

Digital Comics Mathematics Integrated Culture Folklore for Deaf Students

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Abstract

The purpose of this research is to describe the needs of students for the learning media of the digital comic folklore of the people of Lampung “Ompung Silamponga” which integrates mathematics. As for the data-gathering technique used in this study, it was an interview conducted directly with the mathematics teacher of the X class of the Sekolah Luar Biasa Negeri Pringsewu. This study obtained results, among other things: 1) the curriculum used in this research school is *Kurikulum Merdeka* which supports the use of technology in the learning process that occurs; 2) the learning carried out by teachers is often associated with everyday life so that it is possible to associate culture in the process of learning; 3) the lack of knowledge of students about the culture that exists in their area as well as students have difficulty in learning mathematics especially on flat building materials so it can be assumed that the teacher needs to integrate the culture of specific areas on the folklore in the mathematical learning process especially on the plane figure material; 4) Generally students already have their android, but have not been used to know more about the cultural context in their area for learning process. Thus, it is assumed to use the learning medium of digital comics in the learning process; 5) The tendency of deaf students, who are more happy to learn using visual images, is assumed to create the learning medium of the digital comic.

Introduction

Technological advances so rapidly affect everyday life in accordance with the advances of science (Ngafifi, 2014). One of them is the emergence of problems in the cultural sphere, namely the depletion of the love of culture and nationalism of the young generation, as well as the decrease of the sense of nationalism and patriotism (D. S. Y. Agustin, 2011). Irawan also said that the depletion of cultural values and the character of the nation can be a trigger for the dissemination of various social problems in society (Irawan, 2016). In fact, cultural values become the foundation of the character of a nation and are important to embed in every individual. According to (Tandililing, 2013), the preservation and development of regional and national culture play an important role in cultivating and developing the noble values of the nation and the formation of character. Culture and character are believed to be the keys and solutions to various social problems in society. Thus, the cultivation of cultural values and character became a national priority, not only through the world of education, one of which can be transmitted through the learning media. It is supported by the results of research by (Zafirah et al., 2018) that the planting of character values can be done through the use of traditional games as a learning medium.

In this regard, Munir said digital-based learning media could be an alternative for teachers to package learning materials in particular mathematics to be more attractive and can facilitate children to be able to learn more broadly and more varied, which in this case is very useful for students with special needs, such as deaf students (Munir, 2017). In this case, realistic mathematics education (RME) can be used to develop the learning medium of mathematics in the real context of the student (Hadi, 2017). At RME, the teacher acts as a facilitator who accompanies the discovery of the mathematical concepts in their actual context (Fitri & Prahmana, 2020). This is demonstrated by the increased ability of reading comprehension in the deaf students when given mathematics learning with the RME approach (Kushartina, 2019). Mathematical learning with RME's approach can use cultural-based learning sources, called ethnomatematics (Witha et al., 2020).



Figure 1. Folklore of Ompung Silampunga

Figure 1 shows the story of the folklore of Ompung Silampunga. Thus, Lampung has become one of the regions that has a culture of folklore that has been inherited in life but is less in the interest of the community (Zulkarnais et al., 2018). So the integration of folklore Lampung into the digital learning medium is expected to be one of the alternatives for teachers in facilitating students to understand the material by using technology while preserving culture so that learning becomes more meaningful.

Based on the results of interviews with SMALB Pringsewu's X-grade mathematics teacher, it was discovered that the deaf students had difficulty understanding math. They prefer to learn using visual images and be accompanied by teachers who tell stories in simple language. However, in the delivery of the material, the teacher has not connected with the local culture. But as a younger generation, students still have to know and preserve culture. (Cahyono et al., 2018) revealed that due to limitations in hearing, the learning process of the deaf student emphasizes the function of other sensory instruments, such as the (visual) senses. In this regard, (Haryadi et al., 2022) stated that reading activity is considered important, as it is the best means for the deaf students to obtain information or learning messages. Thus, it is necessary to design a visual digital learning medium that can improve students' understanding of the content of reading, especially mathematical concepts. This visual digital learning medium is accessible via Android, which makes it easy for students to study anywhere and anytime, especially for deaf students. Besides, the characteristics of the visual media also correspond to those of deaf students (Ramadhan et al., 2020). The development of

mathematical comics as a learning medium is also potentially preferred by students because it is based on rows of images that can revive the contents of the story and improve students' reading skills.

(Rahmasantika & Prahmana, 2022) has developed Math E-Comic Folklore by Joko Kendil and Si Gundul for deaf students that can improve students' critical thinking skills. However, the use of language in comics is still less simple and not easily understood by deaf students. Based on this, the researchers wanted to develop a digital comic about the folklore of Lampung, "Ompung Silamponga", for students in the Lampung area using language that is adapted to the characteristics of high school students so that it is expected to be easier to understand. The digital mathematics comic learning medium is also accessible via Android, so it is expected to be used more flexibly as well as enhance students' understanding of math, especially among deaf students. The learning medium that will be further developed will be named "E-Colate", which is an abbreviation of E-Comic Lampung Matematika, with the hope that it will be easier to remember by teachers and students. Therefore, before the development of the media form "E-Colate", it is necessary to have an analysis of both the needs of students, teachers, curricula, as well as the means and tools for the media to be developed.

