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Contents

- Obstacle Experienced By Students In Completing The Thesis Students
Junaidi, Junaidi, Vera Wardani, Yulsafli 151-162
- The Effect of Rewards and Job Satisfaction on Organizational Citizenship Behavior (OCB) of Lecturers at Panca Sakti University Bekasi
Uza Sukmana, Gunawan, Luluh Abdillah, Ardin, Muhammad Ridhwan 163-173
- Evaluation of Teacher's Ability in Using Technology Distance Learning in Banda Aceh City
Muslem Daud & Mariati MR 174-184
- Analysis of The Education Value of The Samawa Family at The Reception Before The Marriage Ceremony: Tradition Versus Islamic Sharia Value in Community Lio Cibarussah Bekasi
Eris Hanifah, Alex Kusmardani, Usep Saepulloh, Hayati, Said Darnius, Darmawati, Fahmi Arfan 185-195
- Student Understanding In Using Google Classroom On Online Learning
Muhammad Azzarkasyi, Syamsul Rizal, Dian Aswita 196-208
- Androgogy Approach in the Utilization of Liquid Smoke Coconut Waste as Vegetable Insecticide for Coconut Farming Community
Wahyu Ana Pria Utama, Lukmanul Hakim, Ruka Yulia, Army, Salfauqi Nurman, Erdi Surya, Elviani 209-220
- Stimulus for Teacher's Reading Interest in Improving Teaching Performance and Competence
Norhayati 221-228
- Identification of Causes of Scabies on Santri of Popular Dayah Educational Institutions in Aceh Province
Evi Dewi Yani, Husna, Masyudi, T. M. Rafsanjani 229-239
- Learning Analysis of the Long Jump Material Using the Playing Method for Junior High Scholl Students
Rubi Yatno, Rahmat Putra Perdana, Edi Purnomo, Eka Supriatna, Putra Sastaman 240-250
- Development of Learning Concepts For Natural Resources Materials Teaching In High School Students
Evi Apriana, Azwir, Samsul Bahri, M. Husin 251-261
- Local Content Integration Model and the Value of Science Characters in Students Junior High School In Banda Aceh
Ibrahim, Nurul Akmal, Almukarramah, Marwan, Yahya Don, Mohd Isha bin Awang 262-272
- Increasing Students' Understanding in Medical Surgical Nursing Course about Factors That Can Affect Early Mobilization of Mothers Post Sectio Caesarea at the Rumah Sakit Ibu dan Anak Banda Aceh
Yeni Rimadeni, Puji Indah Lestari, Afdhal 273-286

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Forewords

Praise and gratitude to Allah SWT, because of Allah's love for us so that we are still given a long life and can carry out our various daily activities. May all our activities become our acts of worship, Aamiinnn

in accordance with the commitment of the Jurnal Serambi Ilmu Journal to continue to improve the quality of its manuscripts since the volume 23 number 2 has been published full in English.

We are also be proud that the number of submitted manuscripts is quite large, but only a few are acceptable and worthy of publication. This means that Jurnal Serambi Ilmu has become one of the scientific publications that are considered by experts and education enthusiasts.

For this reason, Jurnal Serambi Ilmu is committed to continuing to maintain the quality, service and discipline that applies in scientific publications.

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GARUDA
GARBA RUJUKAN DIGITAL



Development of Learning Concepts For Natural Resources Materials Teaching In High School Students

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Abstract

This study aims to determine how the development of learning the concept of conserving biological natural resources (SDAH) in high school students through a community science technology approach (STS) with a role-playing method. This research is qualitative in nature, an analysis of the development of learning the concept of conservation of natural resources is carried out through the STS approach with a role-playing method related to Aceh's environmental issues. A trial was conducted on a limited scale on the implementation of learning in class X-4 with 34 students as a subject in one of the State Senior High Schools in Darul Imarah District, Aceh Besar District. Data were collected by classroom observation, interviews and concept understanding tests. The results showed that the development of learning the concept of conservation of SDAH can be done through the STS approach with the role playing method, can increase students' motivation, creativity in learning; By playing a role, students can place themselves as if they were in a real situation so that they can instill roles, understand concepts, can improve science and technology for the preservation of living natural resources related to Aceh's environmental issues.

Keywords: development, science, society, play, role, preservation

INTRODUCTION

Increased human activity in the exploitation of natural resources is becoming an increasingly serious threat, because it will have an impact in various ways. Habitat changes, for example, result in reduced ecosystem diversity and tend to lead to monocultures. A habitat can be lost due to several reasons, such as shifting cultivation, forest clearing and changes in various natural ecosystems into agricultural, livestock, residential or tourism areas (Djajadiningrat, et al., 1992: 79).

