Need Analysis of Teaching Materials for Speed and Discharge Materials in Grade 5th of Elementary School

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Abstract. The purpose of this study is to analyze the need for teaching materials for teachers and students of class VB in SD Negeri 1 Kauman according to the needs that can be practical, interesting, and useful regarding teaching materials toward more complete and strengthen the independent character of students. This study uses qualitative research method. The problem found in learning mathematics in class VB is the lack of variety in teaching materials so that students feel bored and have difficulty absorbing math material considered difficult. In addition, conventional methods such as lectures, questions and answers, and assignments given by teachers during offline and online learning also make students feel bored. Coupled with the online learning that is applied, it weakens the independence of students. The results of the needs analysis questionnaire show the results of 89.78%, which means that most students need. From the results of the analysis, it can be concluded that teachers and students of class VB SD Negeri 1 Kauman need a variety of teaching materials that can support the mathematics learning process, especially speed and discharge material. The teaching materials must be integrated with technology to increase the independence of students.

Keywords: Need Analysis · Mathematics · Teaching Materials · E-Module

1 Introduction

Learning is a process in providing lessons to students regarding an information or concept through experience (Zahro et al., 2018). Mathematics learning is one of the learning carried out in an educational environment. Mathematics is a basic science that cannot be separated from students' daily life (Aprinastuti, 2019; Pinunggul & Apriandi, 2018). Mathematics is a subject that must be studied in every level of education. Mastery of mathematics is abundant needed in dealing with education world, increasingly advanced technology, and a science that is increasingly developing in everyday life (Dele-Ajayi et al., 2019). According to Nuraini (2019), mathematics is a deductive science accepting generalizations based on an evidence, not just an observation (inductive). Mathematics learning at SD/MI level has a main objective so that students can recognize arithmetic operations, simple numbers, measurements, and fields summarized in three parts, which are simple algebra, geometry, and statistics.

However, mathematics is one of subjects still considered abstract and difficult to understand by students, even though mathematics has use values in everyday life (Sili et al., 2018). In learning mathematics, teachers often use conventional method that leads to the additional increase of students' low interest in learning mathematics (Faelasofi et al., 2015). It makes it difficult for students to understand learning so that the subject matter and its use in life cannot be connected. Most students still think that mathematics contains full of memorization so that they are only able to memorize the material received.

One of the mathematics materials in SD/MI is speed and discharge material taught in grade 5 SD/MI. This material often makes students experience difficulties because the material contains problem solving with formula developments for its application (Yurita & Masniladevi, 2020). It causes most students less active in learning. This statement is in line with research conducted by Arrianti & Amelia (2021) where student learning outcomes on speed and discharge material are low. A total of 67% students scored below the school's Minimum Completeness Criteria (KKM), which is 70.

In learning mathematics, it is necessary having teaching materials that are able to support teachers in delivering material toward students creatively and innovatively. One of teaching materials that can accommodate students as a means of independent learning with minimal teacher guidance is a learning module (Deviana & Sulistyani, 2021). The module is a form of teaching material arranged systematically, intact, and planned which contains a set of student learning experiences and is arranged in order for students to achieve specific learning goals (Sili et al., 2018). The module at least contains learning objectives, materials, and learning evaluations. The module has a function as a means of independent learning for students so that they can learn at their own learning speed independently (Khoirudin, 2019). Thus, a module can provide strengthening of students' independent character. However, the position of printed modules in the current era can be replaced by e-module due to technological developments.

The position of technology is excessively important in education world (Ahdhianto et al., 2021). It shifts the position of a module into an electronic form or commonly called an e-module. The substance in the module is arranged in such a way that it transforms into electronic form (Ahdhianto et al., 2021). E-module can be accessed by students anywhere and anytime and are supported by adequate tools and do not make it difficult for students (Elvarita et al., 2020). It makes learning process of students interesting. In addition, teachers are also easy to carry out teaching to students both in one and another place (Fourlila & Fauzi, 2019). Electronic module can be linked with links and equipped with interesting pictures and animations in order to create a meaningful experience for students and not boring (Hafsah et al., 2016; Serevin & Sari, 2018). The substance of material contained in e-module must be arranged in a coherent and systematic manner.

