



## Development of Interactive Learning Media Based on Android Integrated with Ethnoscience Towards the Development of Students' Soft Skills and Science Literacy Abilities in Science Learning at Junior High School

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### Abstract

Ethnoscience is a learning approach that pays attention to and utilises local knowledge and community culture in the context of science. Learning media has a significant influence on various aspects of student academic achievement. More than just a tool or material, learning media is an element that can influence students' motivation and willingness to learn. One technology that can be used as a learning medium is Android. The type of research conducted is research and development. The product developed in this development research is the development of interactive learning media based on Android integrated with ethnoscience to develop students' soft skills and scientific literacy in junior high school science learning. Development by Lee & Owens (2004) is an analysis consisting of needs analysis and initial and final analysis, design, development, implementation and evaluation. The assessment of material experts obtained a total score of 63 with an average of 3.71 and obtained a percentage of eligibility of 92.64% in the "Very Good" category. From the validation data by media experts, a total score of 60 was obtained with an average of 3.75 and obtained a percentage of 93.75% in the "Very Good" category. Based on the assessment results and teacher responses, the score obtained from the teacher was 46, with an average score of 3.83 and a feasibility percentage of 95.83%; this indicates that the interactive learning media that has been created can be tested. Based on the results of the development of students' soft skills, the value of cooperation in groups was 91% in the "Very Good" category. In comparison, students' soft communication skills were 86.30% in the "Very Good" category, soft skills of responsibility were 90.60% in the "Very Good" category, the development of critical thinking and problem-solving soft skills was 83.20% in the "Very Good" category, and the development of soft skills of love for the homeland was 95.30% in the "very good" category.

**Keywords:** Ethnoscience, interactive learning media, android, soft skills, scientific literacy

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### INTRODUCTION

The cultural diversity in Jambi, especially in the Sengeti area of Muaro Jambi Regency, is a valuable heritage that needs to be preserved and socialised by the younger generation. The Sengetiby area, as the capital of Muaro Jambi Regency, has a wealth of local culture that is reflected in customary customs, customary laws, and traditions that have developed from generation to generation. The Sengeti community, the majority of whom are of Malay ethnicity, live side by side in harmony by implementing traditions that are rich in meaning.

Ethnoscience is a learning approach that pays attention to and utilises local knowledge and community culture in the context of science. By incorporating local cultural elements into science learning, students can understand scientific concepts in a way that is relevant and meaningful to students' daily lives. The role of ethnoscience in the learning process is very important in the context of maintaining the existence of local wisdom in the next generation. Through ethnoscience-based learning, cultural values inherited from ancestors can be instilled and socialised to students.

Thus, through an ethnoscience-based learning approach, it is hoped that the younger generation can stay connected to the students' cultural roots and be able to compete and adapt to increasingly modern developments (Mustakim et al., 2023).

The presence of the Merdeka Belajar Curriculum provides a great opportunity to integrate cultural elements and character building in the learning process. By linking learning with local culture, teachers can create a more meaningful and relevant learning experience for students. The Merdeka Belajar concept emphasises four main characteristics that support learning recovery, including a focus on essential materials, contextual learning, providing space for teachers for differentiated learning, and adjustments to local contexts and content (kemendikbud.go.id: 2022).

Learning media has a significant influence on various aspects of students' academic achievement. More than just a tool or material, learning media is an element that can influence students' motivation and willingness to learn. Learning media are various elements in the environment around students that, although they are teaching in nature, can motivate students to learn by stimulating their minds and willingness to study the teaching and learning process (Diamar et al., 2019). Learning media not only conveys information but can also foster critical thinking and reflection and stimulate students' feelings. Through interactive and in-depth learning media, students can be more actively involved in the learning process and understand the important messages conveyed.

Based on initial observations, interviews and needs analysis with Natural Science teachers at SMPIT Nurul 'Ilmi Jambi, there are several problems identified in Natural Science (IPA) learning at SMPIT Nurul 'Ilmi Jambi that are very relevant to the challenges faced in the current learning context. First, Limited Technology-Based Learning Media Facilities. The lack of adequate Information and Technology (IT)-based learning media facilities can hinder the progress of science learning. The use of technology in learning can increase student interactivity and involvement and provide access to more diverse learning resources. Second, there is a Lack of Technology-Based Science Learning Media. The lack of use of IT-based learning media in science learning can have a negative impact on students' scientific literacy levels. The learning media currently used, such as pictures, cartons, PowerPoint, and textbooks, may not be effective enough in improving students' understanding of scientific concepts and science literacy skills. Third, there is a Lack of Linkage between learning and culture (ethnoscience) that is developing in society, so students feel less knowledgeable about the existing culture.

