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ANALYSIS OF THE NEED FOR ELECTRONIC TEACHING MATERIALS ON THE TOPICS OF RELATIONS AND FUNCTION FOR GRADE VIII

Unika Tri Pangestuti[1], Dwi Sulistyaningsih[2], Eko Andy Purnomo[3]
Universitas Muhammadiyah Semarang[1,2,3]
Email: unikaaa111@gmail.com[1], dwisulis@unimus.ac.id[2], ekoandy@unimus.ac.id[3]

Corresponding Author: Unika Tri Pangestuti, email: unikaaa111@gmail.com

Abstract. Teaching materials are an essential component in conveying knowledge to students during the learning process. The optimal use of teaching materials can be achieved if they are designed according to the characteristics and needs of the students. This study aims to analyze the need for electronic teaching materials on the topic of relations and functions that align with student characteristics, as well as to serve as a reference in developing effective electronic-based mathematics teaching materials to enhance students' learning motivation. This research is qualitative in nature, using a descriptive qualitative research method. The research subjects are eighth-grade students and mathematics teachers at a public junior high school in Purbalingga Regency. The research instruments include the researcher, observations during the learning process, a student needs analysis questionnaire validated by content experts, and interview guidelines for both students and mathematics teachers. The stages of analysis involve data collection, reduction, presentation, and drawing conclusions. Based on the research findings, it can be concluded that the use of electronic teaching materials on relations and functions is crucial to meet students' learning needs. This study is expected to serve as a reference in the development of electronic teaching materials on the topic of relations and functions in the future.

Keywords: **Teaching Materials, Electronic, Relations and Functions.**

A. Introduction

Learning activities are a dynamic and complex process that involves interactions among various elements, including teaching materials. Teaching materials serve as the primary reference for teachers in determining the content, designing, and implementing learning activities, as well as helping to achieve the learning objectives (Aisyah et al., 2020). The Ministry of National Education (Depdiknas) emphasizes that teaching materials are an essential component in delivering high-quality teaching and learning activities (Maharani & Hakim, 2022). Teaching materials act as a bridge between teachers and students in delivering and receiving information. According to Depdiknas, teaching materials are classified into four categories: (1) print materials, including books, worksheets, modules, and brochures; (2) audio materials such as radio and sound recordings; (3) audiovisual materials, including instructional videos and educational films; and (4) interactive materials, such as electronic-based teaching materials (Mardiana, 2018). Teachers are required to be creative in selecting and developing relevant teaching materials that make a significant contribution to the teaching and learning process (Nurafni et al., 2020). The selection and creation of teaching materials should consider the characteristics and needs of students, the subject matter, and the learning objectives (Sulistyaningsih et al., 2023). The right choice of teaching materials can stimulate students to become more active in learning activities, thus supporting the achievement of optimal learning outcomes.

Initial observations revealed that teachers more often apply conventional teaching materials in their lessons. Conventional teaching materials are designed and produced to meet general learning needs. These materials are usually ready to use and have not been tailored to the specific needs of students (Yulaika et al., 2020). The habit of using conventional teaching

materials in lessons has resulted in several issues. Students tend to feel bored and become easily drowsy. This is because conventional teaching materials are often used in lectures, where the activity is teacher-centered (Yuniarti et al., 2023). The use of conventional teaching materials also affects students' mastery of the material. Interviews with students revealed that they face challenges in learning the material on relations and functions. Students have difficulty determining the relations or functions of two sets and solving problems related to relations and functions.

Various efforts can be made to address the issues arising from the use of conventional teaching materials, including the development or use of materials that adapt to the advancement of technology and the characteristics or needs of students (Mawarsari & Sulistyaningsih, 2017). The rapid development of technology opens new opportunities for developing teaching materials, one of which is electronic teaching materials (Purnomo & Suparman, 2020; Rakhmawati et al., 2021). Electronic teaching materials are an innovation in education that combines text, images, sound, and animation within a single digital platform (Lawe et al., 2021). These interactive features make electronic teaching materials more engaging and effective in delivering information to students while increasing student participation in learning (Herianto & Lestari, 2021). Electronic teaching materials also have several advantages, including allowing students to learn anytime and anywhere without time and location constraints, as well as providing interactive learning content (Septiani & Wardhani, 2022). Electronic teaching materials can be utilized in mathematics lessons using various models and approaches (Sulistyaningsih & Mawarsari, 2016).

