Needs analysis of integrated natural science teacher book with theme senses of sight and optical devices using connected model for integrated 21st century learning

Ayu Melati, Ratnawulan* and Gusnedi
Department of Physics, Faculty of Mathematics and Natural Science, Universitas Negeri Padang, Jl. Prof Hamka, Padang 25131, Indonesia

*ratnawulan320@gmail.com

Abstract. The purpose of this study to analyze the needs in developing the Integrated Science teacher book with the theme senses of sight and optical devices using Connected model Integrated 21st Century Learning, so as to produce a book that fits the needs of teachers. The method used in this research is descriptive method with qualitative data analysis techniques. This research was conducted at the junior high school in Kerinci district. The data used in this study were obtained through questionnaires and the research literature. The results of the study are still some deficiencies in the existing science teacher books, namely (1) the maximum use of connected types of integrated learning in teacher textbooks is not optimal, (2) the integration of 21st century learning is not optimal in the science teacher’s book with the themes senses of sight and optical using Type Connected. Based on the results of the analysis should be developed by the Integrated Science teacher book with the theme senses of sight and Optics Using the Connected model Integrated 21st Century Learning to lead learners have 21st century learning skills.

1. Introduction
21st century learning is learning that integrates quality characters, literacy and the competencies and technological knowledge. There are four necessary skills possessed by graduates of the 21st century ways of thinking, ways of working, tools to work, and skills. For this reason, it should be able to equip students in four learning skills needed in the 21st century [1].

In addition, certain skills become essential requirement in maintaining the community life of the 21st century. The 21st century formulated into three general skills, namely (1) related to information and communication skills; (2) thinking and problem-solving skills; and (3) interpersonal skills and self-regulating skills. Meanwhile, to meet the demands of the 21st century, a knowledge must be supported by critical and creative thinking skills, character and ability to apply information technology. It is also expressed in the Partnership for 21st century skills; competency framework in 2002 that in the 21st century shows that knowledge alone is not enough, must include one of them with the ability to think creatively and critically [2] [3].

Learning the skills needed in the 21st century, one of them is also the higher order thinking skills (HOTS) which is very important to be prepared in facing global challenges. HOTS is concerned with matters as follows: (a) the ability to resolve new issue of non-routine and unexpected, (b) the ability to
perform activities of analysis, synthesis, evaluation systematically, and (c) the ability to make predictions that are beneficial to a natural phenomenon and life in original, critically and creatively.

One of learning in junior high school are required to have 21st century skills are learning natural science (IPA). IPA is a branch of science which deals with natural phenomena systematically. In general, IPA includes three basic sciences, including biology, physics, and chemistry. The third basic science is called integrated learning [4].

Integrated science teaching is learning that try to combine several subjects from various fields of study Physics, Biology, and Chemistry into one the discussion. So that makes the learning does not standalone, but into a unity [5]. Moreover, Integrated Science Learning emphasizes on providing direct experiences to improve competency in order to explore and understand natural phenomena in everyday life by using a scientific approach [6].

In addition, through an integrated natural science teaching, students can learn about nature and the phenomena that occur therein intact. Consequently, this allows students actively searching, digging, and found the concept of IPA in life. In planning for integrated natural science teaching ordinarily selected objects developed into a theme that will be the focus of the study uses the concept of physics, biology, and chemistry. One the them of integrated science learning is an integrated learning type connected. This type of learning model that is focused connect or combine one concept, one topic, and the skill with others [7].

One of the textbooks used in junior high school science textbooks are integrated natural science textbook. In addition to integrating 21st century learning skills, integrated natural science teacher textbooks should incorporate the concept, ideas and topics and skills so that students understand the competency as a whole by implementing integrated learning.

Based on observations from several Junior High School in the district of Kerinci shows that learning in school has not implemented integrated. One cause has not been the implementation of an integrated learning IPA is an IPA teacher in junior high school is less prepared because there is no unified IPA teaching materials and educational background were also affecting in teaching natural science. In addition, there is no science teachers' books are developed in accordance with the 21st century learning with the themes senses of sight and optical devices using Connected model.

