

Implementation of Integrated Natural Science in Junior High School/MTs Level in Jambi City

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Abstract- Integrated IPA has undertaken to SMP/MTS. Implementation of the integrated IPA will encounter obstacles when not prepared properly. This was not only about teachers' understanding of the concepts and integrated IPA implementation strategy, but also the availability of tools and support facilities. IPA has the characteristics to be integrated fully and properly understood by all stakeholders. It explicitly integrated science teaching for SMP/MTS carried out in an integrated manner. This means, the material taught in integrated science includes biology, physics, and chemistry is taught as one unified whole is taught through the scientific process. The research objective of reviewing the application of integrated science teaching for students of SMP/MTs Jambi. The method used in this research is the study of literature, interview, observation, and distributing questionnaires integrated IPA implementation in 45 science teachers at SMP/MTs Jambi. The results showed that the implementation of integrated science teaching in SMP/MTs Jambi has been carried out but without regard to content that should have linked physics, chemistry, and biology in the same meeting.

Keywords: Implementation, Integrated Natural Sciences.

I. INTRODUCTION

The presence of the global era, marked by increasing free competition in all aspects of life, rapid and unpredictable changes requires qualified human resources, competitiveness, and adaptability to any change. These three factors are the tasks and responsibilities of the world of education, and a challenge that must be faced today. The facts show that the quality of education and the nation's competitiveness are still low. According to Koestoro (2009), Indonesia's competitiveness is ranked 59 out of 60 countries.

According to Trianto (2010), the 21st century is marked by the rapid development of science and technology in various areas of life in the community, especially information and communication technology. Therefore, it is a necessary way of learning that can prepare students to understand science and technology, able to think logically, critically, creatively, and can properly argue.

However, in reality not many students like natural science subject, because it is considered difficult, the limited ability of students or they are not interested in becoming a scientist or technologist. Nevertheless, they still hope that science learning in schools can be presented attractively, efficiently and effectively. Also, teachers want a fun and student-centered learning process. Students enthusiastically raise their hands to answer questions or give opinions, cheer their

celebrations, exchange information and encourage each other. The ultimate goal of all these processes is the satisfying mastery of concepts and learning outcomes.

Moreover, Science is an integral part of human life. All aspects of human life are always closely related to Science, so it can be said that Natural Science is one of the pillars in the progress and development of the world. Hence, paying serious attention to the development of science in his country is one of the important things to do.

Additionally, integrated science can help students to connect different concepts, topics, and relationships between different disciplines. An integrated natural science subject has been implemented for junior high school / MTs. Implementation of integrated this subject will face constraints if not well prepared. These constraints are not only about the understanding of teachers about the concept and strategy of integrated implementation, but also the availability of tools and supporting facilities. Integrated natural science has characteristics that must be understood in full and true by all stakeholders. Explicitly integrated learning process of natural science for junior high school / MTs implemented in an integrated with scientific approach. This means that the science material is taught in an integrated manner including biology, physics, and chemistry as a whole through a scientific process.

To assist the government in the implementation of curriculum, especially science teachers of Junior High School level / MTs in Jambi City in the supply of teaching materials, it is necessary to prepare a model of learning device that suits the needs and demands of the curriculum. Hence, the model of learning tools developed can be used as an alternative example for science teachers Junior High School level / MTs. Related to this matter, it is necessary to develop a learning device that by the implementation of *Permendikn as* number 41 in 2007, the development of learning tools and selection of active learning models, innovative, creative, effective, and fun. Systematic learning planning can be presented in a set of learning tools that are integrated.

The aim of this research is the implementation of integrated science in SMP / MTS Jambi City in real learning activities. Integrated science learning taught by science teachers who do not have a science background.

II. REVIEW OF LITERATURES

Science is an integral part of human life. All aspects of human life are always closely related to science, so it can be said that natural science is one of the pillars in the progress and development of the world. Olteanu (2014) pays serious attention to the development of science in his country. He stated that in the students' view, the importance of Science in our daily life may not be obvious, yet we make science-based choices everyday. Science is involved when we choose what to eat, or choose products with a minimum impact on the environment or make the right decisions about our health-care. Studying Science develops the ability to ask questions, collect information, organize and test ideas, problem-solving and applying what was learned.