To overcome these problems, it is necessary to develop interesting, up-to-date, and technology-based learning media. The learning media must pay attention to the needs and characteristics of students and relate learning to the context of students' daily lives. In addition, training and support for teachers in the use of technology in learning and the development of students' soft skills are needed.

Soft skills development is an important part of education because soft skills shape students' character and prepare them for success in their personal and professional lives. Soft skills include a variety of abilities, such as communication, teamwork, leadership, problem-solving, creativity, and empathy.

The use of technology, especially Android, as a learning medium has opened up new opportunities in education by enabling more flexible and affordable learning.

However, to maximise the potential of Android-based learning, support and training for teachers in the use of this technology are needed. The use of smartphones among students of SMPIT Nurul 'Ilmi Jambi has become commonplace because almost all students have their smartphones; the use of smartphones among students of SMPIT Nurul 'Ilmi Jambi has not been used optimally in learning. So far, there has been no innovation in learning media made by teachers based on Android. Android has been used only to search for references to learning materials. This is an opportunity to develop Android-based learning media.

Culture and technology-based learning is part of the Independent Curriculum and is intended to develop competencies that are in accordance with the applicable curriculum content standards. The combination of culture and technology-based learning aims to maintain culture in line with technological developments and strengthen character so that existing culture does not fade over time. The results of Pratiwi et al.'s (2018) research show that the use of interactive multimedia in learning can increase students' interest in learning and facilitate students' understanding of the material. However, research on Android-based learning media integrated with the concept of ethnoscience to develop students' soft skills and scientific literacy is still limited.

Thus, this research will pave the way for the development of a more holistic and contextual learning approach, which not only helps students develop scientific understanding and skills but also strengthens students' cultural identity. With a focus on the development of soft skills and scientific literacy, this research will provide an important contribution to the younger generation to face the complex challenges in an increasingly advanced society.

## **METHODS**

The type of research conducted is research and development. The product developed in this development research is the development of interactive learning media based on Android integrated with ethnoscience to develop soft skills and scientific literacy of students in junior high school science learning.

The development model uses the Lee and Owens model. The use of the Lee and Owens development model can provide a strong foundation for the development of learning media that are in accordance with the needs of science learning in junior high schools and can make a significant contribution to the development of soft skills and students' scientific literacy abilities. Development by Lee & Owens (2004), namely analysis, consists of needs analysis and initial and final analysis, design, development, implementation, and evaluation.

The trial object of the developed product is the students of class VIII E of SMPIT Nurul Ilmi Jambi, and the product trial is carried out in several stages. First, a one-to-one trial by looking at the responses of 3 people with different levels of academic ability; the purpose of this assessment is to test the product to ensure that all groups can use the product. Second, a small group consisting of 10 students will be the respondents, and third, a large group trial of 30 students will be conducted to see the effectiveness of the product in improving students' scientific literacy and soft skills.

## **RESULTS & DISCUSSION**

### **Results**

In the development stage, the developer realises the previously designed storyboard design and puts it into a product. The resulting product is an interactive learning media based on Android integrated with ethnosience consisting of a loading screen, landing page or main page, menu, Learning Achievements, Ethnosience material, Serengeti culture, our figures, developer profiles, and exercises. In the application, there is a Sengeti culture page containing the cultures that exist in the Sengeti community. Introducing this culture to the younger generation will help them get to know and preserve the existing culture.

After the product is developed, the product is assessed by material experts who assess the suitability of the material with the images and videos displayed in interactive multimedia and the suitability of the material displayed with Learning Achievements and learning objectives. After the material experts listen to and study the android-based interactive learning media that the developer designed, they assess and provide suggestions and comments on the android-based interactive learning media. The assessment of the material experts obtained a total score of 63 with an average of 3.71 and obtained a percentage of eligibility of 92.64% in the "Very Good" category.

Then, the product is assessed by a media expert. After the media expert listens to and studies the android-based interactive learning media integrated with the ethnosience that the developer designed, the media expert then assesses and provides suggestions and comments on the interactive learning media. From the second validation data by media experts, a total score of 60 was obtained with an average of 3.75, and a percentage of 93.75% was in the "Very Good" category.

