Analysis of integrated science teacher's book with blood fluids theme using connected to type integrated 21st century learning

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Abstract. To answer the challenges of the 21st century the book of Integrated Science teachers must reflect the skills expected in 21st century learning. In addition to integrating the material using connected type integrated learning so students receive the competency as a whole. The purpose of this study was to analyze whether in the Integrated Science teacher's book with the theme of blood fluids already using connected types and integrating 21st century learning. The type of research used was descriptive qualitative research. The benefit of this research is to find out whether the teacher's book with the theme of blood fluids has been using connected type and integrating 21st century learning. From the analysis of the book Integrated Science teachers it turns out that 45.5% is used connected to type integrated learning and 48.2% integrated 21st century learning. From the results of the analysis it is necessary to develop an Integrated Science book with the theme of blood fluids using connected types and 21st century learning skill’s.

1. Introduction

Learning 21st century is a learning that integrates literacy skills, knowledge skills, skills and attitudes, and mastery of technology. Maximizing the implementation of literacy activities will provide a more learning experience for learners. One of the skills needed in the 21st century is higher order thinking skills that learners need to face global challenges. The higher order thinking skills indicator relates to the ability to solve new non-routine and unpredictable problems, the ability to carry out analytical activities, synthesis, systematic, evaluations, and the ability to make various predictions that are useful to natural and life phenomena in an original, critical and creative way [1][2]. Based on Bloom’s taxonomy level, higher order thinking skills are cognitive skills that allow students to perform analysis, synthesis and evaluation [3].

In addition to higher order thinking skills, thinking and learning skills are the future world demands that learners must have. These skills include problem solving skills, critical thinking skill, collaboration skill, communication skill, and creativity and innovation skill [4][5][6][7]. Critical thinking is one of the more complex activities of thinking by analyzing more specific ideas, differentiating, selecting, identifying, valuing, and developing them in a more perfect direction [8][9]. Critical thinking is the process and the ability to make rational decisions [9]. Critical thinking skills are the ability to understand complex problems, relate information to one another, and eventually...
emerge various views in solving problems [7]. To solve the problem effectively and practically a learner should have critical thinking skills [7]. While communication skills are the ability of individuals to communicate clearly, using spoken, written, and non-verbal language [7]. Collaborative skills are the ability to work together to achieve common goals. 21st century skills say that mastering collaborative skills requires the ability to work effectively with diverse teams. Collaboration not only works in groups but also aims to instill the ability to socialize and control ego and emotion. Through collaboration will create togetherness, ownership, responsibility, and caring among members. Creativity is one's ability to generate new ideas from existing ideas. Creativity depends on one's creative thinking, the thought process of creating new ideas that lead to new discoveries and often called innovation [7].

The other skills that learners have to face to challenge the 21st century is to have a strong mentality. The foundation of Indonesia's national education is indeed the formation of the character of national life rooted in the values of religion, national culture of Indonesia, and responsive to the changing demands of the times. Education that can improve the character of human resources is education that can prepare learners to face global competition [10]. The most important thing that must be possessed by the students besides applying the theory is applying the character values so that the theory obtained can be applied to the things that are useful and reliable [10]. Character education is concerned with the values and norms that must be developed and practiced in everyday life [10]. The most important values and norms of the learner are the devotion and devotion to God which is one of the spiritual indicators[11]. In this case learners are given a fundamental understanding of the universe of science that will foster admiration and add confidence to God's greatness based on the beauty embodied in the natural rules of God's creation [11]. Based on that, in order to have a strong mentality in facing the challenges of the 21st century, the religious character must be attached to the students themselves.

