

# The Implementation of Integrated Natural Science Textbook of Junior High School be Charged on Character-based Shared Models to Improve the Competence of Learners' Knowledge

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**Abstract.** The process of science learning can take place if there is an attempt to create an active learning atmosphere and can improve the knowledge competence of learners. One of the efforts made is to use learning resources. Textbooks are a learning resource used by learners. This study aims to describe the increase of knowledge's competence of learners with integrated Natural Science (IPA) textbook of Junior High School (SMP) be charged on character-based shared model. The method used pre-test, post-test design with one group using the class as a research subject. Pre-test was given before treatment to measure student's initial understanding of the problem, while the post-test was given to measure student's final understanding. The subject of this research is students of class VII SMP N 13 Padang. Result of gain score is 0,73. The result showed competence student's knowledge increased significantly and high categorized.

## 1. Introduction

The quality of education is one of the determinants of the nation's competitiveness. Educational institutions are required to produce graduates who have the skills and competencies to compete globally. This competition requires graduates who are not only skilled in their respective fields, but also must be able to communicate well to the outside world. Education is a conscious and planned effort to create an atmosphere of learning and learning process so that learners actively develop their potential, has a spiritual strength, self-control, personality, intelligence, noble character, as well as skills needed himself, society, nation and state [1].

Based on the act above can be seen that education has a goal in the learning process that will always grow. The development of the education system has been done in the educational process. One of the developmental changes and curriculum development of KTSP in curriculum 2013. Curriculum 2013 emphasizes on the competence of graduates with noble characters, possessing related skills and related knowledge in learning materials in the form of thematic integration between knowledge. The curriculum is a 'chip' that contains the wishes and wishes of a particular community to improve the situation itself, now and in the future [2]. SMP Curriculum 2013 curriculum is developed based on internal and external challenges, improvements in mindset, strengthening of curriculum and material governance.

Internal challenges relating to educational demands that refer to the National Standards of Education and the development of the Indonesian population. External challenges related to the flow



of globalization and issues related to environmental issues, information technology advances, the rise of the creative and cultural industries, and the development of education at the international level. Curriculum in the educational process serves as a tool for achieving educational goals [3]. In this case, means as an educational tool the curriculum has important components and as a supporter that can support its operation well. These constituent components are related to each other. The components of curriculum development, namely component objectives, content components, component methods, and evaluation components. The components of each other are interrelated.

The component of the method or strategy is an important component because the methods and strategies used in the curriculum determine whether the material provided or the expected objectives can be achieved or not. the standard of basic and secondary education process has hinted about the need for a learning process guided by the principles of scientific in this learning process is often referred to as a characteristic and a distinct strength of the existence of the curriculum 2013, which is certainly interesting to be studied and elaborated further [4]. The approach is a learning process designed in such a way that learners are actively thinking, asking, discussing and interacting between students and teachers [5]. The steps of the scientific approach, as follows: (a) Observing, presents the real object media, learners happy and challenged and easy to implement. (b) Asking : Effective teachers are able to inspire learners to improve and develop the sphere of attitude, skills, and knowledge. When the teacher asks, at that time he also guides or guides learners to learn. (c) Reasoning, The interaction pattern is done through stimulus and response (S-R). This theory was developed based on the results of Thorndike's experiment, which became known as association theory. (d) trying, To obtain real or authentic learning results, learners should try or experiment, especially for the appropriate material or substance. (e) collaborative learning is a personal philosophy, more than just a learning technique in school. In collaborative learning the authority of the teacher is more directive or the learning manager. In collaborative learning the authority of the teacher is more directive or the learning manager.

One way to apply the whole education is by integrating knowledge of Natural Science (IPA) into learning materials in the form of thematic integration between knowledge. IPA is one branch of science that discusses the phenomenon of natural phenomena systematically. . In general, IPA includes three basic sciences, including: biology, physics and chemistry. These three basic sciences are called integrated learning. Natural science is defined as systematic knowledge and constituted by linking the material nature phenomena and based on observations and inductions [6].

Integrated learning is also divided into a variety of integrated learning models as proposed [7] as many as ten integrated learning models. The ten integrated learning models are: (a) *fragmented*, (b) *connected*, (c) *nested*, (d) *sequenced*, (e) *shared*, (f) *webbed*, (g) *threaded*, (h) *integrated*, (i) *immersed*, and (j) *networked*. Of the 10 kinds of Fogarty models selected are shared models, because the shared model is a teaching-learning approach that combines two or more subjects that see the same concepts, attitudes and skills. Merging between the concepts of lessons, skills and attitudes that are interconnected with one another are shaded in one theme, so as to provide a meaningful experience for students. The characteristics of integrated learning [8] : (a) *holistic*: an event that became the center of attention in integrated learning is studied from several fields of study as well as to understand a phenomenon from all sides. (b) *Meaning*: the interrelationship between other concepts will add meaningful concepts learned and hopefully the child is able to apply the acquisition of learning to solve real problems in his life. (c) *Active integrated learning* is developed through the in-discovery approach. Learners are actively involved in the learning process that can indirectly motivate the child to learn. The integrated IPA learning model is recommended at SMP level, as it has several objectives, namely: improving the efficiency and effectiveness of learning; increase interest and motivation, as well as some basic competencies can be achieved at once.

