

## **ANALYSIS OF 21st CENTURY SKILLS IN HUMAN CIRCULATORY SYSTEM IN SCIENCE TEACHING MATERIALS FOR JUNIOR HIGH SCHOOL**

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### **Abstract**

The world of education is growing according to the times and its demands. One of the factors is the emergence of the industrial revolution era 4.0, which is the background for the emergence of the 21st-century skill formulation in the field of education. This study examines and compares teaching materials with the content of 21st-century skills with descriptive analysis methods. The teaching materials used are two pieces published by the Ministry of Education and Culture for the odd semester grade VIII SMP on the fabric of the human circulatory system. Furthermore, it is compared with the component formula in 21st-century skills, which is determined by the literature study method. Comparison of skill components with teaching materials is used to analyze the data so that the suitability criteria emerge. This study produces data in the form of percentage intervals, suitability analysis, and data criteria. The teaching materials published by the Ministry of Education and Culture in the 2017 revised edition have a score of 100% on critical thinking skills, 100% on creative thinking skills, 75% on communication skills, and 100% on collaboration skills. The second teaching material, published by the Ministry of Education and Culture in 2018, scored 60% on critical thinking skills, 66.67% on creative thinking skills, 50% on communication skills, and 100% on collaboration skills. In general, the two teaching materials on the material of the human circulatory system are said to be feasible as learning media for students.

**Keywords:** *21st-century skills, criteria for conformity, teaching materials, skills component*

### **Abstrak**

Dunia pendidikan semakin berkembang menyesuaikan dengan perkembangan zaman dan tuntutan nya. Salah satu faktornya ialah munculnya era revolusi industri 4.0 yang menjadi latar belakang munculnya rumusan keterampilan abad 21 dibidang pendidikan. Penelitian ini bertujuan untuk menelaah dan membandingkan bahan ajar dengan muatan keterampilan abad 21 dengan metode analisis deskriptif. Bahan ajar yang digunakan sejumlah 2 buah yang diterbitkan oleh Kemendikbud tingkat SMP kelas VIII semester ganjil pada materi sistem peredaran darah manusia. Selanjutnya dibandingkan dengan rumusan komponen pada keterampilan abad 21 yang ditetapkan dengan metode studi pustaka. Perbandingan komponen keterampilan dengan bahan ajar digunakan untuk menganalisis data sehingga muncul kriteria kesesuaian. Penelitian ini menghasilkan data berupa interval persentase, analisis kesesuaian, dan kriteria data. Pada bahan ajar terbitan Kemendikbud edisi revisi tahun 2017 memiliki nilai 100% pada keterampilan berpikir kritis, 100% pada keterampilan berpikir kreatif, 75% pada keterampilan komunikasi, dan 100% pada keterampilan kerjasama. Pada bahan ajar kedua yaitu terbitan kemendikbud tahun 2018 mendapatkan nilai 60% pada keterampilan berpikir kritis, 66,67% pada keterampilan berpikir kreatif, 50% pada keterampilan komunikasi, dan 100% pada keterampilan kerjasama. Secara umum

kedua bahan ajar pada materi sistem peredaran darah manusia tersebut dikatakan layak sebagai media pembelajaran bagi peserta didik.