In addition to integrating 21st century learning skills, book of teachers should integrate concepts, ideas and topics and skills so that learners fully understand the competencies by applying integrated learning. One of integrated learning is integrated learning connected type. This model focuses on making explicit connecting one topic with another topic, one skill with another skill, one concept to another, connecting one day's work to the next, or even one semester idea to the next. The key to this model is a deliberate attempt to link ideas in the discipline, rather than assuming that students will automatically understand the connection [12]. The integration of this connected pattern can help students develop key concepts continuously, resulting in internalization process [12]. Some of the advantages of integrated learning connected types include; with the integration of inter-field ideas of study, learners have a broad picture; the occurrence of internalization process because the key concepts are developed continuously learners; allows to review, conceptualize, refine, and assimilate ideas in problem solving so that learners are able to integrate ideas in inter-field studies. While the disadvantages of integrated learning of connected types are the various fields of study still remain separate and appear to have no relationship (Trianto, 2012) [13]. But not all themes in science lessons can use the connected type of integrated learning. One of the themes that can be connected is blood fluid. Blood is a fluid, the concept that applies to the fluid can apply to blood, such as hydrostatic pressure and pascal law. Blood can flow throughout the body through the blood vessels as it is pumped by a pulsating heart. Blood pressure is equal to hydrostatic pressure. If the blood vessels experience a weak point, then any increase in blood pressure in the blood vessels will be transmitted evenly in all directions. Meaning in blood can apply pascal principle. So by connecting the concept of blood with the concept of fluid through the connected type, learners will receive complete competence.

One of the efforts made by the government today is by continuously updating the curriculum to align with the demands of global education and not deviate from the noble values of the Indonesian nation. In the latest curriculum the government provides textbooks. textbooks are a compulsory component that must exist in learning [11]. The making of textbooks should consider the appropriateness of the content of the book with SKL, KI and KD, the adequacy and depth of the material, the scientific approach, the authentic assessment (Permendiknas Nomor 11 tahun 2005.
Jakarta) [11]. One of the textbooks provided by the government is a teacher textbook. The teacher textbook can serve as: guidance on the use of student books, reference learning activities in the classroom, an explanation of the methods and learning techniques used in the learning process. To address the challenges of the 21st century, teachers’ books should integrate the skills needed in 21st century learning. In addition, teacher books should be able to provide complete competence to learners that can be done using a connected type.

However, the problems faced by teachers, especially in the field of science, are the educational background affecting the teaching practice of teachers. Most science teachers are inexperienced, untrained and in some cases unqualified for the work they do [14]. If the integrated science background is small, then the observation skills, problem-solving skills and ability to attract students’ attention during the integrated science lessons are also low. With the various problems encountered in the learning process in school, then in practice teachers use teacher books as one of the supporters in learning. But does the teacher's book meet the demands of the 21st century and provide a complete understanding of competencies for learners?

Based on the above problems, the title of this research is “Analysis of Integrated Science Teacher's Book with Blood Fluids Theme Using Connected To type Integrated 21st Century Learning”.

2. Research Methods
The type of research used is descriptive qualitative research. Descriptive research is a type of research that describes a variable, symptoms, or incidence as it is without giving something controlling the treatment. This study uses a qualitative approach, where researchers want to see, review, and describe about what it is by understanding the meaning, social interaction and feelings of a person based on the views of non-research data sources. This study aims to examine the extent to which the use of Integrated learning types is connected and the integration of 21st century learning in the book of teachers with the theme of blood fluid. The subject of this research is some of Junior High School teachers who teach Natural science in Pasaman Barat Regency, while the object of research is science teacher book. The instrument used in the form of a teacher questionnaire response to the use of integrated learning type is connected and integration of 21st century learning with blood liquor theme in teacher book. Data were analyzed by using likert scale.

3. Results and Discussion
The results of this study contain data on the use of integrated learning type connected and integration of 21st century learning on teacher’s book class with the theme of blood fluid covering two aspects; (1) the use of Integrated learning connected types, and (2) integration of 21st century learning. Both aspects are spelled out into several indicators in the form of statements to be filled by teachers. Connected type aspects consist of 15 indicators and 21st century learning aspects consist of 6 indicators: religious character, higher order thinking skills, critical thinking and problem solving skill, communication skills, creativity and innovation, and collaboration.

