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# Defining The Needs of Teachers and Students in Relation to Science Learning Videos in Order to Improve Critical Thinking and Collaboration Skills

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## ABSTRACT

This needs analysis aims to determine the teaching materials required by teachers on the circulatory system to improve students' critical thinking and collaboration skills at MTs Al Ittifaqiah. This research used a quantitative descriptive study; the research sample consisted of 80 class VIII MTs students and three science teachers. The instruments used are teacher and student questionnaires and documentation. The result analysis of student needs includes (1) teaching materials used (2) teaching materials that students like (3) learning methods used by teachers (4) complex material (5) learning outcomes and (6) developed 21st-century skills. The only teaching materials used by teachers are textbooks from publishers. The result of this research found that teachers at MTs Al Ittifaqiah need to learn video teaching materials based on the PBL model on the circulatory system to improve critical thinking and collaboration skills.

**Keywords**: needs analysis, teaching materials, learning videos

## INTRODUCTION

21st-century learning can be a way to achieve educational goals. 21st-century learning must prepare students with the 4C abilities, namely critical thinking, communication, creative thinking, and collaboration (Trilling et al., 2009). Critical thinking skills are one of the 21st-century skills that students must have. According to Septikasari (2018), critical thinking skills are fundamental for learning in the 21st century. Students with high critical thinking skills have higher learning outcomes (Ramdani et al., 2020).

Developing critical thinking skills can be supported by collaboration between students because cooperation can lead to higher levels of thinking (Zubaidah, 2020). Collaboration will have a good impact on students in facing the future. Collaboration is essential for achieving meaningful and effective results through the learning process at school.

The learning process at school is one of the things that supports students to develop critical thinking and collaboration skills, one of which is in the science learning process. *Science* is a reasonably broad study covering chemistry, physics and biology. Science

learning can provide a direct experience for students to understand the natural surroundings scientifically. Thus, this will undoubtedly give rise to students' critical thinking and collaboration in understanding the new things they discover. However, the results of Najaah's research (2021) state that critical thinking and collaboration skills are still relatively lacking. This is because students rarely practice solving various problems, and their mastery of the subject matter presented is still low.

Learning carried out in educational units must be connected to teaching materials. Teaching materials are all forms of materials used to assist teachers in carrying out teaching and learning activities in the classroom (Nuryasana & Desiningrum, 2020). Teaching materials have a significant influence on success in achieving learning goals. The teaching materials used can be non-printed, for example, learning videos. The results of interviews and questionnaires for class VIII MTs Al Ittifaqiah students related to science material that was difficult to understand, namely the blood circulatory system material, with a percentage of 33.65%. Students express a lot of foreign terms in the circulatory system material, which they need help understanding due to limited learning resources; the teacher's explanations are still abstract, such as mechanisms that occur in the human body, which are difficult for students to understand. Apart from that, the teacher has yet to involve students in the learning process actively, so students are only fixated on the teacher's explanation in front of the class.

Students expect learning videos to be used to make learning more transparent and more enjoyable. According to Sih (2019), teaching media packaged in video form can be preferred by students. Safitri et al. (2022), video is a learning media with examples of images accompanied by sound in the hope of making it easier for students to receive the lesson material. Learning videos developed based on the Merdeka curriculum. The development of learning videos must be distinct from identifying problems and collecting information related to the needs of students in educational units to improve student's critical thinking and collaboration skills.

Needs analysis is a tool for identifying problems to determine appropriate actions (Sujarwo & Erma, 2020). Needs analysis is the initial stage in the development of scientific work because the results of this analysis will form the basis for subsequent design, development and implementation. Needs analysis aims to ensure that the solution developed or implemented will meet user expectations and needs and achieve the desired goals, one of which is improving the quality of education.

Based on the description above, the author intends to conduct a learning video analysis to improve student's critical thinking and collaboration skills at MTs Al Ittifaqiah Indralaya. This article aims to present the results of the analysis of the need for integrated science teaching materials with the PBL model. Thus, it can be understood that the development of teaching materials is needed to support the learning process.

