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Analysis of interactive media integrated natural science with energy themes in the life of using integrated types that integrate of learning for the 21st century

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Abstract. 21st Century Learning is learning that integrates literacy skills, knowledge skills, skills and attitudes, and mastery of ICT technology. Teacher professional competency demands on 21st Century learning must have the skills to be a model of how to learn and work by demonstrating proficiency in technology and transferring knowledge to technology, and collaborating with students and colleagues in using various relevant tools and resources to drive the success of technological mastery innovation. To face the challenges of the 21st Century, Integrated Science interactive media should be able to describe the skills expected in 21st Century learning. The preliminary study carried out aims to analyze the basis in the design of interactive science media integrated with the theme of energy in integrated type life of integrated learning in the 21st century. Research will be conducted using descriptive type research and qualitative approaches. In this study the researchers chose a sample of students at SMPN 11 Padang. Data through questionnaires and interview sheets are primary data that will be used in this research. The results of the analysis state that learning media are needed to help students possess critical thinking skills integrated in 21st century learning.

1. Introduction

Education is a conscious effort planned to realize a comfortable learning process for students to actively explore religious abilities, self-control, intelligence and noble character for society, nation and state [1]. The functions and objectives of national education are outlined in Law No. 20/2003 concerning National Education System article 3 which reads: "National education functions to develop capabilities and shape the character and civilization of a dignified nation in the context of educating the life of the nation, aiming at developing the potential of students to become human believers. and devoted to God Almighty, noble, healthy, knowledgeable, capable, creative, independent and become citizens of a democratic and responsible"[1]. Basically, education in Indonesia includes character education according to Indonesian culture, and is in line with 21st century learning.

The 21st century is based on science and technology, so that human resources are asked to master various forms of skills, such as critical thinking and problem solving, which are increasingly increasing. The Government has currently issued 2013 Curriculum on the National curriculum which is constantly being updated to fit the demands of world education and does not contradict the noble values of the



Indonesian people. Learning in the 2013 Curriculum emphasizes the development of talents, the interests of students to have character and be competent in facing challenges in the 21st Century.

21st Century education integrates ICT knowledge, skills, attitudes and skills [2]. These indicators can be developed through various activity-based learning models that are in accordance with the criteria of competence and material in learning. Indicators of 21st Century skills require higher thinking skills (HOTS) in preparing students to compete globally. In education, besides having students' knowledge, they also have a science-oriented attitude that is critical thinking, creative, communicative and collaborative. At the junior high school level the subjects in the 2013 curriculum that played an important role in facing 21st Century competition were Natural Sciences.

Natural Sciences is a study that studies natural phenomena. At present in the 21st century learning Natural Sciences in schools, especially junior high schools have the scope of just one discipline to broaden students' insights called integrated science [3]. This integrated science learning is expected to be able to make students have direct experience from the environment and the natural environment which is more contextual to accept, save, and apply the concepts they have learned so that the learning process becomes more effective and enjoyable.

Natural Sciences relates to learning that exists in nature and then develop and find out systematically through scientific steps, in other words Natural Sciences is not only the ability in mastering the science being studied [4]. The integration of Natural Science learning can be seen in the Core Competence and Basic Competence where the learning of Natural Sciences has integrated concepts from the fields of biology, physics, earth science and space. This 21st century learning aims to prepare Indonesian people to have the ability to live as individuals and citizens who are faithful, productive, creative, innovative, and beneficial in social life, and can compete globally [5]. In the 21st Century, science learning should be carried out in scientific inquiry with a student centered learning approach to foster creative thinking and critical thinking, be able to solve problems, practice skills innovation, emphasizing the importance of collaboration and communication. The thinking skills developed should already reach the high order thinking skills (High Order Thinking Skills) which if reached with the cognitive realm in Bloom's Taxonomy are at the level of analysis, synthesis, evaluation and creation. So learning must be in accordance with the character and domain of science which includes the domain of concepts, processes, creativity, attitudes or behavior. This requires educators to be able to adjust learning activities in the classroom by using learning models that are in line with government demands, using student worksheets provided by the school, and occasionally accompanied by using learning media that interests students in learning in order to help students have a mindset that is critical in facing the challenges of 21st Century learning.

Learning media is one of the supporters of the learning process. Media is used as a tool for educators to create environmental conditions in learning more effectively and efficiently, so that it can arouse the desire and motivation and increase interest in learning in order to spur students in applying and integrating various concepts that have been learned. Learning media are all things that can convey messages from a planned source, so that a conducive learning environment occurs where the recipient can carry out the learning process effectively and efficiently [6]. The message conveyed through the media in the form of teaching content or material must be acceptable to the recipient of the message (students), using one or a combination of some of their senses. Even better if all the senses possessed are able to receive the contents of the message conveyed. In presenting the concept of science, educators can use instructional media that are integrated literacy abilities, knowledge, skills and attitudes, and mastery of technology called interactive media.

