Need assessment of integrated natural science textbook based on Research-Based Learning for Junior High School

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Abstract. Student's learning outcomes are still low indicating the implementation of the 2013 curriculum on integrated natural science subjects in SMP has not been maximized. The textbook used does not support learners for active learning, consequently the teacher still tends to use teacher-centred learning. Therefore, this study aims to analyze the needs of integrated natural science textbook based on Research-based Learning for junior high school. Research data collected by interview and questionnaire form, as well as analyze by descriptive. The finding shown that (1) according to front-end analysis, the textbook have low readability, not supporting student's innovation, and not based on learning model and teachers need to apply student centred approach; (2) analysis of learners shown that students are kinaesthetic learners but student's ability to solve the problem is low; and (3) analysis of subject matter shown that there are five topics of integrated natural science based on research based learning. Accordingly, it needs an integrated natural science textbook based on Research-based Learning for junior high school.

1. Introduction
Education is aimed at producing qualified individuals. Referring to Law Number 20 Year 2003, the function of education in Indonesia is to develop the ability and character in order to educate the people. In addition, education is aimed at developing the potential of future generations to become human beings who are faithful and devoted to God Almighty, having a noble character, healthy, knowledgeable, capable, creative, independent, and being a democratic and responsible citizen. With these competencies, it is expected that future generations will be able to face global challenges.

The 2013 curriculum in Indonesia aims to enable students to have the necessary competencies for people's lives in the present and the future. The competencies are: (1) religious attitudes and high social ethics; (2) mastering knowledge; (3) skills of scientific inquiry, problem solving, and creativity. [1]. In the 2013 curriculum, competencies of knowledge, attitudes and skills are achieved through all subjects, including Integrated Science. Integrated science which is a combination of biology, physics, chemistry, and earth and space has four main elements of attitude, products, processes, and applications in everyday life. The four elements are complete if learners can experience the learning process of understanding natural phenomena through problem-solving activities, scientific methods, and how scientists think and act. Therefore, the learning process is learning by doing [2].

Implementation of 2013 curriculum in integrated science not yet maximal. The facts show that learners' learning outcomes in the competence of knowledge, attitudes and skills are still low. The low
learning outcomes of knowledge learner’s competence is known from the results of the test in class VIII B as much as 60% of students did not pass. Meanwhile, the students do not yet have a scientific attitude and has not been active in a study based on observations of teachers. It is difficult to create a learner-centered learning because the textbook used does not support it.

Textbooks are a guide for students in learning activities. Besides, containing the subject matter, the textbook also includes investigation activities based on the concept and activities of science. In addition, information and examples of the application of science are also included in the book [3]. As a learning tool, textbooks certainly help students in learning.

To improve students' learning activeness, an innovative approach is needed to support the learning process. Many approaches can be used to improve the quality and effectiveness of learning such as the development of interactive media [4,5] or the application of an appropriate model. Implementation of Research Based Learning model is the right method. One way is to apply the Research Based Learning (RBL) model. In addition, learners not only learn the content in the lesson but also they can practice learning skills, such as searching, assigning hypotheses, collecting data, examining data or analyzing data and conclusions [6]. RBL can used for integrated science because the RBL model contains various methods that can reach the scope of the science as a process, product, and attitude. RBL has 7 characteristics that are visible in learning, that is systematic, active, creative, innovative, effective, objective, and scientific [7]. The stage of RBL are as follows: exposure stage (introduction stage), lecturing of core knowledge (the step of administering a reference), experience stage (action stage), internal report for feedback (the discussion stage), and the final [8].

Learning-based learning model is expected to improve the competence of learners in mastering the concept of science, skills using scientific procedures, and have a scientific attitude. This learning model can be applied in textbooks used in learning. In relation to the fact that there is formulated a problem research is how the need for an integrated book of science-based students based on Research based learning for Junior High School.