Data from the analysis of the teacher's response to the use of integrated type connected learning in the teacher's book with the theme of blood fluid can be seen in Table.1.

| No | Indicator | Statement | Value of Teacher Response |
|----|-----------|-----------|--------------------------|
| 1  |           | In the teacher's book have connected a concept of blood pressure with fluid pressure. | 40 % |
| 2  |           | In the Teacher's book have linked one blood topic to the topic of fluid. | 25 % |
| 3  |           | In the teacher's book it has linked one blood pressure skill with another fluid pressure skill. | 60 % |
| 4  |           | in the book the teacher with the theme of blood fluid has | 43 % |

Table 1. Analysis Results of teacher response to the use of Connected Type Integrated Learning
connected the task performed on one day with the task performed the next day.

5. There is a connection between concepts, topics, ideas in the teacher's book on the theme of fluid and blood.

6. In the teacher's book has developed the concepts of pressure continuously to connect the blood theme with the theme of the fluid so that the process of internalization

7. in the teacher's book enables learners to study, conceptualize, refine, and assimilate ideas in problem solving on fluid and blood themes.

8. In the teacher's book the blood pressure material with hydrostatic pressure is combined into one learning activity.

9. The materials in teacher's book on blood themes with fluid themes can be easily mastered by students and are not fragmented.

10. With teacher's book students are able to pour their ideas, ideas, and skills so that it is possible that themes, materials, chapters, and skills can be integrated into a unified whole of the theme of blood and fluid.

11. The assessment instrument in teacher's book has linked blood concepts with fluid concepts.

12. The assessment instrument in teacher's book has linked one blood pressure skill to another fluid pressure skill.

13. The learning activities in teacher’s book connect the concepts in fluid and blood.

14. Learning activities in teacher’s book link the topic of fluid and blood.

15. The learning activities in teacher’s book on the theme of fluid and blood already incorporate physics, chemistry and biology subjects.

Graph 1. The relationship of the percentage value of the teacher's response to the use of integrated learning type connected with the integrated learning indicator type connected can be seen in Figure 1.

**Figure 1.** teacher's response to the use of integrated learning type connected to the teacher's book with the theme of blood fluid
Data from the analysis of the teacher's response to the integration of 21st century learning on aspects of religious character in the teacher's book with the theme of blood fluid can be seen in Table 2.

**Table 2.** Results of Teacher Response Analysis on the Integration of Religious Character in the Teacher's Book with the Theme of Blood Fluids.

| No Indicator | Statement | Value of Teacher Response |
|--------------|-----------|---------------------------|
| 1 | The teacher's book instills the attitude of acknowledging the power of God YME to the learners because in our body there is a circulatory system so that blood can circulate throughout the human body because it is pumped by the heart. | 53% |
| 2 | The teacher's book instills a sense of gratitude to God Almighty for the health grace given to us so that our blood can transport oxygen and juice throughout the body to learners. | 43% |

Graph 2 relates the percentage value of the teacher's response to the integration of religious characters with indicators of religious character can be seen in Figure 2.

**Figure 2.** Teacher's response to the integration of religious characters in the Teacher's book with the theme of blood fluids.

Data from the analysis of teacher responses to the integration of 21st century learning on aspects of higher order thinking skills can be seen in Table 3.

**Table 3.** Results of Analysis of the teacher's response to the Integration of Higher Order Thinking Skills

| No Indicator | Statement | Value of Teacher Response |
|--------------|-----------|---------------------------|
| 1 | In the materials, assessment instruments and learning activities in teacher’s book train students to solve new non-routine and unexpected problems related to the theme of blood fluid. | 43% |
| 2 | In the material, assessment instruments and learning activities in teacher’s book train the learners to perform systematic analysis, synthesis, and evaluation activities related to the theme of blood fluid. | 55% |
| 3 | In the materials, assessment instruments, methods, techniques and learning activities in teacher's book train learners to make various useful predictions about natural and life phenomena, original and | 48% |
critical, related to the theme of blood fluid.

Graph 3. The relationship of the percentage value of the teacher's response to the integration of Higher Order Thinking Skills with the Higher Order Thinking Skills indicator can be seen in Figure 3.

