presentation of the message so that it is not too verbal; (5) complete and enrich information in learning activities in a fun way; as well as (6) provide real experiences that can foster self-employed activities among SLB students [16].

So, a teaching aid that is designed, made, or will be used by a teacher, should be a tool that makes it easier for students to understand a material, find a formula, or be able to help SLB students in problem practice in a fun learning atmosphere. An example of using the Multi-purpose Videos of Mathematical Teaching Aid to support the increased absorption of students in SLB that is produced and practiced is as follows. The following is one of the product of Multi-purpose Videos of Mathematical Teaching Aid to help the growth of student absorption in SLB which is intended to become a model based on the characteristics of SLB students for the Multi-purpose Videos of Mathematical Teaching Aid. What multi-function means is that this teaching aid can be used as a way to clarify content to students with visual impairments, students with mental retardation, and those who are deaf and speechless.

4. Conclusion
Collaborative research between UNNES and Seameo-Sen Melaka, Malaysia regarding the use of Multipurpose Video for Teaching Mathematics for Special School Students has revealed two important results. The Multi-purpose Videos of Mathematical Teaching Aid was very suitable in improving the absorption of SLB students. The teachers were agree that students need to be trained first so that they can practice and become familiar with the use of Multi-purpose Videos of Mathematical Teaching Aids.
The analysis results were obtained that the use of the Multi-purpose Videos of Mathematical Teaching Aid can increase the Absorption of SLB students through collaborative research between UNNES and Seameo-Sen Melaka, Malaysia.

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