



## Challenges in Designing Learning Media among Mathematics Education Students

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### **Abstract**

This study aims to describe the challenges or difficulties faced by mathematics education students in designing learning media, especially student worksheet, interactive presentation slides, and educational video. This research is a quantitative descriptive research with the subjects in this study are 4th semester students enrolled in the Mathematics Learning Technology course, as many as 23. Data collection was carried out through distributing questionnaires to students regarding their difficulties in developing media. The results showed that students experienced the most difficulties in developing educational videos compared to student worksheet, interactive presentation slides. The main difficulties in educational videos include technical skills such as editing, flow design, and application usage.

**Keywords:** Interactive Presentation Slides; Learning Media; Educational Video; Mathematics; Student Worksheet

### **Abstrak**

Penelitian ini bertujuan untuk menggambarkan tantangan atau kesulitan yang dialami oleh mahasiswa pendidikan matematika dalam membuat media pembelajaran, khususnya Lembar Kerja Peserta Didik (LKPD), bahan tayang interaktif, dan video pembelajaran. Penelitian ini menggunakan metode deskriptif kuantitatif dengan subjek penelitian yaitu mahasiswa semester 4 yang mengikuti mata kuliah Teknologi Pembelajaran Matematika sebanyak 23 orang. Pengumpulan data dilakukan dengan menyebarkan angket kepada mahasiswa mengenai kesulitan yang mereka alami dalam membuat media. Hasil penelitian menunjukkan bahwa mahasiswa paling banyak mengalami kesulitan saat membuat video pembelajaran dibandingkan dengan LKPD dan bahan tayang interaktif. Kesulitan utama dalam membuat video pembelajaran yaitu keterampilan teknis seperti mengedit video, menyusun alur, dan menggunakan aplikasi.

**Kata Kunci:** bahan tayang interaktif; lembar kerja peserta didik; matematika; media pembelajaran; video pembelajaran

## **1. INTRODUCTION**

Learning media is one of the important components in the mathematics learning process. The existence of media not only functions as a visualization aid, but also as a means of communicating abstract ideas and concepts to be more concrete (Sudianto, 2021). The right learning media can stimulate students' interest, motivation, and desire to learn

(Febrita & Ulfah, 2019). Therefore, the development of learning media is an important focus in improving the quality of education, including in the education of prospective teachers.

Some forms of learning media that are commonly developed and used by mathematics teachers and prospective teachers include student worksheet, interactive presentation slides, and educational video. Student worksheet is a tool that has a role in learning mathematics, increasing student engagement, problem solving skills, and learning outcomes (Sutra et al., 2024; Umbaryati, 2016). In addition, interactive presentation slides have shown significant benefits in mathematics education such as increasing student motivation, improving understanding of mathematical concepts, and improving learning outcomes (Bulan, 2020; Hakim & Windayana, 2016). Learning media in the form of videos can also improve student engagement, motivation, and learning outcomes (Isnaini et al., 2023; Risalah et al., 2023). These three types of media can help in facilitating mathematics learning activities.

It is important for mathematics education students as prospective teachers to have the ability to design and develop these three types of media. Mastery of learning media design is part of the professional competence of teachers that must be possessed since college. Project-based learning, which is obtained during lectures, can improve prospective teachers' competence in making learning media (Sobiruddin et al., 2022). This ability to design and develop media is important for students when they become teachers.

However, based on observations and some previous research results, mathematics education students still experience various difficulties in developing learning media. Students have difficulty making worksheets (Ariyanto et al., 2018) and interactive media (Yuwono et al., 2021). Students have difficulty synthesizing information, creating contextual questions, and constructing apperceptions in developing student worksheet. Similar difficulties arise in creating educational videos, with problems in content accuracy, concept construction, and aligning illustrations with the material (Yuwono et al., 2023).

This study aims to describe the challenges or difficulties faced by mathematics education students in designing learning media, especially student worksheet, interactive presentation slides, and educational video. The results of this study are expected to be the basis for developing more effective learning strategies.

## **2. METHOD**

### **Type of Research**

This research is a quantitative descriptive study aimed at describing the challenges or difficulties faced by mathematics education students in designing learning media, particularly student worksheet, interactive presentation slides, and educational video.

### **Time and Place of Research**

The research was conducted in the even semester of the 2024/2025 academic year at the Mathematics Education Study Program, Mataram University. Data collection was conducted at the end of the Mathematics Learning Technology course, after students completed their media development assignments.

