

Development of Maluku Culture-Based Mathematics Learning Video "Saureka-Reka Dance" Using Powtoon

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ABSTRACT

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Maluku is one of the provinces in Eastern Indonesia which has a variety of cultures. Various Maluku cultures contain mathematical values that we can use as a learning approach. Maluku culture, such as the shape of traditional houses, maritime activities of the Maluku people, and traditional Maluku dances contain mathematical values that we can explore in learning mathematics. This culturally integrated mathematics learning will help students understand concepts because the material studied is related to students' lives. This research used Research and Development method that aims to develop a mathematics learning video based on Maluku culture, namely the Saureka-Reka dance using Powtoon. This research used ADDIE (Analyze, Design, Development, Implementation, and Evaluation) model. The learning videos discusses the learning of Mathematics contained in the "Saureka-Reka" dance. The reason for choosing the object of dance study is because the "Saureka-Reka" dance is a dance that is popular among young people in Maluku, from elementary school to university level. This dance is also often used as an everyday game. This media is made with the integration of culture, mathematics, and of course technology. Data collection techniques in this study was a questionnaire. The data collection instruments used were material expert and media expert validation instruments, and questionnaire sheets. Data were analyzed using descriptive quantitative techniques. This study uses the ADDIE model (Analyze, Design, Develop, Implementation, Evaluation). The results of the study show that the learning videos developed are declared very feasible. It can be seen from the value of the validity test by material experts is 84% and the value of the validity test by media experts is 86%. The practicality test results by users reach a value of 90% which indicates that this media is very practical. Media users responded positively to this media. Some positive responses include that this media is interesting and helps them understand the material. Thus, researchers highly recommend this media for use in mathematics learning. This media is passive or one-way only. The author recommends that future researchers can develop more interactive media.



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A. INTRODUCTION

Education is a process in teaching and learning activities to gain knowledge and develop the potential or skills possessed by students through training, teaching and research as well as following the habits of one generation to another through a learning process carried out by educators. Education is one of the areas of concern in the 17 goals of the Sustainable Development Goals (SDGs). The fourth goal of the SDGs is quality education, where it is necessary to ensure inclusive education and balanced opportunities to get quality education, and to enliven lifelong learning for all people (United Nation, 2023).

Education that is evenly distributed in all circles can be achieved through a cultural approach. This is because culture is a habit of the people which of course has been recognized together in everyday life. Integrating culture in education can be an effort to create quality education for all people, regardless of age or level of education. Culture-based education is a learning process centered on the cultural values of a region. Besides that, culture-based education is also freedom of opinion regarding education that is in accordance with their culture (Restu, 2022). One of the advantages of education that is integrated with culture is being able to create harmony, social justice, and create an integrated community life (Budirahayu & Saud, 2021). In addition, studying culture in learning is also an effort to foster a love of local culture (Malalina et al., 2020).

Culture is a hereditary heritage that must be maintained. The State of Indonesia is an archipelagic country with thousands of cultures that are ancestral heritage. One effort to maintain this heritage is to apply it to the world of education. Culture can be seen as a collection of all the factors that give a social group a unique essence. Cultural anthropologists believe that culture is a complex thing that is formed through spiritual, material, intellectual, and emotional characteristics (Zhang, 2019). Culture-based education is very important to implement because our country is always faced with various efforts that can break unity (Nakaya, 2018).

Maluku is a province in eastern Indonesia with a total area of 581,376 km², consisting of an ocean area of 527,191 km² and a land area of 54,185 km². From a cultural aspect, Maluku has a wealth of cultural diversity. This can be seen from the many different languages and tribes and sub-tribes in Maluku. Maluku forgets one of the provinces in eastern Indonesia which consists of various small island groups. The culture in Maluku is very diverse. These cultures include language, customs, food, traditional houses, and songs. The Maluku people have various cultures that developed as a result of colonialism from Europe who came around the 15th century to exploit wealth in the form of cloves and nutmeg (Titaley & Watloly, 2021). The results of the Summer Institution of Linguistics (SIL) study stated that the languages in Maluku consist of approximately 117 languages and there are approximately 100 tribes and sub-tribes (Wakano, 2019). Thus, this diversity represents great potential for the realization of maximum ethnomathematics learning. Ethnomathematics learning can be realized by linking mathematical material with the diversity of Indonesian culture.

