Needs analysis in the development of natural science teachers' book of Junior High School based on local wisdom of West Sumatra

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Abstract. The teachers' book of natural science should contain instructions on using student books. The existing natural science teacher books are not appropriate to the 2013 curriculum requirements. Moreover, based on observations, researchers found that teachers who teach are not someone who is an expert in the field of natural science education, still comes from the field of study of Physics education and Biology education. Consequently, this study aimed to perform needs analysis in developing natural science teachers' book of junior high school based on local wisdom of West Sumatra, so that the book produced in accordance with the needs of teachers. Needs analysis consists of three aspects items, namely teacher analysis, task analysis, and material analysis. This research used descriptive methods with qualitative data to the analysis technique. The selected respondents were natural science teachers at SMP N 18 and SMP N 28 in Padang City. The research instruments used were observation sheet, questionnaire and interview guide. Based on the results of the needs analysis, the teacher needs a natural science teachers' book based on local wisdom for Natural science (IPA) materials that can be integrated.

1. Introduction

The 2013 curriculum design aims to strengthen the competence of students in the realm of attitudes, knowledge, and skills in their entirety [1]. To enforce it, is by blending a number of topics into a wholeness that holds each other in achieving these competencies. As well as learning science at SMP, as the transition to secondary education, the learning material in science groups such as Physics, Chemistry, Biology, and Earth Science and space they need to be presented as a unity in science subjects. These efforts are carried out so that students at the junior high school level can gain complete insight into the basic principles governing the universe and its contents [2].

When students learn the basic principles that govern the universe and its contents, then it implies that students learn how to maintain the balance of the universe. It can start by instructing students to be able to keep the balance of the environment, that is to say by making conservation efforts. The meaning of conservation is not simply a physical environment, but the values of the civilization of a tribe, including the local wisdom [3]. Cultural conservation aspects cannot be distinguished from
physical conservation purposes, between the physical and cultural conservation in synergy to maintain the environmental balance [4].

The values of local wisdom are very important to be introduced and inculcated to students at the primary and secondary school. Cultural values (wisdom) locally not only modulate the relationship between humans but also regulate human relationships with nature (the surroundings). One of Minang's philosophies is often used in the world of education, namely Alam Takambang Jadi Guru which has the meaning that the public nature as a place to learn and apply the knowledge and experience hereditary to preserve the natural surroundings. By integrating the values of local wisdom in learning natural science, students are expected to have an attitude of responsibility to maintain the balance of the environment and use it wisely [5].

Permendikbud No. 58 Th. 2014, disclosed that each student is able to implement the IPA (natural science) wisely to maintain and preserve the local wisdom. Students who are able to preserve local wisdom cannot be separated from the ability of teachers who facilitate teaching and learning activities. Notwithstanding learning activities are student-centered, the teacher still has a really significant purpose in the implementation of activities in the classroom. One of the challenges that must be passed by science teachers, which is required of teachers who actually have the ability to integrate and implement the concepts of science (Physics, Chemistry, and Biology) are integrated into the classroom. Therefore, it takes a teacher's book to help teachers implement teaching and learning activities. In addition to instructions for using student books, teacher’s book also provides guidance for teachers in implementing the learning in the classroom. The teacher’s book is used by teachers in the relation of the principles, procedures, descriptions of the subject matter and learning model that can be used by teachers.

Nevertheless, the reality has been found that science teacher books published by the government are still not in accordance with the integrated natural science concept of 2013 curriculum demands. In the guide, the implementation of learning, have not experienced the implementation of an integrated natural science teaching in every learning, leave out for science taught separately between Physics, Biology, and Chemistry. Teachers are still experiencing difficulties in implementing the teaching models suggested by the curriculum in 2013, while the explanation of the learning model (Discovery Learning, Inquiry, Problem Based Learning and Project Based Learning) contained in the book the teacher is still a theory. Local wisdom values do not appear in the guidelines of learning in the science teacher’s book. Furthermore, teachers also have not been able to package learning based on environmental conditions (the values of local wisdom).

