

Feasibility Study of Biology Learning Media with Life Skill Approach, Community Science and Technology Based on the Results of Lake Tondano Biodiversity Research

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Abstract

Research has been conducted which aims to develop biology learning media with a life skill approach and Community Science and Technology in Biology learning. The learning media developed are based on research on flora and fauna biodiversity on Lake Tondano. The stages of research are the development of learning media, expert analysis (media experts, material experts, and learning design experts), small-scale trials, and limited experimental research. The results showed that the biology learning tools based on the use of life skills produced student life skills' active learning process and raises. The interest in student learning has increased significantly because it is already well known to students.

Keywords: fesibility study, biology, learning media, biodiversity, lake Tondano

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1. Introduction

In the current industrial revolution 4.0 era, it has given a lot of influence to the education and learning system. Biology learning today, must be able to integrate information technology (Sumampouw, et. al. 2017). Nevertheless, the use of local biodiversity is an advantage in developing biology learning media. Furthermore, the learning media developed must be able to stimulate and arouse students' creativity.

Lake Tondano is the largest lake in North Sulawesi. Payangka is one of the fish species, which is very well known to the community around the lake. In addition to having a very high nutritional value, the ability to reproduce is very fast. Meanwhile, plant species that are well known to the public are water hyacinth. Water hyacinth is a water weed that is very threatening to the sustainability of Lake Tondano. Previous studies have been successful in identifying the morphology of Payangka and the study of ultrastructures of water hyacinth. In addition, identification of insects associated with water hyacinth in Lake Tondano has been carried out. The results of the study of Lake Tondano biodiversity, then used as raw material for making biology learning media (Wurarah et.al. 2017; Mokusuli et.al. 2016).

Learning media is developed with the approach of life skills and community technology science. In the industrial revolution era 4.0, the implementation of learning must be able to generate and develop students' life skills. Thus, it will build students' creativity and innovation, so they can adapt and work in the community. Besides that, learning biology must be able to stimulate students to empower the potential of natural resources using the knowledge they have learned. The main object of biology study is biodiversity and its biological characteristics. Therefore, biology learning must be able to stimulate students, to have a strong curiosity towards the surrounding biological phenomena. Furthermore, in the current era of the 4.0 industrial revolution, information technology must be integrated into the development of learning media.

Based on observations made in high schools around Lake Tondano, most schools still translate biological science education as merely the transfer of knowledge possessed by teachers to students. Not many teachers use biodiversity around schools, including Lake Tondano, as a real object of biological learning. Learning that stimulates life skills and mastery of community technology science is difficult to achieve with conventional learning methods. The problem solving that can be raised at this time based on these conditions is the development of learning media that explores the life skills of students and the application of community technology science. In the end, bring the concepts and principles of science closer to those of students with real-life every day, so that students are expected to be able to utilize, empower and develop what they learn in real-life every day. In the long run, it is hoped that Indonesia will produce human beings, who are creative, innovative, apply scientific principles in dealing with life problems every day so that they are not easily provoked by things that threaten national disintegration. This approach is intended to bridge the gap between learning science in the classroom, with the advancement of information technology and the development of society around students. Through this learning media, students are also trained to get used to be concerned about social and environmental issues related to science and technology. Looking at the foundation of the development

of the STM approach, it is no exaggeration if the STM approach in science learning is feasible as an effort to improve the life skills of students.

2. Research Methods

Population and Sample. The research subjects were teachers and senior high school (SMA) students around Lake Tondano were SMA Negeri 1 Tondano, SMA Negeri Remboken, SMA Negeri Kakas and SMA Negeri Langowan

Research Method. This study applied descriptive research methods. The stages of the research were stage 1. Study of the level of scientific literacy in teachers and students, stage 2. Study of biology teacher-made teaching materials used in learning so far, and stage 3. Application of life skill learning media and science technology and society (STS) using the results of Lake Tondano biodiversity research. Scientific literacy studies were conducted by questionnaire method. The questionnaire used was a questionnaire that had been analyzed for reliability and validity. Study of teaching materials was conducted by interview method and study of learning instruments that have been used for the past three years. Learning media with a life skill and STS approach using the results of Lake Tondano biodiversity research consists of audio visual learning media in the form of learning CDs, a practical guide equipped with histology preparations of Payangka (exotic fish in Tondano Lake) and water hyacinth and textbooks. Learning media was developed to be used on Android phones. The results of the learning media application were obtained through questionnaires (responses of students and teachers), interviews (students and teachers), observation, and the results of learning tests on students.