Before the product is implemented for students, an assessment and response from science subject teachers is first carried out as validation by expert practitioners. Teacher assessment is carried out before the product is tested on students—assessment and response from science subject teachers at SMPIT Nurul 'Ilmi Jambi. Based on the assessment results and teacher responses, the score obtained from the teacher was 46, with an average score obtained. Namely, 3.83 and a feasibility percentage of 95.83%; this shows that interactive learning media that has already been made can be tested.

Interactive learning media has been declared suitable by experts in both media and material aspects and has been assessed by teachers of Science. Android-based integrated interactive learning media ethnosience was first tested with a one-to-one trial to get information like clarity, convenience use of the product, sequence of use, and completeness of elements in the product. Then, after getting this information, small group trials were conducted. One-to-one trials were conducted on three students from class VIII E SMPIT, Nurul 'Ilmi Jambi. The instrument used was an open and closed questionnaire using a Likert scale. The student response questionnaire was given to three students. From the results of the questionnaire, the response categories given by the students can be determined.

The next stage after the small group trial is the large group trial. The large group trial was conducted on 30 students of class VIII E SMPIT Nurul Ilmi Jambi. The instrument used was a multiple-choice test. The results of the test were used to measure the extent to which students' scientific literacy increased towards interactive learning media based on Android integrated with ethnosience. Pre-test value of the initial scientific literacy ability of SMPIT Nurul 'Ilmi Jambi students, namely for literacy ability, the highest value of 30 students is seven, and the lowest value is 2 with an average of 4.5 in the category of "Less Good". After treatment using interactive learning media based on

Android integrated with ethnoscience, there was an increase. The results of students' scientific literacy were an average of 9.33 with the highest value of 10 and the lowest 80 with a percentage of 93.3% and included in the category of "Very Good".

