Reflective Abilities in Students with a High Level of Self-confidence

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Abstract. Reflective thinking is the student's ability to actively and carefully answer a given problem. The purpose of this study was to determine the reflective thinking ability of students with high levels of self-confidence. This research is descriptive qualitative, with the researcher as the main instrument and other supporting instruments in the form of a reflective thinking ability test, self-confidence questionnaire, and interview guidelines. The results of the questionnaire showed that there were nine grade VIII B students of SMPN 1 Pundong who had high self-confidence, two subjects in this study were selected by purposive sampling. The results showed that six out of nine students with high self-confidence were able to meet all indicators of reflective thinking. The other three students are only able to meet a fraction of the five indicators. The inability to think reflective because students are not used to linking old knowledge to be used in solving new problems, and students are also less careful in solving problems because students are unable to check the answers that have been obtained.

1. Introduction

One of the goals of national education is to develop the potential for students to have the necessary skills for the future [1]. Students are expected to learn continuously throughout their lives to face various challenges. The challenges that will be met are problems that require students' thinking skills. A means to develop students' thinking skills, especially higher-order thinking, one of which is through learning mathematics. Mathematics is a branch of science that has a critical role in developing science [2]. Therefore, it takes students' ability to solve mathematics [3]. One of the higher-order thinking skills that students need in solving math problems is thinking reflective [4,5].

Reflective thinking is the student's ability to actively and carefully select the knowledge they already have to answer a given problem so that students can get more precise answers. Gurol also defines reflective thinking as a directed and specific activity in which individuals are aware of following, analyzing, evaluating, motivate, get the deep meaning, and use appropriate learning strategies [6]. Reflective thinking utilizes the knowledge students already have to consider, choose, decide the best way to solve complex mathematical problems [7-9]. With reflective thinking too, students can evaluate the steps they have chosen to solve math problems [10,11].

Even though mathematics has been taught from elementary school to the tertiary level, most of the students' ability to solve math problems is still difficult; this is related to psychological factors [12]. One of the psychological factors that affect students' thinking ability in solving mathematics is self-confidence [13]. Self-confidence is an attitude that allows individuals to have a positive but realistic
view of themselves and their abilities, dare to express opinions, do not depend on others, are optimistic,
are responsible for solving problems It can do what they plan to do [14-17]. Students will need self-
confidence because, with confidence, students will be able to convince themselves and believe that what
is being done is correct and appropriate [18]. Students who have high self-confidence, they will have
better-thinking skills to solve math problems [19,20]. Therefore, this study aims to determine the
reflective thinking ability of students with high self-confidence.

2. Methods
This research is descriptive qualitative research. This research was conducted on class VIII B students
of SMP Negeri 1 Pundong. Two subjects were selected using purposive sampling. This study's
instrument was the researcher as the main instrument and other supporting instruments, namely a self-
confidence questionnaire consisting of 45 statements, a test of reflective thinking skills consisting of 5
essay items, and an interview guide.

In this study, the data collection technique was a written test used to determine students' reflective
thinking skills. Then continued the interview to be able to explore deeply how the students' reflective
thinking skills. The questionnaire is used by researchers to select students who have a high level of self-
confidence. After obtaining the necessary data, it is continued with qualitative data analysis, which
includes (1) reducing data, (2) presenting data, (3) conclusion. Researchers used triangulation methods
to determine the validity of the test and interview data by comparing test results and interviews with the
same data source. In this study, reflective thinking indicators were adapted from Nindiasari and Muin
and were developed by the researchers themselves [21,22].

| Table 1. Reflective thinking indicators. |
|----------------------------------------|
| No | Indicators                                              |
|----|---------------------------------------------------------|
| 1  | Describe the problem based on mathematical concepts     |
| 2  | Identify problems based on mathematical concepts        |
| 3  | Apply mathematical concepts that have been owned        |
| 4  | Evaluating problems based on the concepts used          |
| 5  | Make conclusions using mathematical concepts            |

Source: adopted from Nindiasari 2011 and Muin 2017 [21,22]

The self-confidence aspect used in this study was adapted from Lauster and the indicators developed by
the researchers themselves [23].