Competency standards of graduates which states that every learner must have competence in 3 dimension domains, namely: attitude dimension, knowledge dimension and skill dimension [9]. In the realm of attitude dimension, the first most important indicator that becomes the most important is the faithful and devoted attitude to God which is also included from the indicator of spiritual value. In this

dimension of attitudes learners are given an understanding of the fundamental aspects of the universe of science that will cultivate an attitude of admiration to God and add confidence to the greatness of God based on the beauty contained in the rules of God's created nature. The linkage between material classification materials and their amendments that are integrated into material with the theme of cohesion and adhesion to living beings can be useful for increasing the value of the character and competence of knowledge to learners as outlined in a book called textbooks.

Textbook is instructional media, education strategy, education quality and reference book obliged to deliver curriculum materials [10]. So that textbook is a mandatory component that must exist in learning. The preparation of textbooks with the 2013 curriculum must be in accordance with predetermined rules or principles. Textbook creation should pay attention to the suitability of the content of the book with SKL, KI and KD, adequacy and depth of material, scientific approach, authentic assessment [11].

Experience shows that the teaching materials used are still not integrated. In line with the above explanation, Textbooks are used to improve the efficiency and effectiveness of the numbers tailored to the needs of learners [13]. Text books are the main operational tool for the implementation of the curriculum [12]. Lesson textbooks can be a major learning resource for achieving core competencies and core competencies and are declared appropriate by the Ministry of Education and Culture for use in educational units.

Based on the literature review, the authors will develop the analysis of learners related to the knowledge of learners. The formulation of the problem in this research is how to develop the learner's knowledge analysis and its implication on the design of textbook of *SMP* science. The purpose of this research is to describe the improvement of the competence of learners' knowledge by using integrated textbook *IPA SMP* charged characters based on shared model.

## 2. Method

This research is a research of Pre- Experimental Design by using One Group Pre-Test and Post-Test Design. Prior to the treatment, pre-test was first given to determine the students' initial ability. After the learning by applying the textbook is given post-test to determine the ability of the end of the students so it can be known how to improve students' understanding. Subjects in this study were students of class VII N 13 Padang Year of Study 2016 / 2017. Data collection techniques used in this study is to use observation sheet used by observers in observing the implementation of learning plans, written tests used for pre-test and post-test, and questionnaire used to obtain student response data on learning.

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Analysis of pre-research data include problem item analysis, normality test analysis and population homogeneity test analysis. The results of the analysis of the item obtained as shown in Table 1.

**Table. 1.** Problem Analysis Results Item

No	Level of difficulty	Different	Validity	Conclusion
1	Easy	Medium	Enough	Used
2	Easy	Medium	Enough	Used
3	Easy	Bad	Low	Disposable
4	Average	Medium	Enough	Used

5	Difficultly	Bad	Enough	Corrected
6	Easy	Bad	Enough	Corrected
7	Easy	Medium	Low	Disposable
8	Easy	Medium	Enough	Used
9	Medium	Medium	Low	Disposable
10	Medium	Medium	Enough	Used

Based on Table 1 above, of the 10 tested questions, only 7 questions are used for the pre-test and post-test in which each consists of 5 items. While the other 3 problems are not used because they do not meet the feasibility requirements.

Data analysis of research result includes analysis of learning plan implementation, pre-test and post-test result analysis and student response questionnaire analysis. Analysis of the implementation of the lesson plan used the equation (1).

$$P(\%) = \frac{\text{Total score of data collection}}{\text{criteria score}} \times 100\% \quad (1)$$

The criterion of assessment score interpreted as follows:

- 25% - 43.7%: not good
- 43.8% - 62.5%: poor
- 62.6% - 81.25%: good
- 81.26% - 100%: very good

The analysis of pre-test and post-test data was performed using paired t-test as follows:

a. Determining the hypothesis:

Ho: There is no significant increase in student conceptual understanding before and after treatment.

Hi: There is a marked increase in student conceptual understanding before and after treatment

b. Determining the gain value ( $d$ ) is the difference between the pre-test and post-test values of each student.

$$d = \text{value of post-test} - \text{pre-test value.} \quad (2)$$

c. Determine the mean of the gain by formulation:

$$M_d = \frac{\sum d}{N} \quad (3)$$

Where  $M_d$  is mean from gain ( $d$ ),  $\sum d$  is amount of gain ( $d$ ) and  $N$  is result of gain.

