Profile of students’ critical thinking, creativity, and collaboration skills on environmental pollution material

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Abstract. This research was conducted to describe the profile of students' critical thinking, creativity, and collaboration skills in science learning on environmental pollution material. This research uses a descriptive quantitative research method. The population in this study was all students of class VII, 300 students in total. The sample was taken by using purposive sampling technique with a total of 30 students. The instruments used in this study were a test (multiple choice questions and essays) and a non-test in the form of a questionnaire. The results showed that the critical thinking skill of students is in the low class in average, the creative thinking skill of students is in the low class, and the collaboration skill of students in the low class. The results of this study can be used as material for teacher evaluation, especially science teachers so that they can pay attention to the learning process and facilitate students with the use of appropriate models and strategies and the availability of teaching materials and media that can practice these three skills.

1. Introduction

The National Education System in the 21st century faces very complex challenges in preparing the quality of Human Resources (HR) who can compete in society 5.0 [1,2]. The right effort to prepare quality Human Resources (HR) and the only place that can be viewed and functioned as a tool for building high-quality HR is education. The world of education plays a vital role in the survival of a nation. In regard to teaching in Indonesia, the preparation of a capable and skilled future generation to face the challenges of the 21st century is needed [3–5]. Students will experience obstacles in facing the challenges of the 21st century if only focusing on mastering knowledge. In fact, the 21st century skills are essential skills that everyone must master to succeed in meeting the challenges, problems, life and careers of the 21st century [6,7].

The National Education Association has identified 21st-century skills as "The 4Cs" skills. "The 4Cs" covers critical thinking, creativity, communication, and collaboration. In this study, it focuses on critical thinking skills, creative thinking and collaboration skills. Critical thinking skills are skills to perform various analysis, assessment, evaluation, and reconstruction, decision making that lead to rational and logical actions. Activities to think about the subject, content, and problems are carried out through analysis, assessment, and reconstruction activities [8–11]. Creative skills are skills to find new things which have not existed before, are original, develop new solutions to each problem, and involve the ability to generate new, varied, and unique ideas [12–14]. Collaboration skills are skills to work together effectively and show respect to diverse team members, train fluency and willingness to make decisions needed to achieve common goals [15–17].
Critical thinking skills must be mastered because critical thinking skills are involved in social and interpersonal conditions in everyday life, such as in decision making and problem-solving [18,19]. This skill is also very much needed in the field of education because it allows students to store not only information but also students to process the information presented to get a more complex understanding [20]. The level of students' critical thinking skills is significant to be analyzed because according to the 2013 curriculum critical thinking is one of the abilities that must be trained in students. Before practising these abilities, teachers must understand the causes of students' low essential thinking skills [21].

Creative thinking skills are also fundamental for students to possess because they are included in the divergent thinking category; these thoughts produce various solutions to individual problems. Creative thinking skills are used to apply the four concepts; as fluency, flexibility, originality and elaboration. Creative thinking skills are the key to all competencies because, with creative thinking skills, a person can make something better, even new [22,23]. Creative thinking is a style of thinking that allows individuals to produce new and authentic products, find new solutions, and achieve synthesis. Critical thinking skills also mean being critical in thinking and being able to propose new ideas [24,25].

In addition to critical and creative thinking skills, students also need to have collaboration skill because it is important for the growth of enthusiasm for business and a sense of care and not giving up when facing difficult assignments or problems. Collaboration skills include (1) being able to work effectively and rewarding different team members, (2) demonstrating flexibility and a desire to be useful in making compromises to achieve common goals, and (3) taking responsibility for collaborative work and rewarding contributions of each team member [26,27].

Critical, creative and collaborative thinking skills are fundamental for students to prepare a generation who are thinkers, superior, and never give up in dealing with very complex problems. These three skills are also the demands of the 21st century to prepare human resources to be able to compete in society 5.0. Before equipping students with these three skills, it is necessary to analyze and evaluate the extent to which students possess these skills in order to determine the strategy and the most appropriate way to equip these three skills to students. This is supported by the lack of references regarding the analysis and evaluation of critical thinking skills, creatives and collaboration related to the concept of environmental pollution concepts.

2. Method
This research uses a descriptive method, which aims to describe the profile of critical thinking skills, creative thinking skills and student collaboration in science learning environmental pollution material. The population of this study was all students of the seventh grade in SMPN 6 Banjarmasin, which in total amounted to 300 people. The research sample was students of VII A class, totalling 30 people in the even semester of the 2019/2020 academic year, which was determined by purposive sampling technique.

There are two research instruments, namely test and non-test. The test questions are in the form of multiple-choice questions and descriptions to collect data on critical and creative thinking skills. In contrast, the non-test in the form of a questionnaire aims to determine the level of student collaboration. The critical thinking test instrument used refers to according to Ennis (2011) which consists of 5 indicators, namely providing simple explanations, building necessary skills, summarizing, providing a further explanation, and developing strategies and tactics [28]. Hands of creative thinking skills test instruments are fluency (number of ideas generated, flexibility (various categories of ideas generated), originality (oddity or oddity of an idea), and elaboration (jewellery and idea development) [29,30]. Indicators of collaboration skills are productive work, respect, compromise, and shared responsibility [31].