**Kata kunci:** keterampilan abad 21, kriteria kesesuaian, bahan ajar, komponen keterampilan

## Introduction

Education is one of the mandatory instruments for a country that wants a change to improve the quality of human resources. The importance of increasing resources in terms of quality is caused by the development of an increasingly advanced era in all fields. This editor certainly directs a nation to be able to form progressive human beings (Temon Astawa, 2016). The periodization of the world of education today shows the development of the world of modern education. Modern education is characterized by the discovery of scientific research. This discovery was able to have a tremendous impact on the development of the times. One of the instruments that exist in the world of modern education is to place humans in the same perspective as other humans or known as the flow of humanism (Idris & ZA, 2017). The ideal perspective is that education must be able to create individuals who are humane and have expertise that can benefit society and the environment. The concrete form of an ideal education in the perspective of humanism must place educators and students on the same subject so that there is no dichotomy and discrimination in the learning process. Education is oriented to the development of all potentials for both educators and students through a communicative interaction process with the same reciprocity between students, educators, the community, and the surrounding environment (Supriyadi, 2017). Improving the quality of human resources for a nation through educational instruments makes it a must to form a developed nation so that it is able to compete in the era of globalization which continues to develop at a very high level. Qualified individuals are able to make good changes if accompanied by community development and supported by elements of civilization, especially education.

Modern education is currently developing at a high rate so as to create theories that are adapted to the circumstances, needs, and benefits of a group or nation. The reflection of the development of human civilization is shown by the state of its education (Rukiyati, 2000). Education is an important thing in the context of civilization development that is able to improve human quality, which is reflected in every character in every period of time. The contextualization of education in the civilization of the times can be seen from the analysis of the skills of the era. Currently, the development of education is directly proportional to the development of the industrial revolution era 4.0. Although currently the development of the era has been combined with the era of *society* 5.0, the Indonesian nation is still trying to improve its capabilities in the 4.0 era. Era 4.0 is an era of revolution in the fourth generation caused by the participation of an intelligent digital system and automation in the industrial world driven by data algorithms through *Artificial Intelligence* (AI) and *machine learning*.

Industrial revolution 4.0 is often interpreted as an effort to change a developed nation by integrating the digital world and industrial production lines so that all process activities are based on the internet (Abdullah, 2019). The industrial revolution era does not only emphasize human cognitive abilities, meaning that in the industrial revolution era, knowledge also is not enough to improve skills and compete with other individuals. Despite all the criticisms of the 4.0 era, all skills in the periodization of civilization aim to develop quality human resources. The 21st century has experienced many changes in every sector. In this century, the integration of skills is needed to create a complex culture of thinking about the values of educational development. The orientation of 21st-century skills must be able to

create a democratic and scientific form of education. This can be realized if habituation activities are carried out with instruments contained in 21st-century skills that are oriented towards meeting the needs of life while still considering all other aspects of life, such as biological resources other than humans and the surrounding environment (HM & Nurul, 2021). The 21st century has a characteristic that is characterized by the existence of supporting instruments, namely information that can be accessed anytime and anywhere, faster computing, automation capabilities, and communication that can be done anywhere. In the 21st century, an ideal order is formed in the industrial world, which results in a challenge that is quite formidable for humans to face, namely a transformation into a complex and comprehensive science. To face all the challenges in the 21st century, the Indonesian government initiated an innovation that is often referred to as the literacy movement (Ramandanu, 2019). The literacy movement launched by the government has three main focuses, namely technology literacy, human literacy, and digital sector literacy.

In the 21st century, a concrete integration between knowledge and skills is needed so as to create *skills* that are able to support the improvement and development of quality human resources and are able to compete in all sectors of life. In the study of developing 21st-century skills, an ability is known that is used as a reference in navigating the industrial era known as 4C skills. 4C skills include *Critical Thinking* or critical thinking skills, *Collaboration* or the ability to work together personally or communally, *Communication* or communication skills, and *Creativity* or the ability to think creatively (Septikasari, 2018). All elements of this capability must be well integrated with its operations.