Method

This research is included in descriptive research. The research was carried out in class X of SMALB Negeri Pringsewu Lampung. The data collection technique was conducted with a direct interview with the teacher of the X class of SMALB Negeri Pringsewu Lampung and observation of the characteristics of the students as well as the means and facilities available to learn about the needs of students in the learning medium of mathematics, which is digital comics. The purpose of this research is to know, analyze, and describe everything that the students need to the media that will be developed by the researchers is digital mathematical comics integrated with the culture of the folklore of Lampung "Ompung Silamponga".

Result and Discussion

Analysis of Curriculum or Material

Based on the results of interviews with the teachers of the mathematics subjects in the X class, SMALB Negeri Pringsewu, the curriculum used is the *kurikulum merdeka* of learning. The teacher said the books used in the learning process are printed books that have been provided by the government. The learning process in the classroom has been adapted to independent curriculum learning access. The *Kurikulum merdeka* is designed based on environmental characteristics with the hope of making teaching lessons more meaningful and enjoyable according to the characteristics of the students (Malikah et al., 2022). The concept of merdeka belajar is also part of Society 5.0, where it blends technological advances with solutions to social problems so that learning can take advantage of technology-based learning media. (Marisa, 2021).

On the material of plane figure class X SMALB, which was submitted at phase D, mathematical subjects accompanied by properties and circumstances make it possible to associate with the visualization of a folklore of Lampung, one of which is entitled "Ompung Silamponga". This material is taken because

mathematics has a relationship with everyday life and has a connection with culture (Risdiyanti & Prahmana, 2020). Through the visualization of the images presented, students can learn plane figures in a real and more interesting way because they are more concrete. It is consistent with what (Cahyono et al., 2018) revealed: due to limitations in hearing, the learning process of the student whisper emphasizes the function of other sensory instruments, such as the sense of vision (visual). In addition to embracing the concept of a plane figure through the visualization of images contained in the story, students can also get to know culture through the folklore presented. (R. D. Agustin et al., 2019) stated that ethnomathematics-based cultural learning that is integrated with learning can be through learning media. So that students not only know the folklore of Lampung but also can understand the real connections of the plane figure in the story.

Analysis of Integrated Cultures in Learning

Based on interviews with the class X teacher of SMALB Pringsewu, it is known that the learning process that has been undertaken has never been associated with culture. But teachers are more likely to associate it with objects around them that are often found. But culture can't escape from everyday life. Because basically, culture is the habit of a group of people in a particular region. It is a dynamic process that has norms and values of life in social coexistence.

In this regard, in the *kurikulum merdeka*, there are three choices of decisions that can be applied in the educational unit. One of them is the development of teaching tools in the *kurikulum merdeka* (Marfuah et al., 2014). As for the purpose of being *merdeka belajar*, it is to improve the skills of graduates, including soft skills and hard skills, to be better prepared according to the needs of the times, and to prepare the graduates for the future leaders of a nation of superior personality (Chalkiadaki, 2018). Based on this, it can be concluded that independent learning aims to integrate the profile of students at Pancasila with many different media as well as learning tools provided to teachers. Therefore, explore further how local culture can be integrated into the *kurikulum merdeka* in order to realize the student profile of *Pancasila*.

Mathematics is essentially abstract; therefore, it is necessary to help learners concrete that abstraction by organizing learning contextually. One of them is culture-based learning. In this case, ethnomatematics is very close to this learning. Ethnomatematics itself is derived from the word etno, which means ethnicity, culture, and mathematics. So ethnomatematics is a cultural link to the mathematical concept (Pratiwi & Pujiastuti, 2020). Thus, there is a need for ethnomathematics-based media in the learning process to help teachers cultivate the character of the student's profile of *Pancasila* in relation to the *kurikulum merdeka*.

Analysis of Mathematical Learning Media

Based on an interview with SMALB Pringsewu's X class teacher, it is known that all students have an android as a means of learning. It has been proven that when there is learning that requires using an android, all students can access the assignments given through an android.

It was later discovered that the students of the bullshit generally had difficulties understanding mathematics. They prefer to learn using visual images and be accompanied by teachers who tell stories in

simple language. So this enables teachers to be able to use learning media that contain visual images so that children can learn while playing through the android devices they have, so that students are more happy with learning. The digital visual learning media accessible through Android make it easy for students to learn anywhere and anytime, especially for those who are deaf (Firdausi et al., 2021).

Conclusion

Based on the analysis of the needs of students towards android-based learning media, which integrates the folklore of Ompung Silamponga local culture, it was obtained that: 1) the curriculum used is a *Merdeka belajar* curricula that support the use of technology in learning as well as learning in context; 2) often the learning process carried out by teachers is associated with everyday life, then it is very possible to associate culture in learning; 3) students' knowledge of the culture of the region is still lacking, then there is a need for ethnomathematics integration that can be integrated into learning; 4) already there is an android for each student, so it is highly possible for its use in the learning; 5) students' tendency to use continuous visual images assumes to create a digital comic learning media. Some of these things assume the need of students towards the development of media learning media forms of culturally integrated digital comic books for deaf students.

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Author Contributions Statement

The contributions of the author in this scientific article, together with those of PD, NN, RR, WS, SS, and BK, contributed to data collection and analysis, and RR, WS, and SS wrote the article, and BK was the correspondence author.

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