| Table 2. Self-confidence indicators. |
|--------------------------------------|
| Aspect                               | Indicators                                      |
| Believe in your own abilities        | a. Believe in your own ability to complete a given math task. |
|                                      | b. Dare to face challenges.                    |
|                                      | c. Not completely dependent on other people to complete the given math task. |
| Optimistic                           | a. Be positive that he will succeed in learning mathematics. |
|                                      | b. Be persistent in striving for success in learning mathematics. |
| Objective                            | a. Look at the problem with the truth it should be. |
|                                      | b. Don't see things according to oneself.       |
| To be responsible                    | a. Can do a good job.                          |
|                                      | b. Can play an active role in doing group assignments. |
|                                      | c. Can accept criticism as motivation to build yourself. |
| Rational and Realistic               | a. Ability to face problems.                   |
|                                      | b. Ability to analyze problems.                |

Source: adopted from Lauster, 2018 [23]
3. Results and Discussion

The results of the questionnaire showed that nine students had high self-confidence. The written test results of students' reflective thinking skills who have high self-confidence are presented in Table 3.

| No | Student Initials | Indicators |
|----|----------------|------------|
|    |                | Describe the problem based on mathematical concepts | Identify problems based on mathematical concepts | Apply mathematical concepts that have been owned | Evaluating problems based on the concepts used | Make conclusions using mathematical concepts |
| 1  | AIW            | ✔           | ✔           | ✔           | ✔           | ✔           |
| 2  | EDN            | ✔           | ✔           | ✔           | ✔           | ✔           |
| 3  | INAZ           | ✔           | ✔           | ✔           | ✔           | ✔           |
| 4  | LDR            | ✔           | ✔           | ✔           | ✔           | ✔           |
| 5  | NA             | ✔           | ✔           | ✔           | ✔           | ✔           |
| 6  | PH             | ✔           | ✔           | ✔           | ✔           | ✔           |
| 7  | RR             | ✔           | ✔           | ✔           | ✔           | ✔           |
| 8  | RPA            | ✔           | ✔           | ✔           | ✔           | ✔           |
| 9  | SA             | ✔           | ✔           | ✔           | ✔           | ✔           |

Based on table 3 it shows that not all students with high self-confidence meet all reflective thinking skills. From this table, it is known that six students can achieve all indicators of reflective thinking and three other students who are unable to achieve all indicators of reflective thinking. There is one student who is unable to meet the indicators of identifying problems based on mathematical concepts. Two students who were unable to meet the indicators applied the mathematical concepts they had. And three students are unable to complete the indicators evaluating the problem based on the concepts used. Most of the students' problems are when evaluating issues because students are not careful in solving the questions given.

3.1. First subject answer analysis (S1)

S1 is a student with high self-confidence who can meet all indicators of reflective thinking skills. The following is presented in Figure 1, namely the S1 answers' results to the first indicator.

Based on the subject's answers in Figure 1, S1 has met the first indicator, which describes the problem based on mathematical concepts. Subjects can mention what is known and asked and solve problems with mathematical concepts by using arrow diagrams. The subject can conclude that the relation obtained is not a function. This is in line with the interview results that S1 has shown that they already understand what information is obtained and can solve the problem correctly with the first indicator, which describes the problem based on mathematical concepts. Next, is presented in Figure 2, namely the S1 answer's results to the second indicator.
Figure 1. Results of the answers on the first indicator.

Based on the results of the subject's answer in Figure 2, S1 has met the second indicator, namely identifying problems based on mathematical concepts, the subject can say which domain, codomain and can determine the range by looking for the function formula first after the function formula is obtained the subject can enter any domain that is being asked to get the range. This is in line with the interview results that S1 understands the domain, domain, and range correctly. Next, Figure 3 is presented, namely the results of the S1 answer to the third indicator.

Figure 2. Results of the answers on the second indicator.
Based on the subject's answers in Figure 3, S1 has met the third indicator by applying mathematical concepts that have been owned. The subject can remember his old knowledge to be used in solving problems. The subject can remember the factorization material that has been studied before; it can be seen from the results of the subject's answers being able to state how many factors out of 10, namely \{1, 2, 5, 10\}, and the subject is also able to mention how many are the prime factors of the 30 students who answered \{2, 3, 5\}. So that students can solve the questions given correctly. This is in line with the interview results that S1 was able to explain the previous material related to factorization. Next, is presented in Figure 4, namely the S1 answer's results to the fourth indicator.