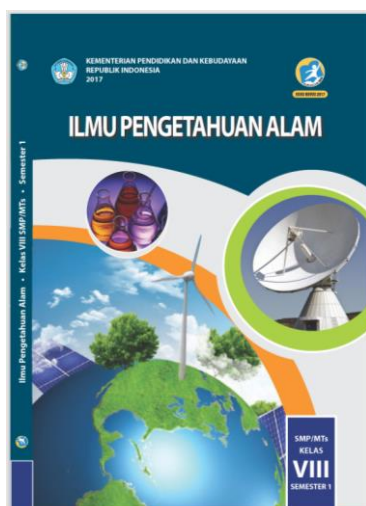
Thinking skills are *Critical* used to analyze a problem and solve a problem so that they are able to make the right decisions in aspects of life, especially in the world of education. This ability is useful in increasing the ability to think that is oriented to dissect a truth. Critical thinking is oriented toward dissecting a concept, applying, and synthesizing the information obtained (Siti Zubaidah, 2010). The next ability needed in the 21st century is the ability to work together or *Collaboration*. Collaboration. The ability to work together is an important ability in everyday life. The importance of this ability is because life requires continuous interaction with all aspects of life so that it is able to adapt and take part in society and the environment (Wulandari et al., 2015). The next ability is the ability to think creatively. Creative thinking is the ability to create an idea or ideas that are new and different from things that already existed before. The ability to think creatively is able to support other abilities so as to create a gradual development with a new culture or culture. In addition, in the 21st century, good communication skills are also needed. Communication skills are the ability to sing an idea or ideas that are owned to others both orally and in writing. All skills in the 21st century are aimed at meeting human needs in dealing with all aspects of life's problems. If we implement it in the world of education, these skills will be useful in a good learning process so as to create comfort in learning.

The learning process in education is the main instrument for transforming knowledge. In science learning at the junior high school (SMP) level or equivalent, science subjects are *integrative science*. This means that the learning process is a unifying element in the natural sciences, namely biology, chemistry, and physics. Learning is oriented as the development of thinking skills, learning abilities, curiosity, and the construction of an attitude of responsibility and care for the environment and society (Rahayu et al., 2012). Science learning is one area that gets concerned in the discussion so that it is included in the 2013 curriculum. Science learning has a basic reference to content standards to form students who have complex knowledge. Subject *integrated science*. The concept of integration in the science learning process is contained in content competencies and basic science learning competencies. In science learning, it contains 21st-century skills as oriented in the 2013

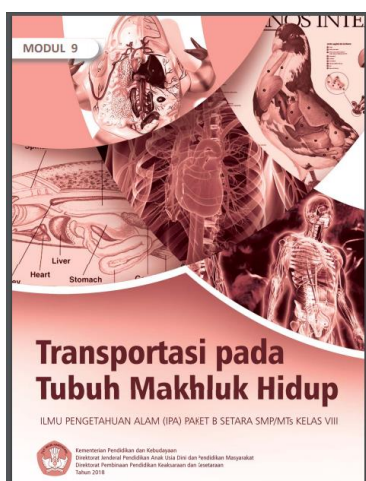
curriculum goals (K13) so that students get a unified concept in the form of wholeness and unanimity of knowledge.

## Method

In research on the analysis of science book material in terms of 21st-century skills, the descriptive analysis method is used. The data was taken using a research approach technique with library research. The review in this study is based on the content of 21st-century skills in the form of critical thinking skills (Critical Thinking), creative thinking skills (Creativity), skills to work together in groups (Collaboration), and good communication skills (Communication). The analysis of 21st-century skills is used in reviewing the level of complexity of the content in the odd semester science books for SMP / MTs students in class VIII. The analysis was carried out using the instrument components that had been provided by looking at the suitability of the content in the book with the components of the research instrument obtained in the library research.



Writer	: Siti Zubaidah et al
Publication	: 2017 (revised)
Year	: Ministry of Education and
publisher	Culture



Writer	: Muhammad Noval
Publication	: 2018
Year	: Ministry of Education and
publisher	Culture

. The components of the analytical instrument are obtained in the literature study that has been carried out and produces the following components of analysis(Afifah, 2019):

**Table 1. Stimulus indicator of critical thinking skills in books**

No	Category	Indicator
1	Clarification at the basic level (elementary clarification)	An instrument that provides a simple explanation of the question or problem at hand
2	Basic support	There is an instrument for assessing the credibility of the source obtained
3	Infer (inference)	Stimulus instrument with logical assumptions for the activities that have been carried out
4	Further clarification (advance clarification)	There are instruments that are able to stimulate the definition in solving problems
5	Strategy and tactics (strategies and tactics)	There are instruments that are able to stimulate the determination of appropriate actions in solving problems.