Education is one of the important aspects that must be developed to improve the quality of human resources. But in reality, not a little education that takes place only in one direction. Learning is only from educators to students without involving active

students in the learning process and only focusing on academic intelligence (Sutaryono, & Prasetyaningtyas, 2020).

The low activity and student learning outcomes, this can be seen by many students who are less enthusiastic in learning (Fauziah, Hadiyanto, Miaz, & Fitria, 2021). Less varied methods (lecture and assignment methods), student boredom, lazy students, low critical thinking skills, lack of students asking questions, low student discipline, low student interest, student learning outcomes are not satisfactory so that learning biology needs to be improved in order to increase interest and power. absorb students (Suarni, Rizka, & Zinnurain, 2021).

The presentation of science subject matter by teachers has rarely been associated with students' learning experiences in everyday life, causing science learning to be less meaningful, students bored and less interested in science lessons, causing low student learning outcomes (Jailani, Abubakar, & Anwar, 2018), and the level of student awareness in protecting the environment is still lacking (Junita, 2018). Efforts to build a generation of Indonesian environmental people through education are expected to form humans who have knowledge and awareness of the importance of conserving natural resources. In the learning process through the community science technology approach with the role playing method, it is expected that students are able to understand concepts well and apply them in everyday life, which is characterized by treating biological natural resources as well as possible and students are able to maintain and preserve biological natural resources. both in their own homes, schools and society in general.

One alternative approach that can be used to implement learning in the context of the relationship between science and society is an approach science and technology society. The term community science technology is translated from English "Science Technology Society". Science technology learning and society means using technology as a link between science and society Public. This program is intended so that school science concepts that have been studied in the disciplines of physics, chemistry, or biology can be applied in situations in society (Poedjiadi, 2005: 100). The Science Technology Society (STM) approach is a learning that uses issues about the latest science and technology that is developing in society (Gunarto and Hidayah, 2014).

This community science technology approach with the role-playing method is applied to learning the concept of conserving biological natural resources. This material was chosen because it is considered very closely related to the environment and students' daily lives. By studying this material, students are expected to be able to understand the concept of conserving biological natural resources well and to increase students' awareness of the environment because learning the material for conserving biological natural resources will provide students with knowledge about the concept of living natural resources in the form of microbes, plants and animals; biological natural resources have biological, economic and cultural values that are interrelated; and the preservation of living natural resources is carried out in an integrated manner and involves various parties.

The purpose of the community science technology approach in learning, among others, is to increase motivation and learning achievement in addition to broadening the horizons of students (Poedjiadi, 2005: 84).

This approach is expected to form individuals who have scientific and technological literacy and have concern for community and environmental problems. Someone who has scientific and technological literacy, is someone who has the ability to solve problems using scientific concepts obtained in education according to his level, knows technology products that are around him and their impacts, is able to use technological products and maintain them, creatively makes simplified technological results and is able to make decisions based on values (Poedjiadi, 2005: 123).

The community science technology approach is learning aimed at training and teaching so that the concepts received by students can be applied and utilized by students in overcoming problems faced in people's lives (Susanto, 2014: 270). The stages of the Community Science Technology Approach are as follows:

STAGE 1: Introduction: initiation/invitation/apperception/exploration of students (Issue/Problem). PHASE 2: Concept formation/development of Concept Consolidation). STAGE 3: Application of concepts in life: problem solving or issue analysis (Concept Consolidation). STAGE 4: Conceptual consolidation STAGE 5: Assessment. According to the National Science Teacher Association (NSTA) in the community science technology approach, there are several principles that must be raised, namely (Susanto, 2014: 270):

- 1) Students identify problems and the impacts that these problems arise in the environment.
- 2) Using local resources to find information that can be used in solving problems that have been identified.
- 3) Focusing learning on the consequences of STM for students.
- 4) The view that understanding STM content is more valuable than just being able to do questions.
- 5) There is an emphasis on process skills that students can use to solve their own problems.
- 6) There is an emphasis on career awareness.
- 7) Provide opportunities to gain experience about the rules of social life that can be used to solve problems that have been identified.

By using the community science technology approach with the role playing method, it is expected that students have sensitivity to the environment. This attitude will be fostered by role-playing activities carried out during learning and finally students will like to be actively involved in the environment.

From the existing learning model, which is interesting and fun and able to activate students to ask questions is the Social Technology Science (STM) learning model. The Community Science Technology (STM) learning model is a learning that synergizes the concepts and principles of science, technology, and society. Science learning will be more meaningful if the concepts, principles, and theories of science are packaged in a framework that is related to the application of technology and scientific issues found in the community (Sadia, 2014).

