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Needs analysis of teachers and students in the development of integrated science students books for curriculum 2013 integrated with 21st century learning process : case study in SMPN 1 solok

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Abstract. With the demands of a competitive era, 21st Century Learning must reflect 4C-based learning, namely critical thinking, creativity, communication, and collaboration. This Case Study is one of the preliminary analyzes of the Research and the Development of Integrated Science Student's Books for 21st Century Learning with the theme of air pressure and the human respiratory system. The research method used is descriptive method which aims to find out the needs of teachers and students in the Integrated Science learning process at SMPN 1 Solok. Data collecting techniques use questionnaires filled by teachers and students. The questionnaire results show that the student's books that have been available have not been able to guide the students in the integrated science learning process so that the students still has difficulty in integrating learning material. Meanwhile, students want fun learning and an explanation of the in-depth learning material from the teacher. By paying attention to the needs of teachers and students, it is expected that the development of Integrated Science Students Books can be integrated with 21st century learning.

1. Introduction

In accordance with the 2013 curriculum, learning activities are expected to apply the scientific approach. In addition, 21st century learning demands can also create a 4-C-based generation that has the ability to think critically, creatively, be able to communicate and be able to collaborate. Likewise, according to Rotherdam [1] the success of students is very much dependent on 21st century skills. The referred skills are critical thinking, problem solving, communication and collaboration. To be able to realize that, we need facilities and equipment that support learning activities, one of which is a student book. Student book are a book that is a source of learning for students [2]. Each chapter contains a concept map, introduction, student activity chapter, both experimental and non-experimental or discussion, practice questions, conclusions and assignments for students.

Student books are developed and used as one of the learning resources in which there are facts related to the concept of learning that can enhance students' creativity and skills in order to form students with character. Student books used for junior high school are integrated science books. the integration of science in the student book includes Physics, Biology and Chemistry disciplines that are interrelated with each other [3]. The current student book is considered not to fulfill all the aspects



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needed to be able to form students to achieve the expected and planned achievement standards. The current student books are still being revised because there are still some shortcomings so that the expected results are not perfect yet. From the results of the observation and analysis it is estimated that the student books that are used today do not meet the criteria that should be obtained by students' books according to the demands of the 2013 curriculum and 21st century learning.

For this reason, it is necessary to conduct research to obtain a more detailed picture of all aspects of student book criteria that are in accordance with the 2013 curriculum so that students' books can be obtained, which present integrated science teaching materials, fulfilling all the criteria that a student book must have. Another goal expected from this research is to provide input for the government to improve student books in the future. In addition, it is also expected that the results of this study can be used as a reference for science teachers in designing integrated science learning activities according to 2013 curriculum standards

2. Research Methods

This research is one of the series in the development research phase, which is one form of research to develop and validate products that have been developed, related to the feasibility of their use. The model used in this development research is the Plomp model. The Plomp model is a development research model that is used to design and develop a learning strategy, learning tools, assessment instruments and so on. Research on the development / design of this Plomp model consists of 5 phases as shown in the following figure [4]:

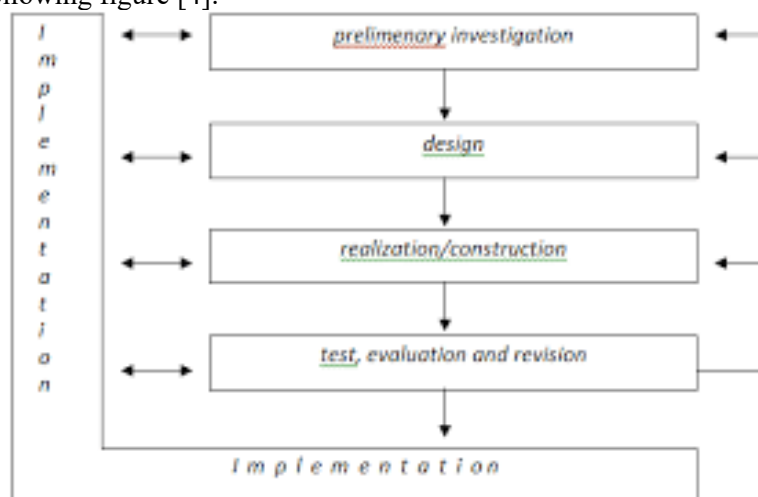


Figure 1. Five phase in Plomp model for development / design research.

