Analysis of students to develop integrated junior high school student books with webbed models integrated with local potential

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Abstract. To implement optimal learning process, one component of a learning process that is student's characteristic should be analyzed. This analysis must be considered in preparing teaching materials and learning resources. These characteristics concern student's interests and talents, learning styles, basic skills and background. Student analysis for book development is very necessary to know how the book will be developed based on the analysis result. This research is done by a combination method that is qualitative and quantitative. Based on the data obtained, the student's initial competence that needs to be analyzed is in the attitude aspect, knowledge and skills. The result of this analysis showed that in the knowledge aspect, the score was 81.25%. This obtained a high score because students are happy with factual learning based on everyday life and facts that is close to students. In the skill aspect, the result is 81.02%, this value is included in category both because of reasoning indicator, students able to make a conclusion based on the result of practice. Good attitude aspects of the spiritual and social attitudes are in a good category, so this aspect is higher than other aspects. Results of this study are used to obtain the student's data used for developing integrated science students' book design.

1. Introduction
Indonesian national curriculum is Kurikulum 2013. Kurikulum 2013 is based on character education, mindset refinement and material deepening to create students who have good ability and behavior. Kurikulum 2013 theme will produce productive, creative, innovative, and effective Indonesian people through strengthening attitudes, skills and integrated strengthening. To achieve this, the teacher is required to be creative in design effective learning and meaningful learning.

Natural Science (IPA) is a science that studies about nature around in a systematic way, so that science is not only the mastery of a collection of knowledge in the form of facts, concepts, or principles but also a process of discovery. Natural Science is expected to be a vehicle for learners to learn about themselves and the environment, as well as the prospects for further development in applying it in everyday life.

Regulation of Indonesian Minister of National Education, Kurikulum 2013 which implies that the content of natural science subjects at the Junior High School level is an Integrated Science. This is based on the tendency of science material that has the potential to be integrated into a particular theme. Integrated science gives impact to teachers, learners, teaching materials and the necessary facilities and
infrastructure [1]. Science teaching materials should be used by teachers and learners in facilitating and digesting the material of science. All efforts need to be deployed in the learning process to achieve optimal learning objectives. Such learning activities can be supported by using teaching materials one of them in the form of Integrated science textbooks.

Integration in science learning can be done with various models such as fragmented, connected, nested, sequence, shared, webbed, threaded, integrated, immersed and networked [2]. Webbed model looks at the curriculum through a telescope, which sees a collection of stars at once. This model combines several eyes by using the theme as a binder [2]. Therefore, this learning model is known as thematic learning. One of the advantages of this learning is that it can motivate students to learn and can help students to see an idea. But the weakness, this learning is very dependent on the selection of learning themes. The selection of a good and appropriate theme will lead the students.

Integrated learning offers a deeper knowledge to the students. Integrated learning will continue to grow and will increase students' understanding of subjects and knowledge among subjects [3][4]. Science learning in schools needs to integrate the scientific paradigm by way of the learner's view of the terms in science and physical phenomena occurring in the natural surroundings. Background culture in the environment of learners also become one of the important factors that can affect the success of the learning process. Teacher's job is to relate between the concepts of physics that learners learn in schools with cultural backgrounds that exist in the environment of students themselves. Conceptual knowledge has been shaped from day-to-day experience and through inherited knowledge. Therefore, the socio-cultural environment needs to be considered in developing physics learning in schools. The goal is that physics learning can be beneficial to learners and to society.

Studies of cultural influences on science learning are followed by a discourse about which learning model is suitable to implement a curriculum developed based on local culture. Teachers must pay attention to four things during the learning process [5]: 1) giving the learner the opportunity to express his thoughts, to accommodate the concepts or beliefs that the learners have rooted in traditional science. 2) presents learners with examples of peculiarities or miracles (discrepant events) that are commonplace according to raw science concepts. 3) encourage learners to actively ask questions. 4) encourage learners to create a series of schemes on concepts developed during the learning process.

