Analysis of learning media in developing science textbooks with theme energy in life using integrated model for integrated 21st century learning

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Abstract. Science textbooks should contain learning and assessment that is relevant to the learning characteristics of the 21st century that aims to develop talents, interests, and potential learners to character, competent and literate. Pilot study was conducted to determine the basic needs in designing and developing the Integrated Science textbooks. The purpose of this study was to analyze the instructional media in the development of Integrated Science textbook Integrated mode with the energy theme in the lives of 21st century learning integrates research was conducted by a descriptive study with a qualitative approach. Samples were taken from the students of Junior High School 1 Sijunjung. The data used are primary data collected through questionnaires and interviews. The result of this research is the book used the school still does not meet the educational character of the 21st century (4C) where textbooks being used has not seen critical thinking skills and problem-solving that helps improve students' thinking skills, the ability to create update based on prior knowledge of the students still low, and could not help express ideas - creative ideas of students are conceptually and practically. Conclusions needed media that can help relate the competencies and context should stimulate learners to have a Low Other Thinking Skills (LOTS) to the Higher Order Thinking Skills (HOTS). Design of Integrated Science textbook required a textbook that integrates 21st-century learning can help students to think a Higher Order Thinking Skills (HOTS).

1. Preliminary

Education is an activity that can optimize the development of learners starting from the potential, skills, and personal characteristics of learners. Educational activities in Indonesia are currently directed toward the achievement of educational goals. The purpose of education will certainly lead to success in the world of education and can face the challenges of the 21st Century. So, education is very important to shape human nature or person, optimize its development to be better and ready later in the face of 21st Century challenges.

21st Century Learning is learning that integrate literacy, skills knowledge, skills and attitudes, as well as mastery of technology. 21st Century Learning will lay the foundation and competence, competence measurement in the order Low Other Thingking Skills (LOTS) to Higher Orther Thingking Skills (HOTS). The learning process will start from something that's easy to get difficult. With LOTS of evaluation will be a ladder for learners to improve competence towards someone who
has critical thinking [1]. One of the subjects that could play an important role in facing the challenges of the 21st century is the Natural Sciences.

Natural Science is a branch of science that originated from natural phenomena. In teaching 21st century today, the learning of Natural Science in Junior High School has undergone several changes, among which the scope of learning of Natural Sciences previously separated according to discipline each now developed into a discipline that will be able to broaden learners namely the integrated Sciences [2]. through learning Natural Sciences integrated, learners will be able to gain direct experience, so that can add strength to accept, store, and apply the concepts he had learned. Learning experiences demonstrate this relationship conceptual elements will make the learning process more effective.

Natural Science is related to the existing learning in nature then developed and found systematically in other words Natural Science is not only the ability in a mastery of science that only learned [3]. 21st-century learning for junior high schools, the teaching of Natural Sciences undergone several changes, including learning concept, was developed as a subject integrative science, not as educational disciplines. The concept of integrity of the Natural Sciences learning demonstrated in Core Competence and Basic Competence learning Natural Sciences that is, in the Basic Competence already integrated the concepts science of biological sciences, physics, and earth and space science. Learning the 21st century have a goal to prepare humans to Indonesia to have the ability to live as individuals and citizens who believe, productive, creative, innovative, and effective and able to contribute to society, and global challenges [4].

The 21st-century learning process for all levels is carried out using a scientific approach and includes three competencies, namely attitude competency, knowledge competence, and skill competency. These three competencies have different psychological acquisition paths. Attitude is gained through activities: receiving, running, appreciating, living, and practicing. Knowledge gained through activities: remembering, understanding, implementing, analyzing, evaluating, and creating. Meanwhile, skills are acquired through activities: observing, asking, thinking, feeling, and creating. This requires educators to adjust learning activities in the classroom by using learning models that are in line with government demands, using student worksheets provided by schools, and sometimes accompanied by the use of interesting learning media for students to learn to help students have a critical mindset in the face of 21st century learning challenges [5].

Effective learning media to convey certain science concepts, then understanding concepts can be accepted by students well and easily. This media is suitable for middle school students entering the formal operational stage of cognitive development where students have been able to think abstractly. With the help of textbooks, students can understand the well-preserved IPA concept without having to do their own experiments in the laboratory. Learning using a shared model that is implemented optimally, students can get information well. The information can then be used by students to assimilate new concepts with the concepts that students have so that there is meaningful learning that can improve students' conceptual understanding [6].

One of the learning media that can be used to integrate literacy skills, expertise, knowledge, skills, and attitudes, as well as mastery of the technology so as to improve the competence of students is textbooks that are used as a source of learning. Textbooks are the means learning process for students so that learners can improve the knowledge base for higher education. Designing and developing a valid, practical and effective textbook requires a preliminary study or in the Plom development model called Preliminary Research. At this stage, a preliminary study has been conducted with needs and context analysis.