The components of the instrument that have been mentioned were taken in the literature study and analyzed further. An explanation of the components of the critical thinking skills instrument is as follows:

- a. *Elementary clarification* for basic level clarification. Components are based on basic phenomena. When students get information, an initial assumption will appear. This is what is referred to as basic clarification. So the learning book as an instrument must contain a component that is able to stimulate the emergence of basic clarification by students in the form of statements and initial questions.
- b. *Basic supporter* basic support. This component is in the form of information sources in learning instruments (student books) that are able to answer a question in the student's book or problems of life phenomena.
- c. *Inference* or inference. The components that must be included in this instrument are in the form of a question or statement that is able to stimulate the ability of students to provide a conclusion on the activities that have been carried out.
- d. *Advance clarification* or further explanation. This component contains instruments in the form of explanations or statements related to the material required explicitly. The goal is that students are able to study further about the deepening of the material that has been given by the teacher.
- e. *Strategies and tactics* or strategies and tactics. The content in the component is in the form of instruments that invite students to think critically, either in the form of mini-research, individual or group assignments, or other similar tasks.

Some of the components above must be contained in a learning instrument in the form of student textbooks that use orientation to 21st-century skills based on the 2013 curriculum. The following is an analysis table in creative thinking skills (Nia & Effendi, 2017).

**Table 2. Stimulus indicators in creative thinking skills**

No	Category	Indicator
1	Fluency	There are instruments that are able to stimulate in generating variations in problem-solving
2	Flexibility	There are instruments that contain a variety of different statements or terms.
3	Originality	There are instruments that contain information or typical statements in student textbooks.

The components above are components that must be contained in student textbooks in creative thinking skills instruments. Next is an analysis table on the components of communication skills.

**Table3. Stimulus indicators in communication skills**

No	Indicator
1	There are instruments that are able to invite students to articulate their thoughts effectively using oral, written, and non-verbal communication skills in various forms of verbs and contexts.
2	There are instruments that are able to invite students to communicate for various purposes, such as providing information or giving instructions.
3	There are instruments that can invite students to use technology.
4	There are instruments that are able to invite students to communicate in various environments and communities.

Analysis in communication skills research can only be oriented to conformity with indicators. What you need to know is that communication skills are not only defined as verbal communication, but communication skills both orally, in writing, and in other forms of communication. Then below shows the form of the analytical instrument on cooperation or collaboration skills(Wulandari et al., 2015).

**Table 4. Stimulus instrument in cooperation skills**

No	Indicator
1	There are instruments that are able to invite students to work in groups effectively and appreciate the diversity of the team.
2	There are instruments that are able to invite students to be flexible and help each other in making the necessary decisions.
3	There are instruments that are able to invite students to share shared responsibilities in the form of collaborative work and appreciate the contributions of other students.

The research was carried out using several procedures that had been analyzed objectively by the researcher. The stages in this research are carried out by:

1. Determine the object of study related to curriculum review in science subjects.
2. Analyzing the books for science students of SMP / MTs K-13 grade VIII odd semester revised edition 2017 by the Ministry of Education and Culture (Kemendikbud) on the material of the human blood circulation system.
3. Determining analysis data based on literature studies in formulating components of comparative indicators on 21st-century skills.
4. Conduct a study of the suitability of the indicator components with the results of the analysis in the student textbooks.
5. Calculate the percentage of indicator content in student textbooks on each of the components that have been formulated using mathematical calculations or the following formula:

$$\text{percentage value \%} = \frac{\text{number of indicators for each category}}{\text{total number of indicators}} \times 100\%$$

6. Classify the percentage results with the suitability criteria based on the following criteria table(Rohmah et al., 2022):

**Table 5. Research criteria based on percentage interval**

Percentage interval	Criteria
81 - 100	Very suitable
61 - 80	In accordance
41 - 60	quite appropriate
21 - 40	Not suitable
0 - 20	It is not in accordance with

7. Interpreting the results of the data obtained in the form of tables and narrations that are adjusted between the instrument and indicator category data with research findings in the form of conformity data.
8. Summarizing the research data that has been obtained.