Indonesian Ministry of Education explains textbooks of primary, secondary and tertiary education subjects referred to as compulsory reference books for the use in primary, secondary and tertiary education. In addition, they explained that the textbook is an instructional medium, educational strategy, educational quality and reference book mandatory in the delivery of curriculum materials. So that textbook is a mandatory component that must exist in learning. Quality textbooks should be fit with the characteristics of the Kurikulum 2013 that are structured in such a way by integrating the Integrated science thematic. So, the development of textbooks in accordance with the Kurikulum 2013 needs to be done to achieve the goals of national education. Preparation of textbooks with the 2013 curriculum must be in accordance with the rules or principles that have been determined.

Learners are members of the community who are trying to develop their potential through the education process on the path ladder and certain types of education. The activity of analyzing the behavior and the early characteristics of the learners is a process to know the behaviors controlled by the learners before following the learning process rather than to determine the prerequisite behavior in order to select the students before following the lesson.

In textbook design there are several things to note that will be used in learning, one of them is problem analysis. One of the problem analyses is the analysis of the learner [6]. A teacher must be able to understand the potential and diversity of learners, to design a learning strategy in accordance with the uniqueness of each learner. Therefore, a teacher needs to do a character analysis of learners in planning a learning process.

Student analysis is a study of the student's characteristics in accordance with the design of learning device development [7]. These characteristics include the background of academic ability (knowledge), cognitive development, as well as individual or social skills related to selected learning topics, media, formats, and languages. Student analysis is performed to get a picture of the
characteristics of students, among others: (1) the level of ability or intellectual development, (2) the existing individual or social skills. The characteristics of learners determine media decisions and formats that are made such as language and presentation style [7]. The information needed in the learner includes Lesson competency, attitude, language and skill/ability. one of the important aspects of the learner's analysis phase is to collect data informing the learner. The data obtained will have an impact on the decision to be made in making the teaching materials product.

Based on the literature review, the authors will develop the student's analysis. The formulation of the problem in this research is how to develop the learner's analysis and its implication on the design of integrated SMP science textbook. Because of the importance of student's analysis in textbook design, the writer tries to analyze the students' early competence as well as the implication on the design of integrated junior high school science textbook. The purpose of this study is to obtain information on the characteristics of learners and their implications on the design of junior high school science textbooks.

2. Research Method

This research is a combination research. Combined research method with the Sequential Explanatory model is a combination research method which combines quantitative and qualitative research method in sequence. In the first phase of the study conducted using qualitative methods and in the second stage is done by quantitative methods.

Qualitative methods play a role in obtaining information so as to prove, deepen, expand, weaken and abort the initial data characteristic data. Quantitative methods contribute to obtaining quantifiable data that can be descriptive, comparative and associative. Combined research steps can be seen in Figure 1.

Data used in this study is the primary data obtained through the survey/questionnaire and secondary data obtained through library research by collecting data relevant to the theme of research. In general, the method of collecting data in the form of a questionnaire/survey. Questionnaires conducted by researchers to observe the early knowledge of learners in learning and its implications on the preparation of textbooks.

Questionnaire compiled is a descriptive-scale questionnaire, because research aims to describe how the initial competence of learners. Early competence of learners seen from the competence of knowledge, attitude, and skills of learners. The instrument grille for each aspect can be seen in Table 1.

| Aspect       | Indicator             |
|--------------|-----------------------|
| Attitude     | Spiritual, Social     |
| Knowledge    | Factual, Conceptual   |
|               | Principal, Procedural |
| Skill        | Trial, Processing     |
The questionnaire analysis technique used is the Likert scale, because the questionnaire aims to the extent to which learners accept or reject the given statement. Likert scale is a statement or question whose answer is a scale of approval or rejection of a statement or question. Acceptance or rejection of a statement is expressed in consent which starts from strongly disagreeing, disagreeing, agreeing and strongly agreeing.

The question form is made in the form of a positive statement. A positive statement is a statement whose answer is in line with the researcher's expectations. The scale of respondents' answers is qualitative in the form of the ordinal scale. The terms of converting to positive statements as follows: 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree.