Integrated science is a subject that appears in the current 2006 curriculum. Considering that learning in a combined form is more advantageous than being taught separately (stand-alone), it is important for science teachers with non-natural science background to keep trying to prepare the learning as well as possible. This statement is in line with Gooch (2008), he says "... a holistic approach that combined the sciences of today's global problems." Further, he said that science is currently taught in a "piecemeal manner" which separated biology, physics, and chemistry."

Integrated science can help students to connect different concepts, topics, and relationships between different disciplines, as described by Olteanu (2014). Integrated natural science has been implemented for Junior High School / MTs level. The implementation of integrated natural science will face constraints if not well prepared. These constraints are not only about the understanding of teachers about the concept and strategy of integrated natural science implementation but also the availability of tools and supporting facilities. Integrated natural science has characteristics that must be understood in full and proved by all stakeholders. Explicitly integrated learning process of natural science for Junior High School/MTs level implemented in an integrated with scientific approach. This means that the science material is taught in an integrated manner including biology, physics, and chemistry that is taught as a whole through a scientific process.

Integrated learning is a learning system that enables students, either individually or in groups, actively searching, digging, and discovering holistic, meaningful, authentic concepts or principles of science or exploring the topic. Themes become controllers in teaching and learning activities, by participating in the exploration of themes/ topics/events students learn as well as the process and content of various subjects simultaneously.

According to Olteanu (2014), science is useful for teaching scientific knowledge and learning scientific reasoning and its content. In this way, students gaining new experiences for themselves are active in developing knowledge through their activities, in connecting new experiences with old ones, in testing their ideas, and reforming and using the ideas of

others. As long as the process is implemented in the classroom, students carry out research, discuss, and communicate their ideas and arguments in small groups. Students work together to agree on the issues they want to answer, and use different materials and resources to draw conclusions and explanations relating to specific phenomena.

The Ministry of National Education has developed guidelines for the development of integrated natural science learning since 2005, whereas the reality in the field almost all science teachers of Junior High School/ MTs level have not yet implemented the integrated science learning for various reasons. The results of interviews from science teachers in Jambi city found several reasons for the implementation of integrated science learning among others, the fear of teachers about the content of the curriculum material is not conveyed, the absence of examples of integrated learning natural science in several textbooks as well as not yet obtained development steps integrated science lesson for Junior High School / MTs teachers.

The integrated learning model is a learning approach that involves several fields of study to provide a meaningful experience to the students. Meaningful means in integrated learning, students will understand the concepts through their direct experience and connect them with other concepts they already understand (Ministry of National Education, 2010). While integrated natural science is an integrative approach that synthesizes the perspective (viewpoint/ review) of all areas of study in science to solve problems. Integrated natural science is a learning approach that connects or integrates various fields of studying natural science into a single unit. Integrated natural science learning should also include the dimensions of attitude, process, product, application, and creativity.

According to Gooch (2008), natural science is a holistic approach that combines the various strands of science needed to give students the skills to address today's global problems. He says science is now taught in the "piecemeal" way that separates biology, physics, and chemistry, not how we should approach it. Science is an integrated subject, which is related to each other and not separately.

According to Fogarty (1991), there are ten ways to integrate concepts, skills, topics, and thematic units. The ten models are fragmented, connected, nested, sequenced, shared, webbed, threaded, integrated, and networked.

Several basic competencies contain the concept of overlapping so that when separately taught it becomes inefficient. Such concepts require learning integrated or shared models. In the integrated model, the learning materials are basic competencies or concepts in a fully-flung of basic competencies; whereas, in the sharing model, basic competencies or concepts in those basic competencies taught are not completely crosshairs, but starting from the intersection. Several other basic competencies contain interrelated concepts but are not crosshairs, and produce an

intact competence. These concepts or basic competencies must be associated with a particular theme to resemble a spider web. This kind of model is called *awebbed*. Because it always requires a hook theme, then the *webbed* model commonly called thematic model.