The teacher's community science technology learning model (STM) can assist students in exploring community science technology issues in everyday life, as for the steps as follows:

- 1) The teacher explains the main material and practical benefits that will be obtained student.
- 2) Explore the issue or problem before the students.
- 3) Students connect new learning with previous learning.
- 4) Identify issues or problems in the community related to topics discussed.
- 5) The teacher formulates specific questions on science issues by the question and answer method reveals briefly to see the level of understanding of the students the teacher can accompany the students' questions so that designated students can answer questions.
- 6) Students in groups try to formulate alternative solutions from the issues that have been formulated.

Based on the background of the problem, the problem that will be answered in this research is "How is the development of learning the concept of conserving biological natural resources for high school students?" In accordance with the problems that have been stated, the goal to be achieved in this study is to find out the development of learning the concept of conserving biological natural resources in high school students through a community science technology approach (STS) with a role-playing method.

METHODOLOGY

This study uses a Qualitative Research design (Creswell, 2013), an analysis of the development of learning the concept of conservation of living natural resources is carried out through a community science technology approach (STS) with a role-playing method related to Aceh's environmental issues. A trial was conducted on a limited scale on the implementation of learning the concept of conserving biological natural resources through the STS approach with the role-playing method. The application trial was carried out in class X-4 with 34 students as a subject in one of the SMA Negeri Darul Imarah, Aceh Besar District.

The data collected during the trial of the community science technology (STS) approach with the role-playing method on the concept of conserving living natural resources include:

1. Class observations are carried out during learning using field observation guidelines.
2. Interviews were conducted on 9 students and 1 biology teacher who were directly involved in the teaching and learning process using interview guidelines.
3. Concept Understanding Test. The written test is in the form of multiple choice questions.

The test kits that were made and tested amounted to 55 questions. The value of the test results is used to determine the validity, reliability, level of difficulty of the questions and the discriminating power of the questions. Of the 55 questions, which were taken only 45 questions that met the criteria, namely with a reliability value of 0.91 (very high), an average validity of 0.41 (enough), a difficulty level of 0.63 (medium), a discriminating power of 0.46 (good).

RESEARCH RESULTS

a. Development of Learning Concepts of Conservation of Natural Resources

The development of learning the concept of conserving biological natural resources for high school students was analyzed for the development of learning the concept of conserving living natural resources through a community science technology approach (STS) with a role-playing method related to Aceh's environmental issues.

The development of the syllabus of the community science technology approach (STS) with the role playing method, teaching materials, student activity sheets (LKPD), tests for the preservation of living natural resources, and attitude scales collected in this study were carried out using development analysis related to issues environment.

The development of a syllabus for the preservation of living natural resources with a community science technology approach (STS) with a role-playing method focuses on developing concepts, methods, student activity sheets (LKPD), indicators, and learning instruments. Learning can be done with a variety of interesting role-playing methods so that students have the capacity and a high level of awareness of the preservation of biological natural resources.

Development of teaching materials for the preservation of living natural resources related to environmental issues, consisting of the concept of living natural resources in the form of microbes, plants and animals, rare animals and plants (animals that are close to extinction and plants that are nearing extinction); biological natural resources have biological, economic and cultural values that are interrelated; and the preservation of living natural resources is carried out in an integrated manner and involves various parties, the importance of conserving biological natural resources (protecting their habitat and artificial reproduction).

The development of student activity sheets (LKPD) consists of worksheets as a guide for activities and the results of student work are part of the teaching materials. The development of LKPD in learning the preservation of living natural resources was used for three meetings, namely LKPD meeting I: biological natural resources in the form of microbes, plants and animals; LKPD meeting II: biological natural resources have biological, economic and cultural values that are interrelated; and LKPD meeting III: preservation of living natural resources is carried out in an integrated manner and involves various parties.

A test is a series of questions or exercises as well as other tools used to measure skills, intelligence knowledge, abilities possessed by individuals or groups (Arikunto, 2013). The development of the test for the preservation of living natural resources compiled in this study was used to measure students' knowledge and understanding of the preservation of biological natural resources. The development of the test for the preservation of biological natural resources refers to the material and learning outcomes that have been previously determined.

The attitude scale is a number of written questions to obtain information from respondents about their personality or things they know (Arikunto, 2013). The

development of the attitude scale in this study was in the form of a multilevel scale that included a scale of attitudes and responses. The attitude scale is used to measure students' attitudes towards the preservation of biological natural resources before and after the learning is carried out, as well as to explore students' responses to the activities that have been carried out. The attitude scale assessment category uses a Likerts scale which includes five categories, namely strongly agree, agree, hesitate, disagree, and strongly disagree.