## METHOD

This research used a descriptive method to analyze learning videos to improve student's critical thinking and collaboration skills. This research is part of the initial stage of the 4D development model, namely the define stage (Thiagarajan et al, 1974). The define stage consists of five activities to analyze the development of required teaching materials: front-end analysis, learner analysis, task analysis, concept analysis, and defining instructional objectives. The activity began by analyzing teaching materials or media to find weaknesses in existing teaching materials. This activity can provide information on the needs that will be developed. Apart from that, the next activity was analyzing the characteristics of the students, telling about the tasks that will be given, and mapping the concept of the material that will be taught. Finally, the researchers consolidated the type of product that will be developed. The defined stages can be seen in the following image.

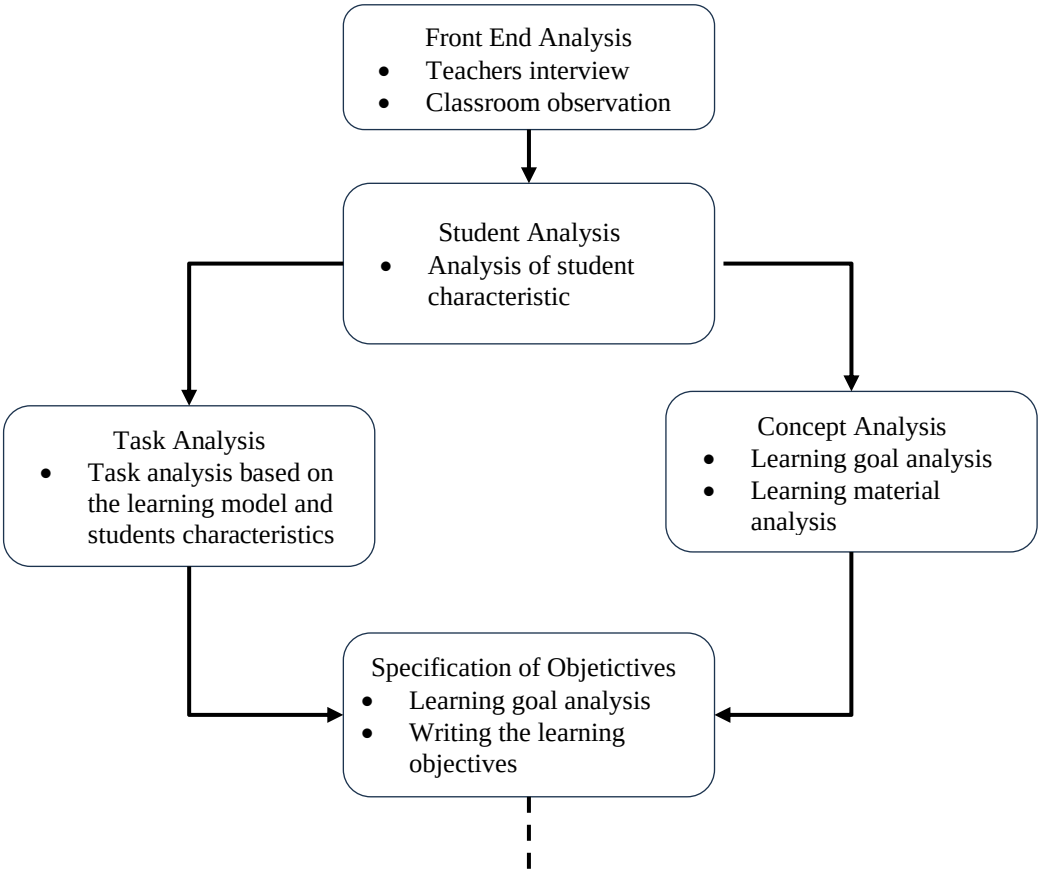


Figure 1. Define stage of 4D model

Research location at MTs Al Ittifaqiah Indralaya. The research sample involved three science teachers at MTs Al Ittifaqiah and 80 students were selected using purposive sampling. Sugiyono, (2008) states that purposive sampling is a technique for determining samples with specific considerations and can logically represent the population. The characteristics of the respondents can be seen in Table 1 and Table 2 below.