Figure 3. Teacher's response to the integration of higher order thinking skills in the teacher's book with the theme of blood fluid.

Data from the analysis of the teacher's response to the integration of 21st century learning on the critical thinking and problem solving skill aspects can be seen in Table 4.

Table 4. Results of teacher response analysis on integrating critical thinking and problem solving skills

| No Indicator | Statement                                                                 | Value of Teacher Response |
|--------------|---------------------------------------------------------------------------|---------------------------|
| 1            | Teacher's book can instill a variety of thoughts / reasoning or reasons, both inductive and deductive with appropriate and appropriate situations on the theme of blood fluid | 48 %                      |
| 2            | The teacher's book appraisal instrument can already have exact or inductive reasoning, or inductive reasoning, both inductive and deductive. | 46 %                      |
| 3            | Teacher's book can train learners to understand the interconnections between concepts on the themes of fluid and blood, and the interrelationships between the concepts of physics, chemistry and biology subjects. | 53 %                      |
| 4            | Teacher's book train learners to assess and determine decisions effectively in processing data and using arguments. | 50 %                      |
| 5            | Teacher's book train learners to test results and establish connections between information and arguments. | 55 %                      |
| 6            | Teacher's book can train learners to process and interpret information obtained through initial conclusions and test it through the best analysis. | 38 %                      |
| 7            | Teacher's book can train learners to make solutions of non-routine problems, either in a common way, or in their own way. | 43 %                      |
| 8            | Integrated science textbook teachers fosters students' problem-solving skills by using their capabilities. | 46 %                      |
| 9            | Assessment instruments in teacher’s book require students to solve problems on the blood fluid theme using their capabilities. | 48 %                      |
| 10           | Teacher's book develop an attitude to compose and disclose, analyze, and resolve a problem relating to the theme of blood fluid. | 53 %                      |
| 11           | Methods, techniques and learning activities in teacher’s book             | 43 %                      |
develop critical thinking skills and problem solving on the theme of blood fluid in learners.

Graph 4. The relationship between the percentage value of the teacher's response to the integration of critical thinking and problem solving skills with the critical thinking and problem solving skill indicator can be seen in Figure 4.

![Graph 4](image)

**Figure 4.** Graph of teacher response to the integration of critical thinking and problem solving skill aspects in the teacher's book with the theme of blood fluid.

Data from the analysis of teacher responses to the integration of 21st century learning in the communication skills aspect in the teacher's book with the theme of blood fluid can be seen in Table 5.

**Table 5.** Results of Analysis of teacher responses to Integration of Communication Skills

| No. | Indicator | Statement                                                                 | Value of Teacher response |
|-----|-----------|---------------------------------------------------------------------------|---------------------------|
| 1   | Indicator 1 | Teacher’s book train students to understand, manage, and create effective communication in various forms and content orally, literally, and multimedia (ICT Literacy). | 55 %                      |
| 2   | Indicator 2 | Teacher's book foster the ability of learners the ability to express their ideas, whether during discussions, inside and outside the classroom, or in writing. | 45 %                      |
| 3   | Indicator 3 | Methods, techniques and learning activities in teacher’s book develop communication skills to learners. | 40 %                      |
| 4   | Indicator 4 | Teacher’s book using a logical, structured mindset in accordance with applicable rules. | 60 %                      |

Graph 5. The relationship of the percentage value of the teacher's response to the integration of communication skills with the communication skills indicator can be seen in Figure 5.
Figure 5. Graph of teacher responses to the integration of communication skills in the teacher's book with the theme of blood fluid.

Data from the analysis of the teacher's response to the integration of 21st century learning on the creativity and innovation aspect in the teacher's book with the theme of blood fluid can be seen in Table 6.

