

The Effectiveness of Teaching Materials Based on Local Wisdom in the Takalar Region to Improve Literacy Capabilities of High School Students

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Received: October 27, 2022

Revised: December 22, 2022

Accepted: December 26, 2022

Published: December 31, 2022

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DOI: [10.29303/jppipa.v8i6.1978](https://doi.org/10.29303/jppipa.v8i6.1978)

Abstract: The literacy ability of Indonesian students is still relatively low, there are several factors that cause it, one of which is an error in selecting learning resources, especially the teaching materials used by schools are not based on local wisdom and do not meet valid categories to measure literacy skills. For this reason, the development of module-based teaching materials is needed. local wisdom in supporting the achievement of competencies and goals in learning. This study aims to obtain a product through a process of testing the effectiveness to measure scientific, data and environmental literacy abilities. This research is development research (R&D) using 4-D type (Define, Design, Develop, Disseminate). The population of this study was class X students with a total of 141 consisting of small and large-scale tests. The results showed that the students' literacy skills were 71.86% (high), the results of the n-gain analysis for the experimental class were 0.70 and for the control class 0.55 (moderate). The results of the inferential analysis were obtained using a different test (t-test) showing that H₀ was rejected and H₁ was accepted, so it can be concluded that teaching materials based on local wisdom in the Takalar area provide a significant difference in increasing the literacy skills of class X students.

Keywords: Teaching materials; Local wisdom; Literacy; N-gain

Introduction

21st century learning requires students to have comprehensive skills. The 21st century skills consist of four main domains namely literacy, inventive thinking, effective communication and high productivity (Turiman et al., 2012) in (Agustin et al., 2021). The 21st century subjects consist of English (the official language of each country), the world's lingua franca, art, mathematics, economics, science, geography, history, government, and citizenship. While the 21st century theme includes global awareness; financial literacy, economics, business and entrepreneurship; awareness as a citizen; health literacy; and environmental literacy (Andrian & Rusman, 2019) in (Kurniawati et al., 2021). literacy is one of the government's efforts that can be used to answer the challenges of the 21st century in preparing quality human resources. This shows that scientific literacy is one of the important skills that must be possessed.

A teacher must train young people in the field of basic knowledge and equip students with critical and creative thinking. Science learning competency-based curriculum aims to provide learning experiences to understand science concepts, science process skills, and solve everyday problems (Agustin et al., 2021). This shows that scientific literacy is one of the goals in education to improve the quality of education in Indonesia. As we know, Indonesian students' literacy skills are still relatively low, especially in science. This can be seen from the results of TIMSS (Trends in International Mathematics and Science Study) and the results of PISA (Program for International Student Assessment) which show that students' thinking skills are still low. Indonesian students' scientific literacy ranks 70th out of 78 participating countries, ranks 72th out of 77 countries in reading ability, ranks 72th out of 78 countries in math ability (OECD, 2018).

The low ability of scientific literacy is due to several factors. Error in the selection of learning resources

How to Cite:

Eviyanti, S.J., Ngabekti, S., & Sumarni, W. (2022). The Effectiveness of Teaching Materials Based on Local Wisdom in the Takalar Region to Improve Literacy Capabilities of High School Students. *Jurnal Penelitian Pendidikan IPA*, 8(6), 3089-3094. <https://doi.org/10.29303/jppipa.v8i6.1978>

(Agustin et al., 2021), lack of contextual content in teaching materials (Irhasyuarna & Hafizah, 2022), lack of learning is more interesting, practical and realistic (Nonggi et al., 2021), is a factor affecting low literacy. As research by Izzatunnisa et al. (2019) states that teachers use student worksheet in learning, but student worksheet has not fully trained and developed students' scientific literacy skills in explaining phenomena scientifically, evaluating and designing scientific investigations, and interpreting data and scientific evidence through scientific work procedures, so that it cannot provide meaning to students. Maryati, (2021) also stated that there are still many students and students who still have statistical literacy skills in the low category, namely they still experience difficulties in learning to present data in the form of charts and graphs. Wulandari in Lestari & Rosana, (2020) also states that low environmental knowledge results in low environmental quality. This occurs because human behavior does not consider environmental factors in carrying out daily activities. The main factor that is often found is the lack of interest in knowing and studying environmental problems. As the main pillar in education, of course, the teacher is the first example to be imitated by students. Thus, as a teacher must provide real stimulus and examples to students in behaving and solving environmental problems.