Table 1. Teacher characteristics

| No | Characteristics of respondents | Number of respondents |
|---|---|---|
| 1 | Science teacher | 3 |
| 2 | Gender | |
| | Male | - |
| | Female | 3 |
| 3 | Level of education | |
| | Bachelor degree | 3 |
| | Master degree | - |

Table 2. Student characteristics

| No | Characteristics of respondents | Number of respondents |
|---|---|---|
| 1 | Class | |
| | VIII. 1 | 15 |
| | VIII. 2 | 16 |
| | VIII. 3 | 20 |
| | VIII. 4 | 14 |
| | VIII. 5 | 15 |
| 2 | Gender | |
| | Male | - |
| | Female | 80 |

Data collection uses questionnaires and interviews. The research questionnaire was validated first by the supervisor and revised before distribution. During the implementation phase, questionnaires were distributed to 3 science teachers and 80 students. The 10-question teacher questionnaire sheet has 4 aspects: teaching materials, learning methods, learning models, difficult material, and 21st-century skills. The 18-question student questionnaire has 6 aspects: learning process, learning methods, learning models, teaching materials, complex materials, and evaluation. The teacher and student questionnaire grid can be seen in Table 3 and Table 4 below.

Table 3. Questionnaire sheet grid for teachers

| No | Aspect | Indicator | Questionnaire Sheet Number |
|---|---|---|---|
| 1 | Teaching materials | 1. Teaching materials used | 1 |
| | | 2. Make teaching materials from publishers | 2 |
| | | 3. Preferred teaching materials | 3 |
| | | 4. Model-based teaching materials | 4 |
| 2. | Learning methods | Method used | 5 |
| 3. | Learning model | The learning model used | 6,7 |
| 4. | Difficult material | Science material that is considered difficult | 8 |
| 5. | 21st century skills | 1. Developed 21st century | 9 |
| | | 2. skills21st century skills that are difficult to develop | 10 |

Table 4. Questionnaire sheet instrument grid for students

| No. | Aspect | Indicator | Questionnaire Sheet Number |
|---|---|---|---|
| 1 | Proses pembelajaran | 1. Teacher in delivering material | 1 |
| | | 2. Provide examples in explaining the material | 2 |
| 2 | Learning methods | 1. The teacher often lectures in delivering the material | 3 |
| | | 2. Students feel bored | 4 |
| 3 | Learning model | The steps used by teachers in the learning process | 5,6, 7, 8,9 |
| 4 | Learning resources | Books used by students | 10, 11,13 |
| 5 | Teaching materials | Material that is difficult to understand | 12 |
| 6 | Evaluation | 1. Practice Questions | 14 |
| | | 2. Assess student assignments | 15 |
| | | 3. Assess student activities | 16 |
| | | 4. Criteria for achieving learning objectives | 17 |
| | | 5. 21st-century skills | 18 |

## RESULT AND DISCUSSION

### Front-End Analysis

1. Teaching Materials Used

Based on the results of the analysis of teaching materials at MTs Al Ittifaqiah, it shows that the teaching materials used in the learning process can be visualized in Figure 2.

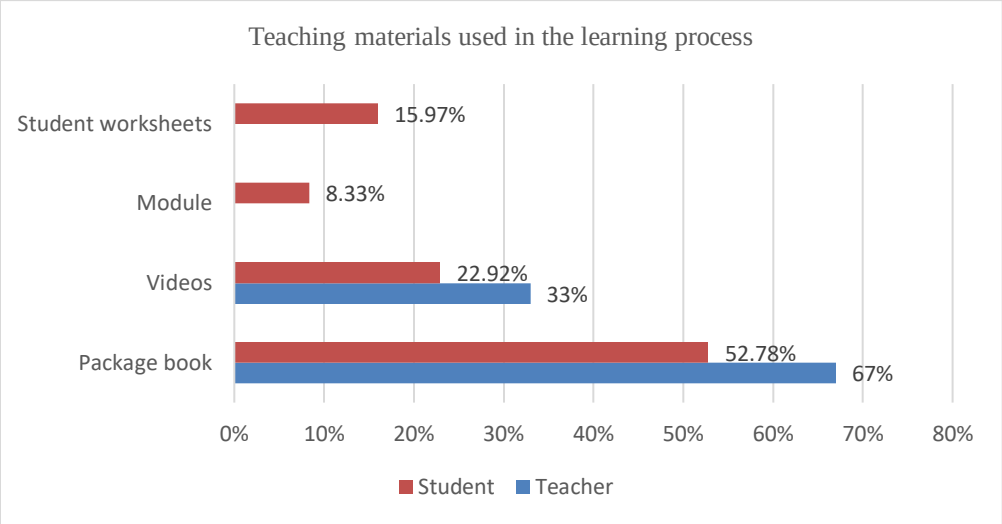


Figure 2. Results of analysis of teaching materials

The results of interviews with science teachers at MTs Al Ittifaqiah stated that the teaching materials used so far in the learning process were only textbooks from publishers.