Data Analysis. The results of the research data were analyzed qualitatively and quantitatively according to the stages and characteristics of the study.

3. Results and Discussion

This first year research focused on exploring data on the evaluation of scientific literacy levels of students and high school teachers, especially on Biology subjects. The source of evaluation data is the use of teaching materials by subject teachers and their implications for the mastery of biology and the life skills of students achieved. High school biology teaching material with a life skill and STS approach that was tested so that it was developed into teaching materials used in high school.

Preliminary studies in the form of literature studies, empirical studies include the study of the initial conditions of the research object through observation and interviews, especially on the condition of students, biology teachers and supporting facilities and the learning process. Furthermore, an analysis of the needs of the object of study was carried out and the preparation of learning devices was carried out. Then, the development of learning devices is carried out with the nature of biology as part of natural science, which includes products, processes and attitudes. Based on the expected needs analysis, the results of the study can contribute to teaching and learning activities in schools.

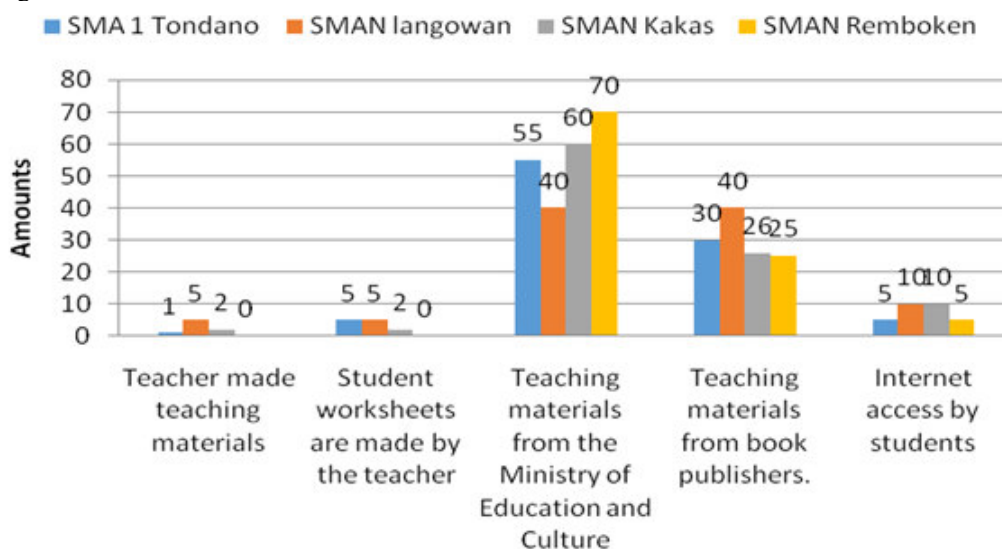


Figure 1. Presentation of biology learning resources used by students.

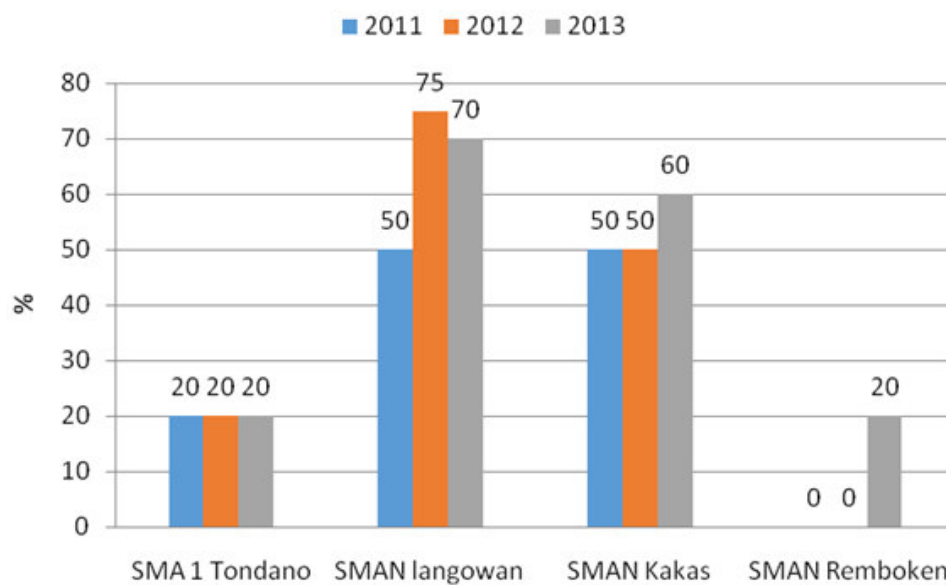


Figure 2. Presentation of implementation of learning with practicum for the past three years.