### Result and Discussion

This research is in the form of a descriptive analysis of a learning media that is reviewed for its suitability to the components that exist in 21st-century skills. The results of this research are in the form of results and data in the form of a narrative fund table that contains an analysis of the textbooks for students of the 2013 curriculum of SMP / MTs class VIII odd semester in the material on the circulatory system published by the revised edition of the Ministry of Education and Culture in 2017. Aspects of the suitability analysis of 21st-century skills include four main aspects, namely critical thinking skills, creative thinking skills, collaboration skills, and communication skills (Septikasari, 2018).

The components in the analysis of critical thinking skills have several instruments needed in determining their suitability, namely basic level clarification, basic support, conclusions, further clarification, as well as strategies and tactics (Arini, 2018). In terms of cognitive analysis, critical thinking is a skill that can be observed by giving an assessment. Based on the tests that have been carried out by researchers by observing and observing student textbooks, the following results are obtained:

**Table 6. Data from the analysis of critical thinking skills on science teaching materials by the Ministry of Education and Culture in 2017**

No	Category	Indicator	There is	There isn't any
1	Clarification at the basic level (elementary clarification)	An instrument that provides a simple explanation of the question or problem at hand	✓	
2	Basic support	There is an instrument for assessing the credibility of the source obtained	✓	
3	Infer (inference)	Stimulus instrument with logical assumptions for the activities that have been carried out	✓	
4	Further clarification (advance clarification)	There are instruments that are able to stimulate the definition in solving problems.	✓	
5	Strategy and tactics (strategies and tactics)	There are instruments that are able to stimulate the determination of	✓	

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appropriate actions in solving problems.

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In the analysis of teaching materials or learning modules by the Ministry of Education and Culture, the output in 2018 produces the following data:

Table 7. The results of the analysis of critical thinking skills in the package B module in the material of the circulatory system in 2018

No	Category	Indicator	There is	There isn't any
1	Clarification at the basic level (elementary clarification)	An instrument that provides a simple explanation of the question or problem at hand	✓	
2	Basic support	There is an instrument for assessing the credibility of the source obtained	✓	
3	Infer (inference)	Stimulus instrument with logical assumptions for the activities that have been carried out		✓
4	Further clarification (advance clarification)	There are instruments that are able to stimulate the definition in solving problems.	✓	
5	Strategy and tactics (strategies and tactics)	There are instruments that are able to stimulate the determination of appropriate actions in solving problems.		✓

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In table 6, it can be seen that the five components of critical thinking skills contained in the student's textbooks meet the five criteria. This means that in the aspect of critical thinking skills, the textbook has a high level of conformity. This level of conformity is obtained by analysis and review by researchers by weighing the indicators that have been formulated and conducting a comparative analysis between 2 student textbooks that have been determined in the research method. Meanwhile, if we look at table 7 of the five components of critical thinking skills, the module only contains three components. Then the data that has been obtained can be analyzed further to determine the suitability criteria based on the results of the percentage interval.