E-module can be a means of independent learning for students so that it can strengthen the independent character of students. The independence of students can increase when the learning process uses e-module. This is in line with the results of previous research conducted by Linda & Son (2021) where e-module can increase students' independence from 64.69% to 81.04% or from medium category to higher category. This study aims to analyze the need for teaching materials for teachers and students of class VB at SD Negeri 1 Kauman, Tulungagung Regency as expected, which can be practical, interesting, and more complete teaching materials and strengthen the independent character of students.
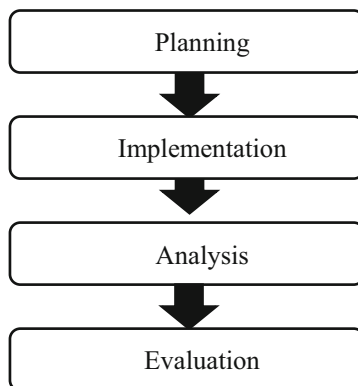
2   Methods

This research uses qualitative method with qualitative descriptive research. Qualitative descriptive approach is a method of data processing through analysis of factors related to the object of research with in-depth presentation of data objects (Prabowo & Heriyanto in Qomalasari & Respati, 2021) (Fig. 1).

In this study, an analysis of the problems occurring in SD Negeri 1 Kauman related to teaching materials used in learning will be carried out. This research is conducted on Thursday, September 30, 2021 in class VB of SD Negeri 1 Kauman with the target of teachers and students in class VB of SD Negeri 1 Kauman. The research procedure can be described as follows.

Procedure consists of 4 steps, which are planning stage, implementation stage, analysis stage, and evaluation stage (Adiansha et al., 2021). The planning stage is carried out by compiling a research plan, making interview guidelines, and making a needs analysis questionnaire for students. The implementation stage is carried out by conducting interviews and filling out student questionnaires. The analysis phase is carried out by processing the data obtained and analyzing and linking it with relevant theories. The evaluation stage is carried out by reviewing the research results obtained for reporting.

The research subject is the main element in the implementation of the research process used as a research variable (Rosilia et al., 2020). This analysis uses the research subject of class VB teachers at SD Negeri 1 Kauman and 21 students in class VB at SD Negeri 1 Kauman consisting of 11 male students and 10 female students. The implementation of this activity is carried out by interviewing the class VB teacher and making observations by filling in class VB students at SD Negeri 1 Kauman. The data obtained comes from teachers and students of class VB of SD Negeri 1 Kauman in the form of descriptive data from the results of the needs analysis carried out.

The interviews conducted in this research and development are interviews with class VB teachers at SD Negeri 1 Kauman with aims to find out the potential and problems experienced during learning mathematics. Table 1 shows the grid of interview

Fig. 1. Research procedure

Table 1. Grid of interview instrument

Aspect	Question Indicator
Student Condition	Number of students in class VB of SD Negeri 1 Kauman
	Characteristics of class VB students at SD Negeri 1 Kauman
	Subjects that students dislike the most
	Difficulties experienced by students
	Factors causing student learning difficulties
Learning	Curriculum used
	Teaching materials used in learning
	Models and methods used in learning
	Learning during pandemic
	The use of technology in learning
	Problems encountered during learning
	Experience using e-modules
	Opinions when learning uses e-modules
Independent character strengthening	The ability of students to learn independently during pandemic
	The state of students when studying online or offline

instruments with VB class teachers at SD Negeri 1 Kauman to find out potentials and problems.

Research instrument is a tool that serves to obtain data from a research activity. In this study, the research instrument used is an interview guide covering three topics, such as students' conditions, learning, and strengthening independent character. In addition, a needs analysis questionnaire is also used for class VB students of SD Negeri 1 Kauman to find out the potential and problems occurring. The grid of research instruments can be described as follows.

A needs questionnaire is given to class VB students at SD Negeri 1 Kauman to find out the needs of students in learning mathematics. The following is a grid of needs questionnaires given to class VB students at SD Negeri 1 Kauman.

The data obtained is analyzed. The analysis results of interviews with teachers and questionnaires from students are used to determine the potential and problems faced when learning mathematics on speed and discharge material in class VB of SD Negeri 1 Kauman. After the analysis is carried out, a description of the data that has been grouped is carried out by taking into account the objectives and focus of the research. In the end, the conclusion, final analysis, and evaluation will be drawn (Table 2).

