Needs Analysis in teacher book development Integrated Natural Science type connected character charged with the theme of the sense of hearing and the sonar system of living things

Ilham Dani, Ratnawulan* and Syafriani
Department of Physics, Faculty of Mathematics and Natural Science, Universitas Negeri Padang, Indonesia

*ratnawulan320@gmail.com

Abstract. Needs analysis in the development of teachers’ books for integrated natural science learning is important, because the teacher’s book is a guide for using student books. The aim of this study to find out the need to develop teachers’ books integrated nature science connected type charged characters with the theme of the sense of hearing and the sonar system of living things. The method used is descriptive, using a questionnaire instrument. For data analysis techniques performed in the form of scoring using Likert scale. Based on teacher book analysis integrated science class VIII revised edition 2017, it is concluded that the existing teacher’s book does not describe specifically the type of alignment used especially in the theme selection only describes the material of physics and essential material contained in the teacher’s book concise. The absence of character values in the teacher’s book, which teachers should develop to students such as the suitability of core competency-3 with core competency-1 is only limited to connecting the ability to hear in humans, and the absence of learning objectives and skills assessment. Of the problem researchers concluded the need for the development of teacher books in accordance with the intended purpose.

1. Introduction
Curriculum development 2013 is advanced steps of competency-based curriculum development which was pioneered in 2004 and educational unit level curriculum 2006 which includes attitude competence, knowledge, and skills in an integrated manner. Educational unit level curriculum 2006 or known by educational unit level curriculum developed into the 2013 curriculum based on thinking about the times, people’s perception, development of knowledge and pedagogy, future competencies, and negative phenomenon that surfaced. The difference between the curriculum 2013 with the previous curriculum one of them is the existence of student books and teacher books which has been provided by the central government as a compulsory book of learning resources in schools [1].

Implementation of the 2013 curriculum making students ‘books and teachers’ books as one means prepared Ministry of Education and Culture in accordance with the regulation of education and culture minister number 71 of 2013 on textbooks [2]. Regulation of education and culture minister explain the teacher’s book is a guide for teachers in teaching and learning [3]. This is appropriate regulation of education and culture minister number 51 of 2014 in article (1) of paragraph 1 is explained that establishing textbooks as student books and teacher manuals for primary and secondary education [4].
Basically a teacher book is a unity that can not be separated as an explanation of the activities to be performed on the student’s books. This is in line with the regulation of the president of the republic of Indonesia number 13 of 2015 contained in article (1) paragraph 22, teacher guidebook is guidelines that contain learning strategies, learning techniques, and assessment for each subject and / or theme of learning [5]. While the student’s book is student learning resources that contain learning materials, student activities, exercises, summary, concept maps, and evaluation [3].

Students’ books outline the work that the student should do to achieve the expected competencies. In the learning process, students are encouraged to obtain information from the various learning resources available in the vicinity. Therefore, the role of teachers is very important in improving and adjust the students’ absorption with availability on the book. Teachers are expected to enrich it with creation in the form of other appropriate activities and relevant sourced from the social environment and natural areas respectively. Therefore, teacher as the main controller in the process of teaching and learning in the classroom need to pay close attention to the student’s book and teacher handbooks that have been provided by the government.

The teacher’s book is live documents that are constantly being fixed, updated, and updated in accordance with the dynamics of needs and changing times. The teacher’s book talks about the process issues in the classroom, which is used as a guide for the use of the student’s book. Therefore the teacher must first learn the information from the teacher’s book. Namely the reference sequence of subject matter developed from the competency standards of graduates, core competencies, and basic competencies of each course load. Then integrated into one particular theme, the theme network of each theme which contains basic competencies and indicator of each of the lesson content to be achieved. Selection of learning developed of subthemes with purpose so that teachers can gradually organize the learning process which conforms to the basic competencies which students must master. The learning that the author of the analysis is learning natural sciences.

According to the regulation of the minister of education and culture number 22 of 2016 on the standard of basic and secondary education processes [6]. Natural science learning is done in an integrated way because natural science is a holistic science, is not a partial science between physics, chemistry and biology. The implementation of natural science learning based on the 2013 curriculum have different characteristics with the implementation of the previous 2013 curriculum. The 2013 curriculum mandates the implementation of learning, which can develop character values to students. This is stipulated in the regulation of the minister of education and culture number 20 of 2016 on the competency standards of graduates which mandates that graduates should have a noble character, related knowledge, skills of thinking and acting through a scientific approach. The implementation of character education expected to be able to develop students’ character values, thus producing graduates of noble character.