In the 2017 revised edition of the teaching materials of the Ministry of Education and Culture, the following results were obtained:

$$\text{percentage value \%} = \frac{\text{number of indicators for each category}}{\text{total number of indicators}} \times 100\% = \frac{5}{5} \times 100\% = 100 \%$$

From the mathematical calculations above, it can be concluded that the teaching materials are in the uppermost interval (table 5) with criteria that are very suitable for 21st-century skills. Then the analysis of the 2018 science module output can be calculated with the following results:

$$\text{percentage value \%} = \frac{\text{number of indicators for each category}}{\text{total number of indicators}} \times 100\% = \frac{3}{5} \times 100\% = 60 \%$$

Based on the results of the analysis above, if the suitability is reviewed based on table 5, it has a level of conformity that is quite appropriate because it is in the interval between 41-60%. The second teaching material (module output in 2018) does not contain components regarding inference and components of strategies, and tactics. In the future, it is hoped that the two components that have not been included in the module can be evaluated and



developed with the output in the form of changes in the form of a revised edition of the module.

The next aspect of the analysis is a component of creative thinking skills. In creative thinking skills, there are several instruments contained in it resulting from an analysis of the components of the specified teaching materials and a literature study of similar studies. The components of creative thinking skills are flexibility, fluency, and originality. These three components must be in teaching materials if you expect maximum results in the learning process. In the teaching materials from the 2017 revised edition of the Ministry of Education and Culture, the results of the analysis in the form of data are as follows:

**Table7. The results of the analysis of creative thinking skills in the 2017 edition of the book by the Ministry of Education and Culture**

No	Category	Indicator	There is	There isn't any
1	Fluency	There are instruments that are able to stimulate in generating variations in problem-solving	✓	
2	Flexibility	There are instruments that contain a variety of different statements or terms.	✓	
3	Originality	There are instruments that contain information or typical statements in student textbooks.	✓	

**Table8. The results of the analysis of creative thinking skills in the 2018 edition of the module by the Ministry of Education and Culture**

No	Category	Indicator	There is	There isn't any
1	Fluency	There are instruments that are able to stimulate in generating variations in problem-solving	✓	
2	Flexibility	There are instruments that contain a variety of different statements or terms.		✓
3	Originality	There are instruments that contain information or typical statements in student textbooks.	✓	

Based on the data generated in table 8 and table 9, it can be concluded the following analyzes. In table 8, the teaching materials analyzed contain all the components of creative thinking skills in the form of flexibility, fluency, and originality. The three components contain data that has been analyzed and bring up indicators as determined. This can be further analyzed regarding the level of conformity or criteria based on the percentage interval obtained by the formula in the research method. We can analyze the data as follows:

$$percentage\ value\ \% = \frac{\text{number of indicators for each category}}{\text{total number of indicators}} \times 100\% = \frac{3}{3} \times 100\% = 100\%$$

Based on the percentage interval table, teaching materials from the Ministry of Education and Culture are at a very appropriate level because they get a percentage of 100% of the data. Meanwhile, in the 2018 edition of the learning module published by the Ministry of Education and Culture, the mathematical results are as follows:

$$percentage\ value\ \% = \frac{\text{number of indicators for each category}}{\text{total number of indicators}} \times 100\% = \frac{2}{3} \times 100\% = 66,67\%$$

From the data above, it can be analyzed that the 2018 learning modules published by the Ministry of Education and Culture are at the appropriate level or criteria because they are in the percentage interval between 61-80% or can be said to be accurate with 21st-century skills in the aspect of creative thinking skills.

The aspect of 21st-century skills contained in the next teaching material is the aspect of communication skills. In collaboration skills, there are four indicators that have been formulated as contained in table 3. What needs to be understood in the formulation of data analysis, communication skills do not only include oral communication, but how the ajar material is able to stimulate students to communicate well with any form of communication either in the form of oral communication, written communication, and other forms of communication. In the aspect of communication skills, the results are as shown in the data listed in the following table.