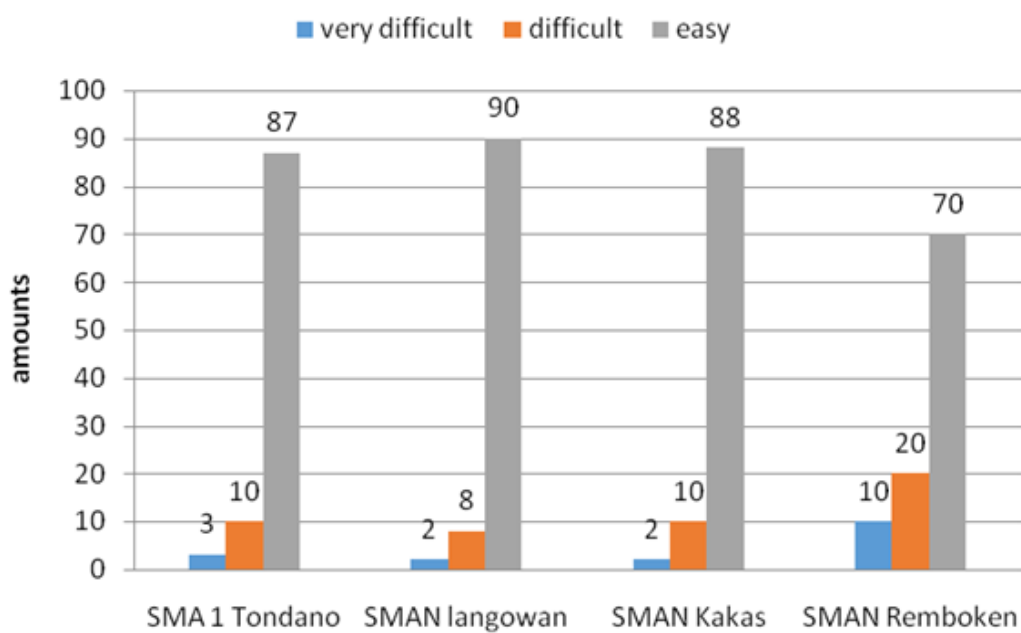


Figure 3. The teacher's response to teaching materials, based on life skills.