One of the original cultures of Maluku is the Saureka-reka Dance. The term Saureka-reka is taken from the Ambonese language which means the movement of the agility of the feet. The Saureka-reka dance exists as a form of gratitude for the sago farmers in Maluku for the harvest season. The uniqueness of the saureka-reka dance is found in the material, the material used is almost 100% from sago trees. Saureka-reka dance is interpreted as the gratitude and happiness of the people of Maluku for the favors and blessings that God has bestowed. This dance is usually performed by 8 people consisting of 4 men and 4 women. The men are in charge of playing the gaba-gaba and the women are the dancers. Gaba-gaba itself is a blade of a sago tree which is used as a dancing property and at the same time serves as music for this dance, apart from being accompanied by tifa and totoburan (Maluku Provincial Tourism Office, 2021).

The use of Maluku dance is very appropriate to study in mathematics learning because this dance is very well known to the people of Maluku. This dance is usually played in the daily lives of Maluku people. This dance is also often presented at official activities. This makes this dance

very well known, from elementary school students to university students, even among the general public. Students' closeness to this culture can help students more easily understand related mathematics material. In this way, ethnomathematics learning will be easily implemented. This is in line with the statement of Sulistyowati & Sayuti (2024) which states that ethnomathematics learning helps students understand mathematical concepts. Thus, ethnomathematics learning becomes a very important thing to implement and study.

In addition to the cultural approach, learning media also need to utilize technology. Video is a form of technological development that can be used as a learning medium. According to Kusumawati & Setyadi (2022), learning in video form can make learning more effective and interesting because learning videos can display real concepts and material that is displayed systematically. Meanwhile, according to Astika et al. (2019) technology-based learning media can be used as an alternative way in the learning process both in the classroom or outside the classroom and independently. Learning media can help clarify information and facilitate the delivery of knowledge so that the learning process can run effectively. The use of technology in developing learning media has been widely researched previously. Rochmadi et al., (2023) researched the use of Android-based learning media using Augmented Reality (AR) technology to support ethnomathematics learning. His research produces media that is affordable for students. Abdullah et al. (2022) also researched the use of Augmented Reality technology in ethnomathematics learning, especially geometry material. The results of the research show that this media can be used in both offline and online learning. Fitriawanati & Setiyawati (2021) developed a digital flipbook module for ethnomathematics learning. The results of the research are in the form of digital flipbook module products that are suitable for use in least common multiple and greatest common divisor materials.

One of the learning media that can be applied is Powtoon media. Powtoon is an online application that can present presentations in video form which has advantages in the form of character features, animated models and cartoon objects that make learning interesting (Anjarsari et al., 2020). Powtoon has been used in several previous studies. Akmalia & Nufus (2021) developed animated learning media using Powtoon to help students understand mathematical concepts. The results of the research show that this media is effective in helping students understand concepts. Agustin et al. (2022) tested the effectiveness of mathematics learning media using powtoon on two-variable linear equations. The results of his research show that powtoon media is more effective than other media. Anjarsari et al. (2023) tested the effectiveness of mathematics learning media using powtoon on 3D geometry material at elementary school level. The results of the research showed that the media was effective and received a positive response from students. Those several studies explain that Powtoon is an important media in learning mathematics.

Media is a communication tool. Media is also something used to stimulate thoughts, abilities, and skills. Media can encourage the learning process (Irmansyah et al., 2020). We can use learning media to distribute learning material so that it can get students' attention in the learning process. Learning mathematics is a subject that requires innovative learning media. Using learning media will increase students' motivation in participating in the learning process, especially in learning mathematics. If media is able to involve many student senses, we can say the media is innovative (Wati & Widiensyah, 2020). The use of learning media must use media

that is easy to make, inexpensive, and takes a short time to manufacture but can produce effective and efficient results. One of the media that is suitable for use is the Powtoon application which can be used as a medium in learning mathematics.