A learning model is a framework that serves as a guide for planning teaching and learning activities, either in the form of tutorials or in the selection of appropriate learning resources (Harefa, 2020). Teachers must be facilitators who can design innovative learning models to enhance students' motivation and help them develop their full potential (Saragih et al., 2021). The implementation of the right learning model can optimize the learning process in the classroom, increase student motivation and engagement, and result in better and more meaningful learning outcomes (Kaban et al., 2021). Therefore, learning models must be adaptive and able to adjust to the changing times, including technological developments (Sarnoto et al., 2023).

Based on the problems and supporting theories, an alternative solution is needed to address these issues, one of which is the development of teaching materials tailored to the characteristics or needs of students. Before developing teaching materials, researchers must first understand and analyze the needs of students in mathematics learning. The difference between this study and others is that at the junior high school where the initial observation was conducted, no teaching material development has been done before. The goal of this research is to analyze the students' needs for electronic teaching materials on the topics of relations and functions.

B. Research Methodology

The research was conducted at a public junior high school in Purbalingga Regency in October 2024. This study is a qualitative research with the research subjects being eighth-grade students and mathematics teachers. The triangulation method used includes unstructured observation, distribution of questionnaires to students, and semi-structured interviews with both students and teachers. Before being used, the instruments were validated by content experts. The outline of the student needs questionnaire can be seen in Table 1.

Table 1 Outline of the Student Needs Questionnaire

Aspect	Indicator	No
Teaching materials	Frequently used teaching materials	1
	The availability of electronic-based teaching materials	2, 3, 4, 5
	Opinions on electronic teaching materials	6
Learning model	Frequently used learning models	7
	Most preferred learning model	8
	Expectations for the implemented learning model	9
Learning approach	Frequently used learning approaches	10
	Perspectives on ethnomathematics in learning	11
Content	Challenges or difficulties in the topic of relations and functions	12
	The use of teaching materials in the topic of relations and functions	13, 14
	Opinions on the development of electronic teaching materials for the topic of relations and functions	15
	Sum	15

Modified from Hasanah et al. (2023)

The data analysis technique in this study uses the descriptive analysis method according to Miles and Huberman (1992) with 4 stages, including: (1) data collection, (2) data reduction, (3) data presentation, and (4) drawing conclusions. The analysis is conducted by analyzing and summarizing information from field data to provide an accurate and precise description of the conditions in the field.

C. Result and Discussion

The research was conducted with 31 eighth-grade students from class VIII G and a mathematics teacher at a public junior high school in Purbalingga Regency. The study on students was conducted by administering a needs questionnaire to all 31 students, with a sample of 2 students selected for more in-depth analysis. The needs questionnaire contained 15 questions aimed at determining the extent of the students' need for teaching materials. Based on the construct content validation by two experts, the average score obtained was 37.5, with a percentage of 93.75%, indicating that the electronic teaching materials needs analysis questionnaire is valid and suitable for use in this study. Additionally, interviews with students and the teacher were conducted in a semi-structured manner, serving as supporting descriptive data, and will be analyzed to compare the teacher's perceptions of teaching material needs with the students' responses obtained from the questionnaire. The students' responses to the teaching materials needs are presented in Table 2.

