Profile Habits of Mind Students in Physics Learning

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Abstract. Habits of mind is one dimension of long-term learning outcomes that consists of critical thinking, creative thinking, and self regulation. It is necessary to develop the character of the nation. The purpose of this study is to investigate habits of mind students in physics learning. This research involves 36 participants of Physics Education Students in a university located in Banjarmasin, Indonesia who taking the introduction of solid-state physics. The research method used was descrptive analysis. The average of self regulation is 3.18, critical thinking is 3.06, and creative thinking is 2.95. The results show that no significant difference habits of mind students between critical thinking, creative thinking, and self regulation.

1.Introduction

Habits of mind is a character of intelligent behavior to behave intelligently when having a problem, or a solution that is not yet known to answer [1]. Problems can be interpreted as a stimulus, question, task, event, discrepancy or explanation that is not immediately known [2]. In solving a complex problem, it takes a reasoning, insight, perseverance, creativity, and someone's expertise [3]. Habits of mind is formed when giving answers to questions or problems whose solution is unknown, so that it becomes vague when observing how students remember a knowledge and how students construct a knowledge in the thinking process [4]. Human intelligence can be seen from the knowledge they have and the most important can be seen from the way in which individuals act [5].

Habits of mind was developed through Costa and Kallick's research in 1985 which was later developed by Marzano in1993 through Dimensions of Learning. At first Costa in 1985 made an article about the level of thinking in The Behavior of Intelligence [6]. This level of thinking includes the concept of thinking skills (comparing, classifying, hypothesizing); strategic thinking (solving problems, making decisions); creative thinking (modeling, thinking methaporical) and cognitive spirit (open-minded, looking for alternatives and not judgmental). The article was later revised in 1991 in his book Developing Minds: A Resource Book For Teaching Thinking. Then some authors develop similar things [7,8]. After experiencing the development of thoughts about habits of mind, the description of habits of mind varies. Figure 1 shows the position of habits of mind in Dimensions of Learning [9].

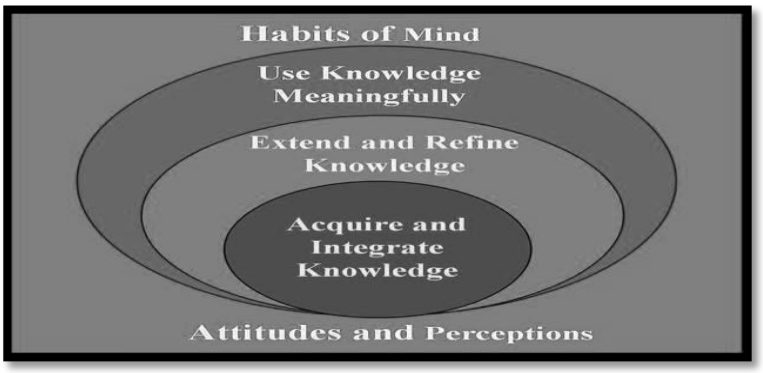

Figure1. Dimensionof Learning Interaction

The main task of students is to collect and integrate their knowledge (acquiring and integrating knowledge) in the second dimension [9]. Through this dimension students must be able to integrate new knowledge and skills that they have known [9]. Here there is a subjective process in the form of interactions of old information and new information. Then along the time process, students develop their new knowledge through activities that help students expand and refine their knowledge (extending and refining knowledge) in the third dimension, and at the end of learning objectives, students can use knowledge in a meaningful way (using knowledge meaningfully) in the fourth dimension [9]. As seen in Figure 1, the second, third, and fourth dimensions work like concerts, each other is inseparable. These five dimensions of learning form a framework that can be used to organize curriculum, learning instruction and assessment [9].

Marzano'framework categorizes habits of mind into self regulation, critical thinking, and creative thinking [10]. Self regulation includes a) is aware of own thinking b) makes effective plans c) is aware of and uses necessary resources d) is sensitive to feedback and e) evaluating the effectiveness of own actions [10]. Critical thinking includes a) is accurate and seeks accuracy b) is clear and seeks clarity c) is open-minded d) restrains impulsivity e) takes a position when the situation warrants it f) is sensitive to the feelings and level of knowledge of others[10]. Creative thinking includes a) engages intensely in tasks even when answers or solutions are not immediately apparent b) pushing the limits of own knowledge and ability c) generates, trusts, and maintains own standards of evaluation d) generates new ways of viewing a situation outside the boundaries of standard conventions[10].

After observing, the aspects of habits of mind as explained earlier, are considered important to train students' habits of mind in order to produce students who can behave and act intelligently so that students succeed in academic, work, and social interaction as students. in dealing with his life as a personal and social being [11]. In line with the opinion expressed that habits of mind as intelligent behavior are far more important than by providing high-level thinking skills to students through science education[12]. Therefore, students need to be equipped in developing habits of mind.