Based on the writer's observations, the development of Mathematics learning media rarely involves culture. Yet without us realizing it, our entire activity and culture are inseparable from Mathematics, which is the mother of science. In addition, many teachers in Maluku are still not optimal in using and utilizing Information and Communication Technology (ICT) based learning media. Many teachers still use conventional learning media such as PPT, WORD, PDF, teaching materials, LKS and textbooks so that learning activities are less interesting and make students tend to get bored and not enthusiastic about participating in learning activities. Thus, the writing team decided to create Mathematics learning media that is integrated with culture and of course by utilizing technology. Rahmawati & Amalia (2023) stated that the use of conventional media would make students bored or uninterested in learning. Thus, teachers should not just monotonously use conventional media but also need to combine it with the use of technology.

There are several studies that are relevant to this research. Wakano (2019) examines the values of multicultural education in the local wisdom of the Maluku people. From this research it was found that multicultural values in the local wisdom of the Maluku people include respect for others and respect for self. This is reflected in the values of mutual respect, mutual support, mutual understanding of differences, and mutual protection. Ali et al. (2021) researched the implementation of school culture-based character education. The results of this research show that the impact of character formation through culture in schools includes loving cleanliness, beauty, neatness, obedience to worship, sharing, respecting each other, and helping each other. Choirudin et al. (2020) also conducted similar research, namely developing Ethnomatematics learning media from Lampung Culture using Powtoon. The results of this research are the creation of appropriate learning media and can be used as learning media. Pitriani (2022) also conducted research on learning videos based on local wisdom in the Lampung area on prism material. The results of this study create appropriate learning media that can be used in offline, online, or a combination of both. Utami et al. (2023) did research to develop online web learning with ethnomatematics content on self regulated learning. The result of this study are: (1) etomathematics aspect is needed to understand how elements of local culture can foster a love for local culture; (2) it requires the use of images, audio and video more than text; and (3) applications can be used to support learning.

The learning media that the writing team develop is a Mathematics learning media that is integrated with the culture in Maluku. The culture that will be studied is the culture of the "Saureka-Reka" dance. The writing team will link between these cultural elements and Mathematical concepts related to that culture. This learning media is also integrated with technology because it is made using Powtoon. The aim of this research is how to develop a mathematics learning media based on Maluku culture in the Saureka-Reka dance using Powtoon media?.

B. METHODS

This research is research development (Research and Development) which was developed using the ADDIE model. The stages in the model are Analyze, Design, Development, Implementation, and Evaluation. The analyze stage is a needs analysis activity carried out to obtain information about the learning media needed in current mathematics learning. It is intended that this research is able to produce learning media that suit current needs. In addition, observations were also made regarding learning videos that were interesting and easy for students to understand. The next stage is the design stage. At this stage, the media layout is designed and the mathematical concepts contained in the culture studied, namely the Saureka-Reka dance, are carried out. At the development stage, learning videos are made using Powtoon media which are accessed via an online website. At this stage validation was also carried out by material experts and media experts. The next stage is the implementation stage. At this stage, the media that has been made is tested on students in the Mathematics Education Study Program. Through this implementation activity, researchers will observe the practicality of the media. The final stage is evaluation. At this stage the researcher will distribute questionnaires to students who have used the media. The questionnaire will be an evaluation tool so that researchers can find out the usefulness of the media that has been made.

The data collection technique used is a questionnaire. This questionnaire consists of 10 statement items on aspects of function and benefits, presentation, as well as language and typography. This questionnaire was adapted from Putri (2014). The research instruments used included material expert assessment sheets, media expert assessment sheets, and questionnaire sheets. Assessment of material experts and media experts was carried out to assess feasibility, while a questionnaire was used to assess practicality. Data were analyzed with descriptive quantitative techniques. Quantitative descriptive analysis was carried out to calculate the percentage of feasibility and practicality of the developed media. The data analyzed was validation of material experts, media expert validation, and student responses. The percentage of material experts and media experts' ratings is calculated using the following formula.

$$\text{Percentage of Feasibility} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times 100\%$$

In addition to data from the assessment of material experts and media experts, there is also data from questionnaires in the form of student responses to the practicality of media. Questionnaire data is analyzed with the following formula.

$$\text{Percentage of Practicality} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times 100\%$$

After calculating the percentages, all of the data are grouped into five eligibility categories. These categories are as follows (Novianti & Susilowibowo, 2015), as shown in Table 1.