One of the learning resources that contains environmental problems is teaching materials. The teaching materials that have been used so far do not have space for students to be skilled in implementing their knowledge to explain surrounding phenomena (Irhasyuarna & Hafizah, 2022). This is due to the lack of contextual content in teaching materials, which means that it is still dominated by content material that is presented in general and is an abstract concept, so students are required to memorize it without knowing its relation to everyday life (Irhasyuarna & Hafizah, 2022). So that the local reality that exists in the region itself along with the environmental problems that occur really need to be raised in school learning, one way is to integrate it into literacy-based teaching materials and local realities (Anggraini et al., 2021). So that students better understand the real conditions that exist in their environment and improve various literacy skills such as science, data and the environment.

Teaching materials help in the learning process because they can help teachers and students in learning activities so that the teacher does not present too much material, besides that teaching materials can replace some of the teacher's role and support individual learning (Irhasyuarna & Hafizah, 2022). According to Sae et al., (2021), teachers need the ability to create a meaningful learning environment and be able to develop subject matter that is adapted to the characteristics or potential of the area where students

live. Subject matter that is adapted to the circumstances around the residence makes it easier for students to understand the subject matter. Currently, teaching materials based on the local wisdom of the Takalar area have been developed which have been declared valid by experts and received responses from users. So, this study aims to test the effectiveness of teaching materials based on local wisdom in the Takalar area on the ability of scientific literacy, data literacy and environmental literacy of students.

Method

This research is a 4-D (Define, Design, Develop, Disseminate) type of R & D (Research and Development) development research adopted by Thiagrajan which aims to aim to obtain a product through the developed effectiveness testing process. The research was carried out in two stages, namely a small-scale test, namely SMA Negeri 3 Takalar and a large-scale test, namely SMA Negeri 1 Takalar and SMAS Tarbiyah Takalar Islamic Boarding School. When the research was carried out in the semestereven the 2022/2023 school year.

The research design for a large scale is the pretest-posttest control group design which involves the experimental and control classes as a comparison. The material studied is environmental change. During the learning process, teaching materials based on local wisdom in the takalar area were used in the experimental class where students were able to obtain information about the takalar environment. The population in this study were students in class X SMA Negeri 3 Takalar (A), SMA Negeri 1 Takalar (B) and SMAS Pesantren Tarbiyah Takalar (C) in the 2022/2023 academic year consisting of 5 classes with a total of 141 students. people.

The data collection technique for students' literacy skills was obtained through the provision of a literacy test instrument made in the form of multiple-choice questions consisting of 20 questions given during the pretest and posttest. The questions given were the same for the control class and the experimental class. Data analysis techniques using inferential and descriptive statistics. Inferential statistics use a different test (t-test), while descriptive statistics use a description of literacy indicators by reviewing the increase in literacy skills in the experimental class and the control class using N-gain. N-gain is obtained from pretest and posttest data using the N-gain formula. The gain index criteria (N-Gain) consist of posttest scores, pretest scores and maximum scores.

$$N\text{-gain} = \frac{S_{\text{post}} - S_{\text{pre}}}{S_{\text{maks}} - S_{\text{pre}}} \quad (1)$$

The gain index interpretation criteria can be seen in Table 1.

Table 1. Gain Index Criteria

| Gains Index | Criteria |
|-------------------|-----------|
| $g \geq 0.70$ | Tall |
| $0.70 > g > 0.30$ | Currently |
| $g < 0.30$ | Low |

(Hake (Ariana, Situmorang, & Krave, 2020))

Result and Discussion

Inferential Statistics

Inferential statistics are used to determine the difference test of the experimental and control classes whether there is a significant difference between the two, when given teaching materials based on local wisdom of the takalar area. Based on the data analysis prerequisite test, the experimental class and the control class in the two schools were declared to be normally distributed and homogeneous. So, the hypothesis test is done by t-test. The test criteria are if $t_{count} > t_{table}$ at a significant level $\alpha = 0.05$ then H_0 is rejected and H_1 is accepted and vice versa $t_{count} < t_{table}$ at a significant level $\alpha = 0.05$ then H_0 is accepted and H_1 is rejected.