Character education is something that should be done both in the school environment, family and community. The importance of character education has been embodied in the function and purpose of national education, namely to develop and shape character and dignified nation civilization in order to educate the nation’s life, and develop student potential. To become a man of faith and cautious, be noble, knowledgeable, competent, creative, independent and become a democratic and responsible citizen. This is in line with the regulation of the president of the republic of Indonesia number 87 of 2017 [7] in chapter I article 1 paragraph (1) on strengthening character education. Strengthening character education is the education movement under the responsibility of the educational unit to strengthen the character of students through harmonization of the heart, as if taste, as if thought, and sports with involvement and cooperation between educational units, family and society as part of the national movement of mental revolution. Therefore, learning character values should be given in the direction of attitude, knowledge, and skills. Creating a conducive environment can be done through a variety of methods as assignment, habituation, training, learning, briefing and exemplary.

Book science teacher charged characters developed by providing cohesiveness, students are expected to understand the learning of natural science. According to Fogarty [8], there are ten integrated learning models of natural science, that is 1) the fragmented model, 2) the connected model,
3) the nested model, 4) the sequenced model, 5) the shared model, 6) the webbed model, 7) the threaded model, 8) the integrated mode, 9) the immersed model, 10) the networked model. One of the integrated learning models that can be used is an integrated learning model of connected type. Through integrated learning type connected students will have a more comprehensive picture of some specific aspects, so students more quickly understand the learning of natural science. Alignment in science learning can be done, if various studies of natural science put together or combined into a single unit using the theme.

One of the usable themes in natural science learning in junior high school is the theme of the sense of hearing and the sonar system of living things. Things that can be developed from the product seen from the interrelationship between: 1) sub theme of the sense of hearing and sonar, 2) sub theme of organizational systems of living things, 3) sub theme of the interaction of living creatures and their environment as shown in Table 1.

| No | Physics                        | Biology                                                                 |
|----|--------------------------------|-------------------------------------------------------------------------|
| 1  | Vibration, Wave, Sound.         | Organizational systems of the smallest living things, that is: dolphins live in sea water, bats live in the cave. |
| 2  | a. Picked guitar sounds.        | a. The ear is used to hear the sound                                   |
|    | b. Sonar can measure the depth of the sea. | b. Bats and dolphins use sonar systems to detect objects around them. |

But the reality of the field, indicates a complaint presented by the teacher related to teacher’s book integrated natural science 2013 revised edition 2017 edition. The teacher explained that physics teachers teach physics while biology teachers teach biology, can be inferred for the delivery of natural science materials not yet seen in an integrated manner due to the teacher of natural science teaching according to the field of study that is mastered. Then the contents of the textbook of the concise, would be better in the teacher’s book loaded the program design of learning thus further clarifying the stepping activities.

See the importance of teacher’s book integrated natural science, then the researchers raised the title needs analysis in teacher book development integrated natural science type connected character charged with the theme of the sense of hearing and the sonar system of living things as for the purpose of this research is to develop teachers’ books integrated natural science type connected character with the theme of the sense of hearing and the sonar system of living things quality with valid criteria, practical and effective.

2. Materials and methods

2.1. The Sense of Hearing and The Sonar System of Living Things
Books of teachers natural sciences junior high school 2013 curriculum is currently in the stage of revision and refinement. Therefore researchers do the study against the teacher’s book natural sciences curriculum 2013. Study conducted by researchers teacher books and student books junior high school Published curriculum 2013 ministry of education and culture limited to class VIII the auditory sense chapter and the sonar system of living things and produce some findings related to the advantages and disadvantages.

As for the basic competencies being analyzed that is basic competencies 3.5 understand the concept of vibration, wave and sounds in everyday life including human hearing systems and sonar systems in animals, basic competencies 3.6 understand the organizational system of life ranging from cell level to
organism and the main compositions of cell constituents, and basic competencies 3.7 analyzing the interactions between living things and its environment and population dynamics as a result of such interactions [9].