This needs analysis was conducted to see how the importance of textbooks will be developed and textbooks developed can contribute to both enhancing existing components on 21st Century learning addition, the results of field observations there are several issues found in the field related to learning and materials taught to use them.
1. Showed that the Natural Sciences learning teaching materials used by teachers are still not optimal because more teachers lecture in presenting the material. Furthermore, the materials given to students in an integrated yet still fragmented between matter physics, chemistry and biology, in other words when teaching a theme, the teacher sought to explain the substance of the matter in accordance with the understanding and background of teacher education itself.

2. The material in textbooks used are lacking the specifications of a theme so that the explanation was separated between each - each discipline.

3. Textbooks used by students have not been able to spur the students to have the skills to think of simple (LOTS) to the higher-level thinking processes (HOTS).

4. Textbooks still do not meet the educational character of the 21st Century (4C)

5. Examples of problems that exist in the book are very few and there is a gap between the material with the problems that exist so that learners is difficult to understand the material being taught.

6. Answers to questions or problems that exist in the textbooks used in schools does not match the contents of the book so that the interest in reading for students to be reduced.

The importance of textbooks in the learning has not been a serious concern in learning so that the implementation of an integrated learning of Natural Science has not done the maximum. Textbooks are a learning resource for students so that they can guide the learners in understanding the concept. Textbooks have the advantage that there is a lot of information on knowledge, attitudes, and skills to the achievement of competence of learners [7].

Therefore, the need to develop a worthy textbook in accordance with the feasibility of content, constructs, and linguistics. Preliminary Research through textbooks used in the learning has not been in line with expectations. Textbooks are expected to have a language that is simple and easy to understand, according to the scientific and include competence attitudes, knowledge, and skills. In fact discovered language textbooks have complicated and difficult to understand and require a high language analysis to understand.

Textbooks will be designed which integrated science text book with the theme of energy in life using integrated type integrates 21st century learning integrated learning makes learning more relevant, effective, efficient, and provide variety in the style of teaching [8]. Integrated learning is also divided into a variety of integrated learning models as proposed [9] as many as ten integrated learning models. The ten integrated learning models are: fragmented, connected, nested, sequenced, shared, webbed, threaded, integrated, immersed, and networked. Of the 10 kinds of Fogarty selected models are integrated, Because The integrated type is this learning models Gives students to gain knowledge as a whole and intact Because its implementation in learning involves Several subjects [10].

Integrated science learning is chosen because students in junior high schools have characteristics that are appropriate for this lesson. In addition, integrated learning can improve student learning motivation. Students feel that science lessons are very close to their lives, such as plants, animals, the environment and themselves. This will certainly have a good impact on the development of competencies not only knowledge but also social and spiritual competencies will also develop very well [11].

In this study, integrated learning model used is a model of integration. Model integration is an integrated learning model that uses an approach to the field of study. The model of integration is also often referred to as thematic learning, i.e. learning with a specific theme and discussed in several disciplines. This model sought by combining field studies by setting curricular priorities and find the skills, concepts and attitudes that overlap in several areas of study [12]. The theme is taken in this research is the energy of life, which is a combination of materials three subjects, i.e. physics, biology, and chemistry. Matter of physics that energy, i.e. photosynthesis biological materials, and chemical materials, namely metabolism and integrates 21st century learning.

2. Research methods
This research is a descriptive qualitative approach. Pdescriptive enelitian not intended to test specific hypotheses. Descriptive research is a form of studies aimed to describe phenomena that exist, whether
a natural phenomenon or man-made phenomenon. The phenomenon can be a form of activity, characteristics, changes, relationships, similarities, and differences between the phenomena with each other phenomena. Descriptive research can produce a picture of the phenomenon under study, describes the processes that occur and present a variety of important information about the variable.

The study population was the students of class VII Junior High School 1 Sijunjung. Number of subjects calculated by the proportion or statistical approaches that are appropriate to the prevailing rules. Sampling was done by using sampling nonprobability accidental sampling, in which subjects are those who met the criteria and in accordance with the purpose of research samples are learners Grade VII Junior High School 1 Sijunjung. The data used in this study are primary data obtained through a questionnaire. Data collection techniques such as questionnaires. The questionnaire used to analyze the assessment that teachers do.

The data analysis technique used is a Likert scale. Likert scale can be used to measure the opinion or perception of a person or group of events or social phenomena [13]. The variables to be measured are translated into sub variable and eventually form a positive statement that starts from never, sometimes, often and always. The questionnaire results obtained by calculating the scores given by the respondents as well as using a Likert scale distribution table.

3. Results and Discussion

Results from the study were obtained from the analysis of research using instruments developed are:

3.1. Analysis Competency Standards

Graduates Competency Standards is graduate qualification capabilities that include attitudes, knowledge, and skills of learners who must be fulfilled or the achievement of an educational unit on elementary and secondary education levels [14]. Competency standards of graduates the which states that every learner must have competence in three-dimension domains items, namely: attitude dimension, the dimension of knowledge and skill dimension [15]. Graduation Standards analysis shown in Figure 1.