Several basic competencies have examples or applied concepts linked to other basic competencies. To the learning in producing complete competence, then the concepts must be linked (connected) in learning. In this connected model of basic competencies or core, the concept becomes the core learning material, whereas the examples or applied concepts associated serve to enrich. The following examples are given for each model. Examples for the integrated model are as follows.

KD: 3.1: Investigates the properties of substances by their form and application in daily life (Physics).

KD: 4.2: Makes separation of the mixture in various ways based on physical properties and chemical properties (Chemistry).

KD: 6.2: Classifies living things based on their characteristics (Biology).

Themes / Topics: Split Separation.

The reason for choosing an integrated model is to combine the field of physics, biology, and chemistry in a mixed conception of both physics, chemistry, and the classification of micro-organisms and the separation of mixtures can be carried out physically (without chemical reactions) by chemical reactions or grouping micro-sized living things. An example of the shared model; (1) basic competency 5.2, analyzes straightforward straight-line experimental data and straight-changing motion and its application in daily life (Physics). (2) Basic competency 1.3, describes the motion system in humans and its relation to health (Biology). (3) Basic competency 2.3, identifies various motions in plants (Biology). The reason for selecting a shared model is the sharing of knowledge in the field of physics and biology studies related to the concept of motion. Motion is a concept of physics that also applies as one of the characteristics of living things.

Moreover, examples of webbed models; (1) Basic competency 4.5, avoids the influence of addictive and psychotropic substances (Chemistry), (2) basic competency 1.5, describes the respiratory system in humans and its relationship to health (Biology) with the thematic; cigarettes and health. The reason for choosing a webbed model is to connect the field of biological and chemical studies into a network of themes to explain about smoking and health. The reason for choosing the connected model is to connect the field of chemical studies with its application in everyday life. Acids, bases, and salts are chemicals found in many environments, including human foods.

The main ideas described in the book are organized in themes such as; science, a way of knowing; the order of the universe;

energy, heat and the second law of thermodynamics; electricity and magnet; electromagnetic wave radiation; Albert Einstein and the theory of Relativity, atom, quantum mechanics, atomic combination, chemical bond, the material and its properties, atomic nucleus, final structure of material, star, cosmology, earth and other planets, tectonic plates, several cycles of the earth, life strategy, living cells, molecules of life, classical and modern genetics, new science to life and evolution. The themes outlined in the main ideas and every major idea are integrated in all fields of science, physics, chemistry, environment, geology, health and safety, astronomy, technology, and biology (Scarce, C. 2007).

An integrated natural science learning model is recommended at Junior High School/ MTs level, as it has several objectives; improving the efficiency and effectiveness of learning, increasing interest, and motivation, as well as some basic competencies can be achieved at once. The integrated science learning model also has several strengths and benefits, the incorporation of various fields of study occurs time savings because three disciplines (physics, chemistry, and biology) can be simultaneously learned. Overlapping material can be more efficient and effective for learning, students can see a meaningful relationship between the concepts of the three areas of study, improve the level of learners' thinking skills, as they are confronted with broader and more profound ideas or thoughts when faced with learning situations, presents real-world applications; applications experienced in everyday life make easier to understand the concept and ownership of natural science competencies. Furthermore, student learning motivation can be improved, help to create a cognitive structure that bridges the students' early knowledge with related learning experiences, so that understanding becomes more organized and profound, and makes easier to understand the relationship of science matter from one context to another; and able to improve cooperation between teachers, teachers with learners, learners with learners, learners/teachers with resource persons, so that learning is more fun, learning in real situations and a more meaningful context.

In addition to the above objectives, Olteanu (2014) added the purpose of integrated natural science in several ways. Psychologically, Integrated Science lessons benefit the students. Research in developmental and cognitive psychology suggests that one learns best when dealing with ideas relating to one another. In this case, it means that integrated natural science learning can help student retention.