**Table9. Analysis of communication skills in the revised 2017 edition of teaching materials**

No	Indicator	There is	There isn't any
1	There are instruments that are able to invite students to articulate their thoughts effectively using oral, written, and non-verbal communication skills in various forms of verbs and contexts.	✓	
2	There are instruments that are able to invite students to communicate for various purposes, such as providing information or giving instructions.	✓	
3	There are instruments that can invite students to use technology.	✓	
4	There are instruments that are able to invite students to communicate in various environments and communities.		✓

**Table10. Analysis of communication skills in the 2018 edition of teaching materials**

No	Indicator	There is	There isn't any
1	There are instruments that are able to invite students to articulate their thoughts effectively using oral, written, and non-verbal communication skills in various forms of verbs and contexts.		✓
2	There are instruments that are able to invite students to communicate for various purposes, such as providing information or giving instructions.	✓	
3	There are instruments that can invite students to use technology.	✓	
4	There are instruments that are able to invite students to communicate in various environments and communities.		✓

In Tables 10 and 11, several narratives can be taken of the results that have been generated. The revised 2017 edition of teaching materials shows the content of 3 components of the four components contained in communication skills. Meanwhile, the 2018 edition of teaching materials shows that 2 of the four components have been fulfilled in communication skills. If analyzed in mathematical form, the following results will be obtained:

1. Analysis of the revised 2017 edition of teaching materials.

$$\text{percentage value \%} = \frac{\text{number of indicators for each category}}{\text{total number of indicators}} \times 100\% = \frac{3}{4} \times 100\% = 75 \%$$

2. Analysis of the 2018 edition of teaching materials.

$$\text{percentage value \%} = \frac{\text{number of indicators for each category}}{\text{total number of indicators}} \times 100\% = \frac{2}{4} \times 100\% = 50 \%$$

The results of the analysis of the mathematical calculations above can be concluded that the 2017 revised edition of teaching materials are in the level or criteria according to (relevant) communication skills because they are in the percentage interval of 61 -80%. Meanwhile, the 2018 edition of teaching materials showed 50% results. This means that this teaching material is in the criteria of being quite appropriate or quite relevant because it is in the percentage interval of 41-60%.

The next aspect of the analysis is collaboration skills or collaborative skills. The component in the aspect of collaboration skills contains three indicators, as shown in table 4. The results of the analysis on cooperation skills in teaching materials can be seen in the following table:

**Table11. Analysis of collaboration skills in the revised 2017 edition of teaching materials**

No	Indicator	There is	There isn't any
1	There are instruments that are able to invite students to work in groups effectively and appreciate the diversity of the team.	✓	
2	There are instruments that are able to invite students to be flexible and help each other in making the necessary decisions.	✓	
3	There are instruments that are able to invite students to share shared responsibilities in the form of collaborative work and appreciate the contributions of other students.	✓	

**Table12. Analysis of cooperation skills on teaching materials in 2018**

No	Indicator	There is	There isn't any
1	There are instruments that are able to invite students to work in groups effectively and appreciate the diversity of the team.	✓	
2	There are instruments that are able to invite students to be flexible and help each other in making the necessary decisions.	✓	
3	There are instruments that are able to invite students to share shared responsibilities in the form of collaborative work and appreciate the contributions of other students.	✓	

The two tables above can be concluded and analyzed at the mathematical calculation stage. The 2017 revised edition of teaching materials shows results that meet three components of collaboration skills. Likewise, the 2018 edition of teaching materials shows 3 component loads in the aspect of collaboration skills. Mathematical calculations can be seen in the following results:

1. Results of data analysis on the revised 2017 edition of teaching materials

$$\text{percentage value \%} = \frac{\text{number of indicators for each category}}{\text{total number of indicators}} \times 100\% = \frac{3}{3} \times 100\% = 100 \%$$

2. Results of data analysis on teaching materials in 2018

$$\text{percentage value \%} = \frac{\text{number of indicators for each category}}{\text{total number of indicators}} \times 100\% = \frac{3}{3} \times 100\% = 100\%$$

From the two processing of data results in both the 2017 and 2018 editions of teaching materials, both show very appropriate or very accurate criteria because they both have a percentage value of 100% and are in the 81-100% interval.