![Figure 3. Results of the answers on the third indicator.](image1)

Based on the results of the subject's answers in Figure 4, S1 has met the fourth indicator, namely evaluating the problem based on the concepts used. The subject can solve the given questions, and the subject can also re-check the answers obtained; it is seen when the subject can check the results obtained by entering the value \( p \) into the known function in the problem. After the answer obtained is the same as what the students know, they are sure that the answer that the value of \( p = 8 \) is correct. This is in line with the interview results that the subject can re-check the results of their work without being ordered first because the subject is used to checking all the answers that have been done before. Next, presented in Figure 5, namely the results of the S1 answer to the fifth indicator.

![Figure 4. Results of answers on the fourth indicator.](image2)

Based on the results of the subject's answers in Figure 5, S1 has met the fifth indicator, namely making conclusions using mathematical concepts; the subject can work on problems using the concept of a Cartesius diagram. The subject is also able to make conclusions from a given problem. This is in line with the interview results that S1 has been able to explain how to conclude the results.
3.2. **Analysis of the second subject's answers (S2)**

The second subject is a student with high self-confidence who can only fulfill several reflective thinking skills indicators. The following is presented in Figure 6, namely S2's answer to the first indicator.

**Figure 6.** Results of the answers on the first indicator.

Based on the results of the subject's answers in Figure 6, S2 has met the first indicator, namely describing the problem given based on mathematical concepts, students can write what is known, what is asked, and students are also able to use mathematical concepts, namely solving problems using arrow diagrams, and being able to answer that the relation obtained is not a function. Next, Figure 7 is presented, resulting from S2's answer to the second indicator.
Figure 7. Results of the answers on the second indicator.

Based on the subject's answers in Figure 7, S2 has met the second indicator, namely identifying problems based on mathematical concepts. Students can say which domain or domain. When conducting interviews, how can the subject find the range if it is \{4, 5, 6\}. The subject explains if the domain is -1 the range is -1, if the 0 is 1, and if 1 is 3, it can be concluded that in the domain, the difference is 2 and so on, so if the domain is 3, the domain is 7, so if the domain is 4, the range is 9, so if the domination is \{4, 5, 6\} then the range is \{9, 11, 13\}. Next, Figure 8 is presented, which is the result of S2's answer to the third indicator.

Figure 8. Results of the answers on the third indicator.

Based on the results of the subject's answers in Figure 8, S2 cannot meet the third indicator, namely applying mathematical concepts that have been owned. Students only wrote back the questions, when interviewed the second subject felt confused when asked why he only wrote questions, the subject did not know that the factor of 10 and the prime factor of 30 were what. This is because the subject cannot remember the previously acquired knowledge regarding factorization to solve the problem at hand. Next, Figure 9 is presented, which is the result of S2's answer to the fourth indicator.

Based on the subject's answers in Figure 9, S2 cannot meet the fourth indicator, namely evaluating the problem based on the concept used. The subject has tried to solve the problem given, but the subject cannot check the answer that has been obtained, so he does not know if the result of the solution still contains an error. And at the time of the interview, the subject also felt confused when he was ordered to re-examine his work results. Subjects only answered if the results of their work were correct and appropriate without checking again. Next, Figure 10 is presented, which is the result of S2's answer to the fifth indicator.
Based on the subject's answers in Figure 10, S2 fulfills the fifth indicator, making conclusions using mathematical concepts. Students can understand the information contained in the questions, and the subject is also able to make conclusions from problems using mathematical concepts. The results of the interview show that the subject can explain how to conclude the problems given.

Based on the results of the analysis, there are still several student problems in solving mathematics even though these students have high self-confidence; this is due to the lack of students in solving exercises that are oriented towards reflective thinking skills so that when students encounter problems related to reflective thinking, students still find it difficult to solve a given math problem. Students are still not used to connecting their previous knowledge to solve problems, and students also cannot evaluate problems because students do not know and are not accustomed to re-checking the solutions they have obtained [24]. This is in line with research, which explains that not all students can think reflectively well when relating knowledge and evaluating [25]. This is because reflective thinking still
lacks teachers' attention and is not usually given to students [6,26]. It can be concluded that not all students with high confidence can not meet all reflective thinking ability indicators.

4. Conclusion

Based on the results of tests and interviews, it was concluded that not all students with high confidence had good reflective thinking skills in solving math problems. Of the nine students who have high self-confidence, six students can describe problems based on mathematical concepts, identify problems based on mathematical concepts, apply mathematical ideas that have been owned, evaluate issues based on the concepts used, make conclusions using mathematical concepts. The other three students were only able to fulfill a few parts of the five indicators. The inability to think reflective is because students are not used to linking old knowledge to solve new problems, and students are also not careful in solving problems because students cannot check the answers that have been obtained.

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