2. Methods
This study uses a descriptive methodology. The subjects of this study are teachers and students of grade 8 Junior High School. Data were collected through observation and questionnaires. Observation were conducted to three teachers of natural science. Observation sheets are used to collect teacher and school performance, teaching materials and learning models, learning difficulties of learners, and the task of learning in the school data. The questionnaire sheets, filled by the learner, are used to collect data of actual abilities, creativity, motivation, learning styles, attitudes, and learning activities. The data analyzed using the percentage of average value. The categories of needs analysis are shown in Table 1.

| Score | Percentage | Category     |
|-------|------------|--------------|
| 1     | 0-25       | Not good     |
| 2     | 26-50      | Pretty good  |
| 3     | 51-75      | Good         |
| 4     | 76-100     | Very good    |

3. Result and Discussion
3.1. Front-end Analysis
The front-end analysis consists of performance analysis, needs analysis, analysis of learning difficulties, and task analysis. Based on the observations, the results of front-end analysis are presented in Table 2.
Table 2 Results of front-end analysis

| No | Components         | Indicators                  | Value | Category      | Score Average | Category     |
|----|--------------------|-----------------------------|-------|---------------|---------------|--------------|
| 1  | Performance Analysis | Teacher identification     | 77.3  | Very Good     | 80.8          | Very Good    |
|    |                    | Supporting Facilities      | 86.3  | Very Good     |               |              |
|    |                    | and Facilities             |       |               |               |              |
|    |                    | Policy Identification      | 83.3  | Very Good     |               |              |
| 2  | Needs Analysis     | Teaching materials         | 50.0  | Pretty Good   | 67.9          | Good         |
|    |                    | Learning model             | 79.2  | Very Good     |               |              |
|    |                    | Character Value            | 75.0  | Good          |               |              |
| 3  | Learning Difficulties Analysis | Teaching material indicator | 50.0  | Pretty Good   | 50.0          | Pretty Good  |
| 4  | Task Analysis      |                             | 76.2  | Very Good     | 76.2          | Very Good    |

Based on Table 2, it can be seen that almost all components are considered good and very good. In the performance analysis, all indicators are rated very well. Similarly, the results of task analysis. However, the results of needs analysis indicate indicator of teaching materials is pretty good. In addition, the results of analysis of difficulties learners categorized pretty good. The results of this analysis show that textbooks in schools are not qualify. In addition, learning difficulties learners become a problem that needs to be considered.

The results of the performance analysis on teacher identification indicators are in good category. This means that the teacher has done the planning, implementation, and evaluation of learning well. Teachers who have high competency and performance will be able to implement the learning process well, thus affecting the learning outcomes of students [9]. Teachers who have good performance will be able to raise the spirit and motivation to learn better learners, which will ultimately be able to improve the quality of learning. The results of the observation also indicate that the teacher also has made efforts to implement student-centered learning, but this is difficult to realize because it is often constrained. Inhibitors of teacher-centered learning paradigm shift to student-centered learning are due to limited human resource capacity and teacher's concerns not reaching learning targets due to time [10].

Indicators of facilities and supporting facilities have a very good category. It means the school already has the very good study room, laboratory, and library. The use of laboratory and library in schools is not maximized in science instruction. The practice of science instruction is still focussed on science concepts and principles and neglecting competencies inquiry of science [11]. Though the laboratory and library is important in students' academic performance [12,13]. Through learning-based learning, laboratory and library functions can be utilized in experimental activities and reviewing references.

The result of needs analysis on teaching material indicator shows that there are deficiencies in the teaching materials used. The teaching material used in school has a low level of legibility, can not lead to innovation and independence of learners, and have not used the step model of learning is clear. It means that the available books do not have a quality book, which is stimulating the activities of learners. It’s one of difficulty learning process so that causing low learning outcomes. Teaching materials have an important meaning in the learning process because it can improve the effectiveness of learning [14]. It indicates that the teaching materials used still have deficiencies in supporting the learning process. Teaching materials used by teachers still have a low level of legibility, has not encouraged the innovation and independence of learners, and there has been no clear step of learning.
activities. Teaching materials have important meaning in the learning process because it can improve the effectiveness of learning.