The five phases include (1) preliminary investigation phase, (2) design phase, (3) realization phase, (4) test phase, evaluation and revision, and (5) implementation phase. In this paper, the phase that has been implemented is the preliminary investigation phase. The stages in this preliminary investigation phase include needs analysis, textbook analysis and the development of a conceptual framework or research theoretical framework. In this preliminary investigation phase, the researchers conducted a needs analysis. In particular, in this phase, the specific method used is descriptive research that is useful to describe the conditions found in educational institutions.

In this needs analysis there are three objects investigated by the researcher. The three objects are science teachers, student books, and eighth grade junior high school students. The science teacher who became the object of this study amounted to 9 people. All teachers who became the object taught science subjects at SMPN 1 Solok. While the students involved in data collection in this study were 80 people. The students studied were students of SMPN 1 Solok.

Data collection techniques used in this study are by distributing questionnaires. Questionnaire distribution technique is one of the data collection techniques by submitting written questions to be answered in writing also by respondents [5]. There are three types of questionnaires used in this study.

Each of the three questionnaires was used to obtain needs analysis data related to Natural Science Teachers, students and student books. The type of questionnaire used is a closed questionnaire where the respondent's answers are limited to four levels of answers. The level of answers used for assessment of teachers and students is (1) never, (2) Sometimes, (3) often, and (4) always. While the level of answers used for assessment of student books is (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree.

3. Result and Discussion

Data collection on the object of research has been carried out. The results of the questionnaire analysis for the three observed objects, namely the Science Teacher, Students, and student books can be explained below.

3.1. Result for Science Teachers

The questionnaire was distributed to 9 science teachers in SMPN 1 Solok. The purpose of distributing this questionnaire is to obtain information on how teachers carry out the process of learning activities in the classroom and to what extent student books can accommodate student learning needs. The two main concerns of the distribution of the questionnaire are to see how much the 4-C aspect has been shown and developed in the classroom and how much influence the use of student books is currently on the level of student's constructivity development. Figure 2 below shows the results obtained regarding the relationship between the way the teacher starts learning activities and the 4-C factor that is owned by students.

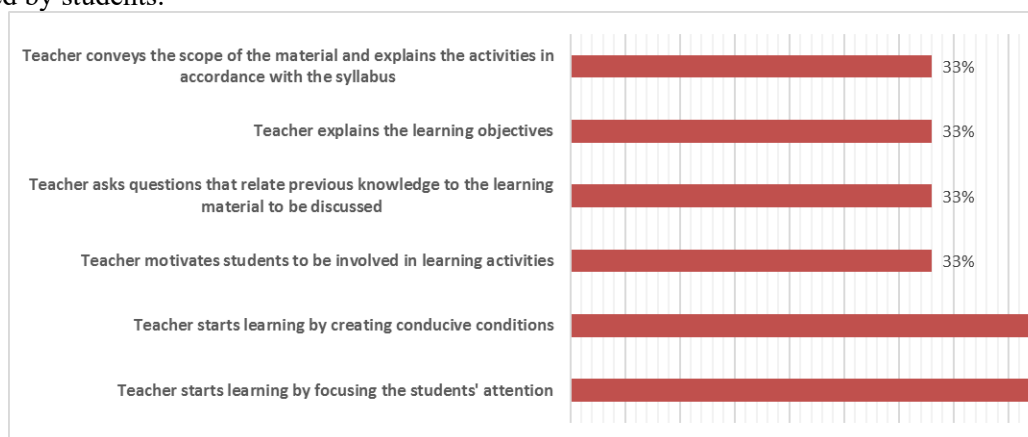


Figure 2. Percentage of teachers who start learning activities to build a learning environment that is conducive for students to learn.

Most teachers who are the object of research have not been able to maximize the existence of a conducive learning environment for students to learn and build their knowledge. There are only 33% to 44% of teachers who have been consistent in building a conducive learning environment for students to be able to express their learning interests and share their knowledge.

