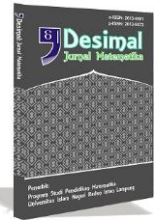




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# Development of mathematics learning video based on Palembang local wisdom about prism materials

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## ABSTRACT

*The Palembang local wisdom-based mathematics learning video is a tangible manifestation of the nation's character building through education. The developed video discusses the prism materials for eighth-graders. The video was developed through development research by adopting the ADDIE design into ADD (analysis – design – development). The purpose of the study was to examine the feasibility of learning mathematics videos based on local wisdom from experts' judgment on material, media, and language. The research instruments were a questionnaire and a suggestion sheet. Assessment of prototype 1 showed that the video is "Feasible Enough" but needs to be improved. After revisions are made, the video is called Prototype 2. The expert's assessment of Prototype 2 showed that the video is "Feasible" and without revision. This video is an alternative learning media (on online or offline learning, even hybrid learning). However, the potential effect remains to be seen. So, this can be a space for other researchers to continue or develop into other materials.*

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## INTRODUCTION

Mathematics learning activities in the classroom, both offline and online, do not always run as expected. Sometimes students can understand the material, sometimes students have difficulty. There are several sources of causes of student learning difficulties. These sources can come from within or from outside the student. Causes that come from within students, namely physiological and psychological (Supriyono & Abu Ahmadi, 1991). External causes include learning

strategies and equipment/tools (Anggraeni et al., 2020).

Teachers can be the cause of student learning difficulties. Some teachers do not have the skills to diagnose student learning difficulties, so they do not choose the right method/strategy/media (Dalyono, 2015). Most students have a wrong perception of mathematics because some mathematics teachers have not been able to create a pleasant atmosphere for their students. So that students are not interested in learning mathematics, even

students tend to be afraid and choose to skip class (Intisari, 2017).

Basically, the inability of teachers to create a conducive learning atmosphere is not the only cause of difficulties in learning mathematics. However, the teachers must still try to manage all their potential. The teacher's skills in managing the learning process determine the quality of learning. One way to improve skills is to increase the activity of compiling teaching materials by processing information in students' daily life (Daryanto & Cahyono, 2014).

Learning with teaching materials that have been developed by the teachers themselves can make it easier for teachers to explain systematically starting from the concrete to the abstract, from easy to difficult material, and according to the different backgrounds and needs of students (Indariani et al., 2018).

The survey results show that more than 90% of students prefer teachers who use creative media/teaching materials (not contemporary) and more than 75% of students state that they understand the material being taught better if they study with these media/teaching materials (Febrianti et al., 2017).

However, problems that often arise include the learning methods used by teachers often do not relate mathematical concepts to students' daily activities (Arisetyawan et al., 2014; Hasanah, 2014) and local culture. In addition, the teaching materials used by the teacher have not been able to meet the needs of students in the field so students tend to experience confusion about the material (Trimantoto, 2016; Widodo et al., 2018).

As we all know, the world (including Indonesia) is currently being hit by the Covid-19 pandemic. Therefore, the government implements distance learning (PJJ) or *distance learning* in order to break the chain of the spread of Covid-19. One of the learning strategies to be applied in distance learning is learning through

digital teaching materials, one of which is video learning (Pitriani & Pratama, 2021).

Learning through video is more interesting than using audio or visual media because it has two sensory sensors, namely eyes and ears so that motivation and interest in learning will arise greater (Purwanti, 2015). This can facilitate understanding and strengthen memory. According to Edgar Dale states that 75% of a person's learning experience is obtained from the sense of sight (eyes), 13% through the sense of hearing (ears), and the rest through other senses (Safitri et al., 2015).

Then, the more rapid information from outside Indonesia makes Indonesian culture and especially local culture increasingly eroded. The South Sumatra Provincial Government promotes regional potential by continuing to introduce regional culture as local wisdom. Local wisdom is local knowledge that is used by the community to survive in an environment that is integrated with a belief system, norm, culture expressed in traditions that are adhered to for a long time (Sumarmi & Amiruddin, 2014).

Basically, there are many learning videos that can be downloaded, but many are not in accordance with the characteristics of our students. In addition, mathematics learning media, especially videos, are still minimal and not sufficient to provide meaningful understanding to students about the local culture of South Sumatra.

