# Qr-Code-Based Mathematics Contextual Comic Module for Elementary School Students

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**ABSTRACT:** This research is based on the results of a preliminary study to teachers and students of class V Elementary School regarding the analysis of the need for Mathematics teaching materials. Initial findings indicate that students' interest in learning mathematics is low, as can be seen from students who pay less attention to when the teacher explains. It is also known that there is no use of other teaching materials other than textbooks. The purpose of this study was to determine the need for appropriate teaching materials in fostering students' interest in learning mathematics. The method used in this research is descriptive qualitative. The subjects of this study were teachers and students of class V, which was held at SDN 2 Pasuruan, Penengahan, Kalianda, South Lampung. Data collection techniques are observation, interviews and questionnaires. The data were analyzed using the Miles and Huberman model, namely: data reduction, data presentation and drawing conclusions/verification. The results of this study indicate that there are still many students whose learning interest is low when studying mathematics but gets a positive response when the teacher uses QR-Code-based illustrated teaching materials so that students become enthusiastic and have an effect on increasing their interest in learning. Specifically on the scale material, the researcher found data that there were still many students who had difficulty understanding it, such as using comparisons on a scale and how to change units of length. Based on the results of the needs analysis, conclusions can be drawn: 1) The use of teaching materials as a learning resource in mathematics is not optimal, 2) Teaching materials that need to be developed in learning mathematics with scale materials, one of which is QR-Code-based comics

**KEYWORDS:** Mathematics, Comic Module, QR-Code, Scale, Learning Interest

## INTRODUCTION

Mathematics has an important role in everyday life and in the development of science and technology. In everyday life, for example, mathematics cannot be separated from buying and selling activities, namely weighing the weight of an object, dividing a cake evenly, and much more. (Perwitasari et al., 2018) explains that teaching materials must be in accordance with the conditions of students and the environmental conditions in which students live (contextual) because they can provide a meaningful learning experience for students. Therefore, mathematics needs to be taught to children from an early age, besides being able to solve math problems, learning mathematics can also help and facilitate students in solving everyday problems. Judging from the role of learning mathematics that is so important, learning mathematics in every school needs to be considered.

The cognitive development of elementary school students is at the concrete operational stage, generally having difficulty in understanding abstract mathematics. The abstraction of mathematics is relatively not easy for students to understand in general (Ermayani et al., 2019). However, if given a mathematical concept without concrete examples, students will find it difficult to learn it and the impact will result in students not having the interest and desire to learn the concept (State Literature & PGMI Tarbiyah and Teacher Training, 2014). Mathematics is considered difficult because mathematics teaching materials commonly used in schools (textbooks), are considered less attractive and difficult for students to understand. This is because the presentation cannot attract the attention of students, such as the book only written letters and numbers, the layout of the book is rigid, and more text than pictures, there are some pictures that are not colored so that students are less interested in learning it.

At SDN 2 Pasuruan, learning mathematics only uses textbooks provided by the school. Many students think that learning mathematics is difficult and boring. Although mathematics has an important role, in fact mathematics is still considered as one of the most difficult subjects by some students (Octavyanti & Wulandari, 2021). Judging from the results of observations, most students do not understand the material in the book. When the teacher gives prompting questions, the students are often silent. The teacher must repeatedly explain the material to students in order to understand. Some students also seemed to prefer to copy their friends' work rather than doing it themselves by looking at examples of how to solve problems in books. Therefore, students need interesting teaching materials that can provide real examples according to everyday life. According to (Purwanti, 2012) contextual

learning is a learning concept that helps teachers relate the material being taught to real-world situations that encourage students to make connections between their knowledge and the application of theory in everyday life.

One of the efforts that can be made by teachers to increase students' learning motivation is to use interesting teaching materials. The interest of students in learning is strongly influenced by the attractiveness of a teaching material. The use of teaching materials is often a benchmark for students' reading interest in studying the material presented in these teaching materials (Fironika Kusumadewi et al., 2020). Teaching materials are important factors that can support the learning process to be effective and efficient (Fikriani & Swetherly Nurva, 2020). Basically, teaching materials are all materials (both information, tools, and texts) that are systematically arranged, which displays a complete figure of competencies that will be mastered by students and used in the learning process with the aim of planning and studying the implementation of learning. For example, textbooks, modules, handouts, worksheets, models or mockups, audio teaching materials, interactive teaching materials, and so on (Prastowo, 2016).