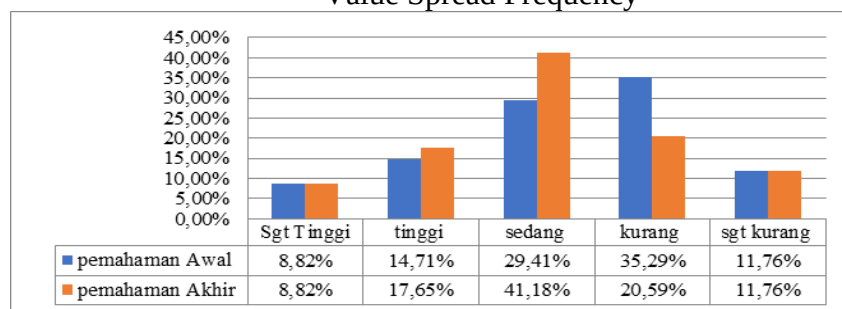
b. Learning Trial

The results of observations on learning trials reveal the implementation of learning activities on the concept of conserving biological natural resources through the STS approach with the role-playing method and the effectiveness of student activities. The results of the learning observations of the first meeting lasted for 2 x 40 minutes, discussing biological natural resources in the form of microbes, plants and animals. The implementation of the teaching and learning process is in accordance with the stages in learning through the S-T-M approach with the role playing method. The learning of the second meeting was carried out for 2 hours (2 x 40 minutes) to understand biological natural resources that have biological, economic and cultural values that are interrelated. The stages of learning are in accordance with the plan that has been agreed with the teacher. Students are directly involved in acting according to the outlines of the scene they have set. Learning I and II are carried out by setting the class to form the letter "U" facing the blackboard, in the front and center there are chairs and tables for roles in discussion forums.

Learning meeting III was held for 2 hours (2 x 40 minutes) studying the conservation of living natural resources carried out in an integrated manner and involving various parties. Learning III is carried out outside the classroom by doing real role-playing activities in the school yard (especially in the backyard of the school multipurpose hall).

Students' opinions on the application of the S-T-M approach with the role-playing method in learning the concept of conserving biological resources were successfully collected through interviews with high, medium, and low groups. Biology teachers' opinions on the application of the S-T-M approach with the role-playing method in biology learning were collected through interviews after learning. The results of data processing regarding the level of understanding of the concept of conserving living natural resources are as follows:

Graphics 1
Value Spread Frequency



Source: Research Results 2021

The data collection tool for understanding the concept of conserving biological natural resources used is a concept understanding test. The written test in the form of multiple choice questions (multiple choice) consists of 45 questions that meet the criteria.

From graph 1. it can be seen that the distribution of data about students' understanding before learning is in the very high category of 8.82% and high 14.71% after learning the very high category of 8.82% and high 17.65%.

Increasing the value (gains) in understanding the concept of conserving biological natural resources in high school students who learn through a community science technology approach with the role-playing method, as follows:

Graphics 2
Spread of Pretest, Posttest and Score Scores (Gains)



Source: Research Results 2021

From graph 2. when viewed in a horizontal direction, the pretest (initial) value is 5.98, the posttest (final) value is 7.17, the increase in value (gains/late-early) is 1.19. This shows that there is an increase in the value (gains) in understanding the concept of conserving biological natural resources better.

Development of a syllabus for the preservation of living natural resources using a community science technology (STS) approach with the role-playing method, teaching materials, student activity sheets (LKPD), tests for the preservation of living natural resources, and an attitude scale for imparting knowledge of living natural resources in the form of microbes. , plants and animals; biological natural resources have biological, economic and cultural values that are interrelated; and the preservation of living natural resources is carried out in an integrated manner and involves various parties. Learning to conserve biological natural resources should be presented in an interesting way that involves cognitive (brain, intelligence), affective (feeling), motor (movement) and social (human-to-human) aspects. Van Den Berg and Dann (2008) have conducted research on the Conservation Stewards Program (CSP) attracting the attention of Extension audiences, increasing student ecosystem knowledge, improving resource

management attitudes, and fostering skills in accessing ecological information, showing the results that CSP can design curriculum, implementing a guiding program, evaluating program processes and conservation impacts.

The development of the syllabus for the preservation of living natural resources using a community science technology (STS) approach with the role-play method, teaching materials, student activity sheets (LKPD), tests for the preservation of living natural resources, and an attitude scale are carried out so that students have the capacity and level of awareness that is high. to the preservation of biological natural resources.