2. Preferred Teaching Materials.

Based on the analysis results, the teaching materials that students like are learning videos at 59.79%. This can be seen in Figure 3.

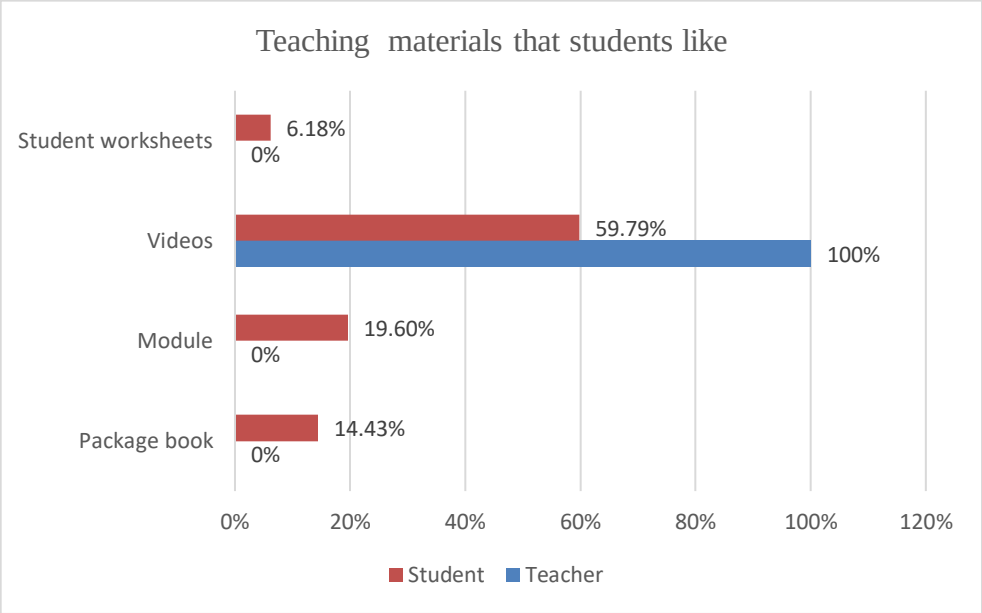


Figure 3. Results of analysis of preferred teaching materials

Based on the results of interviews with teachers and students, the selected teaching materials are learning videos. Students stated that videos could present information that was easy to understand and more enjoyable. This can strengthen the learning experience and help students remember information better.

3. Learning methods used by the teacher

The results of the analysis of the methods used in the learning process at MTs Al Ittifaqiah based on percentages can be seen in Figure 4.