The results of the analysis for SMA 1 The results of the analysis obtained $t_{count} = 6.66667 > t_{table} = 1.671$. Whereas for Islamic Boarding Schools obtained $t_{hitung} = 13.6333 > t_{table} = 1.684$. This means H_0 is rejected and H_1 is accepted. So, it can be concluded that Teaching Materials Based on Local Wisdom in the Takalar Region make a significant difference in improving the literacy skills of class X students at SMA Negeri 1 Takalar and SMAS Tarbiyah Takalar Islamic Boarding School

Descriptive statistics

Descriptive statistics serve to describe the object under study through sample data. This analysis aims to describe the increase in student learning outcomes for the experimental class and the control class. Meanwhile, inferential statistics are used to generalize from the sample to the population.

1) *Description of the achievement of literacy indicators*

a) *Science Literacy*

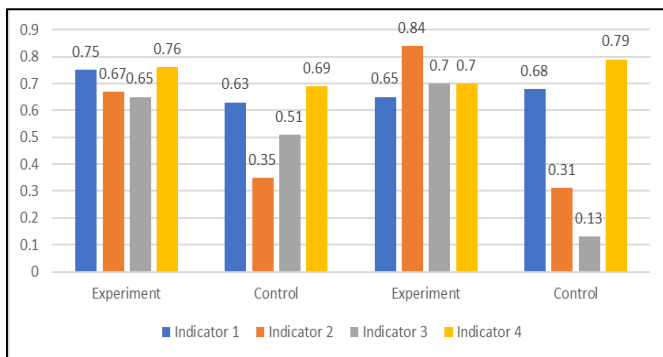


Figure 1. Description of achievement of scientific literacy indicators

The scientific literacy indicator consists of 4 indicators, namely identifying valid opinions (indicator 1), conducting effective literature searches (indicator 2), understanding how research design elements and how they impact findings and conclusions (indicator 3) and solving problems using skills quantitative including basic statistics (indicator 4). As shown in the figure, the chart has increased for each indicator

b) *Data Literacy*

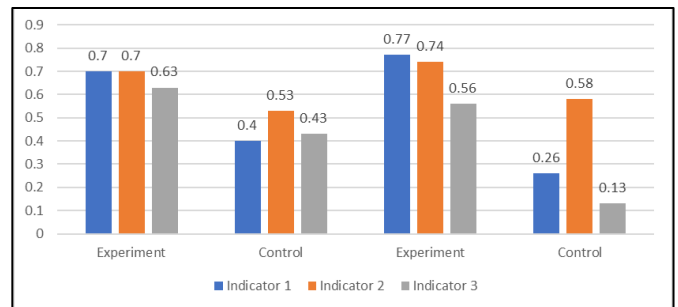


Figure 2. Description of achievement of data literacy indicators

Data literacy indicators consist of 3 indicators, namely interpreting data processing correctly (indicator 1), being able to understand data information correctly (indicator 2), and being able to communicate the results of processing information or data appropriately (indicator 3). As shown in the figure, the chart has increased for each indicator.

c) *Environmental Literacy*

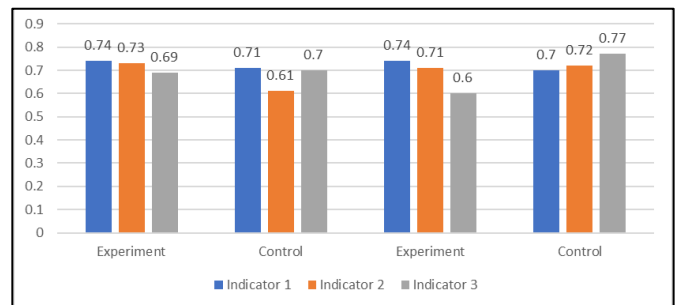


Figure 3. Description of achievement of environmental literacy indicators

Environmental literacy indicators consist of 3 indicators, namely investigating the causes of environmental change (indicator 1), planning to address environmental problems (indicator 2), and reviewing the implementation of government policies (indicator 3). As shown in the figure, the chart has increased for each indicator.