Increased mastery of concepts as a manifestation of students' ability to understand well the concepts on each test item. This happens partly because in general the concepts taught in the concept of conserving biological resources are problems that are already known to students in everyday life, students often see/observe the application of the concepts being studied. If the teacher in his learning can relate the concepts to the state of the student's environment, it is likely that the students can more easily master the concept. Junita's research (2018) describes how learning the concept of acid and base contributes to class XI IPA3 students in increasing environmental awareness. The results of research by Fauziah, Hadiyanto, Miaz, & Fitria (2021) show that: (1) There is an effect of student activities taught by the STM model, (2) there is an effect of student learning outcomes taught with the STM model.

The increase in understanding of this concept can be caused because the concepts to be taught depart from the issues that exist in society, students are also involved in observing the role-playing activities and observing the roles played. This has been stated by Block (in Yunita, 1999: 62) namely that science teaching must always be connected with the surrounding environment so that it can develop scientific and technological literacy.

The impact of the learning process can affect differences in understanding concepts in students, students tend to acquire concepts through extracting ideas and facts followed by a thought process that can be used in addressing problems in everyday life. The research of Suarni, Rizka, & Zinnurain (2021) can be concluded that there is an influence of the science technology learning model society on student learning outcomes in class VIII biology subjects at SMP Negeri 3 Batukliang.

The increase in learning outcomes mastery of the concept of conservation of biological resources is caused by several factors, namely: 1) the S-T-M approach with the role-playing method can motivate students in the learning process, especially during discussions and evaluations (I) and (II), because students are more free to express ideas/ideas/thoughts gained through experience, 2) the S-T-M approach with the role-playing method encourages students to be more active in responding to social issues/problems or asking questions about the problems faced in society related to community science and technology.

In constructivism, this happens because children are not satisfied with the knowledge gained from experience, while the new concepts provided are more meaningful, 3) the S-T-M approach with the role-playing method involves students

actively in the learning process. As stated by Yager (1992: 20) that the S-T-M approach with the role-playing method is a process of learning and teaching science and technology through social issues, because science and technology are felt closer, more

In constructivism, this happens because children are not satisfied with the knowledge gained from experience, while the new concepts provided are more meaningful, 3) the S-T-M approach with the role-playing method involves students actively in the learning process. As stated by Yager (1992: 20) that the S-T-M approach with the role-playing method is a process of learning and teaching science and technology through social issues, because science and technology are felt closer, more real and have more meaning than other concepts. and scientific theories themselves. The results of the research by Jailani, Abubakar, & Anwar (2018) conclude that the implementation of the STS approach can improve the quality of student activities, student learning outcomes, the quality of scientific and technological literacy of students well, as well as student and teacher responses.

Students' opinions about the application of the S-T-M approach with the role-playing method in learning the concept of conserving biological resources were successfully collected through interviews with high, medium, and low groups. Biology teachers' opinions on the application of the S-T-M approach with the role-playing method in biology learning were collected through interviews after learning. Learning the STS approach with the role-playing method in biology learning is a fun first experience, it can increase students' motivation, creativity in learning, and by playing a role students can place themselves as if in a real situation so that they can instill roles, understand concepts, and can increase knowledge of the conservation of biological natural resources.

The weakness of learning the concept of conserving biological natural resources through the S-T-M approach with the role-playing method is that it takes longer time, can only be done by teachers who are able to look for actual issues that exist in the community and plan out outlines of roles, and do not train students as scientists. , students only play a role in oral discourse. The obstacles experienced by Suarni, Rizka, & Zinnurain (2021) in applying the community technology science learning model (STM) are the lack of interest and motivation of students in the learning process so that they tend to be lazy. Plus the results obtained in this study reveal the truth of the opinions expressed by experts who state that the learning model or method can be used as a pattern of choice, meaning that teachers may choose appropriate and efficient learning models and methods to achieve their learning objectives.

CONCLUSION

Based on the analysis and discussion, it can be concluded that the development of learning the concept of conserving biological natural resources can be done through the

Based on the analysis and discussion, it can be concluded that the development of learning the concept of conserving biological natural resources can be done through the development of a learning syllabus for the concept of conserving biological natural resources through the STS approach with the role-playing method, teaching materials, student activity sheets (LKPD), natural resource conservation tests. biological, and attitude scales are integrated into the goals, principles, and methods of the STS approach with the role-playing method.

Learning the concept of conserving biological natural resources through the STS approach with the role-playing method is a fun first experience; can increase students' motivation, creativity in learning; By playing a role, students can place themselves as if they were in a real situation so that they can instill roles, understand concepts, can improve science and technology for the preservation of living natural resources related to Aceh's environmental issues.

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