Based on these descriptions, it is necessary to do a needs analysis activities towards the development of natural science teacher’s book of junior high school based on local wisdom of West Sumatra. Needed analysis can offer information and consideration for the author, regarding whether to develop of natural science teacher’s book of junior high school and provide information to teachers in implementing integrated science learning based on local wisdom that is more creative and innovative in accordance with the outcomes of the analysis and follow-up determined.

2. Methods

This study is a descriptive research using qualitative data analysis techniques. Descriptive research is a research method that attempts to describe and interpret objects as they are. In general, descriptive research has two main objectives, namely systematically describe the facts and characteristics of the object under study accurately [6]. The objects are investigated in this preliminary study is a natural science teacher at the junior high school SMP N 18 and SMP N 28 Padang, syllabus and natural science teacher’s book of junior high school. The natural science teacher used to obtain information about the extent to which the use of books used by teachers, science teachers and the implementation of natural science teaching in schools. Syllabus and natural science teacher’s book are used for material analysis needs and get information on the integration of science learning materials and their application in accordance with the 2013 curriculum requirements. In summation, the syllabus is also
used to determine the topics of science that can be integrated with local wisdom values of West Sumatra.

Data was collected through observation, questionnaires and interview. Observations carried out to get an overview of the implementation of learning natural science by teachers in the classroom. This type of observation is done is unstructured observation. Interviews and questionnaires are used to find out the existing problems and the level of need regarding whether or not the development of natural science teacher’s book of junior high school based on local wisdom is needed. The instrument used in the interview is an interview guide sheet.

3. Results and Discussion

Based on the observation that has been done shows that teachers typically start by focusing student learning and create a conducive learning atmosphere. After the student's attention is really focused on learning activities to be carried out, then the teacher started teaching. At the root of the learning, the teacher tried to construct knowledge the students to ask questions that connect the initial knowledge of the pupils with the material to be examined. In the core activities, observations conducted on the application of learning approaches, methods, models, media and sources of learning or teaching materials used. Based on the requirements of the curriculum in 2013, which encouraged learning approach that uses a scientific approach which consists of observe, ask, gather information, reasoning and communicate. On the activities of reasoning, the teacher has not been able to direct students to be able to process the information collected. So that students' difficulties find the concept of science of the problem set by the teacher. Learning is still dominated by lecture method.

One causal factor of the success of the learning process is the role of the learning model. The learning model suggested in the curriculum in 2013 include: Discovery Learning, Inquiry, PBL and PjBL. In the learning conducted in SMP N 18 Padang, the execution of the four models has not been picked up to be practiced by natural science teachers. Instructional media to support the learning process is also rarely used by teachers. Almost all students are learning resources in the form of IPA textbooks published by Kemendikbud. The content of these textbooks has taken into account the phenomenon in everyday life of students with regard to learning materials. Still, the phenomenon presented yet contains the values of local wisdom student residence.

The ability of teachers in the learning close is good enough. The actions conducted out by the teacher, which involves students in concluding learning, provides feedback on the learning process and results in the form of assignments. Nonetheless, teachers still often forget to express the subject matter to the next learning.

In addition to observations, interviews were also conducted to find out the teacher's opinion about the teacher's book used and the need for the development of natural science teacher’s book based on local wisdom. The instruments used in the form of sheets of interview guidelines. Based on the results of interviews, some of the teachers who were the informants stated that the science teacher books used at the school were published by the Kemendikbud and were appropriate to be used as guidelines for the implementation of learning and instructions for using student books. However, they must be repaired in some parts of the book. In the books of science teachers, both class VII and class VIII, explained the learning model suggested by the 2013 curriculum and its syntax. Nevertheless, exclusively confined to theory only. As for how to implement four models (Discovery Learning, Inquiry, PBL and PjBL) on learning not described in detail. Teachers also mention that in the book there is a seventh grade science teacher to teach materials section, where the material presented in the book the students already there, so no need to exist on the books teachers. In the eighth grade science teacher books have described the scope of materials science (Physics, Chemistry and Biology) contained in a science topic. However, teachers do not understand how to present the material in an integrated manner in one meeting because most teachers only mastered a particular field of study. Biology teachers often have difficulty in presenting the physical material and vice versa. According to natural science teacher at SMP N 18 and SMP N 28, stated that the introduction of the values of local wisdom in learning science is important. One of the reasons is because the values of local wisdom is
closely related to the environment and the universe are studied in science and that the values of local wisdom is not lost eroded by the current modernization.