Table 2 Student Questionnaire Results on Teaching Materials Needs

No	Questions	Answer	Frequency (100%)
1	What teaching materials or media do you frequently use in your lessons? (You may choose more than one answer)	Textbook Student worksheets Others	35,4 35,4 29,1
2	Do you own a cellphone/ laptop/ tablet/ computer?	Have	100
3	What activities do you frequently do using a cellphone/ laptop/ tablet/ computer?	Communication Learning Playing games Social media/others	28,6 14,3 27,1 30
4	Do you often use a cellphone/ laptop/ tablet/ computer for learning?	Often Rarely	32,3 67,7
5	Does your teacher use a cellphone/ laptop/ tablet/ computer in the learning process?	Yes, but in mathematics learning, it is still rare	100
6	What is your opinion about electronic-based teaching materials?	Interesting Less interesting	87,1 12,9
7	What learning model is frequently applied by your teacher in the learning process?	Lecture and explain with the whiteboard	100
8	What learning model do you prefer during lessons?	Lecture Using games Others	19,3 71 9,7
9	How do you expect the application of the learning model to be during class?	Fun and exciting Create a calm/ quiet atmosphere	90,3 9,7
10	Has your teacher ever used an approach in teaching?	Ever Never	38,7 61,3
11	What is your opinion if the lesson material is connected to a culture around you?	Interesting Less interesting	96,8 3,2
12	Do you experience difficulties in understanding the topic of relations and functions?	Yes No	90,3 9,7
13	Has your teacher ever used media to deliver the material on relations and functions?	Ever Never	29 71
14	Do you think it is necessary to use electronic-based teaching materials for the topic of relations and functions?	Necessary Not necessary	87,1 12,9
15	What is your opinion if electronic teaching materials or media were provided to help you understand the topic of relations and functions?	Agree Disagree	87,1 12,9

Below are the results of the questionnaire and excerpts from in-depth interviews regarding the answers written by the students, with each subject labeled as Subject 1 (S1) and Subject 2 (S2).

Subject 1 (S1)

No	Indikator	Pertanyaan	Jawaban
1	Bahan ajar yang sering digunakan	Apa saja bahan ajar atau media yang sering anda gunakan dalam pembelajaran? *(jawaban boleh lebih dari satu)*	-Buku paket -Buku LKS -Proyektor
2	Ketersediaan bahan ajar dalam bentuk elektronik	Apakah anda memiliki *handphone*/ laptop/ tab/ komputer?	handphone, dan laptop

Figure 1 Questionnaire Results for Questions 1 and 2, Subject 1

Based on Figure 1, regarding the question about teaching materials frequently used in learning, the student wrote that textbooks, student worksheets (LKS), and projectors are often used in the lessons. Furthermore, in question number 2, related to the ownership of electronic devices, the student wrote that they own a cellphone and a laptop.

3		Apa kegiatan yang sering anda lakukan dengan menggunakan *handphone*/ laptop/ tab/ komputer?	handphone digunakan untuk bermain tik tok youtube wa. dll laptop untuk melihat film/ animasi lain.
4		Apakah anda sering menggunakan *handphone*/ laptop/ tab/ komputer? untuk belajar?	Pernah

Figure 2 Questionnaire Results for Questions 3 and 4, Subject 1

Based on Figure 2, it can be seen that the student frequently uses electronic devices (cellphone/laptop/tablet/computer) they own to play on social media and watch movies. The student also mentioned that they have used their cellphone and laptop for studying.

5		Apakah guru anda menggunakan *handphone*/ laptop/ tab/ komputer? dalam proses pembelajaran? *(Jika pernah jelaskan contohnya)*	Pernah, untuk menjelaskan pelajaran yang akan di pelajari atau menunjukan materi video.
6	Pendapat/pandangan mengenai bahan ajar elektronik	Bagaimana pendapat anda mengenai bahan ajar atau media berbasis elektronik (menggunakan *handphone*/ laptop/ tab/ komputer)?	Menarik

Figure 3 Questionnaire Results for Questions 5 and 6, Subject 1

Based on Figure 3, the student wrote that the teacher has used electronic devices in the learning process to explain the material to be studied. The student also mentioned that they are interested in electronic-based teaching materials.