2. Methods
This type of research is descriptive qualitative. This research was conducted in several junior high schools in the district of Kerinci. Informants selected are science teachers scattered in several junior high schools in kerinci district. The instruments used in this study are a questionnaire to analyze teacher books using a Likert scale with 4 options scale [8]. The main target of this phase research aims to see the extent to which the needs of integrated science teachers to the teacher books on the theme senses of sight and type optical devices connected with the integration of 21st century learning.

3. Results and Discussion
The results of this study contain data on the use of integrated science learning and integrating the type of connected 21st century learning in integrated science teacher textbook VIII class with a theme senses of sight and optical devices which includes two aspects; (1) the use of integrated science teaching connected type, and (2) the integration of 21st century learning. Both aspects are translated into a number of indicators in the form of a statement that would be filled by the teacher. Aspects of the type connected is composed of 15 indicators and aspects of learning 21st century consists of six indicators, namely: a religious character, higher level thinking, critical thinking skills and problem solving, communication skills, creativity and innovation, and collaboration. Data from the analysis of the use of integrated learning Connected types can be seen in Table 1 and Figure 1. Data for the analysis results of integrating learning 21st century in some aspects; a religious character, Higher Other Thinking Skills (HOTS), the ability to think critically and problem solving, communication skills, creativity and innovation, and the ability of collaboration Skills in integrated science teacher text book with the theme of the sense of sight and optical devices can be seen in Figure 2.
Table 1. The results of the analysis of the use of integrated learning types Connected

| No Indicator | Statement                                                                 | Value  | Category |
|--------------|---------------------------------------------------------------------------|--------|----------|
| 1            | In the integrated science teacher textbooks already connecting one concept to another | 35.5%  | Disagree |
| 2            | In the integrated science teacher textbooks already connecting the eye with light topics | 35.0%  | Disagree |
| 3            | In the integrated science teacher textbooks have connected one skill with other skills | 61.0%  | Agree    |
| 4            | Integrated Science teacher textbooks have linked tasks performed on one day with the tasks performed on the next day on the theme of the sense of sight and optical instruments | 44.5%  | Disagree |
| 5            | There is a connection between concepts, topics, ideas in the textbook teacher on the theme of the sense of sight and optical instruments | 46.5%  | Disagree |
| 6            | Integrated Science teacher textbooks are already developing concepts for the reflectance of light continuously for connecting the theme of the eye with the theme of light resulting in a process of internalization | 45.5%  | Disagree |
| 7            | Integrated Science teacher textbook allows students to assess, conceptualize, refine, and assimilate the ideas in problem solving on the theme of the sense of sight and optical equipment | 48.0%  | Disagree |
| 8            | Masters in Integrated Science text book material that has been integrated into a single relevance of learning activity. | 61.0%  | Agree    |
| 9            | The material in textbooks on the theme of the sense of sight and optical devices can be easily controlled by students and not fragmented. | 55.0%  | Agree    |
| 10           | With Integrated Science Teacher textbooks, students could express ideas, ideas, and skills which could be among the themes, content, chapter, and skills can be integrated into a single mutual understanding intact on the theme of the sense of sight and optical instruments | 42.5%  | Disagree |
| 11           | Assessment instruments in the Masters textbooks has connected one eye concept with the concept of light | 35%    | Disagree |
| 12           | Instruments assessments in integrated science teacher textbooks already connects the eye skill with light reflection skills | 50.0%  | Agree    |
| 13           | The learning activities in the textbook teacher connect concepts in the sense of sight and optical instruments | 53%    | Agree    |
| 14           | The learning activities in linking teacher textbook topic senses of sight and optical equipment | 53%    | Agree    |
| 15           | The learning activities in textbooks, teachers on the theme of the sense of sight and optical instruments already integrating the subjects of physics, chemistry, and biology. | 35.5%  | Disagree |
Figure 1. The results of analysis of the use of integrated learning types Connected