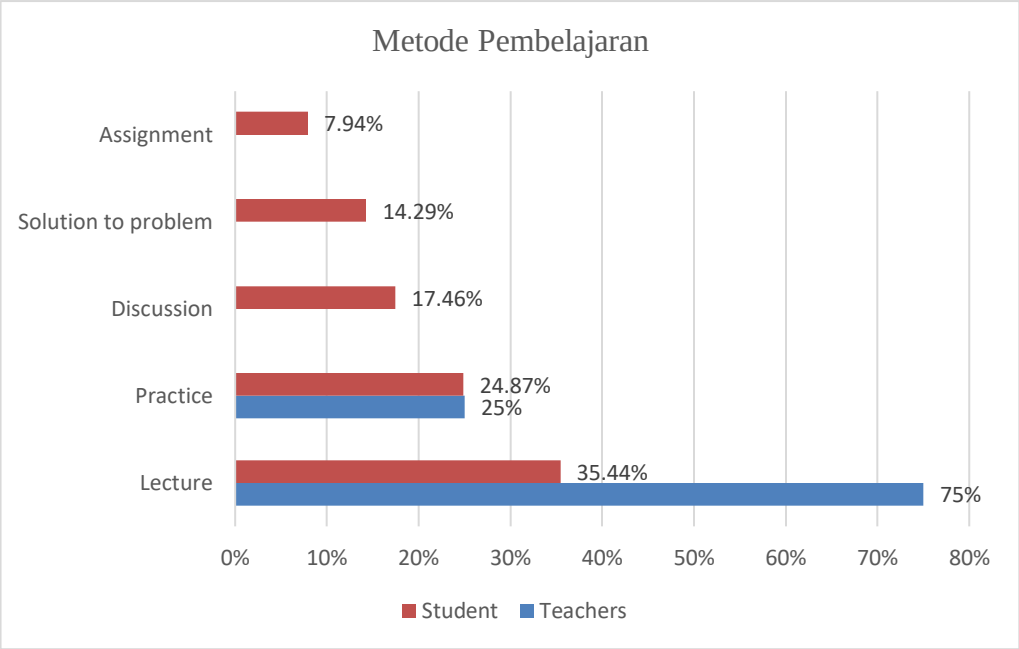


Figure 4. Analysis results of the learning methods used

The results of interviews with science teachers at MTs Al Ittifaqiah stated that teachers still predominantly use the lecture method in the learning process. Teachers have not yet integrated it with learning models because they do not understand existing ones, especially those recommended in the Independent Curriculum.

4. Difficult material in class VIII

Based on the analysis of complex material at MTs Al Ittifaqiah, the percentage of complex science material in class VIII can be seen in Figure 5.

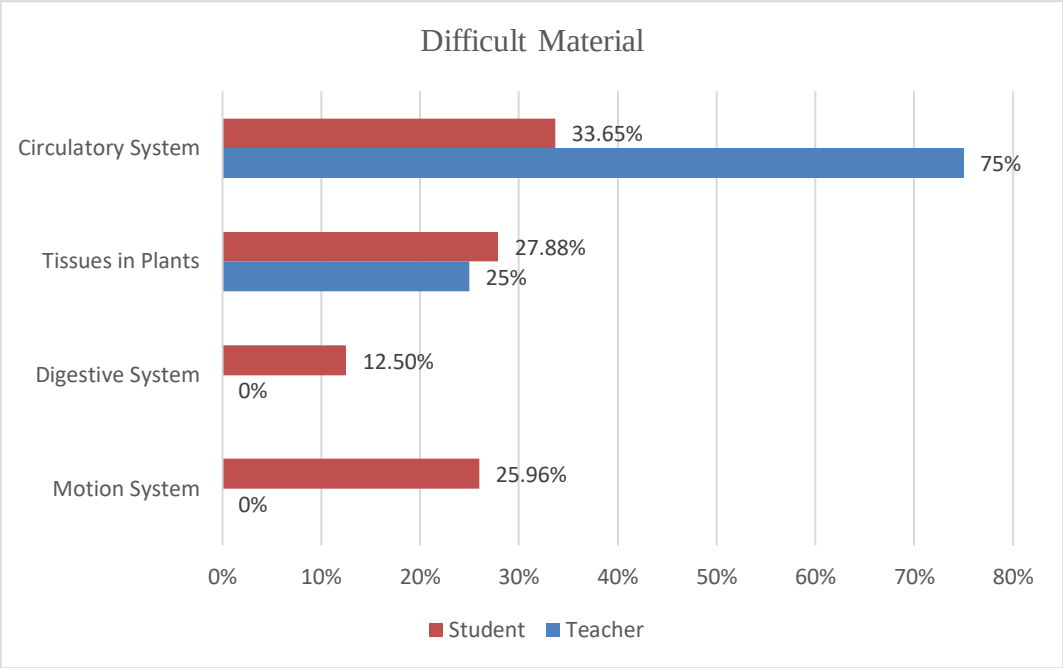


Figure 5. Results of analysis of difficult material for class VIII

The results of interviews with teachers and students stated that the problematic science lesson material in class VIII was the circulatory system material. Unknown foreign terms, explanations of only abstract material, and learning resources that do not support it make it difficult to understand the material.