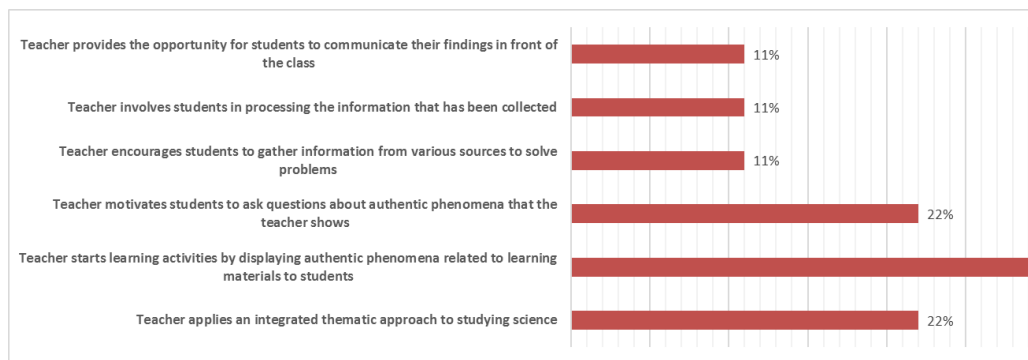


Figure 3. Percentage of teachers who develop learning conditions that make students more active in classroom learning.

Figure 3 shows the low percentage of teachers who provide opportunities for students to be more active in the learning process. Most of the teachers still apply the centralized learning pattern to the teacher so that the 21st century learning pattern cannot be maximally developed for students.

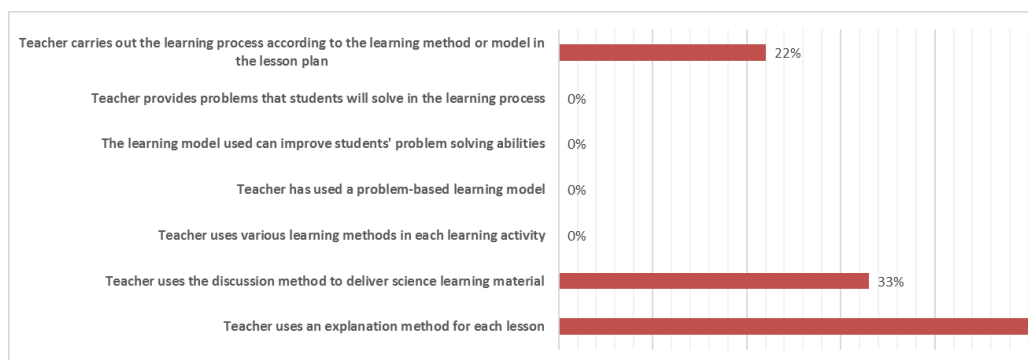


Figure 4. Percentage of teachers applying various learning models in classroom learning activities.

Figure 4 shows that 56% of teachers still use explanatory methods in teaching and do not even try to use problem-based learning models. It can be seen from the picture that of the 9 teachers who were respondents, there were no teachers who applied the problem-based learning model which was seen with the percentage of 0%.

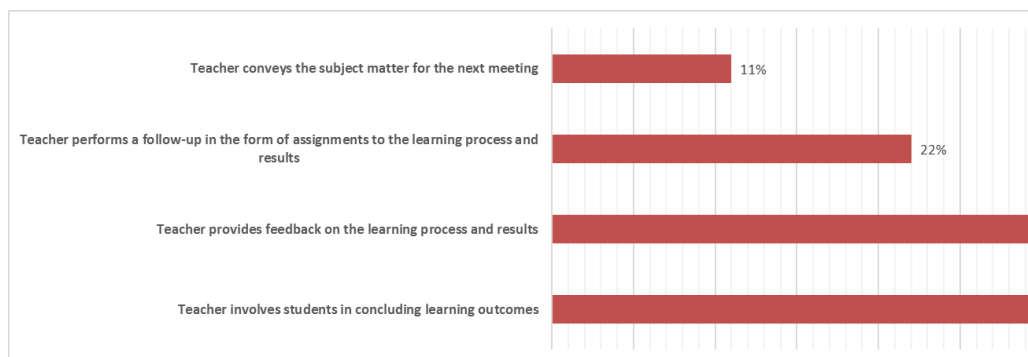


Figure 5. Percentage of teachers who involve students in summarizing learning outcomes and providing follow-up in classroom learning activities.