### **Research Targets and Objectives**

The target of this research is mathematics education students who have received training and experience in developing learning media. The primary objective is students enrolled in the Mathematics Learning Technology course during the fourth semester.

### **Research Subjects**

The subjects in this study were fourth-semester students enrolled in the Mathematics Learning Technology course, totaling 23 participants. They had completed assignments to develop three types of learning media: student worksheet, interactive presentation slides, and educational video.

### **Research Data and Instruments**

The data collected in this study is quantitative data in the form of student perception of difficulty questionnaire scores. The instrument used is a closed-ended questionnaire in the form of a 4-point Likert scale (1 = strongly disagree, 4 = strongly agree). The questionnaire consists of 3 initial questions related to which learning media are the most difficult to develop, why those media are the most difficult to develop, and students' suggestions for overcoming those difficulties. Then, there are 18 statements covering 6 statements for student worksheet, 6 statements for interactive presentation slides, and 6 statements for educational videos.

### **Data Collection and Analysis Techniques**

Data collection was conducted by distributing the questionnaire to students via Google Forms. Students completed the questionnaire independently after finishing their media development tasks. The data obtained was analyzed using descriptive quantitative methods.

## **3. RESULT AND DISCUSSION**

This study aims to describe the challenges faced by Mathematics Education students in designing three types of learning media, namely student worksheet, interactive presentation slides, and educational video. Data were obtained from questionnaires completed by 23 fourth-semester students who had completed media development

assignments in the Mathematics Learning Technology course. The following is data on the types of media that were most difficult for students to develop.

**Table 1.** The Most Difficult Learning Media for Students to Develop

Learning Media	Percentage (%)	Number of Students
Student Worksheet	26.1	6
Interactive Presentation Slides	21.7	5
Educational Video	52.2	12
Total	100	23

Based on the data in Table 1, educational videos are the medium that students find most difficult to develop, with a percentage of 52.2% (12 students). This is followed by student worksheet at 26.1% (6 students) and interactive presentation slides at 21.7% (5 students). These findings indicate that most students experience difficulties when creating educational videos.

Students also answered questions regarding why these media are the most difficult to develop and their suggestions for overcoming these difficulties. Many students stated that educational videos are considered the most difficult because they require a significant amount of time, technical skills such as editing, and readiness to speak in front of the camera. One student mentioned that they needed a lot of time to download materials, edit, and re-record videos, while others expressed that they were not yet sufficiently familiar with editing applications. Not only that, psychological factors such as lack of confidence also emerged, for example, one student stated that they lacked confidence in speaking in front of the camera. This shows that the challenges in making videos include technical, affective, and time management aspects. Research by Dharmayanti & Husin (2022) also revealed that time constraints prevent teachers from developing instructional videos for many materials.

Meanwhile, difficulties in compiling student worksheet are generally related to the selection of activities, adjustment to learning objectives, and the use of appropriate language. Some students said they had trouble compiling a logical and interesting sequence of activities for students.

Some students found interactive presentation slides difficult because they lacked understanding of how to organize interactive and interesting slide structures. One student mentioned that they had difficulty adapting the results downloaded from Canva to suit the assignment requirements.

Furthermore, students provided various suggestions to overcome these difficulties, including:

- Increasing independent practice: “More practice in explaining the material,” “Try more applications.”
- Collaboration and discussion: “Ask a friend or lecturer to teach you,” “Group discussions can facilitate understanding of features.”
- Time management: “Need more time to maximize editing and video recording.”
- Access to references: “Conduct more research from journals or YouTube.”

These suggestions indicate that students recognize the importance of self-effort and social support in overcoming challenges in developing educational media.

In addition, students also completed a questionnaire consisting of 18 statements related to difficulties in developing student worksheet, interactive presentation slides, and educational video. The questionnaire was in the form of a 4-point Likert scale (SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree). The following table shows the results of the questionnaire.