Socio-culturally, integrated natural science learning at the junior level leads to the needs, interests, and capacities of students at the time. This is where the need to think about the development of devices that must be tailored to the interests and needs of students, which can improve critical thinking, problem-solving and alternative/ solution of problem-solving. Motivated, integrated science learning avoids learning to memorize the material, therefore learning is organized around the selection of selected topics/themes as well as to be solved

with 'Problem Solving' so that it is expected to motivate and expand students' interest to follow up.

Pedagogically, to overcome a very wide and difficult material coverage and possibly a teacher's constraint to cover all the things that are essential for a productive life. One effort to overcome this they must focus the experience of experience toward the internalization of a positive attitude toward learning, as well as science learning Integrated direct students use skills significantly and directly also improve the transfer of learning because it is close to real conditions/ live science).Of the many goals and benefits of natural science learning in an integrated manner, ultimately creating quality, meaningful learning, leading to high-level thinking learners, increasing motivation, and enhancing cooperation. Learning with integrated science becomes more fun and more contextual according to the needs and interests of learners.

The underlying foundation of integrated natural science is as follows; (a) the philosophical foundation of progressivism, the school of philosophy of education that emphasizes change. Values grow steadily because of new experiences. Therefore, the curriculum should be tailored to the needs of the students. (b) The foundation of constructivism learning theory, which is a view of learning, that learning in one's self is to build new knowledge based on prior knowledge. Constructivism is a theory of how one learns. Constructivism explains how man builds his understanding and knowledge of the world around him by recognizing the objects around him that he reflects through his experience. (c) Judicial basis of *Permendiknas* numbers 22 and 23. *Permendiknas* No 24 of 2006 in Article 1 paragraph 2 stated that the elementary and secondary education units can develop a curriculum with a higher standard than the Content Standards. In terms of Minister of National Education Decree No. 41 of 2007 point II, it states that the lesson plan is prepared for each basic competency that can be implemented in one or more meetings. Then, in point II C number 5, it is stated that the development of lesson plan takes into account the principle of linkage and integration, meaning that the preparation of the lesson plan should consider the relevance and integrity of competency standard, basic competency, learning materials, learning activities, indicators of competency achievement, assessment, and learning resources in a unity of learning experience.

The opinion of Pappas on Science (2006), changing the teaching of science by making the transition from a deductive form to that based on exploratory and scientific investigations meeting the demands on the strategy of organizing scientific education in Europe has a view to stimulate and enhance students' interest in science. One way to increase students' interest in science is through the use of modules. Natural science aims to emphasize students' responses to the use of integrated natural science modules in the classroom. Thus, this study focuses on students' perceptions of topics related to science in daily life and its importance to society.

Furthermore, Pappas (2006) describes some of the benefits of reading natural science books, including limited classroom explanations by teachers, reading and writing of different science books from narratives, specific texts encouraging scientific understanding, providing explanations and answers from natural phenomena, supporting in natural science exploration to students, acting as mediators in ideas, thoughts, and reasoning, and providing the kind of language that scientists use when reading, writing, speaking. Approach that connects science learning with language and writing.

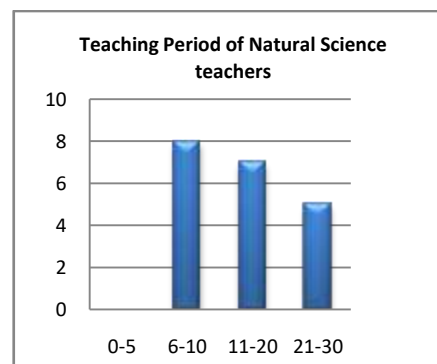
III. RESEARCH METHODS

The method used in this research is the study of literature, study of documentation to get the data of science teachers, interviews, observations, and distributing questionnaires for the implementation of integrated science. The sample in this study were 45 science teachers in Junior High School / MTsin Jambi City.