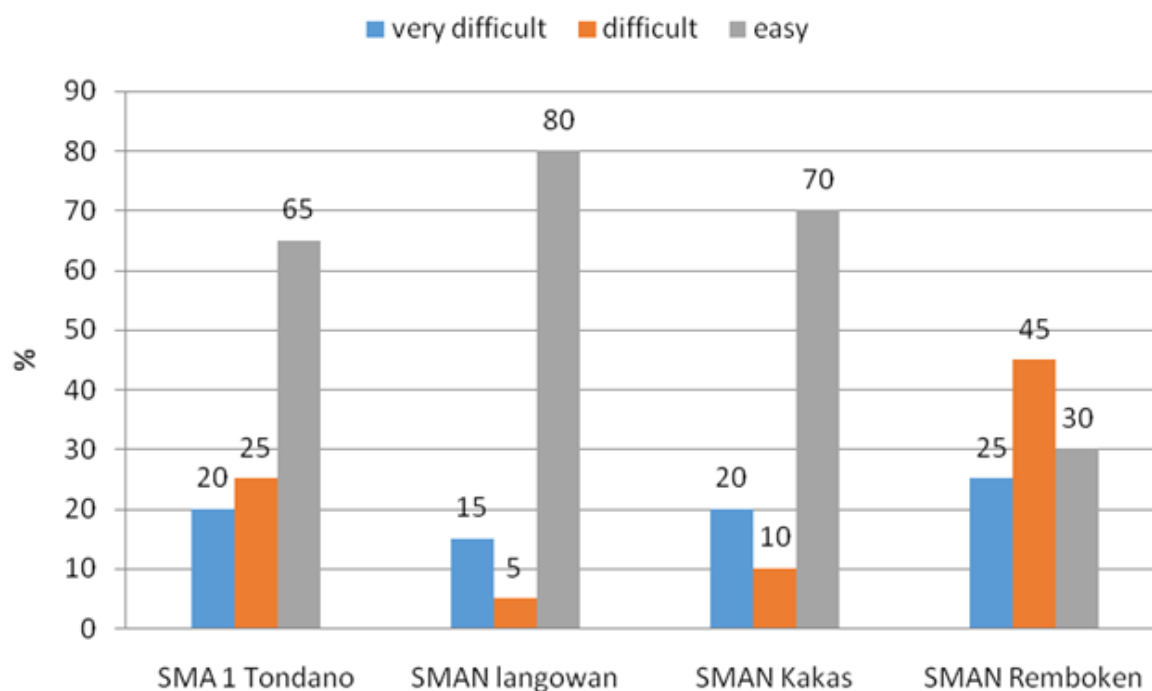


Figure 4. Student responses to teaching materials, based on life skills.

Based on the results of the preliminary exploration study, an analysis of the needs of the object of study was carried out, and the preparation of learning devices was carried out. Life skills-based biology learning tools that are developed are teaching books, learning media, student worksheets and learning designs. The instrument used to obtain research data is the observation sheet and student perceptions questionnaire on the teaching material being tested. Then the learning tools and instruments used for determining validation

Media experts, material experts and learning experts provide assessors above 90. This means the learning package that has been made, meets the requirements to be applied. Repairs only to the writing aspects and book design. Field tests produce good student responses to the learning package..

Trials limited to teaching materials based on life skills in selected high schools

Homogeneity test is used as a prerequisite before conducting research. Pre-test for two classes of research subjects to determine the homogeneity of respondents in terms of student interest and as a comparison material to the state of interest in learning after participating in learning. The results of the pretest interest in students' learning from the two classes of subjects in the next study were analyzed statistically. Levene's test results for pre-test data between the experimental group and the control group were 0.052 with $p = 0.737 > 0.05$, which means that the pre-test data variance between the two groups was not significantly different. Thus the spread of the upper, lower and middle group values in the two groups is not much different. The results of the t test, obtained the value $t = -0.017$ ($p = 0.928 > 0.05$), which means that the average pre-test of the two groups was not significantly different. Thus the two groups departed from the same initial conditions.

At the beginning of the learning device implemented in small classes. This is intended to determine the level of readability of the questionnaire, from the suggestions and comments sheets given to students after reading the questionnaire. Students' responses include mistaken sentences and terms not understood by students. This becomes data for revision of learning packages. Based on the data it can be seen that the average student interest in the control group between before and after learning is relatively the same, namely in the sufficient category. Thus, increasing student learning interest is classified as low with an average value of 0.1.

Based on the results of the pre-test and post-test from the experimental class, data was obtained on increasing students' interest in learning. Based on the data it appears that the average student interest in learning in the experimental group between after and before learning is relatively different. Before learning the average student interest reached 57.96 with sufficient criteria. After learning increased to 85.61 in the very high category.

Life skill-based learning devices after compiled and validated by experts and practitioners, were applied in the experimental class. To see the extent to which life skill activities appear in the classroom, in each learning process in this study involves four accompanying teachers, to observe the activities of students' life skills. The average student performs life skill activities that have been planned in the learning device. There are three skill elements that arise in learning, namely; participate in learning, write opinions / ideas, listen and speak well.

Whereas the skill element that is least carried out by students is the skill of stringing tools. There are three students who perform all skills, a student who gets the highest test score (84) has a low skill score (7).

The amount of life skill activity and the large increase in students' interest in learning in the experimental class is interesting to look for the relationship between the two things. From the data of activities and learning interests, the results of the regression analysis obtained the influence of life skill activities on learning interest Regression models are $Y = 78.29 + 0.201X$ with Y expressing interest in learning and X expressing life skill activities. The model showed that every increase in one student's activity in life skill learning will be followed by an increase in interest in learning by 0.105 life students 'skills are directly proportional to students' interest in learning. The regression model is tested using the F test. The results of the calculated F test amounted to 22,058 ($p = 0,000 < 0,05$) thus significantly the student's life skill activities had a positive effect on their learning interest. The magnitude of the contribution of life skill activities to student learning interest reached 37.7%.

The use of life skills based biology learning tools produces an active learning process and raises student life skills. The interest in student learning has increased very significantly, because the learning package is based on the results of Lake Tondano's biodiversity research, which is already well known to students.

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