Figure 5 shows the low percentage of teachers who included students together to conclude learning outcomes, including providing feedback and learning follow-up in the form of assignments for

students. Most of the teachers who were respondents in this study did not complete learning activities correctly and efficiently and provided feedback to students so that students could access all the knowledge that had been acquired during the learning activities taking place in the classroom.

3.2. Result for Students

The questionnaire was distributed to 80 people, eighth grade students of SMPN 1 Solok. The purpose of distributing this questionnaire is to see how much students are able to face the 21st century learning process, especially those based on 4-C. Figure 6 below shows the percentage of students who can show aspects needed in the 21st century learning process.

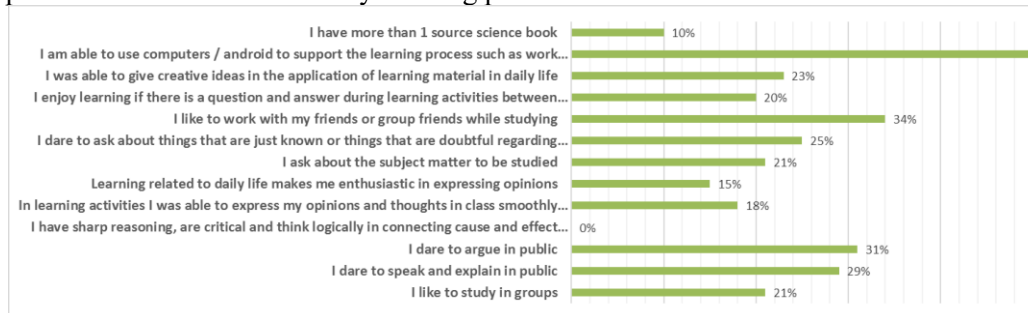


Figure 6. Percentage of students who can show the aspects needed in 21st century learning.

The percentage of students who are considered able to fulfill the 21st century learning process based on 4-C is considered quite low, can be seen in terms of the ability to think critically, creativity, the ability to communicate within the community and the ability to work together in groups. The highest percentage of 53% is that students can use computers or android devices to support learning activities. None of the students who are the object of data collection who have the confidence to judge themselves already have sharp reasoning and have the ability to think critically.

3.3. Result for Student Book

The questionnaire was distributed to 9 science teachers to assess student books used in the learning process. The results of the questionnaire analysis related to systematics of student books used in the learning process can be seen in Figure 7 below.

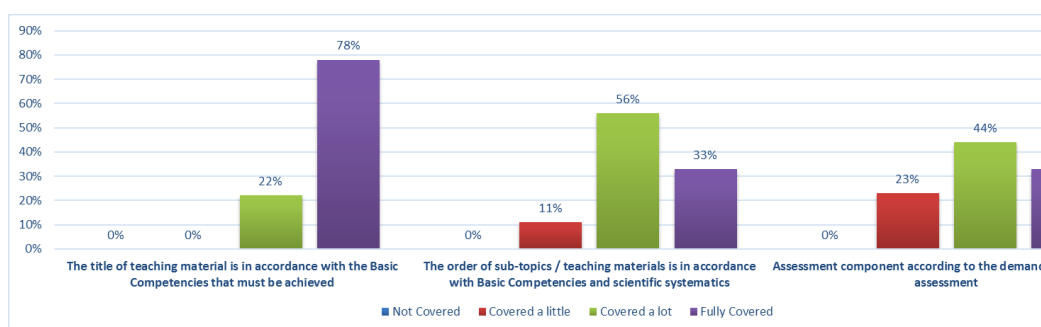


Figure 7. Analysis of questionnaires on systematics of student books

The title of the instructional material is considered to have been included and appropriate, with Basic Competencies, but both the sub-topics and assessment components contained in the student's book are considered not to cover all aspects that need to be considered or have not shown integration. Figure 8 below shows the results of the questionnaire analysis of student books on aspects of the description of teaching materials.