From the description above, the researcher understands that it is necessary to develop a teaching material that is able to integrate mathematics material into students' cultural wisdom (in this case Palembang) as a form of renewal. Learning videos can be developed using the OBS application (*Open Broadcaster Software*). The use of OBS is able to present the figure of a teacher in students' imaginations (Puspita et al., 2020). OBS Studio is a free and open-

source software for recording and live streaming. OBS has the following advantages: (1) good performance in capturing and mixing video or audio; (2) can load scenes from multiple sources including capture windows, images, text,

browser windows, webcams, etc.; (3) relatively easy to make.

There are some previous related researches focusing on similar research areas, Table 1 gives information on the differences between the current research and the previous related research.

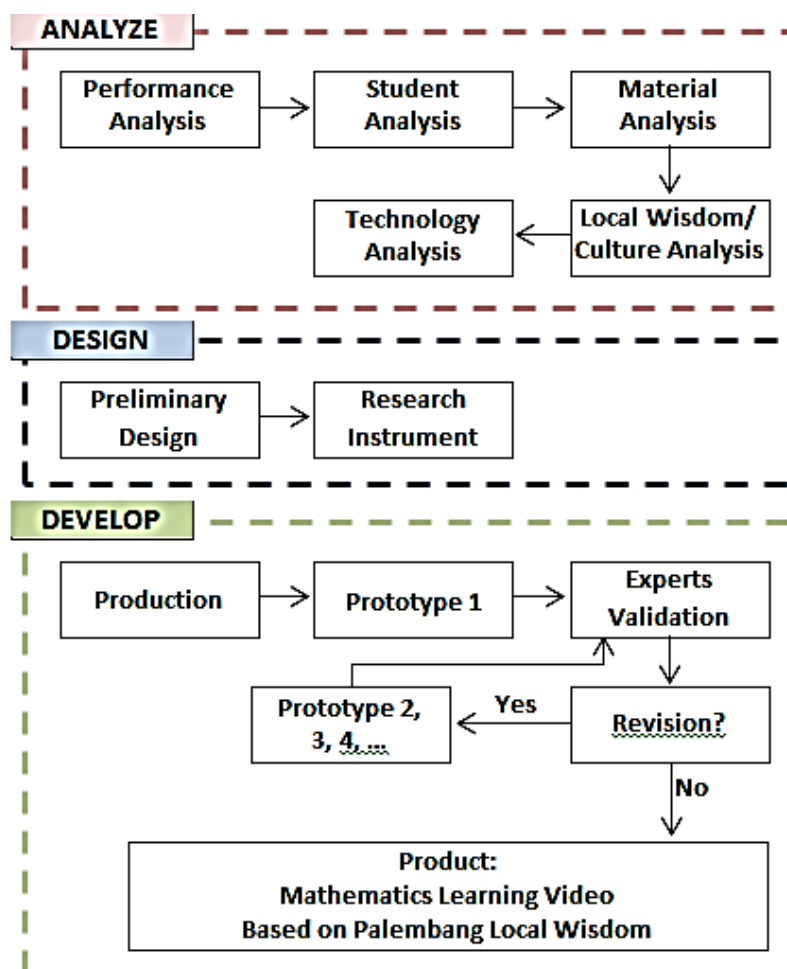
**Table 1.** The Distinctions among Current Research and Previous Related Research

Researchers	Video	Approach	Local Wisdom
Saufi & Gunawan, 2018	Yes	PBL	South Kalimantan
Andriani et al., 2019	Yes	Realistic	No
Zulfah & Insani, 2020	No	Local Wisdom	Riau
This research	Yes	Local Wisdom	South Sumatra

## METHOD

This research method is a development that aims to produce a product and test the effectiveness of the product (Sugiyono, 2014). The research

design used is an adopted ADDIE design (Analyze, Design, Development, Implement and Evaluate) (Branch, 2009). The stages in this research are divided into 3 stages, namely Analyze, Design, and Develop (ADD).



**Figure 1.** Design of this Research

At the initial stage (analyze), the first step is performance analysis, student analysis, analysis of learning materials (including learning objectives), and analysis of local wisdom and technology. In this stage, the main activity is to analyze the urgency of developing learning videos in order to achieve learning objectives.

The next stage is the design stage. At this stage, the researcher designs a scenario or preliminary design and prepares the main components in the learning video. In addition, the researcher also developed research instruments.

The next stage is the development stage, namely the making/production of

videos. The video draft was validated by 3 experts, namely material experts, media experts, and linguists. Material experts and media experts work as lecturers in the mathematics education study program who are currently pursuing doctoral education. Meanwhile, linguists are teachers of Indonesia Language subjects.