By testing criteria, reject Ho if  $t\text{-count} > t\text{-table}$ . With the level of trust and  $dk = (N-1)$ . Furthermore, the calculated normalized gain score to calculate how much increase the students' concept of understanding when t-test is obtained that the visualization of experimental video in the laboratory as a learning medium provides significance to improving students' understanding.

### 3. Results

To find out the improvement of science understanding of students after being given treatment, the result data of pre-test and post-test that got tested by using paired t-test, then searched how big achievement increase understanding of concept mastered by student by using gain of score normalized.

#### 3.1 Normality Test

Before paired t-test can be used to test data of pre-test and post-test results, then test the normality of research data first. The results of normality test data pre-test and post-test are as follows;

**Table 2.** Results Calculation of Normality of Pre-Test and Post-Test

Test		Result
<i>Pre-Test</i>	4,43	Normal
<i>Post-Test</i>	0,48	Normal

### 3.2. Paired T-Test Results

After the results of the research are normally distributed, the *t*-test is performed with the following results

**Table 3.** Results of Paired T-Test Calculations

		Explanation
27,93	2,03	Ho is rejected

Based on the result of *t*-test calculation as in Table 3 above, it is concluded that *H*<sub>0</sub> is rejected with 95% reliability. Thus, it can be said there is a significant increase to the understanding of the concept of students before and after giving treatment in the form learning using integrated IPA textbooks

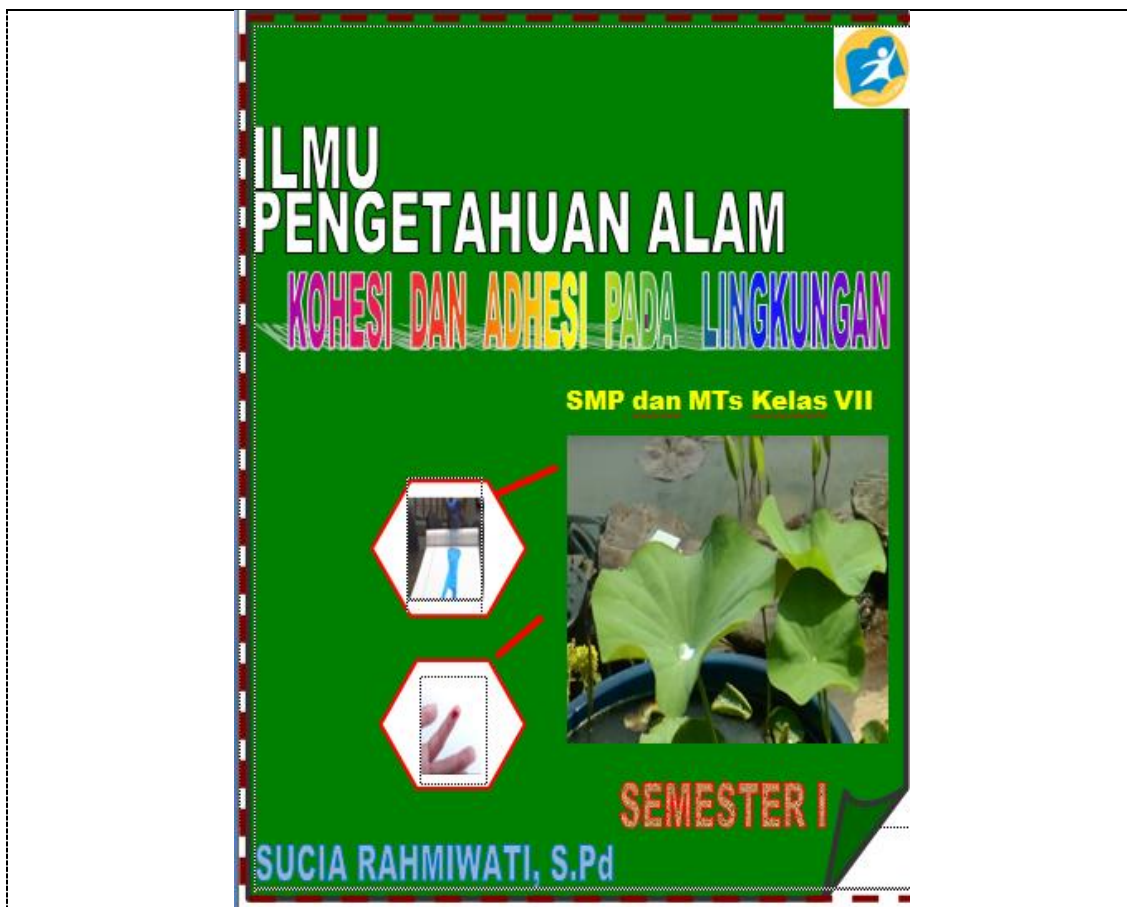
## 4. Discussion

The success of the level of achievement of the students' understanding is due to several factors, namely: the use of integrated IPA textbook SMP is characterized as a learning medium. This integrated IPA textbook is tailored to the textbook structure that refers to *Kemendikbud* 2014 starting from the cover (chapter title) of the textbook. The title display of textbook can be seen in Figure 1.