Competence category of learners is obtained by calculating the score obtained by each respondent. Scores for each respondent were obtained using the equation:

$$S_k = \frac{\sum x}{x_{\text{max}}} \times 100$$

where: $S_k$ is the score obtained, $x_i$ is the score of each respondent and $x_{\text{max}}$ is the maximum score of the questionnaire for each indicator.

Furthermore, scores obtained from each descriptor performed data analysis. Data analysis to assess the competence of learners for each indicator using the provisions in Table 2 as follows:

| No | Category     | Value from questionnaire                                      |
|----|--------------|--------------------------------------------------------------|
| 1  | High         | More than 80 ($S_k > 80$)                                    |
| 2  | Medium       | More than 60 and less than 80 ($60 < S_k \leq 80$)          |
| 3  | Low          | More than 40 and less than 60 ($40 < S_k \leq 60$)          |
| 4  | Very Low     | Less than 40 ($S_k \leq 40$)                                 |

### 3. Results and discussion

The results of the study obtained from literature study are to determine the competency aspects of learners that need to be analyzed. Aspects of competence include aspects of attitude, knowledge, and skills.

Competence of learners can be reviewed from three groups of attitude competence, knowledge, and skills. Each competence of learners built by each indicator. The indicator for attitude competence is the competence of spiritual and social attitudes. The competence of the learner's knowledge with the indicator is the competence of factual, conceptual, principal, and procedural knowledge. In addition, competence for the skills aspect includes the skills of trying, processing, tasting, and reasoning.

In addition, the results obtained from the analysis of learners using the instruments developed are as follows:

#### 3.1. Competence of Students from Attitude Aspect

Based on the lattice of instruments that have been developed, the competence of students from the aspects of attitude can be seen in terms of spiritual and social learners. The competence of student from the spiritual attitudes aspect with an average value on aspects of spiritual attitudes is 87.73. In addition, the competence of students on the social attitude aspect with the average score is 78.27. The result of data analysis of student attitudes on the spiritual aspect and social attitudes aspect obtained a mean value of 83.00 which is categorized high. The competence graph of learners from the attitude aspect can be seen in Figure 2.
Competence of Students on Attitude Aspect

3.2. Competence of Student from Knowledge Aspect
Based on the developed instrument lattice, the competence of students from the knowledge aspect can be seen from the factual, conceptual, principal, and procedural knowledge of students. Factual knowledge of students with an average of 79.92. Conceptual knowledge with an average of 78.41. Knowledge of the principal with an average of 78.41. Procedural knowledge with an average of 81.82. The result of data analysis of student's knowledge by using questionnaire obtained average value 79.64 which is categorized Medium. Student competence graph from the knowledge aspect can be seen in Figure 3.

Competence of Learners on Knowledge Aspect

3.3. Competence of Students from Skill Aspects
Based on the developed instrument lattice, the competence of students from skill aspect can be seen from the skill of trying, processing, data serving and reasoning the students. Skills of students on the trial aspects with an average of 82.10. Skills of students on the processing aspect with an average of 76.14. Skills of students on the data serving aspects with an average of 79.55. Skills of students on the reasoning aspect with an average of 80.75. Based on the four aspects of the student's skill, then the results of the data analysis of students using questionnaires obtained an average value of 80.75 which is categorized as high. The competence graph of students from skill aspect can be seen in Figure 4.
Therefore, to produce instructional media that match the characteristics of learners required student analysis. One of the instructional media used in learning is textbooks. Through textbooks that match the characteristics of students is expected to facilitate students in understanding the learning materials.

4. Conclusion
Early competency student analysis is needed to determine what is needed in learning. This is done so that the learning according to the characteristics of students. One of the needs for learning is the source of learning is textbooks. Thus, the competence student’s analysis is necessary for the design of textbooks. Characteristics of students that need to be analyzed include three components of attitude, knowledge, and skills. Each of these components will be divided into several indicators and descriptor in the questionnaire. The results obtained will be the basis of the author to design and develop the textbook of learning.

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