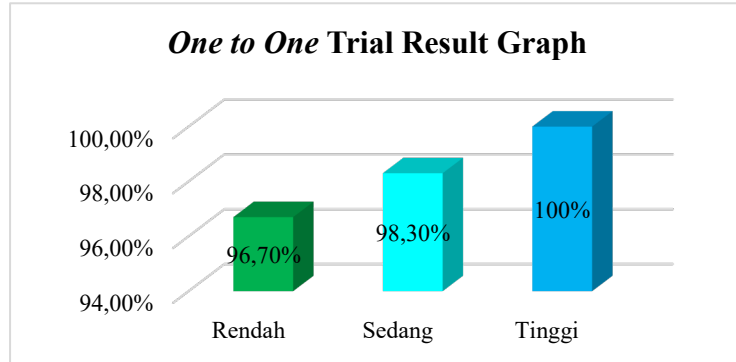


Figure 1. One-to-One Test Result Graph

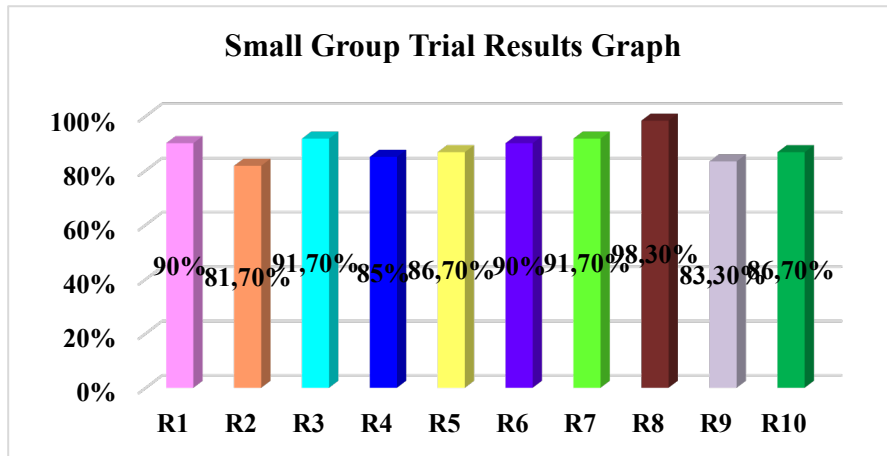


Figure 2. Graph of small group trial results

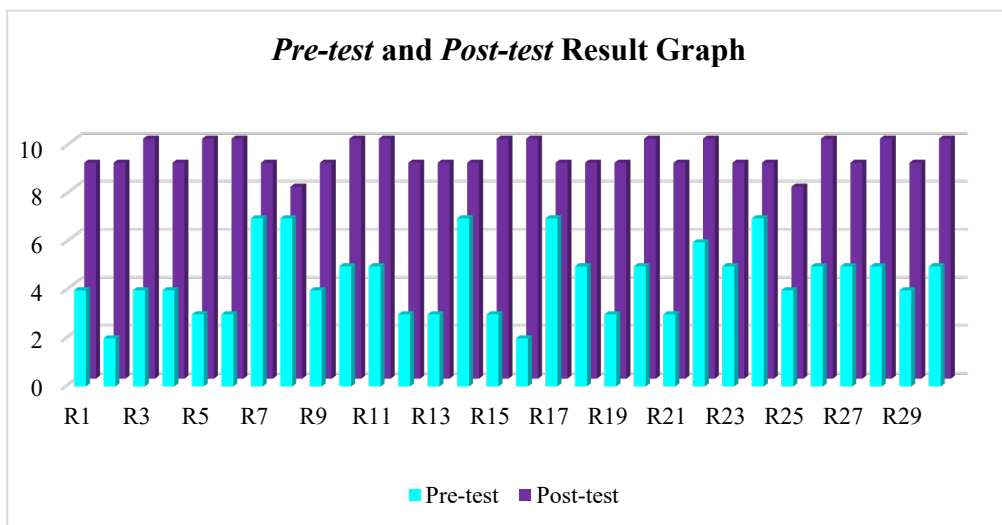


Figure 3. Graph of pretest and posttest results

In addition to seeing the increase in students' scientific literacy, interactive learning media based on android integrated with ethnoscience is also designed to develop students' soft skills. In the trial of interactive learning media based on Android integrated with ethnoscience, it was implemented in learning to see the development of students' soft skills. At this stage, a questionnaire was given to 30 students in class VIII E of SMPIT Nurul 'Ilmi Jambi. The instruments used were open and closed questionnaires using a Likert scale. The results of the questionnaire were used to determine the development of students' soft skills with the help of interactive learning media based on Android integrated with ethnoscience.

Based on the results of the development of students' soft skills, the value of cooperation in groups was 91% in the "Very Good" category. In comparison, students' soft communication skills were 86.30% in the "Very Good" category, soft skills of responsibility were 90.60% in the "Very Good" category, the development of critical thinking and problem-solving soft skills was 83.20% in the "Very Good" category, and the development of soft skills of love for the homeland was 95.30% in the "Very Good" category.

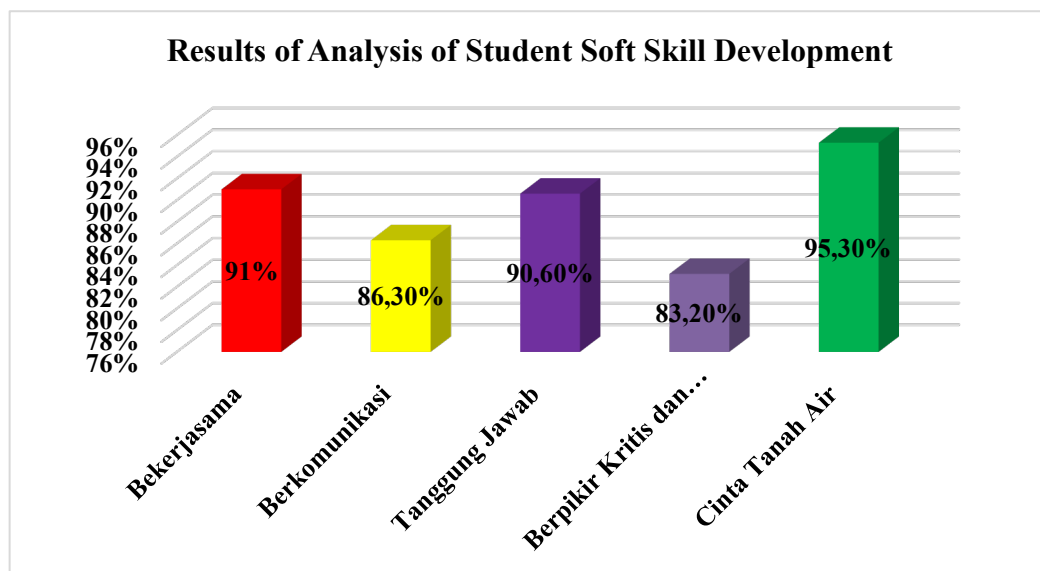


Figure 4: Results of Soft Skill Development Analysis

## Discussion

The development of interactive learning media based on android integrated with ethnoscience on simple aircraft material was carried out using the Lee and Owens (2004) development model, which has five stages: analysis, design, development, implementation, and evaluation. The selection of this model is based on several reasons, namely: the Lee and Owens development model is specifically used in the development of learning media, this model contains a general and easy-to-implement basic framework, this development model has been widely used in various developments including the development of learning media and has been proven to produce good products.