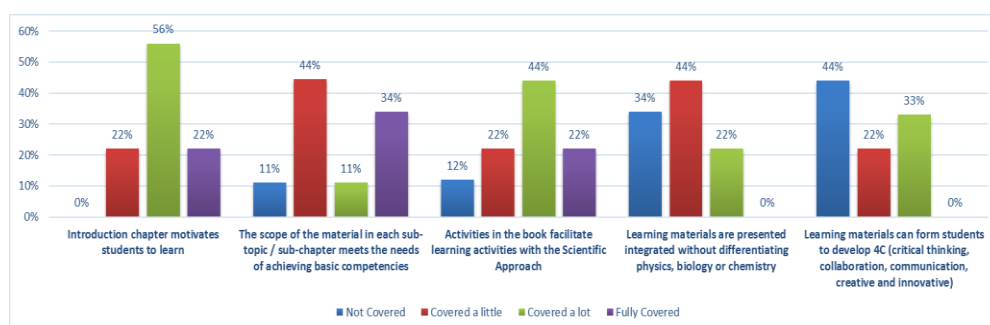


Figure 8. Results of questionnaire analysis on material descriptions in student books.

From Figure 8 above, it appears that most of the student books that are currently available cannot fully motivate students, but most of them have already been. Only a small part includes material that is suitable for the needs for basic competency achievement, it is large enough to cover scientific activities, not fully integrated yet, only a small part of the scope contains integrated science materials and has not fully formed 4-C constructing students. Figure 9 below shows that student books have fully included knowledge assessment, but have not yet fully covered the assessment of attitudes, skills and assignments for students.

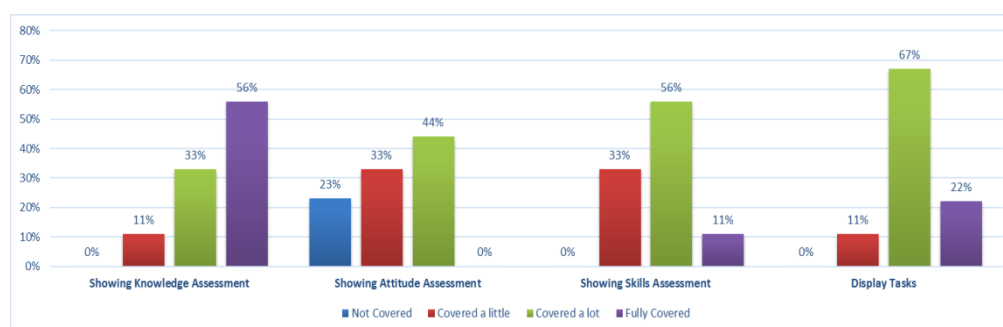


Figure 9. Analysis of questionnaires on aspects of evaluation of learning processes and results contained in student books.

4. Conclusion

Analysis of the needs of science teachers and students has been successfully implemented and the results obtained are that there are still many shortcomings of student books that have been used today. Therefore, it is necessary to develop student books that can help students in learning integrated science teaching materials by taking into account aspects that need to be improved from the student books currently used. In addition, the student books that will be developed are also expected to later be able to help teachers and students to be able to carry out classroom learning activities following the 4-C-based 21st learning process.

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References

- [1] A. J. Rotherdam and D. Willingham, "21st Century Skills : The Challenges Ahead," *Educational Leadership*, vol. 67, no. 1, pp. 16 - 21, 2009.
- [2] Kemdikbud, Materi Pelatihan Guru Implementasi Kurikulum 2013 Tahun 2015 SMP/MTs Mata Pelajaran IPA, Jakarta: Badan Pengembangan Sumber Daya Manusia Pendidikan dan Kebudayaan dan Penjaminan Mutu Pendidikan Kementerian Pendidikan dan Kebudayaan,

- 2015.
- [3] G. Gusnedi, R. Ratnawulan and L. Triana, "*Application of Student Book Based On Integrated Learning Model Of Networked Type With Heart Electrical Activity Theme For Junior High School*," in IOP Conference Series: Materials Science and Engineering, Bristol, 2018.
 - [4] F. Mufit, F. Festiyed, A. Fauzan and L. Lufri, "*Impact of Learning Model Based on Cognitive Conflict toward Student's Conceptual Understanding*," in IOP Conference Series: Materials Science and Engineering, Bristol, 2018.
 - [5] D. Maielfi, R. Ratnawulan and Usmeldi, "Pengembangan Perangkat Pembelajaran Fisika Dengan Pendekatan Contextual Teaching and Learning Berbasis Iman dan Taqwa," in Jurnal Penelitian Pembelajaran Fisika, Padang, 2012.