Table 1. Category of Feasibility and Practicality

Percentage (x)	Criteria of Feasibility	Criteria of Practicality
$81\% < x \leq 100\%$	Very Feasible	Very Practical
$61\% < x \leq 80\%$	Feasible	Practical
$41\% < x \leq 60\%$	Pretty Decent	Pretty Decent
$21\% < x \leq 40\%$	Unfeasible	Unpractical
$0\% < x \leq 20\%$	Very Unfeasible	Very Unpractical

C. RESULT AND DISCUSSION

The results of this study are the media in the form of a Maluku culture-based math learning video "Saureka-Reka Dance". One approach that can be used in education is culture-based education. This culture-integrated education has even been seen since the Dutch colonial era. One of the efforts to struggle during the colonial era was formed through culture-based education (Weiner, 2018). This is intended so that students get to know and love their culture so that of course they will maintain the culture by implementing it in their lives. This is as found by Ida et al. (2020) that many young people actively participate in the social environment around them. The following is a display of the learning video that was developed, as shown in Figure 1.



Figure 1. Learning Video Display

This video was created using Powtoon. Making this media has gone through five stages, namely analyze, design, development, implementation, and evaluation.

1. Analyze

At the analysis stage, it was found that mathematics learning media in Maluku Province is still rarely integrated with culture. Indeed, there have been many math lessons using video, but these videos are still general in nature and have not been integrated with culture. This becomes a need which then becomes the basis for the follow-up of making this media. The learning video made is related to one of the Maluku cultures, namely "Saureka-Reka Dance". This dance is a traditional dance from Maluku which is known by people of all ages. Thus learning mathematics associated with this dance will be easily understood by the general public because it has been widely known before.

2. Design


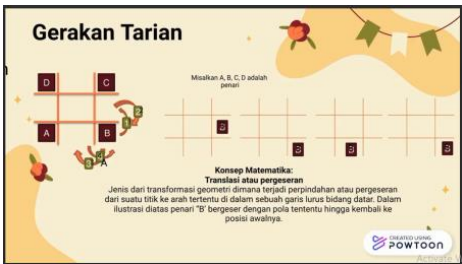

At this stage the team designs media layouts and assessment instruments for content experts, media experts, and users. The research team discussed video design including layout, duration, content, instruments, and voice overs. The team will look up some reference ideas on Powtoon to decide on the look to use. After that, the team created a mathematical model which

is a form of representation in the form of symbols and variables which will be used as the core material to be discussed in the learning video. Mathematic is always connected with culture. This is evidenced by the fact that there are many mathematical objects related to cultural values (Pratami et al., 2018).

3. Development

At this stage the team creates media by accessing the Powtoon website. Media production is done online because the Powtoon site is an online site, so it must be accessed via the internet. The video that was made contains mathematical material related to Maluku culture "Saureka-Reka Dance". The mathematical material discussed in it is some geometric transformation materials such as lines, angles, translations, and rotations, as shown in Table 2.

Table 2. Display of Learning Video

Display	Description
	<p>The Saureka-Reka dance is related to geometric transformations, especially rotations. The rotation occurs when the movement rotates by the dancers.</p>
	<p>The relationship between the Saureka-Reka dance and the transformation geometry material, especially translation. The shift occurs due to the positional shift of the dancers, where the positional shift forms a regular geometric pattern.</p>
	<p>The position of the dancers and the position of the gaba-gaba tools used reflect the concepts of right angles, parallel lines and square shapes.</p>

After the media has been made, it is then validated by material experts and media experts. The indicators that are validated in terms of material are: (1) suitability of material; (2) quality of material; and (3) language. The suitability of the material can be seen from the content of the material according to the subject matter and learning objectives. The quality of the material can be seen from the content of explanation in the video is suitable with the subject matter and material display explained systematically. In terms of language, the validated aspect focuses on using language that is simple, easy to understand, structured and expresses clear meaning, as shown Figure 2.