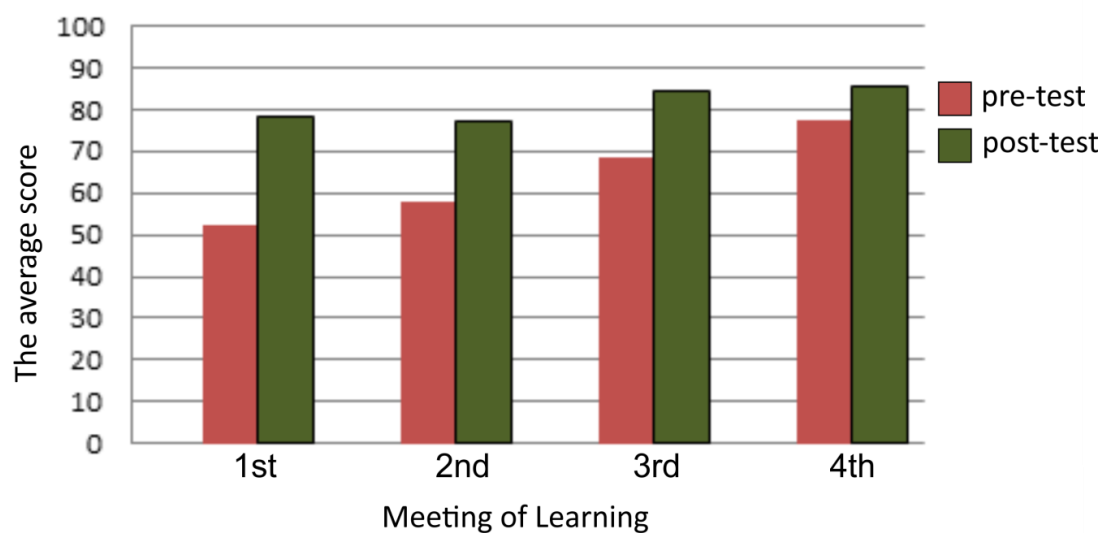
Cover describes the content of the textbook in the form of cohesion and adhesion events that occur in the environment. Water is on the leaves of taro representing cohesion, wound on the fingers representing adhesion and cohesion events that make the paper not wet. The cover design is tailored to the learner's analysis, and learners are expected to be enthusiastic in science learning because the IPA is associated with natural events.

With effective learning media to convey certain concept of IPA, then understanding of the concept can be accepted by students with good and easy. The medium is suitable for junior high school students entering the formal operational stage of cognitive development where students have been able to think abstractly. With the help of textbooks, students are able to understand the concept of a well-carried IPA without having to carry out their own experiments in the laboratory. Learning using the shared model that is implemented maximally, students can obtain information well. The information can then be used by students to assimilate the new concept with the concept that students have so that there is meaningful learning that can improve students' conceptual understanding.

Assessment of learners' knowledge is done by pretesting at the beginning of learning and posttest at the end of each learning session and performs daily test. Pre-test and post-test are done in every meeting to see the learners' knowledge at the meeting. The daily test is done at the end of the material classification chapter. The average of pre-test and post-test values can be seen in Figure 2.



**Figure 1.** Cover of IPA Textbook.



**Figure 2.** Average pre-test and post-test values of each meeting

Based on Figure 2, students are very interested in the concept of IPA taught by applying an integrated textbook IPA SMP charged characters. It is characterized by excellent ratings on the points of items one, two, three and four. The learning and explanation of teachers get a good response while



the teacher guidance in the discussion process is considered very good. Students are enthusiastic if the learning of teaching materials in addition to teaching materials in this research is delivered with the same learning strategy as learning strategy applied in this research.

## 5. Conclusions

Based on the results of research and discussion that have been put forward in the above section, it can be concluded that the implementation of integrated textbooks SMP lecture-based character of the shared model as a medium of learning to understand the concept of science with better can be done well, increased understanding of science concept students on the subject matter of hydrostatic pressures by utilizing the visualization of experimental video gravity currents as a learning medium is achieved significantly, and the subject of the study responds positively to the learning being carried out.

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