Integrated science analysis of student text books with the theme of blood fluids using integrated connected type 21st century learning

T A Putri1, Ratnawulan2* and Gusnedi2

1Student of Physics Education Master of State University of Padang, Indonesia,
2Department of Physics, Faculty of Mathematics and Natural Science, State University of Padang, Indonesia

*ratnawulan320@gmail.com

Abstract. In the Integrated Science learning, an integrated science textbook is needed according to 21st century learning demands. This study aims to analyze the books of integrated science students with the theme of blood fluids using the connected integrated type of 21st century learning. This research is a descriptive method with qualitative research. Research conducted using instruments, namely questionnaire. The analysis carried out is analyzing the books of Integrated Science students. Based on the results of the study obtained, the book analysis of Integrated Science students was developed so that a book of Integrated Science students with the theme of blood fluid using connected, integrated type 21st century learning was developed to encourage students to have 21st century learning skills.

1. Introduction

Century learning is a must-have every student to be able to carry out learning activities with enthusiasm in everyday life. Where in the 21st century require students to have a skill, knowledge and ability in the field of technology, media and information, learning and innovation skills and life and career skills. In the 21st century education plays an important role in ensuring students have learning and innovation skills, skills in using technology and information media, and can work, and survive by using skills for life [1]. In the 21st century learning there are four skills that must be possessed by each student, namely communication, critical thinking, collaboration and creativity. In limited teaching time each teacher faces major challenges in teaching 21st century learning skills to every student [2].

In addition to integrating 21st century learning skills in the development of books for Integrated Science students, one should relate one subject to the next, linking one concept to another, linking one skill with another, so that students can comprehend competencies in full by applying learning. Integrated [3]. Where IPA is a branch of science that studies, systematic natural phenomena. Integrated science learning includes three basic sciences, namely: physics, biology and chemistry [5]. Integrated Science Learning aims to improve efficiency and effectiveness in learning and can increase students' interest and motivation [5].

In this sense, this uses the connected type. The connected type is a model of inter-study integration. The connected type integrates a continuous concept, skill, or process capability in one subject or other sub-subject matter in one field of study so that learning becomes more meaningful and effective. Integration in connected patterns can help students develop concepts continuously [3]. This type of
connected can be applied to the theme of blood fluid. In this article, the book analyzes the integrated science students with the theme of 21st century integrated blood fluid learning aims to encourage students to have 21st century learning skills in the learning process. To form students with character, the book of Integrated Science students must be developed as a source of information in which the book has facts related to the concept of learning. So, it takes a book that can stimulate the mindset of students in attitudes, knowledge and skills [4]. But hacyl preliminary survey at school, shows that the books of Integrated Science students who have not applied the connected type in the learning process, have not organized or integrated one concept with another concept, linking one skill with another, so that learning cannot be said to be effective. Besides that the books of Integrated Science students used have not escorted students in the 21st century skills. Based on the existing problems, this article explains the results of the integrated analysis of the books of science students with the theme of blood fluids using the type of connected integrated 21st century learning.

2. Methods

Methods used in the study are a descriptive method. This research was conducted at junior high school 4 Lubuk Alung. The selected Infroman are students in class VIII2 consisting of 30 people. The instrument used in this study is a questionnaire for student book analysis, using a Likert scale. The questionnaire aims to find out how far the teacher and students accept or reject the statement given. The results of the analysis of the book of Integrated Science students with the theme of blood fluids using, the type connected that is obtained will be displayed in graphical form.

3. Results and Discussion

The results of the analysis carried out are the analysis of connected type connected IPA student books in the integration of 21st century learning. The results of the analysis include knowing the application of the connected book type of Integrated Science students, and the integration of 21st century learning, where each indicator is, training students' thinking skills, critical thinking skills and problem solving, communication skills, creative and innovation.

Data resulting from the application of the connected type in the student book Integrated IPA on the theme of blood fluids can be seen in Table 1.