3   Result and Discussion

This study aims to analyze the need for teaching materials for teachers and students of class VB at SD Negeri 1 Kauman, Tulungagung Regency as expected, which can be practical, interesting, and more complete teaching materials and strengthen students'

Table 2. Grid of need analysis questionnaire

Aspect	Question Indicator
Student's perception of mathematics subject	Students like math Mathematics is a difficult subject for students Students can master mathematics learning materials Students feel bored when learning mathematics Factors causing student learning difficulties
Speed and discharge material	Speed and discharge material is a difficult material Students have understood the relationship between length and time Students have understood the relationship between volume and time
Student characteristics	Students prefer the game or practicum method Students already have smart phones Students have been able to operate smart phones Students prefer to use cell phones or the like to study
Student conditions during online learning	During online learning using mobile phones to study Students have difficulty in understanding the material when learning online Students are assisted by parents during online learning
Independent character strengthening	Students know the meaning of independent attitude Students can name examples of self-reliance

independent character. The results obtained from the interview process with class VB teachers at SD Negeri 1 Kauman can be described as follows.

The results of the needs analysis conducted with class VB students of SD Negeri 1 Kauman can be presented as follows. According to the results of interviews about the condition of class VB students at SD Negeri 1 Kauman, Mrs. Dwi Ratnasari as the class teacher revealed that the number of students is 21 students with the difficult subject is mathematics. It is evidenced by the results of students' low mathematics scores, especially in speed and discharge material. These problems are caused by the development of formulas in the material so that students have difficulty understanding it. It is in line with research conducted by Arrianti & Amelia (2021) which obtained the findings of low values on speed and and discharge material. This statement is supported by research conducted by Yurita & Masniladevi (2020) who revealed that the material often makes students experience difficulties because the material contains problem solving by developing formulas for its application. On the other hand, it is found that the class

Table 3. Result of need analysis of class VB students

Aspect	Percentage	Average Percentage	Category Analysis Results
Student's perception of mathematics subject	74,29%	89,78%	Most need
Speed and discharge material	80,95%		
Student characteristics	98,41%		
Student conditions during online learning	95,24%		
Independent character strengthening	100%		

VB students are familiar with technology such as smartphones, both owned or owned by their parents. Based on these results, it is necessary to have mathematics learning with varied teaching materials utilizing technology so that students do not get bored in learning mathematics, especially on speed and discharge material. It is also supported by the results of the needs analysis found that 20 out of 21 students of class VB prefer to learn by using their smartphones (Table 3).

Learning in class VB of SD Negeri 1 Kauman has referred to the 2013 curriculum. The teaching materials used are thematic and agile textbooks from the government. This is felt by the teacher to be quite effective in learning material. However, during the pandemic, students feels bored because the learning activity only utilizes WhatsApp and teachers mostly uses assignment methods sourced from thematic books or agile intelligence without being accompanied by videos or other supporting media that makes learning more interactive. In fact, interesting pictures, videos, and animations can be meaningful experiences for students and lead to not-boring learning (Hafsah et al., 2016; Serevina & Sari, 2018). In line with the current implementation and principles of the 2013 curriculum, students need alternative variations of teaching materials (Ahdhianto, 2016).

Even during offline learning, teachers often use lecture and question and answer methods and occasionally use practicum if needed. It is not in accordance with the characteristics of elementary school students who like to play, love to move (Kurniawan, 2015), and enjoy using technology in learning (Adesti & Nurkholimah, 2020).

The problem that occurs in learning in class VB of SD Negeri 1 Kauman when learning offline is that students often feel bored and lazy to read, especially in learning mathematics. This resulted in low learning achievement in the field of mathematics. At the time of online learning, learning has utilized technology but is only limited to using WhatsApp as a communication medium between teachers to give assignments to students. The problem that occurs when learning online is that sometimes students experience signal difficulties which cause delays in the absorption of material by students. In addition, the assignment method without being accompanied by something that makes learning more interactive makes students bored in learning and has difficulty absorbing learning material (Meidawati, 2019). It is reinforced by the results of filling

out the questionnaire showing that 19 out of 21 students felt bored and had difficulties when learning online usually done by the teacher. This boredom leads to student laziness in doing assignments. From the results of the questionnaire, as many as 20 out of 21 students are assisted by their parents in completing assignments online. It makes the independence of students weaken and results in declining student achievement.