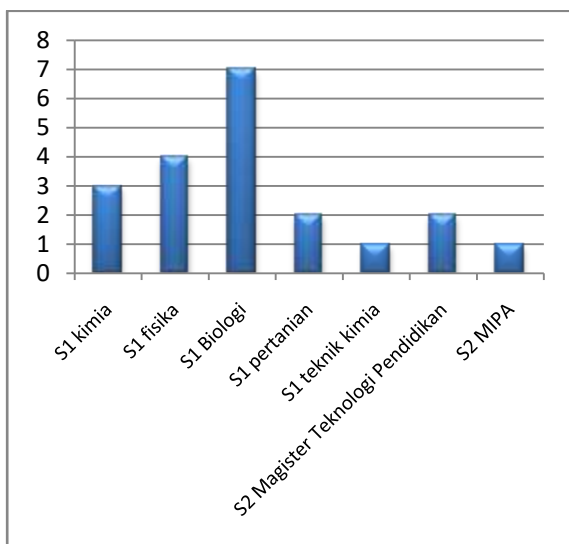
The data obtained were analyzed, described to produce conclusions about the implementation of integrated science in SMP / MTS in Jambi City.

IV. FINDINGS AND DISCUSSIONS

The background of natural science teachers viewed from the period of work as a science teacher can be seen in graph 1.



From graph 1 it can be seen that the science teachers of SMP / MTs in Jambi City, working period of 0-5 years are 2 people (4.4%), 6-10 years are 18 people (40%), 11-20 years are 6 people (13%), 21-30 years are 19 people (42%). From those percentages, teachers who teach science include teachers experienced as science teachers. Long experience in teaching science, while science teachers in Junior High School / MTs level in Jambi city still have not mastered integrated science. Although integrated science is a subject that emerged in the current 2006 curriculum. Considering that learning in a combined form is more advantageous than being taught separately (stand-alone) it is important for science teachers with non-natural science background to keep trying to prepare the learning as well as possible. In line with Gooch's opinion (2008), a holistic approach that combined the sciences of today's global problems. He said science was currently taught in a 'piecemeal manner' which separated biology, physics, and chemistry.



From graph 2, Science background of science teachers in Junior High School / MTs level in Jambi city, it is seen that they come from different backgrounds, where there is no background in science education. This means that science teachers of Junior High School/MTs level in Jambi City should be able to master the subject physics, chemistry, and biology as well. From 45 science teachers in SMP / MTS in Jambi City, with strata 1 (S1) background seen in a row, physics education (14 people), biology education (19 people), agriculture (2 people), chemical engineering (3 people), and animal husbandry (2 people). From the data drawn from the documentation of the MGMP profile of junior high school / MTS science teachers in Jambi City, it appears that none of them teach integrated science.

According to Olteanu (2014), a lot of conflict of opinion in the field between agreeing and disagree about Integrated Science learning. This conflict is further complicated when the respective perceptions of preparing and implementing in the Integrated Science learning process. There are three versions of the Junior High School level, the first version in junior high school is taught by each teacher of the existing field of study, for example, the field of Biology and Physics studies. While the field of chemistry studies is only as a compliment. The second version, taught by science teachers according to the curriculum, does not look at whether a biology teacher or a physics-based teacher. The third version that teaching science

is not from the background of the field (mismatch) while the teachers are there and want to teach the science (due to the lack of teachers). This fact makes student learning outcomes not optimal, and unfortunately if teachers are oriented to the opinion that universities do not have Integrated Science. The fact that there is a bachelor's degree in Educational Science, a master's degree in Educational Science, and a doctoral degree in Educational Science.

V. CONCLUSION

The results showed that the implementation of integrated science learning in SMP / MTs in Jambi City had been carried out but without regard to content that should have linked physics, chemistry, and biology material in the same meeting.

The implementation of integrated science in schools is based on the package books and LKPD circulating that are not yet nuanced integrated science so that learning integrated science is still separated between physics, chemistry, and biology. This is caused by several obstacles, including the lack of reference / learning resources to carry out integrated science learning. Integrated science learning resources needed include syllabus, lesson plans, student worksheets (LKPD), and modules. Science learning in SMP / MTs in Jambi City is integrated science learning. Integrated science learning in Jambi City Junior High School / MTS is taught by teachers who do not have a science education background. Behind education from the Natural Sciences.

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