Table 1. Results of the Analysis of the Application of Connected Type in the Books of Integrated Natural Science Students

| No | Indicator                                                                 | Statement                                                                                           | Value | Category |
|----|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------|----------|
| 1  | In the Integrated Science Students’ Book has connected one concept         | of blood pressure with fluid pressure                                                                | 47.5% | Disagree |
| 2  | In the book Integrated Science Students have linked one topic to the topic | of fluid.                                                                                           | 50.8% | Agree    |
| 3  | In the Integrated Science Student Book has connected a blood pressure     | skill with other fluid pressure skills.                                                              | 40.8% | Disagree |
| 4  | Integrated Student Books have linked assignments in one day with           | assignments performed on the next day on the theme of fluid and blood                                | 40%   | Disagree |
| 5  | There is a connection between concepts, topics, ideas in Integrated       | Science Student Books on fluids and blood                                                             | 40%   | Disagree |
| 6  | Books Integrated Science Students have developed pressure concepts         | on an ongoing basis to connect conflict with fluid themes                                             | 38.3% | Disagree |
| 7  | The Integrated Science Students' book allows students to study,            | conceptualize, improve, and assimilate ideas in problem solving on                                     | 50%   | Agree    |
the theme of fluid and blood

8 In the Science Students book Integrated blood pressure material with a hydrostatic pressure becomes an activity in learning. 51.6% Agree

9 The material in the Integrated Science Student's book on the theme of blood with the theme of fluid can be easily mastered and the material is not fragmented. 43.3% Disagree

10 With the book Integrated Science Students are able to pour their ideas, ideas, and skills so that it is very possible between themes, materials, chapters, and skills can be integrated into a single unified understanding. 40% Disagree

The results of the analysis of the book Integrated Science students with the theme of blood fluids using the type of connected integrated learning of the 21st century can be seen in Figure 1.

Figure 1 shows that each The book analysis indicator of students in the connected type aspect is categorized as very lacking. It can be seen from the average results obtained at 44.25%, it shows that the book of Integrated Science students has not linked one subject to the next. To overcome this, it is necessary to develop a connected type of Integrated Science student book, so that learning is more meaningful and effective.

Data analysis of 21st century learning integration on aspects of Higher Order Thinking Skill (HOTS) can be seen in Table 2.

Table 2. Results of Analysis of Integrating 21st Century Learning on Higher Order Thinking Skill Aspects (HOTS)

| No | Indicator | Statement |
|----|-----------|-----------|
| 1  | In Integrated Science Student Books, in learning activities, students are able to solve new problems related to blood pressure | 53.3% Agree |
| 2  | In the book Integrated Science Students have linked one topic to the topic of fluid. | 40.8% Disagree |
In the Integrated Science Students’ Book, it has connected a blood pressure skill with other fluid pressure skills. 43.3% Disagree

Graph the relationship between values and statements on the indicator of practicing simple thinking skills (LOTS) towards the high-level thinking process (HOTS) in the integration of 21st Century learning in the book of Integrated Science students can be seen in Figure 2.

**Figure 2.** A graph of the relationship of values and statements on the indicator trains thinking skills from simple (LOTS) to a higher-order thinking process (HOTS).

Figure 2 shows that each book analysis indicator for students to practice simple thinking skills (LOTS) towards the high-level thinking process (HOTS) in integrating 21st century learning in the books of Integrated Science students is in the category of very lacking, seen from the average results obtained by 53.3%, it shows that in the book Integrated Science students have not been able to train students’ critical thinking skills.

21st century learning integration analysis data on aspects of Critical Thinking and Problem Solving Skill can be seen in Table 3.

**Table 3.** Results of Analysis of 21st Century Learning Integration on Critical Thinking and Problem Solving Skill Aspects

| No | Indicator                                                                 | Statement                                                                 | Value  | Category |
|----|---------------------------------------------------------------------------|---------------------------------------------------------------------------|--------|----------|
| 1  | Book Integrated Science Students can instill various thoughts / reason or reasons, both inductive and deductive appropriately and accordingly situation. | 40.8% | Disagree |
| 2  | Books Integrated Science Students can train students to understand the concepts of blood fluid and the interrelationship between the concepts of physics, chemistry and biology | 42.5% | Disagree |
| 3  | Books Integrated Science Students practice assessment and decision making effectively in processing data and using arguments. | 41.7% | Disagree |
| 4  | Integrated Science Students' books trying to test results and establish connections between information and arguments. | 39.2% | Disagree |
Books Integrated Science Students can train to process and interpret information obtained through initial conclusions and test them through exercises. 44.2% Disagree

Books Integrated Science Students can train in making solutions to various learning problems, both in a general way, and in their own way. 42.5% Disagree

The Integrated Science Students Book fosters the ability to solve problems using their abilities. 42.5% Disagree

The Integrated Science Students Book fosters an attitude to compile and express, analyze, and solve a problem. 53.3% Agree

Graph the relationship between values and statements on indicators of critical thinking skills and problem solving in integrating 21st century learning in the book of Integrated Science students can be seen in Figure 3.