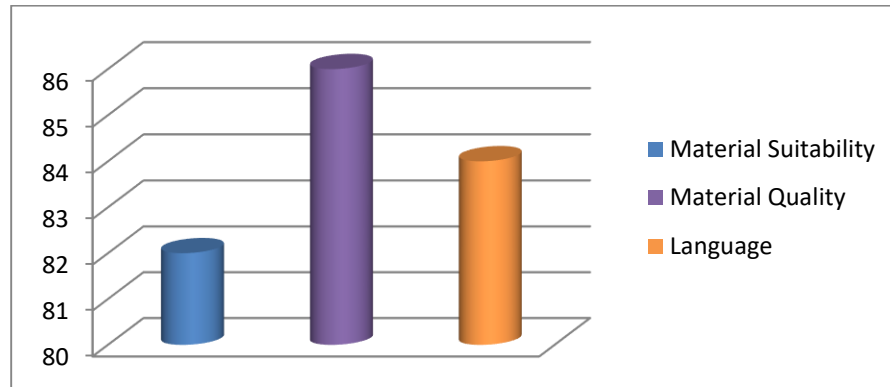


Figure 2. Assesment Result of Material Expert

Figure 2 illustrates assessment result of material expert. The average score of material experts assessments is 84% which indicated that the media was valid and very feasible to use. More specifically, the results of the material expert's assessment can be seen from the material suitability, the material quality, and the language. The material suitability gets a score of 82%, the material quality gets a score of 86%, and the language gets a score of 84%. The indicators validated in terms of media are: (1) function and benefit; (2) media display; and (3) language and typography. The function and benefit can be seen from clarifying and facilitating understanding of the material, training student independence, arousing student motivation, and awakening student creativity. Media display can be seen from image clarity, color display, suitability of image movement speed, sound and music. The language and typography can be seen from language accuracy and writing accuracy, as shown in Figure 3.

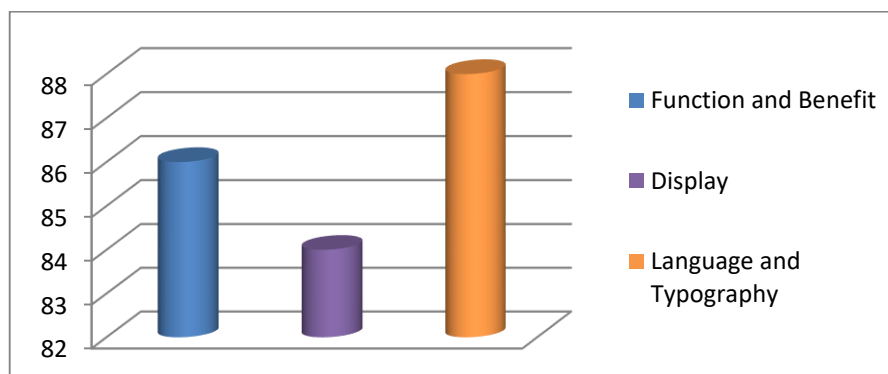


Figure 3. Assesment Result of Media Expert

Figure 3 illustrates assessment result of media expert. The average score of media experts assessments is 86% which indicated that the media was valid and very feasible to use. More specifically, the results of the material expert's assessment can be seen from the function and benefit, the display, and the language and typography. The function and benefit get a score of 86%, the display gets a score of 84%, and the language and typography gets a score of 88%. Aprianti (2019) states that mathematics learning media using Powtoon meets the criteria of being valid/appropriate for students to use. One way to increase students' understanding of mathematical concepts is to develop valid or appropriate mathematics learning media so that the appropriate media for developing learning media is using the Powtoon application.