A good interactive learning media is a media that causes interactivity that makes students able to respond to the material presented. The expected response is an active response to participate in providing answers, decisions, elections, and experiments in the media. In designing and developing a valid, practical and effective interactive media a preliminary study called the Preliminary of Research needs to be done in the Plomp development model. The preliminary study conducted is a needs analysis and analysis of students. This needs analysis aims to find out how important interactive media will be

developed, so that it can make a good contribution in 21st century learning. In addition, there are some problems found through field observations related to learning and teaching materials used, including:

- Shows that in science learning, teaching materials and media used by educators are still simple and do not yet contain character in 21st century education (4C).
- Teacher competencies are not optimal in integrating material with 21st century learning.
- The material given to students has not been specific to the development of a theme, it is still separate between one scientific discipline.
- The media used are not yet optimal to assist teachers in achieving 21st century learning goals that integrate attitudes, knowledge, skills and technological mastery.

With the advancement in technology, it is possible to produce interactive learning media that are interesting and fun for teaching and learning. As Suheri (2006) argues that multimedia gives a pleasant impression helping the learning process in remembering it [7]. Agreeing with this, Frey & Sutton (2010) said that multimedia learning in the classroom is not a new phenomenon, but advances in computer technology enable multimedia to be developed to present learning material interactively [8]. Media development that is carried out is an interactive science media integrated with the theme of energy in life using integrated types that are integrated in 21st century learning. Integrated learning can create learning more relevant, effective, efficient and provide variations in teaching styles [9]. Integrated type is combining various subjects / disciplines by determining the main points to find concepts, skills, and attitudes in various disciplines [10]. This integrated learning in the 21st century can increase students' learning motivation, so that they feel that learning science is so close to their own environment and life. This has a good impact on the development of knowledge competencies, attitudes, and skills [11]. Therefore the title raised in this study is the analysis of interactive science integrated science with the theme of energy in life using integrated types of integrated learning in the 21st century.

2. Research Method

The research conducted was a descriptive study using a qualitative approach. This descriptive study is a study that aims to describe the phenomena that exist, both natural and artificial phenomena that will be examined, and can also describe the processes that occur and present important information from the variables studied.

Researchers took the population of all students of SMPN 11 Padang. The number of subjects was calculated using a statistical approach in accordance with applicable rules. Non-probability sampling technique that is accidental sampling is used for sampling, where they are met are subjects who fit the criteria of the research objectives. In this study the researchers took a sample of VII grade students at SMPN 11 Padang, and used primary data obtained through data collection techniques in the form of an observation questionnaire to analyze the assessments made by teachers.

This study uses data analysis techniques in the form of a Likert scale. Likert scale can be used to measure someone's opinion about social events or symptoms [12]. The variables to be measured are translated into a number of positive statements and negative questions that start from very good, good, enough and less. The results of the observation questionnaire analysis were performed by calculating scores obtained from respondents and using Likert scale distribution tables.

3. Results and Discussion

The results of the questionnaire and instrument analysis used in the study can be seen as follows:

3.1 Analysis Competency Standards

Graduates Competency Standards are the ability of graduates to be achieved in an educational unit covering the attitudes, knowledge, and skills of students [13]. Graduates' competency standards state that students must have competencies in 3 domains, namely: the realm of attitudes, knowledge and skills [14]. Analysis of Graduation Standards can be seen in Figure 1.

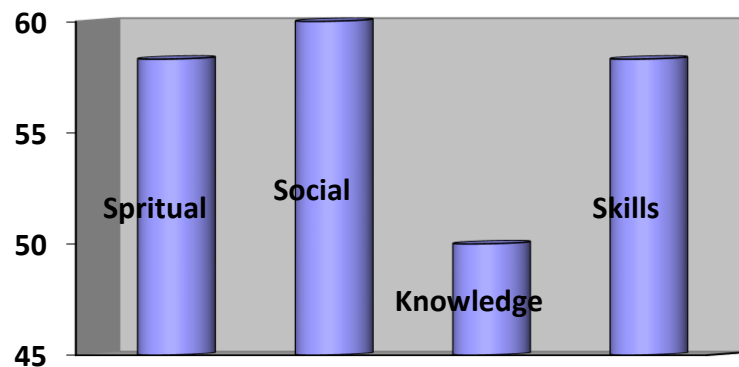


Figure 1. Analysis Graduates Competency Standards

Figure 1 explains that the realm of attitude has a higher percentage than the realm of skills and knowledge. This explains that the learning process has not been balanced in achieving attitudes, knowledge and skills competencies. In terms of students' attitudes have been optimal but not in line with the development of knowledge competence and skills, so that integrated learning between the three realms of 21st century learning has not been illustrated.

3.2 Analysis of Students

Characteristics and development of students is a condition that must be considered in developing learning tools, both related to the interests, talents, learning styles and basic abilities of these students. Students who have good basic skills will be different from students who do not have basic skills. Character Analysis of Students can be seen in Figure 2.