Figure 3. Graph of relationships of values and statements on indicators of critical thinking skills and solutions problem (21st Century Learning)

Figure 3 shows that each Critical Thinking and Problem Solving Skill indicator is categorized as very lacking, as seen from the average results obtained by 43.3%, it shows that the books of integrated science students in integrating Century Learning 21 have not been able to make students in critical thinking that are independent, self-discipline and improve the students' thinking processes.

Data analysis of 21st century learning integration on the Communication Skills aspect can be seen in Table 4.

Table 4. Results of Analysis of 21st Century Learning Integration on Communication Skills Aspects

| No. | Indicators                                                                 | Statement of                                                                 | Value  | Category |
|-----|---------------------------------------------------------------------------|------------------------------------------------------------------------------|--------|----------|
| 1   | Books Integrated Science students train students to Understand, manage,    | Understand, manage, and create communication effectively in various forms    | 48.3%  | Disagree |
|     | and create communication effectively in various forms and contents        | and contents verbally, in writing, and Multimedia (ICT Literacy).           |        |          |
|     | manage, and create communication effectively in various forms and contents| Verbally, in writing, and Multimedia (ICT Literacy).                        |        |          |
| 2   | Books Integrated Science students cultivate the ability of perserta       | Students cultivate the ability of perserta students the ability to express   | 45%    | Disagree |
|     | students the ability to express an idea-the idea, be it on saatberdiskusi,| an idea-the idea, be it on saatberdiskusi, inside and outside the classroom,|        |          |
|     | inside and outside the classroom, and stated in writing.                  | and stated in writing.                                                      |        |          |
| 3   | Book Integrated Science students Using logical thinking, structured      | Logical thinking, structured according to the rules that apply.             | 51.7%  | Agree    |
|     | according to the rules that apply.                                        |                                                                               |        |          |
Graph the relationship between values and statements on communication skills indicators in the integration of 21st century learning in the books of Integrated Science students can be seen in Figure 4.

![Graph](image)

**Figure 4.** Graph of relationship values and statements on communication skills indicators

Figure 4 shows that each indicator of skills communicating in the category of very lacking, seen from the average results obtained by 48.3%, it shows that the books of Integrated Science students have not been able to help students in generating responses / meanings from among students with other students.

21st century learning integration analysis data on Creativity and Innovation aspects can be seen in Table 5.

**Table 5.** Results of Analysis Integrating 21st Century Learning in Creativity and Innovation Aspects

| No. | Indicator | Statements                                                                 | Value   | Category |
|-----|-----------|-----------------------------------------------------------------------------|---------|----------|
| 1   | Book      | Integrated Science students cultivate the ability for learners to develop, implement, and communicate ideas-new ideas related to fluid blood | 51.7%   | Agree    |
| 2   | Books     | Integrated science students cultivate ideas-Creative ideas are conceptually and practically to learners | 51.7%   | Disagree |
| 3   | Books     | Integrated science students have the ability to create kebaharuan based on prior knowledge possessed. | 47.5%   | Disagree |

Graph the relationship between values and statements on indicators of creativity and innovation in integrating 21st Century learning in the book of Integrated Science students can be seen in Figure 5.
Figure 5 shows that each indicator of creativity and innovation falls into the category of very lacking, seen from the average results obtained by 50.2%, it shows that the existing Integrated Science students' books have not yet developed the ability of students to develop, implement, and convey ideas new ideas verbally and in writing.

The 21st century learning integration analysis data on the Collaboration Skills aspect can be seen in Table 6.

Table 6. Results of Analysis of 21st Century Learning Integration on the Collaboration Skills Aspect

| No. | Indicator                                                                 | Statement                                                                 | Value | Category     |
|-----|---------------------------------------------------------------------------|---------------------------------------------------------------------------|-------|--------------|
| 1   | Integrated Science students develop skills in group collaboration with students in fluid themes blood | 45%                          | Disagree |
| 2   | Books Integrated Science students are able to foster adaptation in various roles and responsibilities, work productively with others to students on the theme of blood fluids | 50%                          | Agree   |
| 3   | Books Integrated Science students are able to develop an attitude of compromise with other members in groups in order to achieve the goals set for students on the theme of blood fluid | 46.7%                       | Disagree |

Graph the relationship between values and statements on indicators of collaboration in integrating 21st Century learning in the book Integrated Science students can be seen in Figure 6.
Figure 6 shows that each collaboration indicator is in the very poor category, as seen from the average results obtained at 47.2%, it shows that the existing Integrated Science students' books have not fostered a form of collaboration among participating students, and books for Integrated Science students have not fostered an attitude of adaptation in various roles and responsibilities among students.

Data from the analysis of integrating 21st century learning about aspects of religious character in developing Integrated Science students’ books on the theme of blood fluid can be seen in Table 7.