2.2. Method
This type of research is descriptive analytic research, namelu a research that aims to provide an overview about the reality of the object being studied objectively. This research emphasizes on one variable that is correctness of concept on teacher’s book integrated natural science curriculum 2013. Development model used in this study is plomp development model. The plomp development model consists of 3 phases that is : 1) preliminary research, 2) prototype phase, and 3) assessment phase [10].

3. Results and discussion
Needs analysis is a part of preliminary research phase on the plomp model, this phase is needed to obtain preliminary information on issues in the field of education (there is a gap between situations that exist with the expected). The purpose of this phase is : 1) to obtain information on existing issues and likely to require improvement/ innovation, 2) to obtain the temporary characteristics of the developed product.

Important activities to be undertaken at this stage that is needs analysis includes final preliminary analysis, material analysis, media analysis, analysis of learning activities, assessment analysis. Information gathering is done observation by instrument in the form of questionnaire at the junior high school 24 Padang and Islamic junior high school Al Azhar 32 Padang, while the analysis of learning materials through the analysis sheet. As for the main steps undertaken at the preliminary research stage can be seen in Table 2.

| Research Activities | Criteria / Target | Activity Description | Results |
|---------------------|-------------------|----------------------|---------|
| Preliminary Research | a. Books of teachers and student books | Teacher book observation and student books, media, learning activities and assessment. | Problems found so it can be determined product design to be developed. |
|                     | b. Natural science learning materials junior high school | | |
|                     | c. Instructional media | b. Material analysis | |
|                     | d. Process of learning activities | | |
|                     | e. Assessment | | |

Needs analysis in teacher book development for integrated science learning important to do, because of the teacher’s book is a guideline for explaining students’ books. If analyzed further, books of teachers which does not describe specifically the type of alignment used especially in the theme selection only describes the material of physics. This can be seen in the teacher’s book class VIII revised edition 2017 chapter 10 and the contents of the teacher’s book as shown in Figure 1 [11].

The teacher book is missing character values that teachers should develop to students, such as the suitability of core competencies-3 with core competencies-1 only limited to connect the ability to hear in humans, better inserted character values order value core competencies-1 exposed clearly in the competence of knowledge, which is shown in Figure 2 [11].

On the teacher’s book also there is no learning objective so the book components seem less complete, this can be seen in Figure 3 [11]. Should include the purpose of learning after the indicator of material achievement, for teachers and students know the purpose of learning.
In Figure 4 [11] seen that the competence of project skills in the teacher’s book has not been listed skills assessment, should be immediately included assessment of project skills to facilitate teacher performance.
In figure 4 it is seen that competence of project skills on teacher’s book no skills assessment has been included, should be listed immediately assessment of project skills to facilitate teacher performance. Based on the results of interview researchers to teachers natural sciences, it can be concluded that the teacher’s book published by the government has incomplete contents if reviewed from the combined subjects. In reality teachers are required to adjust learning science with graduated standard of graduate competency that must be taken by students, so as to provide more specific material the teacher should refer back to the textbook natural sciences which he thinks is more complete.

Problems that still exist in the teacher’s book government publications attract researchers to develop teachers’ books integrated natural science which is in line with the 2013 curriculum, character and themed sense of hearing and sonar systems in living things. Based on the problem to make it happen required a needs analysis, which is a first step to take in development research. To obtain information about the problem existing and possibly in need of repair and innovation then needs analysis. Using the plomp development model in phase preliminary research needs analysis needs to be done which aims to identify the problem, the cause of the problem and the possible solutions that can be taken to solve the problem. Needs analysis is done by giving a questionnaire to the teacher consisting of; 1) final preliminary analysis, 2) analysis of instructional media, 3) analysis of learning activities, and 4) assessment analysis.

Result of this requirement analysis obtained through the instrument of questionnaire observation with the respondent is 1 teacher natural sciences Islamic junior high school Al Azhar 32 Padang and 1 teacher natural sciences junior high school 24 Padang. In the initial preliminary analysis has a good category average value, but found some weaknesses: that is teachers’ books do not meet the criteria of qualification skills that include attitudes, knowledge and skills. The contents of each chapter of teachers’ books less describe the adequacy of growth growers basic competencies from core competencies-1 and core competencies-2. The contents of each chapter of teachers’ books simply illustrates the appropriateness of breadth and depth of matter with basic competency coverage from core competencies-1, core competencies-2, core competencies-3, core competencies-4, lack of learning goals. On analysis of instructional media obtained the average value of both categories. However, found weakness that is teachers simply use the learning model which varies every meeting. Teachers simply use the implementation of learning in accordance with the allocation of time.