Several data analyses that have been shown in the tables above show the relevance of teaching materials in containing 21st-century skills, which are very important because it is one of the instruments used as the basis for formulating the 2013 curriculum in Indonesia. Therefore, the complexity of 21st-century skills, which include critical thinking skills, creative thinking skills, communication skills, and Collaboration or collaboration skills, must be fulfilled in each component that has been formulated. The goal is to shape the quality of Indonesian human resources that are able to meet the needs in the educational process so that the long-term result will be a nation with integrity and progress. In the education process, especially in science subjects, a clear orientation is needed starting from small things or a minimum scale, one of which is learning media that contains 21st-century skills. Although the two teaching materials that have been researched and analyzed do not show perfect values, they already have several components contained in every aspect of skills. It is hoped that there will be an evaluation and publication of a better-revised edition so that it fulfils the components of skills equally. In general, the two teaching materials published by the Ministry of Education and Culture on the material of the human circulatory system can be said to be feasible as learning media for junior high school students and equivalent. Although the two teaching materials that have been researched and analyzed do not show perfect scores, they already have several components that are included in every aspect of skills. It is hoped that there will be an evaluation and publication of a better-revised edition so that it fulfils the components of skills equally. In general, the two teaching materials published by the Ministry of Education and Culture on the material of the human circulatory system can be said to be feasible as learning media for junior high school students and equivalent. Although the two teaching materials that have been researched and analyzed do not show perfect scores, they already have several components that are included in every aspect of skills. It is hoped that there will be an evaluation and publication of a better-revised edition so that it fulfils the components of skills equally. In general, the two teaching materials published by the Ministry of Education and Culture on the material of the human circulatory system can be said to be feasible as learning media for junior high school students and equivalent.

## Conclusion

From the results of the data that have been analyzed and reviewed as in the results and discussion instruments, several conclusions can be formulated as follows:

**Table13. Results of data analysis of teaching materials with 21st-century skills**

Skill aspect	The percentage value of teaching materials	
	2017 revised edition	2018 edition module
Critical thinking skills	100% (very suitable)	60% (fairly appropriate)
Creative thinking skills	100% (very suitable)	66.67% (appropriate)
Communication skills	75% (according to)	50% (fairly appropriate)
Cooperation skills	100% (very suitable)	100% (very suitable)

1. In the aspect of critical thinking skills, teaching materials from the 2017 revised edition of the Ministry of Education and Culture received a score of 100% and were

included in the very appropriate criteria (very relevant). Meanwhile, the teaching material in the form of a 2018 module by the Ministry of Education and Culture received a score of 60% and was included in the quite appropriate category.

2. In the aspect of creative thinking skills, teaching materials from the 2017 revised edition of the Ministry of Education and Culture received a score of 100% and were included in the very appropriate criteria (very relevant). Meanwhile, the teaching materials in the form of modules in 2018 by the Ministry of Education and Culture received a score of 66, 67% and were included in the appropriate category.
3. In the aspect of communication skills, teaching materials from the 2017 revised edition of the Ministry of Education and Culture received a score of 75% and were included in the appropriate (relevant) criteria. Meanwhile, teaching materials in the form of modules in 2018 by the Ministry of Education and Culture received a value of 50% and were included in the quite appropriate category.
4. In the aspect of collaboration skills or collaboration skills, teaching materials from the 2017 revised edition of the Ministry of Education and Culture received a score of 100% and were included in the very appropriate criteria (very relevant). Meanwhile, the teaching material in the form of a 2018 module by the Ministry of Education and Culture received a score of 100% and was included in the very appropriate category.

As for some suggestions and recommendations for further research regarding the suitability of 21st-century skills with teaching materials for science students on the material of the circulatory system, namely: 1) the need for a questionnaire to limit the level of the subjectivity of research in every aspect of skills. 2) there is a deeper study of the components that must be included in every aspect of 21st-century skills. 3) there is a need for a development study on teaching materials that contain aspects of 21st-century skills.

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