The data collection instruments used were questionnaires and suggestion sheets. The questionnaires used has 4 answers, namely very good (4); good (3); poor (2); and very poor (1). Aspects and indicators assessed by experts can be seen in Table 2.

**Table 2.** The Aspects of Expert Assessment

Experts	Aspects
Language	Language (5 statements)
	Typography (6 statements)
	Use of Terms, Symbols, or Icons (2 statements)
Material	Accompaniment Audio (2 statements)
	Material Suitability (3 statements)
	Material Accuracy (8 statements)
	Up-to-date Material (4 statements)
Media	Supporting Learning Materials (6 statements)
	Presentation Technique (4 statements)
	Display (4 statements)
	Graphics (7 statements)

**Table 3.** Feasibility Criteria of Experts' Judgment

Quality Score	Feasibility Criteria	Information
$3.26 < \bar{x} \leq 4.00$	Feasible	Without revision
$2.51 < \bar{x} \leq 3.26$	Feasible Enough	With partial revision as suggested
$1.76 < \bar{x} \leq 2.51$	Less Feasible	Partial revision and review
$1.00 < \bar{x} \leq 1.76$	Not Feasible	Complete revision

This research uses qualitative and quantitative descriptive analysis techniques. Qualitative data was obtained from input validators (material experts, media experts, and linguists) through the suggestion sheet. Meanwhile, quantitative data was obtained from the average calculation of the results of the questionnaire that had been filled out by the validator. After calculating, the data is converted based on Table 3.

## RESULTS AND DISCUSSION

Development research is a bridge between research and educational practice (Cahyadi, 2019). Developing a teaching material, especially during the learning period from home as it is today, is an important activity for teachers to do. Teachers are required to be able to take advantage of technological sophistication to make it easier for students to understand the material. However, teachers still rarely develop instructional videos for teaching (Ilsa et al., 2020). To

develop a learning video, there are several things that must be considered, including being able to attract students' interest and must be up to date (Asnawir & Usman, 2002). The following steps are carried out by the researcher.

The results of the analysis that have been carried out are used as guidelines and considerations in the preparation of mathematics learning videos. The analysis carried out includes material analysis and student analysis, performance analysis and Palembang local wisdom, and technology analysis.

Based on the results of interviews, information was obtained that teachers have not maximized the use of technology in the learning process. In addition, teachers still rarely connect mathematics learning with local culture. Thus, teachers feel the need for a learning media that can help to increase students' interest in learning and mathematical abilities, as well as integrate local culture in learning.

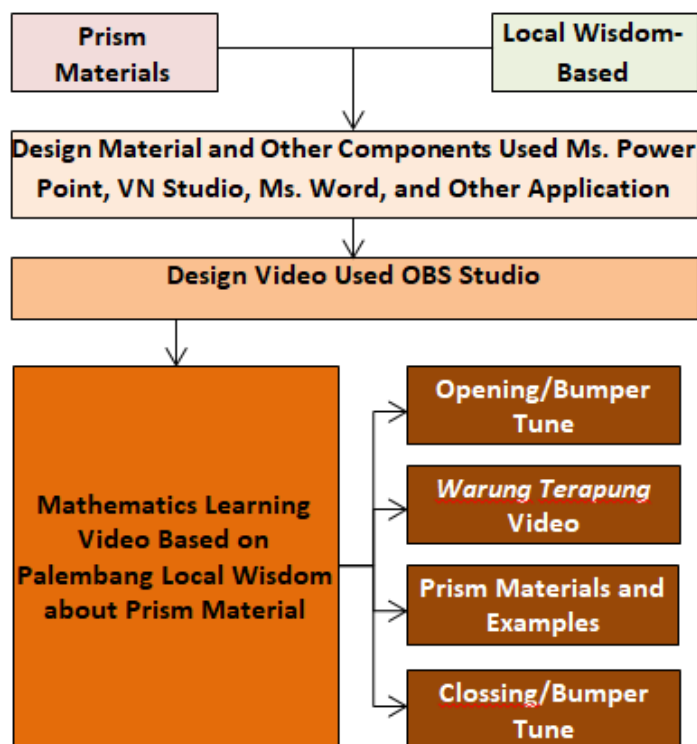
From the results of interviews with the mathematics subject teachers of class VIII Pondok Pesantren Assa'adatud Daroien Palembang, it can be concluded as follows: (1) Students are less enthusiastic about participating in the mathematics learning process because students consider mathematics as an unimportant and difficult subject. (2) The low ability of most students to understand the concept of building space and there are even students who think that building space is similar to a flat shape. (3) Students have difficulty solving problems related to the area and volume of a prism.