![Figure 1. Analysis of Competency Standards](image)

Figure 1 shows that the dimensions of knowledge have a very high compared with the dimensions of skills and attitudes. This suggests that the learning process only requires the achievement of competence of knowledge alone, resulting in the formation of learning is still lacking in character.
3.2. Learning Activity Analysis
Implementation of the learning activity is the implementation of a lesson plan that had been developed. Learning activities include preliminary activities, core activities and closing activity. Analysis of learning activities carried out in class VII Junior High School 1 Sijunjung shown in Figure 2.

![Figure 2. Analysis of Learning Activities](image)

Figure 2. Shows that the low especially learning activities integrated Natural Sciences, which of the three indicators is still in the category enough, this is because more teachers lecture in presenting the material. Furthermore, the materials given to students in an integrated yet still fragmented between matter physics, chemistry and biology, in other words when teaching a theme, the teacher sought to explain the substance of the matter in accordance with the understanding and background of teacher education itself.

3.3. Analysis Assessment
Assessment is a part that can not be separated in a learning process. Assessment is a collection of information that is valid, reliable, and aims to improve the appearance. Ratings need good information and good information that should be valid and reliable. Assessment in education is the process to get information about the performance or the performance of learners. Analysis of assessment made in Junior High School 1 Sijunjung shown in Figure 3.

![Figure 3. Assessment Analysis](image)
Figure 3. Shows that there is one indicator that is still in the category enough that the performance indicators. Implementation of learning done in school is not comparable with the planning process and pelapioran, this happens because teachers are too focused on class lesson planning and reporting, so that the implementation process was not optimal learning.

3.4. Character Analysis of Students
The conditions and characteristics of learners is one of the considerations that must be considered before making a learning tool, both related to interests and talents of learners, learning styles and abilities tendency possessed basic learners. Learners who is considered to have good basic skills will be different with learners who have little or no ability basis. Character Analysis of Students can be seen in Figure 4.

![Figure 4. Analysis of Student Analysis](image)

Figure 4. Analysis of Students

Figure 4. Shows that the indicator analysis of learners are significant results, in which the spiritual attitude indicator to get a value of 92.00 by the excellent category, social attitudes category value of 82.30 with good knowledge of the value of 77.50 with good category, the ability of students' initial value of 84.30 with both categories, learning styles to get a value of 77.50 by the good category, and motivation to get a value of 84.10 with both categories. Based on the analysis, there are two indicators that have low values such as knowledge and learning styles with a value of 77.50. This is because learning Natural Sciences still looks general, The material in textbooks used are lacking the specifications of a theme so that the explanation was separated between each discipline that resulted in learners do not understand the lesson well, coupled with learning to do still use the transfer of knowledge and lectures, thus making participants students feel bored and tired of learning.

3.5. Learning Media Analysis
Instructional media helps teachers in the process of pembelajaran that pembelajaran will attract more attention so as to motivate students to learn; learning materials will be quite vague so that it can be understood by students and enable it to master and achieve learning objectives. Analysis of media that is used in Junior High School 1 Sijunjung can be seen in Figure 5.
Figure 5. Indicates that there is a gap in the use of instructional media used for the indicators of the quality of schools where learning and technical quality obtain the highest value that is equal to 83.30, while the quality of the content scores juah now significantly low at 70.80. It can be seen that the quality of the contents used in the instructional media used by teachers in schools is still low and does not meet the global challenges. Where teachers must be able to create and use instructional media will be able to attract students to be more motivated and able to make students think critically.

Based on the analysis performed on the 5 aspects of the above, it is clear that learning is done optimally disekola has not done in accordance with the purpose of education one is responding to global challenges. Global challenges can be faced when learning is initiated and implemented in accordance with a 21st century education, where education meintegrasikan between skills knowledge, skills and attitudes, as well as mastery of technology, information and computer. These skills can be developed through different models or types of activity-based learning in accordance with the characteristics of competence and learning materials. Efficiency is needed in the 21st century is also the higher order thinking skills (HOTS), which is indispensable in preparing students to face the global challenges.

4. Conclusion
Activity learning analysis is essential to provide an overview of the level of learning achievement among a learner with other learners. There are 5 aspects done in Junior High School school 1 Sijunjung. First, the analysis competency standards showed that the learning process only requires the achievement of competence of knowledge alone, resulting in the formation of learning is still lacking in character. Second, the analysis of the learning activities are still seen not meet than expected or in the category enough because teachers are more lectures in presenting the material. Furthermore, the materials given to students in an integrated yet still fragmented between matter physics, chemistry and biology, in other words when teaching a theme, the teacher sought to explain the substance of the matter in accordance with the understanding and background of teacher education itself. Third, the analysis of the learning Implementation done in school is not comparable with the planning process and pelaporan, this happens because teachers are too focused on class lesson planning and reporting, so that the implementation process was not optimal learning. Fourth, the analysis of the character of the students there are two indicators that have low values such as knowledge and learning styles is due belajar. Hal still visible Sciences general, materials in the textbooks used are lacking the specifications of a theme so that the explanation was separated between each - each of the disciplines that lead learners do not understand the lesson well. Fifth, the media analysis of learning in content quality
scores still low. It can be seen that the quality of the contents used in the instructional media used by teachers in schools is still low and does not meet the global challenges.

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