4. Implementation (Implementation)

This activity was carried out through media trials on Mathematics Education Study Program students. Students will be given a link to access the video. Students will access the video on the link provided and use it to understand the material. After that students will be given a questionnaire containing responses to the practicality of the media. Media practicality can be seen from several aspects, namely effective, interactive, efficient, and creative. The effective aspect consists of responses to whether the learning media explains the material, as well as the media making it easy to understand the material. The interactive aspect consists of a response to the displayed letters which can be read clearly or not. The efficient aspect consists of responding to whether learning media is easy to use anywhere, and easy for students to use. The creative aspect consists of a response to whether the presentation of the media is interesting, and the media is new and has characteristics. The results obtained show an average score of 90% which indicates that the media is very practical. Users state that this media is very practical because it can be accessed online and can be accessed continuously so that users can study at any time and can be repeated as they wish. They admitted that they were interested and greatly helped by this media. Figure 4 illustrates the result of student response, as shown in Figure 4.

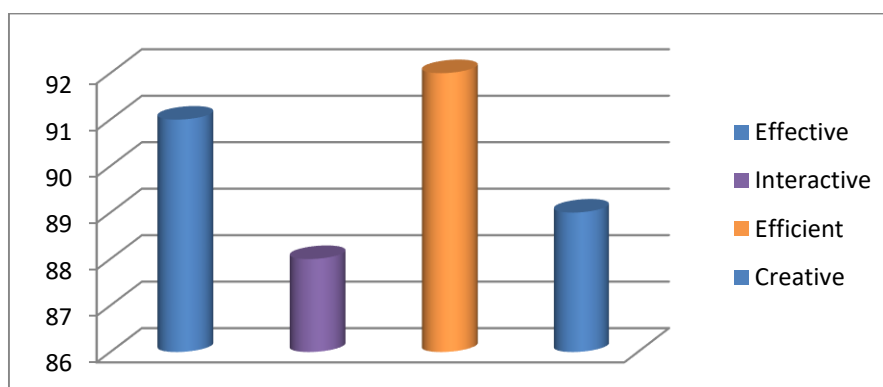


Figure 4. Result of Student Response

5. Evaluation (Evaluation)

Evaluation is carried out to improve the media based on input from users. Students will write their comments and suggestions on questionnaire sheets which are distributed after they use the media. Here are some comments and suggestions from users, as shown in Table 3.

Table 3. User Comments and Suggestions

No.	User	Comments and Suggestions
1.	A	Hopefully it can be uploaded to Youtube so that it can be accessed by more people
2.	B	Media is very engaging and helpful
3.	C	The material is easy to understand
4.	D	Interesting

Based on the table above, there are no revisions to the media. It is just that the student stated that he hoped that the media could be uploaded on Youtube so that it could be accessed by more people. Considering these inputs, we decided to upload the learning videos that had been developed on Youtube. The video can be accessed at the link <https://youtu.be/Z4QTri8uKVw>. Most students show a positive response to the use of this media. Students feel this media helps them understand the material. This is also stated by Akmalia & Nufus (2021) that the use of Powtoon animation learning media products is effective in increasing understanding of mathematical concepts. In addition, students also feel interested in using this media. This is in accordance with the statement of Pangestu & Wafa (2018) that Powtoon is an interesting medium to use in learning.

D. CONCLUSION AND SUGGESTIONS

Culture is an approach that can be used in realizing quality education as one of the goals in the SDGs. Cultural education in learning mathematics in the Maluku region is an innovative effort because in Maluku itself it is still rare to learn mathematics that is related to culture. This media was created as an effort to realize culture-based Mathematics learning. This media is in the form of a video that examines one of the Maluku cultures, namely the Saureka-Reka Dance. This media has been tested for validity and declared very feasible. The value of the validity test by material experts is 84% and the value of the validity test by media experts is 86%. Those mean the media is very feasible. The practicality test results by users reach a value of 90% which indicates that this media is very practical. So this media is stated very feasible and very practical. Media users provide positive feedback on this media. Some positive responses include that this media is interesting and helps them understand the material. Thus, researchers highly recommend this media for use in mathematics learning. This media is passive or one-way only. The author recommends that future researchers can develop more interactive media.

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