7	Model pembelajaran yang sering digunakan	Apa model pembelajaran yang sering diterapkan oleh guru dalam proses pembelajaran?	Menjelaskan cara atau contoh. menerangkan dengan lisan.
8	Model pembelajaran yang paling disukai	Apa model pembelajaran yang anda sukai ketika pembelajaran? Berikan alasannya!	tetap seru-seruan tetapi serius akan pelajaran.
9	Harapan terhadap model model pembelajaran yang dilaksanakan	Bagaimana penerapan model pembelajaran yang anda harapkan pada saat pembelajaran di kelas?	seru tetapi serius
10	Pendekatan pembelajaran yang sering digunakan	Apakah guru anda pernah menggunakan sebuah pendekatan dalam pembelajaran? *(Seperti menghubungkan materi dengan kehidupan sehari-hari atau dengan budaya sekitar)*	Belum pernah

Figure 4 Questionnaire Results for Questions 7, 8, 9, 10, Subject 1

Based on Figure 4, the student stated that in lessons, the teacher more frequently explains the material verbally or through lectures and has never used any approaches in the learning process. The student also mentioned that they prefer a learning model that is fun but still serious about the lesson material.

11	Pandangan terhadap etnomatematika dalam pembelajaran	Bagaimana pendapat anda jika materi pelajaran dihubungkan dengan suatu kebudayaan yang ada disekitar anda?	Menarik
12	Kendala atau kesulitan dalam materi relasi dan fungsi	Apakah anda mengalami kesulitan dalam memahami materi relasi dan fungsi?	Iya
13	Penggunaan bahan ajar/media pada materi relasi dan fungsi	Apakah guru anda pernah menggunakan media dalam menyampaikan materi relasi dan fungsi? *(Sebutkan jika pernah)*	Pernah
14		Apakah menurut anda perlu menggunakan media pembelajaran terutama berbasis elektronik pada materi relasi dan fungsi?	Perlu
15	Pendapat mengenai pengembangan bahan ajar elektronik pada materi relasi dan fungsi	Bagaimana pendapat anda jika diadakan bahan ajar atau media elektronik untuk membantu anda dalam memahami materi relasi dan fungsi?	setuju

Figure 5 Questionnaire Results for Questions 11, 12, 13, 14, Subject 1

Based on Figure 5, the student believes they would be interested if the lesson material were connected to the culture around them. In the next question about the difficulties or challenges faced in understanding relations and functions, the student stated that although the teacher has used media to deliver the material, they still experienced difficulty in understanding it. The student also mentioned that they find it necessary and agree that an electronic-based teaching material development should be conducted to help in understanding relations and functions. To explore further, the researcher conducted an interview with Subject 1 (S1). Below is an excerpt of the interview dialogue between the researcher (R) and Subject 1 (S1).

R : What teaching materials do you use in mathematics lessons?
S1 : Textbooks, LKS (Student Worksheets), and a projector.
R : What about teaching materials that use electronic devices like a cellphone, laptop, or projector? Have you ever used those?
S1 : Oh, for mathematics lessons, never. But for other subjects, yes, just not mathematics.
R : What electronic devices do you own?
S1 : I have a cellphone and a laptop.
R : What activities do you often do with the electronic devices you own?
S1 : I use them for TikTok, YouTube, WhatsApp, and watching movies. I also use them for studying, but only occasionally.
R : What teaching method or model does your teacher use during lessons? What do you think about the model the teacher uses?
S1 : The teacher usually explains while writing on the board, so sometimes I get sleepy and bored. I want the lessons to be more fun so I don't fall asleep.
R : Do you have any difficulties or challenges in understanding the topic of relations and functions?
S1 : Yes, I can't tell the difference between a relation and a function. I also don't understand how to find the value of a function.
R : What do you think about having electronic teaching materials to help understand relations and functions?

S1 : I agree, because nowadays many people have cellphones, so it would be easier to learn new things.