On assessment analysis obtained the average value of both categories. However, found weakness that is: teachers simply use the attitude assessment instrument which is in the handbook (books of teachers). Assessment of attitudes in the teacher’s book quite clear and enough to facilitate the teacher in conducting student attitude assessment. Questions in the teacher’s book simply represent every achievement of the learning indicator. Questions in the teacher’s book quite related to the phenomenon in everyday life.

Based on the description of the needs analysis which has been done to the teacher’s book, to overcome those weaknesses in order to meet the needs of teachers’ books which is in line with the demands of the 2013 curriculum, the book of teachers was prepared natural sciences charged characters. This thing which makes the author interested in conducting a research development by title teacher book development natural sciences integrated connected type charged characters with the theme of the sense of hearing and sonar systems in living things.

4. Conclusion
Based on the research that has been done, obtained several conclusions as follows:
1) The book does not describe specifically type of alignment used especially in choosing a theme only describes the material of physics.
2) No character values yet which teachers should develop to students, such as the suitability of core competencies-3 with core competencies-1 only limited to connect the ability to hear humans.
3) The absence of learning objectives so the book components seem less complete, should include the purpose of learning after the indicator of material achievement, so that teachers and students know the purpose of learning.

4) Assessment for skills competencies not yet specified, should be immediately include assessment of project skills to facilitate teacher performance.

5) According to the plomp, to obtain information regarding the existing problems and possibly require improvement and innovation the needs analysis.

References
[1] Ilham Rizkiyanto, Rusgianto Heri Santosa 2017 Jurnal Mosharafa. Analisis Buku Matematika Siswa SMP Kurikulum 2013. Departemen Pendidikan Matematika, Universitas Negeri Yogyakarta. Volume 6, Nomor 2, Mei 2017. P-ISSN: 2086-4280; e-ISSN: 2527-8827.

[2] Permendikbud Nomor 71 Tahun 2013 tentang Buku Teks Pelajaran dan Buku Panduan Guru untuk Pendidikan Dasar dan Menengah. Jakarta : Departemen Pendidikan dan Kebudayaan.

[3] Latiful Jannah, Mohamad Nur, Suyono Jurnal Desain Bahan Ajar Materi Gelombang dan Bunyi Model Inkuiri Terbimbing untuk Melatihkan Keterampilan Proses Sains Siswa SMP. Pendidikan Sains Pascasarjana Universitas Negeri Surabaya, Vol. 6, No.1, Nov 2016. ISSN : 2089-1776.

[4] Permendikbud Nomor 51 Tahun 2014 Tentang Buku Teks Pelajaran dan Buku Panduan Guru untuk Pendidikan Dasar dan Pendidikan Menengah. Jakarta : Departemen Pendidikan dan Kebudayaan.

[5] Peraturan Pemerintah Republik Indonesia. 2015. PP RI Nomor 13 Tahun 2015 Tentang Perubahan Kedua atas Peraturan Pemerintah Nomor 19 Tahun 2005 Tentang Standar Nasional Pendidikan. Jakarta : Departemen Pendidikan dan Kebudayaan.

[6] Permendikbud Nomor 22 Tahun 2016 Tentang Standar Proses Pendidikan Dasar dan Menengah. Jakarta : Departemen Pendidikan dan Kebudayaan.

[7] Peraturan Presiden Republik Indonesia Nomor 87 Tahun 2017 Tentang Penguatan Pendidikan Karakter. Jakarta : Departemen Pendidikan dan Kebudayaan.

[8] Fogarty R. 1991. The Mindful School: How to Integrate the Curricula. Illinois: Skylight Publishing.

[9] Maharani. 2018. Tesis Pengembangan Buku Teks IPA Terpadu Tipe Connected Bermuatan Karakter dengan Tema Indera Pendengaran dan Sistem Sonar pada Makhluk Hidup. UNP : Padang.

[10] Plomp, T. 2013. Educational Design Research : An Introduction. Netherlands : enschede.

[11] Kementerian Pendidikan dan Kebudayaan. 2017. BSE Buku Guru Ilmu Pengetahuan Alam/ Kementerian Pendidikan dan Kebudayaan. Jakarta : Pusat Kurikulum dan Perbukuan, Balitbang, Kemendikbud