5. Student learning outcomes at MTs Al Ittifaqiah

Based on the needs analysis at MTs Al Ittifaqiah class VIII, it shows that 55% of students' scores still need to reach the predetermined criteria for completing the learning objectives (KKTP). The KKTP score for science subjects is 76.

6. Developed 21st-century skills

Based on the analysis results at MTs Al Ittifaqiah, the percentage of 21st-century skills developed by teachers can be seen in Figure 6.

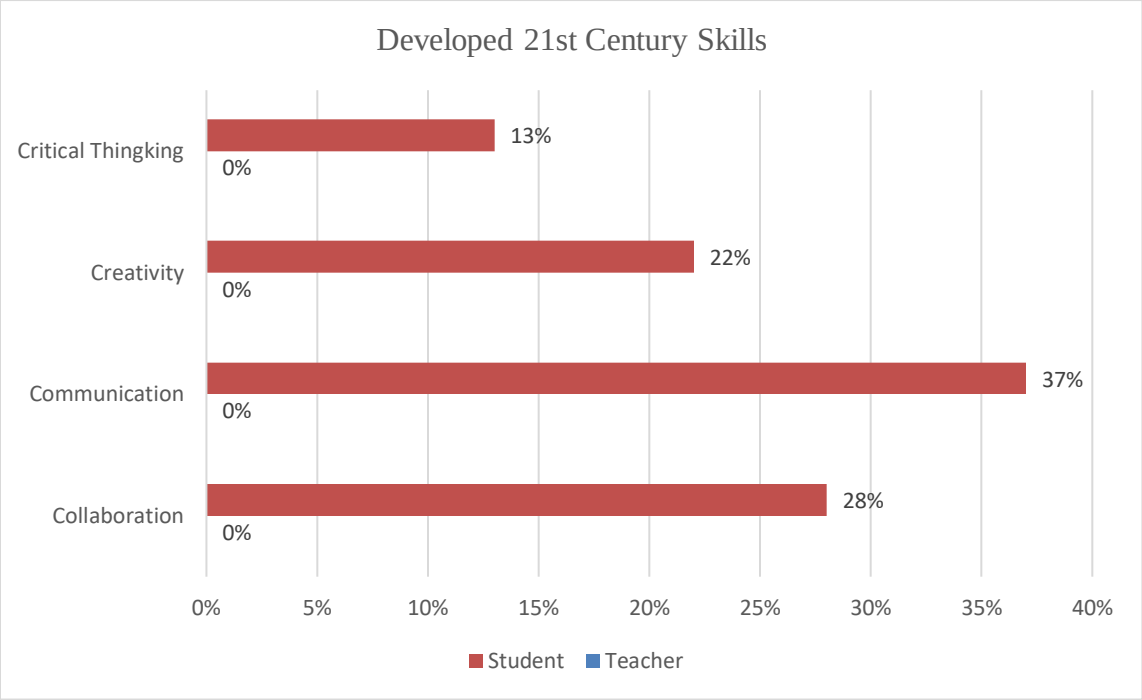


Figure 6. Results of 21st century skills analysis

**Learner Analysis**

Based on the characteristics of students, the results of the needs analysis show that students still have difficulty understanding the abstract material explained by the teacher. This is due to the lack of interest in the teacher's learning process. In classroom learning, teachers still predominantly use the lecture method, so there is no interaction between teachers and students nor between the students. Monotonous learning and minimal learning resources have negative impact such as students difficult to understand the material taught. One of the materials that is difficult to understand due to the needs analysis is the blood circulatory system because the explanation is very abstract. Student learning outcomes are still low, as evidenced by 55% of students not achieving the criteria for achieving learning objectives.

**Task Analysis**

Several cases contained in the learning video regarding the circulatory system material must be completed according to PBL syntax, namely:

1. Students are assigned to understand cases (for example, cases of leukaemia) related to disorders of the circulatory system in humans.
2. Students are assigned to form groups and are given cases of circulatory system disorders and written on student worksheets (LKPD) distributed by the teacher.
3. Students are assigned to discuss, identify and collect relevant sources to solve disorders in the human circulatory system.
4. Students develop their work by presenting the results of discussion activities.