The results of the interview above show that the teaching materials used in mathematics lessons are textbooks and student worksheets, and electronic-based teaching materials have not yet been implemented. Additionally, the teaching model used is still conventional, where the learning process is teacher-centered. This causes Subject 1 to quickly feel bored and sleepy during lessons. Subject 1 hopes the teacher can apply a more engaging and fun teaching model while still focusing on the material. Furthermore, Subject 1 agrees and is interested in the development of electronic teaching materials that could help in understanding the topic of relations and functions.

Subject 2 (S2)

No	Indikator	Pertanyaan	Jawaban
1	Bahan ajar yang sering digunakan	Apa saja bahan ajar atau media yang sering anda gunakan dalam pembelajaran? *(jawaban boleh lebih dari satu)*	Buku paket, LKS, komputer, Buku tulis
2	Ketersediaan bahan ajar dalam bentuk elektronik	Apakah anda memiliki *handphone*/ laptop/ tab/ komputer?	handphon

Figure 6 Questionnaire Results for Questions 1 and 2 Subject 2

Based on Figure 6, in response to questions regarding the teaching materials commonly used in lessons, the student wrote that the materials often used in lessons include textbooks, worksheets, computers, and notebooks. In response to question number 2 regarding the ownership of electronic devices, the student wrote that they only own a cellphone.

3		Apa kegiatan yang sering anda lakukan dengan menggunakan *handphone*/ laptop/ tab/ komputer?	hari main gem, set tiktokan, dan pelajaran, komina atas.
4		Apakah anda sering menggunakan *handphone*/ laptop/ tab/ komputer? untuk belajar?	Pernah

Figure 7 Questionnaire Results for Questions 4 and 5 Subject 2

Based on Figure 7, the student often uses the electronic devices (cellphone/ laptop/ tablet/ computer) they own to play games, engage in social media, and study.

5		Apakah guru anda menggunakan *handphone*/ laptop/ tab/ komputer? dalam proses pembelajaran? *(Jika pernah jelaskan contohnya)*	Pernah menggunakan handphon untuk merekap vidio atau mencari pelajaran di internet
6	Pendapat/pandangan mengenai bahan ajar elektronik	Bagaimana pendapat anda mengenai bahan ajar atau media berbasis elektronik (menggunakan *handphone*/ laptop/ tab/ komputer)?	menarik dan lebih semangat untuk belajar

Figure 8 Questionnaire Results for Questions 5 and 6 Subject 2

Based on Figure 8, the student wrote that the teacher has used electronic devices in lessons to record videos and search for materials on the internet. The student also mentioned being interested in electronic-based teaching materials and feeling more motivated to learn.

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7	Model pembelajaran yang sering digunakan	Apa model pembelajaran yang sering diterapkan oleh guru dalam proses pembelajaran?	mengelaskan secara lisan dan digelas kan di papan tulis
8	Model pembelajaran yang paling disukai	Apa model pembelajaran yang anda sukai ketika pembelajaran? Berikan alasannya!	pembelajaran secara main game /suasana yang tidak berisik
9	Harapan terhadap model model pembelajaran yang dilaksanakan	Bagaimana penerapan model pembelajaran yang anda harapkan pada saat pembelajaran di kelas?	tidak berisik
10	Pendekatan pembelajaran yang sering digunakan	Apakah guru anda pernah menggunakan sebuah pendekatan dalam pembelajaran? *(Seperti menghubungkan materi dengan kehidupan sehari-hari atau dengan budaya sekitar)*	belum pernah

Figure 9 Questionnaire Results for Questions 7, 8, 9, 10 Subject 2

Based on Figure 9, the student stated that in lessons, the teacher more frequently explains the material orally and writes it on the board, and that the teacher has never used any specific learning approach. The students also wrote that they prefer a teaching model that involves games and an environment that is not noisy.