The curriculum used for making this video is Curriculum of 2013. The video discusses the shape of the flat side space. The shape of the space that will be discussed is a prism. More specifically, the material discussed is the surface area and

volume of a prism. The researcher identified, compiled, and details local wisdom that is relevant to the prism concept or material. The researcher believes that Palembang's local wisdom that is relevant to the prism, among others, is the Floating Warung on the Musi Riverside. Then, the researcher formulated the learning objectives through this learning video, namely: (1) finding the formula for the surface area and volume of a prism and (2) solving problems based on local wisdom related to the surface area and volume of a prism.

This research was carried out during the implementation of online learning due to the Covid-19 pandemic. The researcher examines that the applications used in general can be divided into two, namely (1) video conferencing applications such as Zoom and Google Meet; (2) messenger applications such as WhatsApp, Google Classroom, and Telegram. Both have advantages and disadvantages of each. However, the use of video conferencing applications has relatively more problems, one of which is absorbing a lot of internet quota, so some teachers prefer to use the messenger application. In fact, by using video conferencing applications, students do not lose the figure of a teacher even though they are studying at home. Learning by looking at the figure of the teacher will give a deep meaning.

From the analysis above, it can be concluded, the researcher needs a video maker application that can display the figure of a teacher. An application that can meet these needs is OBS Studio. Meanwhile, the teaching materials were made on Ms. Power Point 2010 because its use is relatively easy. In addition, the researcher also uses the VN Studio application and Ms. Publisher 2010.



**Figure 2.** Preliminary Design

Some of the activities carried out by the researcher at the design stage are as follows: (1) Preparation of the preliminary design of the learning video, as shown in Figure 2. (2) Preparation of the main components in the preliminary design. The researcher started by compiling the prism material components. Prism materials were arranged on Ms. Power Point 2010 from various sources. In addition, the researcher also compiled sample questions based on local wisdom. Then, the researcher took pictures and videos around the Floating *Warung* on the Musi Riverside. Furthermore, the video is edited as needed using the VN Studio application. (3) Preparation of research instruments in the form of questionnaires

and advice sheets for material, media, and language experts (linguists).

The development stage is the realization of the initial design at the design stage. The researcher makes videos using the OBS Studio application. The video recording process is carried out with various equipment, including cameras, laptops, lighting, screen background, tripod, headset, pen tablet, and various other tools. Then, the recorded video that has gone through editing is called Prototype 1. The next step, prototype 1 is validated by media, material, and language experts. The following are the results of the assessment of the experts on Prototype 1.

**Table 4.** Recapitulation of Experts' Assessment on Prototype 1

Experts	Aspects	Score	$\Sigma$	Information
Language	Language	2.80	2.91	Enough Feasible; Partial Revision
	Typography	2.83		
	Use of Terms, Symbols, or Icons	3.00		
	Accompaniment Audio	3.00		
Material	Material Suitability	3.33	3.07	Enough Feasible; Partial Revision
	Material Accuracy	3.13		
	Material Update	3.00		
	Supporting Learning Materials	2.83		
Media	Presentation Technique	3.25	3.13	Enough Feasible; Partial Revision
	Appearance	3.25		
	Graphic	2.89		
Average Score of Prototype 1			3.04	Enough Feasible; Partial Revision

**Table 5.** Suggestions from Experts on Prototype 1

No.	Experts	Suggestion
1.	Language	Adjust back sound volume with teacher's voice Reduce noise
2.	Material	Give examples of questions based on local wisdom Give the process of finding the formula
3.	Media	Add bumper tune Switch back sound with Palembang's folk song Remove the teacher's background when the teacher is explaining the material

The average score of the experts' assessment of Prototype 1 is 3,04. Based on Table 3, Prototype 1 is an "enough feasible" video with partial revision as suggested by the experts. The suggestions given by the experts are briefly described in Table 5.

After the researcher made improvements, a learning video was obtained called Prototype 2. Then, the prototype was returned to the experts to

be assessed. The results of the assessment by experts are shown in Table 6 below.

The average score of the experts' assessment of Prototype 2 is 3,53. Based on Table 3, this is a "feasible" mathematics learning video about prism material without revision.

There are some differences between Prototype 1 and Prototype 2. The researcher has made some changes based on expert suggestions.