Results of analysis of learning difficulties of learners are in pretty good categories. Learners are still not maximized the learning process caused in difficulties in focusing, information processing in the form of symbols, formulas, and the meaning of the sentence. Learning difficulties must be resolved. Learning difficulties learners can be caused by internal factors including interest, attention, motivation and learning habits and external factors include teaching methods, learning media and learning resources [15]. Learning resources should be presented in simple language and related to everyday life so as to help learners in overcoming the difficulties of science learning.

3.2. Learner Analysis

Characteristics of learners can be seen from four aspects include Aspects of competence include aspects of actual ability, learning styles, characters, and learning activities of learners. Each aspect is composed by each indicator. Results of learner analysis based on observation as seen in Table 3.

| Learner Analysis          | Indicator   | Value | Category   | Score | Average | Category |
|---------------------------|-------------|-------|------------|-------|---------|----------|
| Actual Ability            | General ability | 77    | Very Good  |       | 72      | Good     |
|                           | Creativity   | 70    | Good       |       |         |          |
|                           | Motivation   | 63    | Good       |       |         |          |
| Learning Styles           | Visual       | 62    | Good       |       | 65      | Good     |
|                           | Auditory     | 65    | Good       |       |         |          |
|                           | Kinaesthetic | 68    | Good       |       |         |          |
| Attitudes toward Learning | Learning activity | 79    | Very Good  |       | 79      | Good     |
| Activities                | Learning activity | 70    | Good       |       | 70      | Good     |

As shown in Table 3, the results of the student’s analysis overall were considered good. In actual capacity, the general ability of learners is in very good category and the indicators of creativity and motivation are in good category. The result of the learning style analysis shows that all types of learning styles of the students are in good category, with more dominant kinaesthetic learning style. The results of attitude analysis and learning activities are also in good category.

Analysis of learners obtained actual ability with good category. However, the creativity and motivation of students in solving problems and logical thinking has not been maximized. Analysis of learners' learning styles shows that the greatest percentage of learners has a kinesthetic learning style. This means that most students receive lessons related to movement, practice, or a hands-on learning experience easily. Kinesthetic learning relates to direct learning practices or experiences [16]. Learners with kinesthetic learning style certainly fits with the learning process that requires the learner's activity. The research-based learning model is an effective way to practice learning by doing [17].

Based on the analysis of the beginning-end and the analysis of learners is needed textbook based research-based learning that can help teachers in overcoming learning difficulties learners. This research-based textbook is expected to improve students' learning outcomes as the result of research that the development of research-based modules can increase the science literacy of learners [18]. Other studies have shown that the implementation of life skills-based learning-oriented research can increase the activity and mastery of important concepts [19]. In addition, the use of research-based student worksheets in physics is effective for improving student competence in SMAN 1 Padang [20]. The application of research-based learning materials can enhance student activity and learning outcomes in the classroom [21].
3.3. Material Analysis

Material analysis is done by grouping material according to facts, concepts, principles, and procedures. Based on the analysis, the learning materials are appropriately applied to apply research-based learning model which is the science material of eighth grade semester 2 including material of pressure substance, human respiration system, excretion system, vibration and wave in daily life, and light and optical instrument. The success of learning as a whole depends on the teacher's success in designing the learning materials.

4. Conclusion

This study analyzes the need for integrated science textbooks based on research based learning in Junior High School. There are three analyzes: front-end analysis, learner analysis and material analysis. The results of front-end analysis indicate the indicator of teaching materials and the needs of students categorized enough. The results of observation indicate that the teaching materials used have low level of readability, can not lead to the innovation and independence of learners, and have not used the steps of a clear learning model and teachers need to apply student centered approach. Student analysis shows that the most dominant kinesthetic learning style of the learner. Students' ability to solve problems is still considered low. Analysis of the subject matter shows that there are five integrated science topics based on Research Based Learning. Therefore, an integrated science text book based on research based learning for Junior High School is required.

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