11	Pandangan terhadap etnomatematika dalam pembelajaran	Bagaimana pendapat anda jika materi pelajaran dihubungkan dengan suatu kebudayaan yang ada disekitar anda?	sangat menarik
12	Kendala atau kesulitan dalam materi relasi dan fungsi	Apakah anda mengalami kesulitan dalam memahami materi relasi dan fungsi?	iya
13	Penggunaan bahan ajar/media pada materi relasi dan fungsi	Apakah guru anda pernah menggunakan media dalam menyampaikan materi relasi dan fungsi? *(Sebutkan jika pernah)*	pernah / ~~tidak pernah~~ ~~pernah~~
14		Apakah menurut anda perlu menggunakan media pembelajaran terutama berbasis elektronik pada materi relasi dan fungsi?	perlu
15	Pendapat mengenai pengembangan bahan ajar elektronik pada materi relasi dan fungsi	Bagaimana pendapat anda jika diadakan bahan ajar atau media elektronik untuk membantu anda dalam memahami materi relasi dan fungsi?	setuju

Figure 10 Questionnaire Results for Questions 11, 12, 13, 14 Subject 2

Based on Figure 10, the student expressed that it is very interesting when the lesson material is connected to the culture around them. In response to the following question about challenges or difficulties faced in understanding relations and functions, the student stated that, although the teacher has used media to deliver the material, they still experience difficulties in understanding it. The students also stated that they agree and feel that the development of electronic-based teaching materials to help in understanding relations and functions would be

beneficial. To further explore this, the researcher conducted an interview with Subject 2 (S2). Below is an excerpt from the interview dialogue between the researcher (R) and Subject 2 (S2).

R : What teaching materials do you use in mathematics lessons?
S2 : Textbooks, worksheets, and notebooks.
R : Have you ever used electronic devices such as mobile phones, laptops, or projectors for teaching materials?
S2 : No, not in mathematics lessons.
R : What electronic devices do you own?
S2 : I only have a mobile phone.
R : What activities do you usually do with the electronic devices you own?
S2 : I use it to play online games, watch TikTok, and sometimes search for study materials.
R : What teaching methods or models are used by your teacher during lessons? What is your opinion on the teaching model used by the teacher?
S2 : The teacher explains the material verbally and writes on the board. I sometimes don't understand when the material is explained verbally, and I often get sleepy as well. I would prefer a learning method that involves playing but without creating too much noise.
R : Do you face any difficulties or challenges in understanding the material on relations and functions?
S2 : Yes, I don't fully understand the material yet.
R : What do you think about the idea of using electronic teaching materials to help in understanding relations and functions?
S2 : I think it's interesting because we haven't used it before. So, I agree.

Based on the results of the interview above, it was found that the teaching materials used in mathematics lessons are textbooks, worksheets, and notebooks. The teacher mostly delivers the material verbally and writes it on the board. This method has caused Subject 2 to experience difficulties in understanding the material and often feel sleepy during the teacher's explanations. Subject 2 hopes that the teacher could apply a learning model that involves playing, but in a quiet environment. Furthermore, Subject 2 agrees with and is interested in the idea of developing electronic teaching materials to help with understanding the material on relations and functions. According to Subject 2, this approach would not only aid in understanding the material better but also serve as a way to explore and familiarize oneself with the culture around them.

The data analysis of this research shows that the teaching materials applied in mathematics lessons are still conventional. These teaching materials have not been adjusted to meet the needs and characteristics of students in the field. The learning process tends to be dominated by teacher activities, while students become passive and mainly listen. Based on the interview results, both Subject 1 and Subject 2 reported feeling bored and easily sleepy when the teacher applied a lecture-style teaching model. This aligns with Astuti (2017) opinion that, currently, many teaching methods do not emphasize student activities enough, leading students to become passive and lose motivation to learn mathematics. Research by Ritonga and Rahma (2021) also shows that students tend to become lazy when the teacher delivers lessons through lectures. Based on the interview, the teacher explained that the lecture method was applied more frequently. This method can be considered less varied and fails to provide students with opportunities to explore knowledge and develop their abilities (Nurfadhillah et al., 2021). However, according to the current Merdeka Curriculum, the learning process should place students at the center of the learning process (Pertiwi et al., 2022). This is because the Merdeka Curriculum views that each student has different potentials and interests. A student-centered learning approach allows individuals to develop according to their potential (Barlian et al., 2023). The teaching model applied at this junior high school does not meet the students'

expectations for fun and engaging mathematics lessons. Therefore, the effectiveness of the learning process is greatly influenced by the selection of relevant teaching materials, adjusted to the characteristics of students, and the use of appropriate teaching models and approaches.