Data on critical thinking skills, creative thinking skills, and collaboration skills were analyzed quantitatively to determine the level of critical thinking skills and collaboration skills. Critical thinking skills and collaboration skills refer to Table 1 and creative thinking skills in Table 2.

| Table 1. Criteria for critical thinking skills and collaboration skills |
|----------------|----------------|
| Criteria       | Interval       |
| Very High      | 81.26 - 100    |
| High           | 71.60 - 81.25  |
3. Result and Discussion

The results obtained from this study are critical thinking skills, creative thinking skills, and collaboration skills on environmental pollution material in class VII students of SMPN 6 Banjarmasin. Below is a Table 3 results of students' critical thinking skills as a whole and a table of 4 indicators of critical thinking skills.

| Interval       | Average Class |
|----------------|---------------|
| 81.25 - 100    | Very High     |
| 71.50 - 81.25  | High          |
| 62.50 - 71.50  | Medium        |
| 43.75 - 62.50  | Low           |
| 0 - 43.75      | Very Low      |

Based on Table 4, it is known that the overall critical thinking skills are in the average percentage of 60.81% or in the low category. Of the 30 students, 3 were in the very high category, 5 were in the high class, 13 were in the medium category, 5 were in a low class, and 4 were very low. Below is a table of 5 results of students' creative thinking skills as a whole and a table of 9 indicators of creative thinking skills.

| Interval       | Category | %   |
|----------------|----------|-----|
| 0 < 55         | Low      | 33.33 |
| 55 - 74        | Medium   | 53.33 |
| ≥ 75           | High     | 13.33 |

Table 6. Results of creative thinking skills every indicator

| No. | Average Score Creative Thinking Indicators | %   | Category |
|-----|--------------------------------------------|-----|----------|
| 1   | Fluency (Thinking Current)                  | 75.83 | High     |
| 2   | Flexibility (Flexible Thinking)             | 55.00 | Average  |
| 3   | Originality (Original Thinking)             | 50.00 | Low      |
| 4   | Elaboration (Elaborating)                   | 44.17 | Low      |
| 5   | Evaluation (Thinking Assessing)             | 30.83 | Low      |
Based on the table above, it can be seen that of the 30 students only 4 students or 13.33% are in the high class, 16 students or 53.33% are in the medium class and 10 students or 33.33% are in the low class. So that the average score of students' creative thinking skills is 51.17%, including in the low class.

| No | Average Score Indicators for Collaboration Skills | Category |
|----|---------------------------------------------------|----------|
| 1  | Productive Work                                   | 64.17    | Good     |
| 2  | Respectful Attitude                               | 60.00    | Good     |
| 3  | Compromise                                        | 57.50    | Enough   |
| 4  | Responsibility together                           | 59.17    | Enough   |

The results of the analysis showed that the students' critical thinking skills in grade VII were in a low category, namely 60.81%. Several factors cause the low critical thinking skills during the learning process, only some students actively ask questions, provide solutions, solve problems, and have low curiosity. Most of the students do not want to ask about what is not being done that confuses students and the lack of teaching materials that facilitate students to develop students' critical thinking skills. Most students are also not used to solving questions because the questions given are usually at the C1, C2, C3. However there are also some questions at the C4, C5 and C6 levels, but they did not show maximum effort in solving the items [32–34].

The results of the analysis showed that the average score of the VII grade students' creative thinking skills test was soft, with a score of 51.17%. The results of this study are in line with previous research that the creative thinking skills of students are low because they still tend not to be able to create new ideas or innovative ways to solve the problems they face. Students only tend to follow the stages given by the teacher, and answer improperly and do not understand the problem completely. Most students only provide solutions but are not supported by answers related to the material being studied [35–37].

Based on the results of the analysis, the average collaboration skills of class VII students were 60.21% in the low class. This is in line with previous research which shows that the collaboration performance of participants is in a low category because students are still not free to work together to achieve their main goals, only focus on certain parts of completing the task. Students also did not contribute optimally in completing their assignments, and the student collaboration process is limited to learning time at school. Another thing that causes the low ability to collaborate is the lack of media or teaching materials that can accommodate students' needs to develop collaborative skills [33,38,39].

Based on the results of this study it is necessary to pay attention to the use of models and strategies in the learning process so that these three skills can develop. In other words, students can develop critical thinking skills, creative thinking skills and collaboration skills to face the 5.0 community and be able to compete in the century. Another thing that needs to be paid attention to is the use of teaching materials that can facilitate the development of these skills.

4. Conclusion
The profile of critical thinking skills, creative and collaborative thinking of the seventh grade students at SMPN 6 Banjarmasin on environmental pollution material can be concluded as follows. The overall profile of students' critical thinking skills is 60.81% with a low category. Meanwhile, the creative thinking skills got a percentage of 51.17% with a low category, and the collaboration skills obtained a rate of 60.21% with a low category. The results of the research can be used as an evaluation to improve the learning process, especially in natural science learning.

5. References
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