Table 6. Results of Analysis of teacher responses to Integration of Creativity and Innovation

| No | Indicator       | Statement                                                                 | Value of Teacher response |
|----|-----------------|---------------------------------------------------------------------------|---------------------------|
| 1  | Teacher’s book  | develop the ability of learners to develop, implement and deliver new ideas related to the theme of blood fluid | 43 %                      |
| 2  | Assessment      | instruments in teacher’s book require learners to develop, implement and deliver new ideas related to the theme of blood fluid | 48 %                      |
| 3  | Teacher’s book  | generates creative ideas conceptually and practically to learners related to blood fluid themes | 35 %                      |
| 4  | Teacher’s book  | have the ability to create novelty based on initial knowledge of blood fluid held. | 45 %                      |
| 5  | Methods,        | techniques and learning activities in teacher’s book develop creative and innovative skills in peserte students | 48 %                      |

Graph 6. Relation of teacher response percentage values to the integration of creativity and innovation skills with the creativity and innovation skills indicator in the teacher's book with the theme of blood fluid can be seen in Figure 6.
Figure 6. Graph of the teacher's response to the integration of creativity innovation in the teacher's book with the theme of blood fluid.

Data from the analysis of the teacher's response to the integration of 21st century learning on the collaboration skills aspect in the teacher's book with the theme of blood fluid can be seen in Table 7.

Table 7. Results of Analysis of Teacher Responses to Integration of Collaboration Skills

| No Indicator | Statement                                                                 | Value of Teacher Response |
|--------------|---------------------------------------------------------------------------|----------------------------|
| 1            | Teacher's book develop skills in group collaboration to learners on the theme of blood fluid. | 58 %                       |
| 2            | Teacher's book are able to foster adaptability in roles and responsibilities, work productively with others to learners on the theme of blood fluid. | 40 %                       |
| 3            | Teacher's book are able to cultivate a compromising attitude with other members in the group for the achievement of predetermined goals against learners on the theme of blood fluid. | 55 %                       |
| 4            | Methods, techniques and learning activities in teacher’s book develop collaborative skills in learners | 45 %                       |

Figure 7. The relationship of the percentage value of the teacher's response to the integration of skills collaboration with the collaboration skills indicator in the teacher's book with the theme can be seen in Figure 7.

Figure 7. Graph of teacher's response to the integration of collaboration skills in the teacher's book with the theme of blood fluid.

Based on the results of the data analysis of the teacher's response about the use of type connected in the teacher's book with the theme of blood fluids, the average percentage was 45.5% with a low category of 15 connected type indicators. This means that the use of type connected in the teacher's book with the theme of blood fluid is not optimal. With the low value of the average percentage of teacher response to type connected use means that students have not obtained a clear and broad picture
of the concept of blood fluid and students do not get the opportunity to deepen, review, improve and assimilate ideas gradually. This is because the concepts or ideas contained in the theme of blood fluid have not been maximally connected.

When viewed from the results of the teacher response analysis on the integration of 21st century learning, the average score of teacher response was 48.2% with a low category of 6 indicators. The 6 indicators are: religious character with an average percentage of teacher response 47.5% of 2 indicators; higher order thinking skill with an average percentage of teacher response 48.3% of 3 indicators; critical thinking and problem solving skills with an average percentage of teacher response percentage 47.0% of 11 indicators; communication obtained the average value of teacher response percentage 52.5% from 4 indicators; creativity and innovation skills with an average score of teacher response 43.5% of 5 indicators; collaboration skills with an average teacher percentage score of 50.6% from 4 indicators. Based on the description above, it means that the teacher's book with the theme of blood fluid has not maximally integrated 21st century learning skills. With the low average percentage value of 21st century learning integration, students are not ready to face the challenges of the 21st century.

4. Conclusion
The use of connected learning on teacher's book with fluida blood theme has not been developed maximally, meaning learners have not gained overall understanding, as evidenced by the average value of 45.5% percentage with disagree category. While the integration of 21st century learning skills in the teacher's book with the theme of blood fluid has not been developed optimally, it means that teacher's book with the theme of blood fluid have not fully developed the skills expected to face the challenges of the 21st century, this is evidenced by the average percentage. value 48.2% with category not agree. Based on the above description, the teacher's book with the theme of blood fluid should be developed by using integrated learning type connected and integrated learning of the 21st century.

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