Based on the results of data analysis showed that the use of the type connected to the textbook teacher with the theme of the sense of sight and optical devices with an average percentage of 46.8% of the 15 indicators of the type connected. This means that users type in the textbook teacher connected with the theme of the sense of sight and optical equipment has not been maximized. With the low value of the average percentage of use of the type connected means learners not obtain a clear and comprehensive overview of the concept of the sense of sight and optical devices as well as the learners are also not so gain the opportunity for deepening, review, improve and assimilate the idea gradually. This is certainly due to the concepts contained in the theme of the sense of sight and optical equipment has not been linked to the fullest. Meanwhile, if seen from several indicators on the integration of 21st century learning the average value of the percentage is obtained is equal to 48.9%.

Figure 2. The results of analysis of the integration of 21st century learning on 6 aspects

Based on the above description may mean that textbooks teachers with the theme of the sense of sight and optical devices integrated learning has not been maximized applied, connected type
integrated learning and integrating 21st century learning skills. By looking at the average percentage of 21st century learning integration, students are not ready to face the challenges of the 21st century.

4. Conclusion
The use of integrated learning type on the textbook teacher connected with the theme of the sense of sight and optical tools has not been developed to the maximum, this is evidenced by the average value of the percentage that has been obtained by 46.8% to a category does not agree. While the integration of 21st century learning skills in integrated science teacher textbooks with the theme of the sense of sight and optical equipment also has not been fully developed. This is also evidenced by the average value of the percentage obtained by 48.9%. Based on this, the textbook was then integrated with the theme Science teacher sense of sight and optical instruments should be developed using the type of connected learning integrates 21st century learning.

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

References
[1] Asrizal, Festiyed, and R Sumarmin. 2017. Analysis of Instructional Materials Development Needs Integrated Science Literacy Loaded Digital Era for Junior Class VIII student learning. Eksakta Journal of Education. Volume 1 Number 1.
[2] H Purwanti Widhy., Patient N., & Widodo SW. 2013. Model-Based Socio Integrated Science Scientific Issues for Developing Thinking Skills in Delivering 21st Century Skills. Journal of Mathematics and Science education Tahun I, No.2, December 2013.
[3] Permana, FH. 2015. Development Biology Textbook Provision Based Blended Learning For Life in the 21st Century for Students of Chemistry UM S1. Proceedings of the National Seminar on Education Biology 2015 UM graduate, March 21, 2015.
[4] Rahmiwati, S., Ratnawulan., & Yohandri. 2018. The Implementation of Integrated Natural Science Textbook of Junior High School Be Charged on Character-based Shared Models to Improve the Competence of Learners' Knowledge. IOP Conf. Ser.: Mater. Sci.Eng. 335 012 076.
[5] Gusnedi, G., 2018. Application of the Student Book Based on Integrated Learning Model of Networked Type With Heart Electrical Activity Theme for Junior High School. IOP Conf. Ser.: Mater. Sci. Eng. 335 012132
[6] Cholishoh, L, S Fatima., & F Yuniasih. 2015. Critical Thinking Skills in Integrated Science Learning Viewed from Learning Motivation. Indonesian Journal of Physics Education. Volume 11 Number 2.
[7] Fogarty, R. (1991). Ten ways to integrate curriculum. Palatine Illinois: IRI / Skylight Publishing, Inc. (Accessed July 17, 2018)
[8] Hidayati, A., A Rahmi., Yohandri., & Ratnawulan. 2018. Validity of Basic Electronic 1 Module Integrated Character Value Based on Conceptual Change Teaching Model to Increase Students Physics STKIP PGRI Competency in West Sumatra. IOP Conf. Ser.: Mater. Sci. Eng. 335 012 079.