5. Students are assigned to convey conclusions from the results of discussion activities.

These activity steps can certainly develop students' critical thinking and collaboration skills. In this way, students will understand the concept of the material being taught.

**Concept Analysis**

The teaching material taught is by analyzing the results of questionnaires and interviews conducted with students. Material that is difficult for students to understand is made into a mind map concept to make it easier to determine what sub-material will be discussed according to the learning outcomes. This mind map can be seen in Figure 7 below.

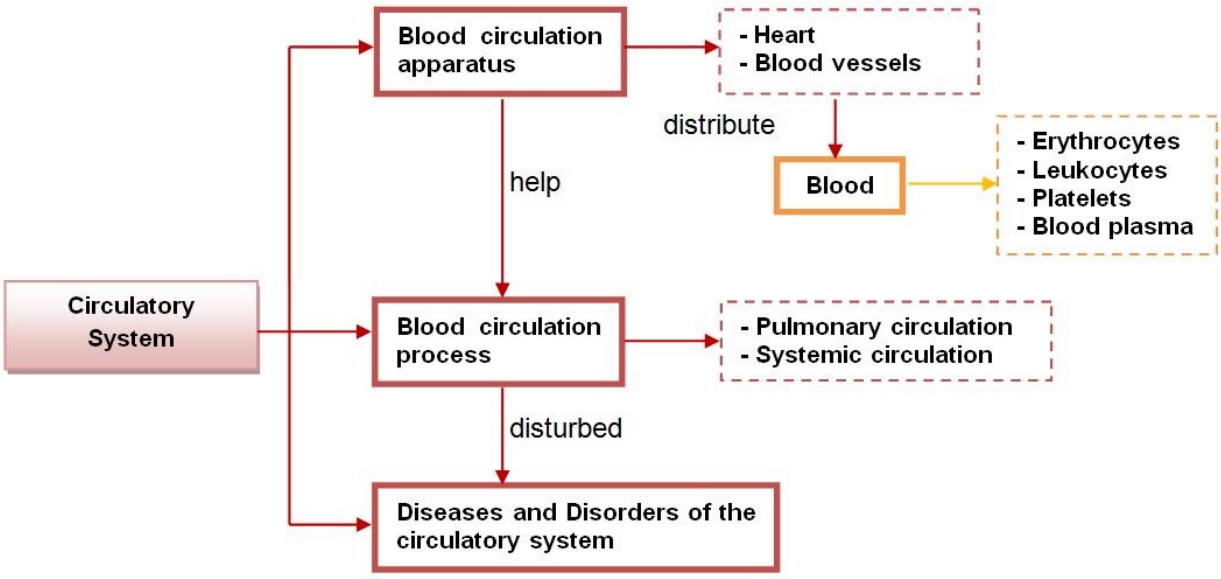


Figure 7. Circulatory system concept map

**Specifying Instructional Objectives**

Based on Phase D Learning Outcomes, the learning objective that students must achieve in the circulatory system material is analyzing the relationship between organ systems and their functions and abnormalities or disorders that arise in specific organ systems (circulatory system).

Referring to the needs analysis results at MTs Al Ittifaqiah, the teaching materials needed are in the form of learning videos. Learning videos are considered to be more interesting for students because the information is easier to understand. It can strengthen the learning experience and help students remember various information better. The teaching materials used must be able to stimulate and encourage changes in students' potential and foster activity and creativity so that academic abilities increase in the learning process. The teaching materials used in the learning process are the primary source of information and basic concepts in certain subjects. Choosing teaching materials that suit students' needs and integrating them effectively into the learning process to target students' competency achievement (Wahyudi, 2022).

Learning videos are one of the exciting teaching materials in the learning process. Learning videos can provide a positive response from students because the activities are interesting for students to observe and increasing their curiosity, which motivates students to learn. Thus, it will undoubtedly have an impact on improving critical thinking and collaboration skills. According to Sae & Radia (2023), videos show a significant increase in students and write about their thinking abilities. This is because not all materials can be described realistically, and observing them requires a long process; therefore, teachers need media or tools to be able to describe them to students so that students can more easily understand the science material (Febrianti & Rb, 2022; Wahyuningsih et al., 2022). Learning through videos will make it easier for teachers to convey learning material and also make it easier for students to understand the context of the subject (Nurfadhillah et al., 2021). Learning videos can stimulate students so that they are more enthusiastic about learning.