**Table 6.** Recapitulation of Experts' Assessment on Prototype 2

Experts	Aspects	Score	$\Sigma$	Information
Language	language	3.60	3.53	Feasible; Without Revision
	Typography	3.50		
	Use of Terms, Symbols, or Icons	3.50		
	Accompaniment Audio	3.50		
Material	Material Suitability	3.67	3.50	Feasible; Without Revision
	Material Accuracy	3.50		
	Material Update	3.50		
	Supporting Learning Materials	3.33		
Media	Presentation Technique	3.50	3.56	Feasible; Without Revision
	Appearance	3.75		
	Graphic	3.43		
Average Score of Prototype 2			3.53	Feasible; Without Revision



The following is one of the differences between Prototype 1 and Prototype 2. In Prototype 1, the initial learning video is an impression of Warung Terapung. Based on the advice of media experts, it is better to give a bumper tune. A bumper tune is a limiting tune or naming a show.

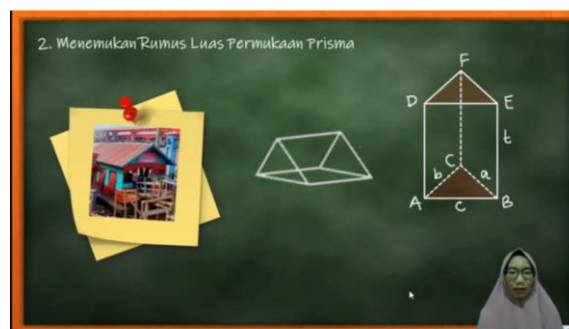


**Figure 3.** Video Opening is Video of Warung Terapung



**Figure 4.** Video Opening is Bumper Tune

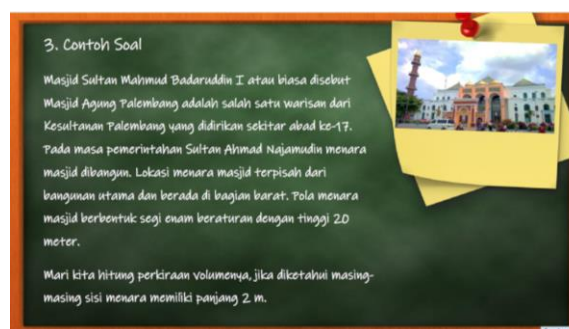
Learning mathematics is a complex and continuous process. So, from one material to another need a good understanding. However, the pandemic period forced students and teachers to study online without meeting face to face. Therefore, a teacher must be creative in developing teaching material. The learning video developed with the help of the OBS application is claimed by the researcher to be able to provide a solution because students do not lose the figure of a teacher (Puspita et al., 2020). Figure 3 shows there is a teacher figure in the video. By removing the background, the teacher seems to be in front of the blackboard.



**Figure 5.** Video's Screenshot

The researcher developed a mathematics learning video based on local wisdom. Palembang local wisdom displayed by the researcher in the video is Floating *Warung* on the Musi Riverside, a cake of Maksubah, and the tower of the Sultan Mahmud Badaruddin (SMB) I Palembang Grand Mosque. The integration of mathematics with local wisdom is expected to show that mathematics is the study of abstract patterns around students themselves (Chambers, 2008).

Below is an example of Palembang's local wisdom which is linked to the concept of prism volume material. The tower of the SMB I mosque can be integrated into the prism volume problem.



**Figure 6.** Local Wisdom Integrated into Mathematical Problems

In addition, local wisdom-based mathematics learning videos are a tangible manifestation of building student character as the government has announced in the 2013 Curriculum. Cultural education and national character must be integrated into every subject but



the practice is still minimal (Saufi & Gunawan, 2018).

The limitation of this research is that until the development stage it has not been implemented to students. So, it cannot provide further information. From several relevant studies, students gave a very good response to teaching materials based on local wisdom. Students are enthusiastic about learning mathematics while knowing the local culture (Farhatin et al., 2020; Saufi & Gunawan, 2018).

### CONCLUSIONS AND SUGGESTIONS

Based on experts' judgment on material, media, and language, the local wisdom-based mathematics learning video prism materials is "feasible" for use in mathematics learning. This research is still limited to the results of assessments from experts, so the researcher still have to see the potential effects of these learning videos. This is a space for other researchers to continue. This learning video is only for prism materials. It is recommended for other researchers to develop videos based on local wisdom with other materials. Other researchers can also try to develop videos using other applications. On the other hand, this research is one of the efforts to build student character and preserve local culture through education.

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