The rapid development of technology has also not been maximally applied in mathematics lessons, both in the learning process and in the use of teaching materials. This is reinforced by the results of an interview with the mathematics teacher, who confirmed that the use of electronic-based teaching materials is quite rare. Electronic teaching materials are those that utilize electronic devices such as cellphones, laptops, or computers, containing text, images, and moving animations to create a dynamic and engaging learning experience (Jazuli et al., 2018; Sriwahyuni et al., 2019). Compared to conventional teaching materials, electronic-based teaching materials offer several advantages, such as flexibility, interactivity, and the ability to be tailored to student needs (Yulaika et al., 2020). According to the interviews with Subject 1 and Subject 2, electronic-based teaching materials are actually very appealing as they provide something new, especially in mathematics lessons. This is supported by the research of Nida et al. (2021), which found that students responded positively and felt helped by the use of electronic teaching materials, as well as being motivated to study the material. The availability of engaging teaching materials is expected to assist and motivate students in understanding the material presented by the teacher.

Based on the questionnaire and interview results related to the challenges or difficulties faced by students in mathematics, especially the topics of relations and functions, Subject 1 stated that they have difficulty distinguishing between a relation and a function from two sets, as well as determining solutions to problems related to relations and functions. Subject 2 stated that they do not yet understand the relations and functions material explained by the teacher. Research by Anggreni et al. (2022) shows that a lack of interest in the learning process is a factor that causes students to struggle with understanding the relations and functions material, leading to boredom and a lack of focus. Other studies also show that the difficulties in relations and functions arise from a lack of mastery of the material and the tendency to forget prerequisite concepts (Hutagaol et al., 2022). Therefore, in mathematics learning activities, it is necessary to apply teaching models or approaches that can create an engaging and effective learning environment to help increase student motivation.

Another question in the needs questionnaire related to students' opinions on the necessity of using electronic teaching materials in mathematics lessons, particularly on relations and functions. Both Subject 1 and Subject 2 stated that they agreed and felt it would be helpful if electronic teaching materials were available to assist in understanding relations and functions. This is because, with electronic teaching materials, students are more motivated to learn the material. This aligns with the findings of Dwi et al. (2024), which showed an increase in student interest and motivation after using electronic teaching materials. According to the interview, the mathematics teacher also expressed strong support for the development of electronic teaching materials because they could serve as an alternative and a means of updating mathematics teaching methods. The teacher revealed that the lack of implementation of electronic teaching materials in the learning process was due to concerns about its limitations and the fear that it would not meet the learning objectives. This situation has led the teacher to prefer using ready-made teaching materials rather than developing materials tailored to the students' characteristics and needs. As a result, the lessons become less engaging and fail to motivate students to learn actively. Therefore, electronic teaching materials are highly needed because they play an essential role as an innovation and alternative in the mathematics learning process.

D. Conclusion

Based on the research that has been conducted, it is concluded that the teaching materials used in mathematics lessons at one of the Junior High Schools in Purbalingga Regency are still conventional, consisting of textbooks and LKPD/LKS (Student Worksheets) with each having a percentage of 35,4%. Based on the findings from the research, the need for teaching materials includes the necessity of using models or approaches that are tailored to the characteristics of the students and that keep up with the rapidly changing times. The results of the teaching materials needs analysis conclude that 87,1% of students and teachers have given positive responses and agree with the proposal to develop electronic teaching materials for the material on relations and functions, which is seen as an innovation and is considered engaging and helpful in understanding the material.

Based on the results of the research conducted, the researcher recommends that future studies focus on the development of more engaging and relevant electronic teaching materials that meet the needs of students, in order to improve the effectiveness of learning.

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