At SMPIT Nurul 'Ilmi Jambi, which implements the independent curriculum, students are asked to be more active in independent learning so that the use of interactive media that is interesting and can be easily accessed independently is needed, and the development of soft skills is needed in independent curriculum learning so that the use of interactive learning media that is interesting and can be easily accessed independently is

needed. Based on the results of the data analysis of student needs and characteristics distributed to 30 students of class VIII E SMPIT Nurul 'Ilmi Jambi, it shows that 53.3% of students find it difficult to learn and understand simple machine material. The obstacle for students to understand simple machine material is because the material is not only memorising but requires an understanding of the material; this shows the need for learning media that can improve students' scientific literacy and soft skills. In addition, it is also known that 86.5% of students stated that science material, especially simple machine material, is very interesting to understand if applied in the form of interactive learning media, whereas 86.7% of students prefer digital learning media (PPT, learning videos, learning websites, android applications) compared to printed learning media (textbooks and LKS). Data was also obtained that 93.3% by applying interactive learning media based on Android integrated with ethnoscience can improve students' scientific literacy.

So, 76.6% of students strongly agree that interactive learning media based on Android integrated with ethnoscience should be applied to simple machine material. The development of interactive learning media is also supported by the facilities and infrastructure available at the school and owned by students and the student's ability to operate technology such as smartphones and laptops/computers. The importance of utilising educational technology was also expressed by Listianingsih and Aini (2021), that utilising ICT can increase the efficiency and effectiveness of learning; besides that, it is also a recommendation for the implementation of the independent curriculum.

Based on the validation data of the material in the android-based interactive media integrated with ethnoscience, which was validated 2 times. In the first validation by the material expert, the score obtained was 55, with an average score of 3.24 and obtained a percentage of 80.90%. There are several suggestions given by the material expert so that the material presented in the interactive media is even better, adding material that can develop students' soft skills, adding other types of simple machines and including material related to the development of soft skills and science literacy. Therefore, based on the suggestions from the material expert, the researcher then continued the validation to the second validation stage by considering the suggestions given by the material expert; all improvements and suggestions that had been given in the first validation stage were carried out and were appropriate. The score obtained in the second stage of material validation was 63, with an average score of 3.71 and obtained a percentage of 92.64% with the category "Very Good" The interactive learning media product developed was conceptually and procedurally feasible so that it could be continued to the trial stage.

Based on the validation data by media experts who conducted two validations of the media components in the interactive learning media developed, in the first validation, the score obtained was 50 with an average score of 3.13 and obtained a percentage of 78.3%. From the first validation, several revisions were suggested by media experts so that the interactive media displayed would be even better. Based on the suggestions given by media experts, the researcher made improvements and continued the media validation in the second stage after all suggestions and improvements had been made and completed. In this second validation, the score obtained was 60 with an average score of 3.75 and obtained a percentage of 93.75% with the category "Very Good" so that the interactive learning media product developed was conceptually and procedurally feasible so that it could be continued to the trial stage.

## CONCLUSION

The type of research conducted is research and development. The product developed in this development research is the development of interactive learning media based on Android integrated with ethnoscience to develop soft skills and scientific literacy of students in junior high school science learning. Development by Lee & Owens (2004) is an analysis consisting of needs analysis and initial and final analysis, design, development, implementation and evaluation. The assessment of the material expert obtained a total score of 63 with an average of 3.71 and obtained a percentage of eligibility of 92.64% in the "Very Good" category. From the validation data by media experts, a total score of 60 was obtained with an average of 3.75 and obtained a percentage of 93.75% in the "Very Good" category. Based on the assessment results in data and teacher responses, the score obtained from the teacher was 46, with an average score obtained. Namely, 3.83 and obtained a feasibility percentage of 95.83%; this shows that interactive learning media that has already been made can already be tested. Based on the results of the development of students' soft skills, the value of cooperation in groups was 91% in the "Very Good" category. In comparison, students' soft communication skills were 86.30% in the "Very Good" category, soft skills of responsibility were 90.60% in the "Very Good" category, the development of critical thinking and problem-solving soft skills was 83.20% in the "Very Good" category, and the development of soft skills of love for the homeland was 95.30% in the "Very Good" category.

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