So that students can understand mathematical concepts well, an interesting teaching material is needed. These teaching materials are expected to help improve students' mathematical understanding abilities. Especially in mathematics, there are a lot of abstract concepts that are considered very difficult by students, so they need teaching materials that can foster student interest so that they are more interested in participating in learning so that the material presented by the teacher can be absorbed properly. One of the teaching materials that have these characteristics is a comic-shaped teaching material. According to the Indonesian dictionary (2005) comics are illustrated stories that are generally easy to digest and funny. Teaching materials in the form of comics are an effective educational tool to generate learning motivation for students. Comics are also one of the authentic media to clearly describe the reality of everyday life, because visuals, language style, and codes in comics can attract students' interest to facilitate mastery of concepts (Aprilla, 2020).

The use of comics teaching materials for mathematics learning has been carried out by several previous researchers. As research conducted by (Fironika Kusumadewi et al., 2020) entitled "Development of Digital Comic-Based Mathematics Teaching Materials to Increase Reading Interest of Elementary School Students" the results show that the interest of students after being given digital comic-based mathematics teaching materials increased compared to before. using digital comics. In a study conducted by (Pamungkas et al., 2019) entitled "Development of Comic Media With a Scientific Approach to Improve Elementary Mathematics Problem-Solving Ability" shows that comic media with a scientific approach to improve problem-solving skills in elementary schools is effectively used in learning. While the research conducted by (Sari & Ritonga, 2021) entitled "Development of Weight Unit Materials for Math Comics Teaching Materials in Elementary Schools" the results also show that product development in the form of weight unit math comics teaching materials is considered very feasible and effective to use during activities. learning. Based on the explanation above, this research can be used as a basis for developing teaching materials in the form of math comics.

**METHODS**
This research is a descriptive research with qualitative method. The research subjects were teachers and students of class V SDN 2 Pasuruan, District, Penengahan Kalianda, South Lampung. There are three data collection methods used: observation, interviews, and questionnaires. Observations are made by looking at the activities of students when learning mathematics. Interviews were conducted with the fifth grade elementary school teachers. The selection of class V teachers is based on the fact that researchers will conduct research in class V so that the teacher feels that they know the problems in class V related to the most difficult material according to students in understanding learning or based on student learning outcomes. The type of interview conducted is an unstructured (free) interview. Free interviews are interviews in which researchers do not use systematic and fully edited interview guidelines for data collection (Sugiyono, 2015). Data collection using a questionnaire is used to analyze the needs of students regarding the most difficult material to learn, and the causes of students' difficulties in learning. Questionnaires were given to 33 fifth grade students via google form. After collecting data through observation, interviews and questionnaires, then the data was analyzed using the model (Miles & Huberman, n.d.) as follows: 1) Data reduction, namely the process of researchers in classifying data that are considered important, 2) Presentation of data, namely the process of researchers in compiling information in the form of paragraphs and 3) Drawing conclusions/verification, namely the process of reviewing the results of writing to obtain conclusions (Ridder et al., 2014).

**RESULTS AND DISCUSSION**
Preliminary research, which began in early May, was conducted with field observations, namely in the fifth grade of elementary school at SDN 2 Pasuruan, Penengahan, Kalianda, South Lampung. Observations are made in order to see the actual situation in learning mathematics or themes. Researchers saw a significant difference between when students learn thematically and when students learn mathematics. The students seemed to be silent when the math material was explained, but when asked to ask questions by the teacher, no one wanted to ask. However, when given a question, the students asked repeatedly until the teacher

had to repeatedly explain to the students. Not even a few students complain that mathematics is difficult. Judging from the students' scores, the average value is still higher during thematic learning.

Based on the results of interviews with fifth grade elementary school teachers, the materials that are most difficult for students to understand are addition and subtraction of fractions, multiplication and division of fractions, and scales. Judging from the learning outcomes, the average score of the lowest students is in the addition and subtraction of fractions. The teacher said that the teaching materials used in learning mathematics were only Yudhistira's textbooks given by the school. The teacher has not been able to make modules or LKPD because the teachers at the school do not really understand how to make teaching materials. The books used tend to be difficult for students to understand because the explanations for the material are few and do not provide concrete explanations for students. Sources of teaching materials that are only glued to textbooks without being innovative and the creativity of teachers in developing teaching materials will have an impact on the learning process being hampered (Nupus et al., 2021). So students lose interest in learning to use the book.