Besides supporting teaching materials, choosing learning methods is critical in achieving practical learning goals and motivating students to learn. The learning method commonly used by teachers at MTs Al Ittifaqiah is the lecture method. The lecture method plays role in determining motivation or encouraging students to learn even though the students themselves are more inclined to do so due to external factors. In line with Effendi's (2018) research, it is stated that the lecture method is not the only way to shape learning motivation; many other factors can influence students' learning motivation.

Learning methods can be integrated with learning models to achieve optimal learning goals. One of the 21st-century learning models recommended as a learning model that supports the Independent Curriculum is the problem-based learning (PBL) model (Indarta et al., 2022). PBL is a learning model that is able to train students' abilities in solving problems (Fani & Indarini, 2023). PBL learning also requires students to learn how to think critically and skills in solving problems so that PBL learning directs students to improve their thinking abilities through stages that provide flexibility in building their knowledge so that student learning independence can be formed (Asyhari, 2018). PBL syntax, namely (1) orienting students to problems (2) organizing students to learn (3) guiding investigative groups (4) developing and presenting work results and (5) analyzing and evaluating the problem-solving process (Arend, 2012). Through the PBl syntax stages, students are trained in solving the problems presented. Science learning through the PBL model assisted by video media can improve students' critical thinking skills (Pertiwi, 2019). In line with Erander et al. (2023) statement, PBL-based science learning videos improve students' critical thinking on science material. PBL improves critical thinking skills significantly (Masrinah, 2019; Sulaiman & Azizah, 2020). The results of the needs analysis show that one of the science materials that students in class VIII MTs Al Ittifaqiah consider difficult is the blood circulation system because there are many foreign terms. In line with research by Rumiati et al., (2022) stated that students' difficulties in learning science are due to the many foreign terms and lack of understanding of concepts. Learning difficulties will have an impact on reducing student learning outcomes (Jannah et al., 2022).

The human circulatory system is a complex biological concept. Therefore, students must understand the concepts of blood circulation, including the heart and blood vessels that circulate blood, how the heart works, and the blood circulation process. This material has a vital role for students because this material is related to everyday life. Some cases relate to everyday life and are related to the circulatory system, for example, cases of leu-leukaemia. Through problem-solving in groups in the learning process, students will be required to develop critical thinking and collaboration skills. In line with Zubaidah's (2020) research, the development of critical thinking skills can be supported by student collaboration. Masrinah's research (2019) explains that critical thinking skills can be improved through PBL because it is not only about understanding problems, but you must collaborate to solve a problem. This is what is demanded in the world of education in the 21st century.

21st-century education in the context of developing 4C skills (Critical Thinking, Communication, Collaboration, and Creativity) is considered very important. Critical thinking is one of the skills that must be developed in 21st-century education. According to Rahardhian (2022) critical thinking is one of the high-level thinking skills needed in developing 21st century skills. Every individual needs critical thinking skills to solve problems in complex situations successfully. Khairunnisa et al. (2022) critical thinking skills are an active thinking process carried out by a person by analyzing information, questioning the truth, by remembering old memories so that a conclusion is reached. The development of critical thinking skills can be supported by collaboration between students because collaboration can lead to the development of higher levels of thinking (Zubaidah, 2020). *Collaboration* is a skill that is very necessary for entering the world of work. According to Najaah (2021), students' collaborative work becomes more successful as part of a team, and their performance becomes of higher quality, so collaboration is essential in life. The importance of critical thinking and collaboration as a foundation for future success and can create a better future.

Based on the description above, it can be concluded that a learning video based on the Problem-Based Learning model will be developed to improve student's critical thinking and collaboration skills on the circulatory system material at MTs Al Ittifaqiah.

## CONCLUSION

Based on the research results, it can be found that teachers at MTs Al Ittifaqiah need to learn video teaching materials based on the PBL model on the circulatory system to improve critical thinking and collaboration skills. Teachers still use teaching materials that only come from publishers and have never designed their teaching media. Questionnaires for students require teaching materials in the form of learning videos because they are considered very interesting when used in the learning process.

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