The results of the study show that the description of the achievement of the indicators for scientific literacy, at SMA B, can be seen in the graph that there has been an increase for each indicator. The indicator with the

highest increase, namely indicator 4, is solving problems using quantitative skills including basic statistics. As the literacy test instrument is given several tables and graphs, students interpret the information presented in the tables and graphs. Teaching materials based on local wisdom in the Takalar area are equipped with tables and graphs, one of which is related to changes in the area of mangrove Takalar land, disaster studies by BNPB, and many others that train students to understand various information contained in teaching materials. As for the lowest indicator, namely in the control class, namely, effective literature search. As the teaching materials developed are equipped with procedures for distinguishing various literature that can be used as reference material to understand existing information, whereas the control class does not yet have such teaching materials.

In SMA C, it can be seen in the graph that there has been an increase for each indicator, the indicator with the highest increase is indicator 2, which is effective literature search, as the teaching materials used in the experimental class are teaching materials that are equipped with procedures for differentiating literature from various literatures used as reference material/reference to understand valid information, while the control class does not have such teaching materials so that the increase in n-gain is 0.31. while for the lowest indicator, namely in the control class, namely understanding the elements of the research and how it impacts the findings and conclusions. As the teaching materials developed are given various findings regarding the environment, so that in the teaching process additional information is given regarding research elements which include problem formulation, hypotheses, theories, research results, discussion to conclusions. So that students understand systematic sequences in conducting simple research, but not for the control class.

So it can be concluded that teaching materials based on local wisdom in the Takalar area make a significant difference in the learning process in increasing scientific literacy. In line with the research conducted by Rohaili et al., (2021) who developed instructional materials for guided inquiry models integrated with local wisdom based on outcome-based education (OBE) through online use, the results obtained were that teaching materials had an influence on learning. As for Shofiyah who developed the integrated Particle Dynamics module of E-Learning-Based traditional games, as local wisdom is not limited to customs, the environment but traditional games are also part of local wisdom (Shofiyah et al., 2020). the quality of education in Indonesia is low due to a lack of attention to the socio-cultural environment as a source of learning. So developing a particle dynamics module that increases significant literacy skills in students (Shofiyah et al., 2020).

Developing Environmental Sustainability Education Oriented Teaching Materials based on local wisdom in the South Sumatra region, which states that the teaching materials developed are of good quality with high validation results that can increase scientific literacy (Anggraini et al., 2021).

Based on the results of increasing data literacy for the two schools, it was found that the highest indicator in the experimental class for the two schools was in indicator 1, namely interpreting data processing correctly. As teaching materials provide a lot of information, in the form of data, pie charts, tables that help students understand information related to the environment. So that students have been equipped beforehand to be able to understand the data presented on the test instrument. Whereas for both schools, the lowest indicator is in the control class, which is found in indicator 1. As we know students are not taught with teaching materials that are equipped with various data presentations, so students are not yet trained to solve problems by presenting data, so that the lowest increase score is obtained.

In line with research conducted by Watoni et al., (2022) who developed the Lombok island environmental change module, producing valid, effective and practical E-modules in improving Environmental Literacy and Data Literacy for high school students. Sustainable by developing a test instrument with the local potential of the Kuta traditional village in Ciamis, the test instrument developed consists of 4 indicators, exploring data, selecting data, changing data and making decisions based on data (Lestari & Rosana, 2020). The test instrument provided means that most of the sample still needs to practice in learning data literacy. Hanum et al. (2019) state that which develops worksheets based on cognitive conflict, which aims to improve conceptual, contextual and reduce student misunderstandings. So that the developed cognitive conflict-based student worksheet provides a significant difference in the latest literacy abilities, one of which is data literacy.