Rini Lestari (fifth grade teacher) once provided a solution by learning using a QR-Code-based module, the student response at that time was very good. There is an interest in learning because it uses technology that is very new to students. When students feel they have forgotten how to solve the problem that the teacher has conveyed, students can watch the problem solving method again by accessing the video using a QR-Code. The teacher also finds it easier, because the teacher does not need to repeatedly explain material that is difficult for students. The use of IT technology helps students, in the implementation of the learning process, especially as an illustration tool (Sahertian, 2013). The use of QR-Code is also a solution for distance or face-to-face learning. Along with the development of information technology and in various ways can make learning stay connected even though it is in a different room (Pakpahan & Fitriani, 2020). It's just that the module using the QR-Code that the teacher tested cannot be used by students at home, because the number of modules is limited and can only be used at school. The teacher also hopes that a QR-Code-based module can be developed because the module has proven to be effective for distance learning or learning at school.

Some students who were interviewed said that the teacher's explanation when delivering the material was clear, and the learning methods that the teacher used were interesting, it's just that the textbooks used were difficult to understand. So when students are given assignments at home, students feel difficulty and confusion in doing these assignments. Students also said that the books provided by the school were not interesting, the pictures were few, and the final evaluation questions were very difficult, not the same as the questions taught previously.

Based on these data, the researcher assumes that the use of teaching materials from handbooks alone is considered less attractive and difficult for students to understand. This is because the presentation cannot attract the attention of students, such as only writing letters, numbers, a rigid book layout, more text than pictures, there are some images that are not colored so that students are less enthusiastic in learning mathematics and often learning This math is considered boring.

Based on information from teachers, not many teachers can develop their own learning media. Therefore, it is necessary to develop a teaching material that visualizes learning materials, especially scale materials by adjusting the characteristics of students. The goal is to help students understand the abstract learning material. The teaching materials made must be interesting so that they can increase student interest in learning. Based on the results of the analysis, it can be concluded that the teaching materials needed are teaching materials in the form of comic modules. The module concepts that will be developed based on the results of interviews with teachers and students can be detailed as follows: 1) The module is in the form of a comic, 2) QR-Code-based module, 3) The module has a clear, uncomplicated and communicative storyline, 4) Using cartoon characters, 5) Using bright colors 6) The comic module discusses scale material about using comparisons on scales and calculating scales.

Based on a literature review, researchers found data that this QR-Code-based comic book teaching material is a form of learning resource that can help students and replace teachers because they can be used both inside and outside the classroom so they can be read anytime (Putra, 2018). The use of QR-Codes can also make it easier for students to access materials or examples of problem solving on YouTube videos or websites. This QR-Code-based comics teaching material has the potential to be preferred by students, because the images in comics offer images, visuals, art. Through pictures, long and complicated explanations of texts or learning topics read in comics can be more easily understood and remembered by students (Tulniza & Hidayati, 2020). The material that is changed in the form of everyday sentences becomes easier to understand and understand (Subroto et al., 2020). This is in line with the opinion expressed by Sudjana and Rivai (2012: 68) that comic media can function as a bridge in fostering interest in learning for students. (Hima et al., 2016) revealed that comics are the right media for learning because the emotional involvement of the readers will significantly affect the memory of the subject obtained. Digital comic modules are also very easy to access anywhere and anytime, especially with the presence of smart phones, learning no longer has to carry printed learning materials that burden students (Andriani, 2019).

**CONCLUSION**

Based on the results of the needs analysis, conclusions can be drawn: 1) The use of teaching materials as a learning resource in mathematics is not optimal, 2) Teaching materials that need to be developed in learning mathematics with scale materials, one of

which is QR-Code-based comics. Based on the conclusions described above, it is known that in the learning process, especially on the scale material regarding the use of comparisons on scales and scale calculations, other teaching materials must be provided, namely the QR-Code-based contextual comic module. These teaching materials can facilitate teachers and students in the learning process. The teaching materials used must also be interesting in order to increase student interest in learning. This comic module will help students understand the material because abstract material can be changed to be more concrete and the material is packaged into a story that is associated with everyday life so that it is closer to the lives of students. With the QR-Code-based mathematical contextual comic module, it is hoped that it can make students more enthusiastic in learning mathematics and increase students' understanding in understanding scale material. Based on the conclusions and implications that have been described previously, the researchers provide the following suggestions: 1) Given that learning mathematics, especially on scale material is considered difficult, teaching materials are needed to help students understand the material by visualizing abstract concepts properly and correctly. So it is necessary to carry out further research, namely the development of a QR-Code-based mathematical comic module. 2) Elementary school teachers are also expected to be able to develop and use a QR-Code-based math comic module for other learning materials.

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