One of the variations of teaching materials that teachers can use to overcome student boredom in learning is e-module. E-module is a module with an electronic version that utilizes electronic devices such as smartphones, tablets, computers, or laptops (Sholikhah, 2020). The presentation of e-module is in the form of soft-files that can be displayed on electronic media used so that the resulting learning utilizes existing technology. Electronic modules can be interpreted as a form of systematically presenting independent teaching materials and presented in electronic form where each unit in it is connected through navigation in the form of links that make students more interactive through the presentation of images, animations, audio, and videos to enrich the learning experience (Feriyanti, 2019). Therefore, it can be concluded that modules and e-modules have differences only in the form of their presentation in print and electronically, where e-modules are equipped with navigation in the form of links that can be accessed by students in order to enrich the learning experience through pictures, animations, audio, and video as raise the independence of students' learning.

The class VB teachers of SD Negeri 1 Kauman admits that they have never used e-modules in learning. The learning carried out usually uses a printed module from the government. However, the class VB teacher of SD Negeri 1 Kauman knows about e-module learning. According to him, e-modules can help supporting the learning process, and students will be more interested because they can use their smartphones to learn. E-modules can be used by students anywhere and anytime and are supported by adequate and not difficult tools (Iriani et al., 2020). It makes students enthusiastic and interested in the learning process. In addition, it is also easier for teachers to teach students both in one place and in another by utilizing e-modules (Fourlila & Fauzi, 2019).

In addition, based on the interview results with class VB teachers, during online learning, the students' visible characters are discipline in collecting assignments, being active, and taking responsibility while the independent character has not been seen when learning online applied because the teacher has difficulty in controlling student learning at home (Yulia & Putra, 2020). This is supported by the results of student questionnaires which show that as many as 20 out of 21 students are assisted by their parents in completing assignments online. The data shows that the level of independence of students is weakened due to online learning. According to the class VB teacher, when learning online, the parents are working on it because it can be seen in their writing. Meanwhile, when learning is offline, inevitably the students themselves do the work.

When learning online, teachers encounter obstacles in the learning carried out, especially in learning mathematics. According to him, the material taught is considered by students to be difficult material, coupled with online learning. The teacher becomes confused in explaining the material. As a result, students are less in terms of understanding the material. Moreover, according to the results of filling out the questionnaire, 14 out of 21 students consider mathematics as a difficult subject and 15 of 21 students consider speed and discharge material is difficult.

The results of the needs analysis questionnaire show a percentage of 89.78%. Referring to the percentage category of Munggaran (in Febriana Wati et al., 2020), the results of the needs questionnaire carried out include in the interval 76% - 99.9% and show the level of needs included in the category of most in need. From the results of this analysis, it can be concluded that teachers and students of class VB SD Negeri 1 Kauman need a variety of teaching materials that can support the mathematics learning process, especially speed and discharge material. These teaching materials can be integrated with technology so that they can match the characteristics of students, in which they prefer to learn to use their smartphones. The teaching materials developed are expected to be valid and can be used in a practical and interesting way. Teaching materials in accordance with this statement are e-modules that can be a means of independent learning for students and lead to interactive learning because they are equipped with navigation in the form of interesting links, pictures, videos, dan animation.

4   Conclusion

In learning mathematics in class VB, problems are found, which are the lack of variety in teaching materials so that students feel bored and have difficulty in absorbing mathematics learning materials considered difficult. In addition, the conventional method given by the teacher during offline and online learning makes students feel bored. Coupled with the online learning that is applied, the independence of students is weakened. The results of the needs analysis questionnaire show the results of 89.78%, which means that most of the students need it. From the results of this analysis, it can be concluded that teachers and students of class VB of SD Negeri 1 Kauman need a variety of teaching materials that can support the mathematics learning process, especially speed and discharge material. These teaching materials can be integrated with technology so that they can match the characteristics of students, in which they prefer to learn to use their smartphones. Teaching materials in accordance with this statement are e-modules which can be a means of independent learning for students and lead to interactive learning because they are equipped with navigation in the form of links, pictures, videos and interesting animations. For further researchers, it is hoped that the further research can developed as an interactive e-module for speed and discharge material in supporting mathematics learning process for fifth grade elementary school students. In addition, researchers need criticism and suggestions for the perfection of this article.

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