The results of the description in Figure 3 are descriptions of the achievement of environmental literacy indicators. At SMA B, it can be seen on the graph that there has been an increase for each indicator. The indicator with the highest increase is indicator 1, namely investigating the causes of environmental change. As a literacy test instrument is given a problem then students understand and investigate the causes that might be the cause of a change in the environment. Teaching materials based on local wisdom in the Takalar area are equipped with various environmental problems around the Takalar area, so that students are able to actualize these problems in real terms. In addition to environmental problems around students are trained to find the main cause points of a problem so that when given questions on the literacy test instrument students

are able to understand the causes of a change in the environment. As for the lowest indicator, namely in the control class, namely, designing to overcome environmental problems. As the teaching materials developed are equipped with various ways to overcome environmental problems such as recycling plastic waste, how to destroy B3 waste carefully, while the control class does not yet have such teaching materials.

In SMA C, it can be seen in the graph that it has increased for each indicator, the indicator with the highest increase is indicator 3, namely examining the implementation of government policies in the control class, this proves that knowledge related to information on implementing government policies in the control class has a better understanding than the experimental class, but as we know that the teaching materials in the control class have teaching materials sourced from schools and the center so that they have a lot of information regarding the government's role in solving problems. Likewise, the lowest is in the experimental class, namely indicator 3. So that teaching materials based on local wisdom in the Takalar area still need to

add insight regarding the study of government policies in solving environmental problems.

So, it can be concluded that teaching materials based on local wisdom in the Takalar area make a significant difference in the learning process in increasing environmental literacy. In line with research conducted by Azizi & Hasanul, (2021) who developed local wisdom-based mini-research, obtained the result that mini-research related to biodiversity material made a significant difference to mastery of the material in the control and experimental classes. As for Kahar & Fadhillah, (2019) who developed the Local Potential-Based High School Biology Learning Toolkit in the Kubuh Raya area, which has very valid, practical, and effective criteria so that it can be widely implemented in learning. Developing teaching materials based on regional local wisdom using problem based learning models, as the ability to solve environmental problems is part of forming environmental literacy, it is found that the developed teaching materials are able to make a significant difference in increasing scientific literacy (Anggraini et al., 2022).

2) *N-gain analysis*

Table 2. The average N-gain score of students

| School | Class | Score | | Average N-Gain Score | Category |
|-------------------------|------------------|----------|-----------|----------------------|-----------|
| | | Pre-Test | Post-Test | | |
| SMAN 3 Takalar | Experiment Class | 4.171 | 15.342 | 0.71 | Tall |
| SMA 1 Takalar | Experiment Class | 4.45 | 15.34 | 0.70 | Tall |
| | Control Class | 4.28 | 13.08 | 0.56 | Currently |
| Islamic Boarding School | Experiment Class | 4.16 | 15.33 | 0.70 | Tall |
| | Control Class | 5.33 | 13.38 | 0.55 | Currently |

Based on the data in Table 2. For the small-scale test, namely SMA Negeri 3 Takalar, it can be seen that the average N-gain score for the literacy skills of the experimental class students is in the high category with an average N-gain score of 0.71. SMA Negeri 1 Takalar obtained an average N-gain score for the literacy skills of the experimental class students in the high category with an average N-gain score of 0.71. SMA Negeri 1 Takalar obtained an average N-gain score for the literacy skills of the experimental class students in the high category with an average N-gain score of 0.70, while the control class with an average N-gain score of 0.56 was in medium category. SMAS Tarbiyah Takalar Islamic Boarding School, it can be seen that the average N-gain score for the literacy skills of the experimental class students is in the high category with an average N-gain score of 0,

Conclusion

Based on the results of the study it can be concluded that the effectiveness of teaching materials based on local wisdom in the Takalar area was obtained from the different test (t-test), description of increasing literacy

indicators and the average n-gain score. The description of achievement of literacy skills is in the high category for both schools, and it is concluded that Teaching Materials Based on Local Wisdom of the Takalar Region makes a significant difference to the literacy abilities of class X students in SMA.

Acknowledgments

Thank you to the Ministry of Research and Technology for providing grants for this research. The researcher also thanks all UNNES leaders, lecturers of Science Education Study Program, as well as teachers and students who have participated in the research, so that this research can run well.

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