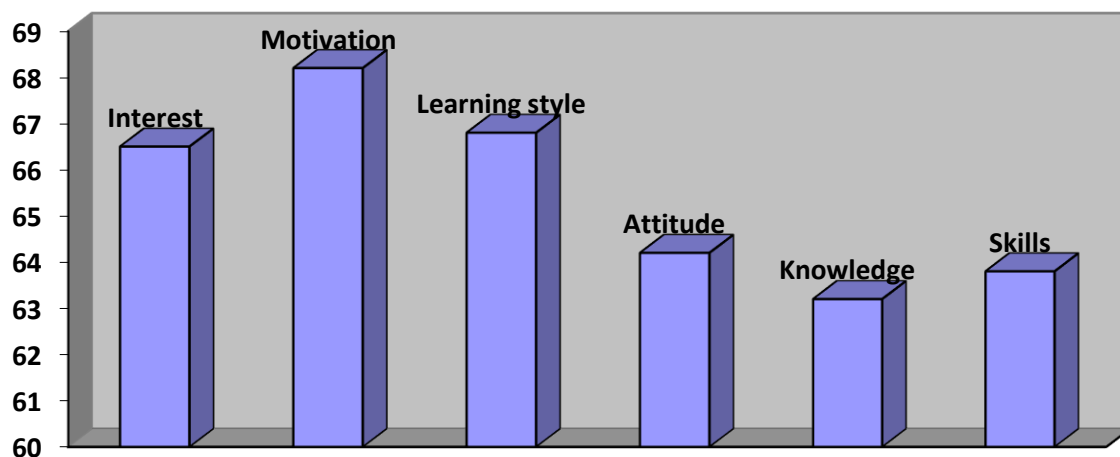


Figure 2. Analysis of Students

Figure 2. Explain that the results of student analysis for all indicators are in the sufficient category. This is caused because Natural Science learning in schools is still general and not yet contextual, the use of media and teaching materials are also less specific on a theme that is close to the lives of students and are still separate between disciplines that have an impact on the lack of interest of students in learning so that participants students do not understand learning well.

3.3 Learning Media Analysis

Learning of media is one of the learning tools that teachers must have as a tool in the learning process, so as to create a learning atmosphere that can attract the attention of students and foster motivation to learn. In addition, the media can also make learning materials clearer in meaning and easily understood

by students that enable them to master and achieve learning goals. Analysis of the learning media used at SMPN 11 Padang can be seen in Figure 3.

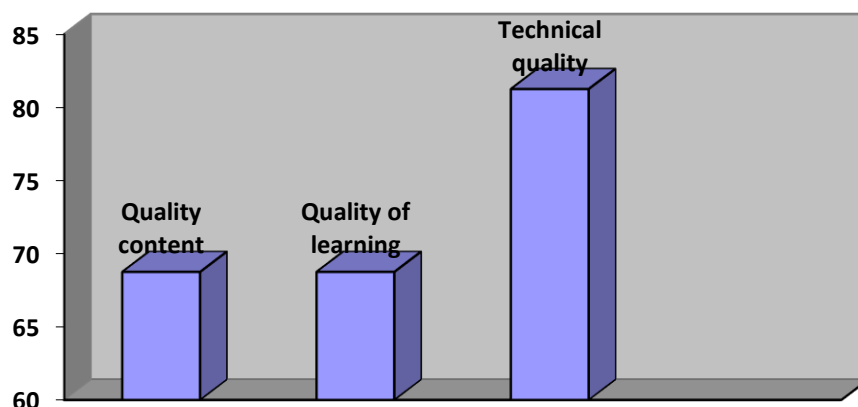


Figure 3. Analysis of learning media

Figure 3 illustrates that the use of instructional media in schools for indicators of content quality and learning quality is very low at 68.75%, while the technical quality is much higher at 81.25%. This shows that the quality of the content and the quality of learning in the media used at school are still not optimal and are not in accordance with good and correct media criteria so that they are not reflected in achieving global challenges. Where teachers are required to design and use learning media that can attract students' attention and trigger students' critical thinking skills, and adapt them to the diverse characteristics of students.

Based on the results of the analysis conducted on the 3 aspects above, it is illustrated that learning done at school is not optimal in accordance with educational goals, one of which is preparing students to face global challenges in accordance with 21st century learning. Education that integrates knowledge, skills, and attitudes, and proficient in the use of ICT. 21st Century learning can be carried out well if it is integrated with interactive media that includes critical thinking skills and problem solving, communicating, creative and innovating and able to collaborate.

4. Conclusion

Activity preliminary study to analyze the learning process is very important to know the achievement of the learning process between students and educators. Of the three aspects of the analysis carried out, it appears that in the analysis of SKL and learner competencies of knowledge is very low, this illustrates the learners have not been able to master the concepts well, supported by the media analysis of learning that describes the content and quality of media used was not appropriate with the expected goals, especially the demands of 21st century learning that integrates knowledge, attitudes, skills and mastery of technology.

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