Furthermore, the analysis also on teachers, assignments and materials is caused by utilizing a questionnaire sheet. The data collected with regard to the purpose of the development of natural science teacher’s book of junior high school based on local wisdom of West Sumatra. In addition, this data is also used to strengthen the findings obtained from literature and field studies. The data were received through a needs analysis questionnaire given to the six teachers at SMP N 18 and four teachers in SMP N 28. The results of the needs analysis questionnaire are presented in Table 1.

| Measured Components | Indicators                                                                 | Frequency response (%) |
|---------------------|---------------------------------------------------------------------------|------------------------|
| Teacher Analysis    | The teacher comes from the scientific study area                          | 100                    |
|                     | Teachers mastered the material in an integrated natural science (IPA)      | 40                     |
|                     | Teachers do team teaching in integrated natural science teaching materials | 35                     |
|                     | The Teacher instills the values of local wisdom                           | 30                     |
| Task Analysis       | Teachers prepare learning device (teacher’s book, lesson plans, LKPD and others) | 76                     |
|                     | Teachers implement the learning process according to the instructions of the teacher’s book | 80                     |
|                     | The teacher designs assessment and evaluation activities in the learning process | 35                     |
| Material Analysis   | Basic competence in every material describes the integration of IPA        | 96,7                   |
|                     | Suitability of the content of Natural Science material with the science learning concept in the 2013 curriculum | 100                    |
|                     | IPA material content is based on local wisdom                             | 100 Important          |

Based on Table 1 it can be seen that all the teachers were given a questionnaire is a teacher who has competence in the field of science, but with specific sub-disciplines (Physics, Chemistry and Biology). This implies that teachers do not understand the concept of integrated science. Of the ten teachers who were given the questionnaire, only three people who integrate the values of local wisdom in learning science. Most of the teachers admitted the difficulty of integrating the values of local wisdom in the material natural science, as to integrate into learning, need to analyze basic competence to determine the values of the local wisdom what is in accordance with the basic competencies that have been formulated. It would take a long time, while the teacher still has to do other teacher tasks.

Based on the task analysis that has been done, only 35% of teachers who design their own assessment and evaluation with a different format each year. The rest just makes an assessment with grilles and instrument format that has been available previously. From the results needs analysis questionnaire also found that all the teachers were given a questionnaire stating that the values of local wisdom necessary to be integrated into the material natural science. One reason is that IPA teaches the interaction between humans and their environment, in order to preserve the environment, humans must be cultured, especially upholding local wisdom values.

Indonesia, which has a multicultural student can be a reason to reconcile natural science and local knowledge that can be learned at once. IPA basic competence of junior high school, mostly associated with everyday life, can be used by teachers as an entrance connecting science concepts with local wisdom. Learning natural science is expected to create the character of students appreciate the various cultures that exist and seek to preserve it [7].
Teachers have a very important role in the implementation of learning in the classroom. Therefore, teachers must have the ability to create learning programs, implementing the learning, assessment and evaluation. To help teachers do this, the required natural science teacher’s book who not only provides instructions for the implementation of student books, but also provides guidance in making the learning programs, strategies to implement an integrated natural science teaching, designing grating and assessment instruments to evaluate. In addition, given the importance of the values of local wisdom in learning natural science, the science teacher books are developed should be based on the values of local wisdom.

4. Conclusion
Based on interviews, observation of the implementation of learning and the results of analysis of the need for the development of natural science teacher’s book of junior high, it can be concluded that teachers require science teachers' book based on local wisdom for materials that can be combined and integrated with the values of local wisdom.

Acknowledgment
The authors thank to PNPB UNP for financial support through Grant Applied 2017-2018 for this work.

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