**Table 2.** Result of Survey on Students' Difficulties in Developing Learning Media

No	Statements	Percentage (%)			
		SA	A	D	SD
1	I have difficulty designing appropriate activities in student worksheet.	4.3	47.8	47.8	0
2	I have difficulty compiling student worksheet that is relevant to learning objectives.	4.3	21.7	73.9	0
3	I have difficulty creating student worksheet that is appropriate for students' thinking levels.	4.3	56.5	39.1	0
4	I have difficulty adjusting the language of student worksheet to suit students' characteristics.	4.3	60.9	34.8	0
5	I have difficulty organizing the sections of student worksheet systematically.	4.3	56.5	39.1	0
6	I have difficulty compiling student worksheet with an attractive layout design.	13	30.4	47.8	8.7
7	I have difficulty creating interactive presentation slides that are relevant to learning objectives.	4.3	26.1	69.6	0
8	I have difficulty creating interactive presentation slides that facilitate student engagement.	8.7	39.1	52.2	0
9	I have difficulty arranging the slides in a logical and systematic order in interactive presentation slides.	0	17.4	82.6	0
10	I have difficulty creating visually appealing slides in interactive presentation slides.	0	34.8	65.2	0
11	I have difficulty using hyperlinks and navigation buttons in interactive presentation slides.	0	17.4	65.2	17.4
12	I have difficulty choosing the right animation for each slide in interactive presentation slides.	0	39.1	52.2	8.7
13	I have difficulty creating educational video that are relevant to learning objectives.	0	26.1	69.6	4.3
14	I have difficulty designing a educational video flow that is easy to understand.	4.3	47.8	47.8	0
15	I have difficulty organizing the script for a educational video in a logical sequence.	0	47.8	47.8	4.3

16	I have difficulty editing a educational video to look professional.	21.7	43.5	30.4	4.3
17	I lack confidence speaking in a educational video.	4.3	8.7	60.9	26.1
18	I am unfamiliar with the applications used to create educational video.	0	21.7	56.5	21.7

Based on the table above, it can be seen that most students do not find it very difficult to develop student worksheet. Although there are still some aspects that remain challenging, namely 60.8% of students stated that they had difficulty creating student worksheet that was appropriate for the students' level of thinking (4.3% strongly agreed & 56.5% agreed); 65.2% experienced difficulties in adapting the language of the student worksheet to the characteristics of the students (4.3% strongly agree & 60.9% agree); and 60.8% found it difficult to organize the parts of the student worksheet systematically (4.3% strongly agree & 56.5% agree). Yuwono et al., (2021) research also shows that teachers face various challenges in developing mathematics worksheets, such as difficulties in creating contextual questions, formulating formulas, and designing various response activities in the worksheets.

Furthermore, developing interactive presentation slides proved to be quite challenging for students. Some of the indicators that are difficult for students include 30.4% of students stating difficulty in creating interactive presentation slides relevant to learning objectives (4.3% strongly agree & 26.1% agree) and 47.8% experiencing difficulty in creating interactive presentation slides that facilitate student engagement (8.7% strongly agree & 39.1% agree). No students strongly agreed with technical and visual difficulties. This indicates that the challenges in interactive presentation slides are more conceptual in nature. Pratiwi & Dewi (2024) revealed that teachers face difficulties in developing digital technology-based learning media, such as providing technological facilities, aligning applications with learning content, designing media using mathematical applications, and managing time effectively.

Furthermore, educational videos are also challenging to develop, with several notable aspects: 52.1% of students reported difficulty designing the flow of educational videos to make them easy to understand (4.3% Strongly Agree & 47.8% Agree), and 65.2% experienced difficulty editing educational videos to make them look professional (21.7% Strongly Agree & 43.5% Agree). The combination of technical challenges (mastery of applications and editing), conceptual challenges (flow and script), and psychological challenges (confidence) makes video development the most complex of the three types of media. Previous research also shows that teachers face several challenges in developing multimedia educational videos. These challenges include time constraints, difficulty using digital editing tools, age factors, high costs, lack of knowledge, and network constraints (Pratiwi & Nugraheni, 2022).

#### 4. CONCLUSION

This study revealed various challenges faced by Mathematics Education students in designing learning media, especially student worksheet, interactive presentation slides, and educational video. Students experienced the most difficulties in developing educational videos compared to student worksheet and interactive presentation slides. The main difficulties in educational videos include technical skills such as editing, flow design, application use, and lack of confidence when performing in front of the camera. In student worksheet, the challenge lies more in making student worksheet that are suitable for students' level of thinking, adjusting the language of student worksheet to the characteristics of students, and organizing the parts of student worksheet systematically. Meanwhile, on interactive presentation slides, students have more difficulty in making interactive teaching materials relevant to learning objectives and making interactive teaching materials that facilitate student involvement. Students suggested solutions such as independent practice, discussion, reference utilization, and time management to overcome these obstacles. Future research is suggested to use a mixed approach to explore the factors causing students' difficulties, including affective and technical aspects. In addition, interventions can be conducted in the form of training or mentoring to measure their effectiveness in improving learning media development skills.

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