**Table 7. Results of Analysis of Integrating 21st Century Learning on the Aspects of Religious Character**

| No Indicator | Statement                                                                 | Value | Category    |
|--------------|---------------------------------------------------------------------------|-------|-------------|
| 1            | Books Integrated Science Students instill the attitude of God Almighty to students because in the fluidity there is a circulatory system so that blood can circulate throughout the human body because it is pumped by the heart | 45%   | Disagree    |
| 2            | Books Integrated Science students, instill gratitude to God for the grace and health that is given to us so that blood can transport oxygen and food essence throughout the body of students | 47.5% | Disagree    |

Chart the relationship between values and statements on indicators of religious character in the integration of 21st Century learning in books of Integrated Science students can be seen in Figure 7.
Figure 7. Graph of the relationship between values and statements on the character indicator

Figure 7 shows that each indicator of religious character falls into the category of very lacking, seen from the average results obtained by 46.25%, it shows that the book of Integrated Science students on aspects of religious attitudes is still low and needs to be optimized.

The results of the analysis on the application of the connected type in the book Integrated Science students with the theme of blood fluid obtained an average of 44.25% with very less categories means that the books of Integrated Science students in schools have never applied the type of connected in learning, especially in the fluid material of blood. Whereas on the indicator Whereas in the indicator of the ability to train students thinking skills in integrating 21st Century learning obtained results of 53.3% with very less categories, meaning that the books of Integrated Science students have not been able to train students thinking skills from simple (LOTS) towards the level thinking process high (HOTS). In the indicator of critical thinking skills and problem solving in the 21st century learning integration, it has obtained an average of 43.3% with categories very less, meaning that the integrated science students' books in integrating 21st Century Learning cannot make students in critical thinking independent, disciplined self and improve the students thinking process. In communication skills indicators obtained an average of 48.3% with categories very less, meaning that the books of Integrated Science students have not been able to help students in generating responses or meanings from among students with other students. In the indicators of creativity and innovation, an average of obtaining 50.2% is in a category that is very lacking, meaning that the existing books of Integrated Science students have not developed the ability of students to develop, implement, and convey new ideas orally or in writing. The collaboration indicator obtained an average of 47.2% with category very poor, meaning that the books of Integrated Science students have not been able to grow a form of collaboration between students, and the book of Integrated Science students has not fostered an adaptation in various roles and responsibilities among students. Whereas on the indicator of religious character obtained on average by 46.25% with categories less, meaning that the books of Integrated Science students on aspects of religious attitudes are still low and need to be optimized.

4. Conclusion
Based on the results of the study and discussion, it can be concluded that the books of Integrated Science students in the integration of 21st Century Learning are still low. This is because the books of Integrated Science students in schools have not applied the connected type in the theme of blood fluids. The book of Integrated Science students also has not spurred students to have 21st century
learning skills. Therefore, it is necessary to develop an Integrated Student Book with the theme of Blood Fluids Using Integrated Connected Types of 21st Century Learning.

Acknowledgements
The authors say thank you to the Lubuk Alung Junior High School Principal has given permission to carry out research and Auliya Santi, S.Pd as a science teacher at Lubuk Alung Junior High School 4 who has given permission to carry out research in class VIII$_2$ along with parents, family and colleagues who have provided enthusiasm, support and motivation in conduct research.

References
[1] Wijaya Etistika Yuni et al, 2016, Transformation of 21st Century Education As Demands for Human Resource Development in the Global Era: Proceedings of the 2016 National Mathematics Education Seminar ~ Kanjuruhan University Malang
[2] Mohd Rusdin Norazlin et al, 2018, Implementation of 21st Century Learning and the Challenges: Qualitative Research Conference (QRC) 2018 10-12 July 2018, Melaka, Malaysia.
[3] Fogarty R, 1991. How To Integrate the Curricula. New York City: IRI / Skylight Publishing, Inc.
[4] Gusnedi & Ratnawulan, 2018. Application of Student Book Based on Integrated Learning Models of Networked Type with Heart Electrical Activity Theme for Junior High School: ICOMSET IOP Publishing IOP Conf. Series: Materials Science and Engineering 1234567890 ’ 335 (2018) 012132 do: 10.1088 / 1757-899X / 335/1/012132
[5] Rahmiwati & Ratnawulan, 2018. The Implementation of Integrated Natural Science Textbook of Junior High Schools is Charged on Character-based Shared Models to Improve the Competence of Learners’ Knowledge: IOP Conf. Series: Materials Science and Engineering 335 (2018) 012076 doi: 10.1088 / 1757-899X / 335/1/012076