2. Method

The research method in this study is using descriptive analysis [13]. The participants were taken from students of Physics Education which programmed course the introduction of solid-state physics in a university located in Banjarmasin, Indonesia. The population of 36 students consisting of 11 males and 25 females. The collection of data were conducted during even semester of 2018 academic year. The age of the students from 18-23 years old.

Table 1. Distribution items of rubric Habits of Mind

No.	Habits of Mind	Items
1	Self Regulation	5
2	Critical Thinking	6
3	Creative Thinking	4
	Total	15

The instrument used to adapt the rubric habits of mind from Marzano [10] which consists of self regulation, critical thinking, and creative thinking. The distribution of rubric Habits of Mind can be listed in the Table 1. Self regulations consists of 5 items, critical thinking consists of 6 items, and creative thinking consits of 4 items. The total is 15 items. Each item is divided into 4 level, they are: Very Good (4), Good (3), Good Enough (2), No Good (1). This rubric is given to students to fulfill the items and later the answer will be analyzed by descriptive statistic. After that, it used F test (One Way Anova) to determine differences between variable self regulation, critical thinking, and creative thinking. The results of this study is to perform the profile habits of mind of the students.

3. Result and Discussion

Habits of mind divided into three field, i.e: self regulation, critical thinking, and creative thinking. Profile of self regulation students listed on Table 2, profile of critical thinking students listed on Table 3, and profile of creative thinking students listed on Table 4.

Table 2. Profile of self regulation students

	Self Regulation	N	Min.	Max.	Mean	SD
SR1	Is aware of own thinking.	36	1	4	2.94	3.51
SR2	Makes effective plans.	36	1	4	3.03	4.61
SR3	Is aware of and uses necessary resources.	36	1	4	3.28	4.45
SR4	Is sensitive to feedback.	36	1	4	3.11	4.52
SR5	Evaluating the effectiveness of own actions.	36	1	4	3.39	4.73
	Average				3.18	4.36

In Table 2, the data of profile of self regulation students minimum value of 1 and maximum value of 4 with a total number of students of 36. The standard deviation value of 4.36 is greater than the mean value of 3.18 which indicates that the data varies.

The highest average value in self regulation is evaluating the effectiveness of own actions (SR5) by 3.39 and the lowest average value is is aware of own thinking (SR1) at 2.94. While the average value makes effective plans (SR2) is 3.03, the average value is aware of and uses necessary resources (SR3) of 3.28, and the average value is sensitive to feedback (SR4) of 3.11.

Table 3. Profile of critical thinking students

	Critical Thinking	N	Min.	Max.	Mean	SD
I1	Is accurate and seeks accuracy.	36	1	4	2.83	4.65
I2	Is clear and seeks clarity.	36	1	4	2.58	3.77
I3	Is open-minded.	36	1	4	3.33	4.53
I4	Restrains impulsivity.	36	1	4	2.94	3.67
I5	Takes a position when the situation warrants it.	36	1	4	3.31	4.58
I6	Is sensitive to the feelings and level of knowledge of others.	36	1	4	3.39	4.77
	Average				3.06	4.33

In Table 3, the data of profile of critical thinking students minimum value of 1 and maximum value of 4 with a total number of students of 36. The standard deviation value of 4.33 is greater than the mean value of 3.06 which indicates that the data varies.

The highest average value in critical thinking is sensitive to the feelings and the level of knowledge of others (I6) is 3.39 and the lowest average value is is clear and the clarity index (I2) is 2.58. While the average value of is accrute and seeks accuracy (I1) is 2.83, the average value is open-minded (I3) is 3.33, the average value of restrains impulsivity (I4) is 2.94, and the average value takes a position when the situation warrants it (I5) at 3.31.

Table 4. Profile of creative thinking students

	Creative Thinking	N	Min.	Max.	Mean	SD
E1	Engages intensely in tasks even when answers or solutions are not immediately apparent.	36	1	4	2.83	3.74
E2	Pushing the limits of own knowledge and ability.	36	1	4	2.97	3.56

E3	Generates, trusts, and maintains own standards of evaluation.	36	1	4	3.14	4.72
E4	Generates new ways of viewing a situation outside the boundaries of standard conventions.	36	1	4	2.86	3.80
	Average				2.95	3.96

In Table 4, the data of profile of self regulation students minimum value of 1 and maximum value of 4 with a total number of students of 36. The standard deviation value of 3.96 is greater than the mean value of 2.95 which indicates that the data varies.

The highest average value in creative thinking is generates, trusts, and maintains own standards of evaluation (E3) of 3.14 and the lowest average values are engages intensely in tasks even when answers or solutions are not immediately apparent (E1) at 2.83. While the average value is the limit of own knowledge and ability (E2) of 2.97, the average value of generates outside the boundaries of standard conventions (E4) is 2.86.

Based on these data, the comparisons between the field of self regulation, critical thinking, and creative thinking can be illustrated with a bar diagram. The bar diagram showing the profile of habits of mind students can be seen in Figure 2.

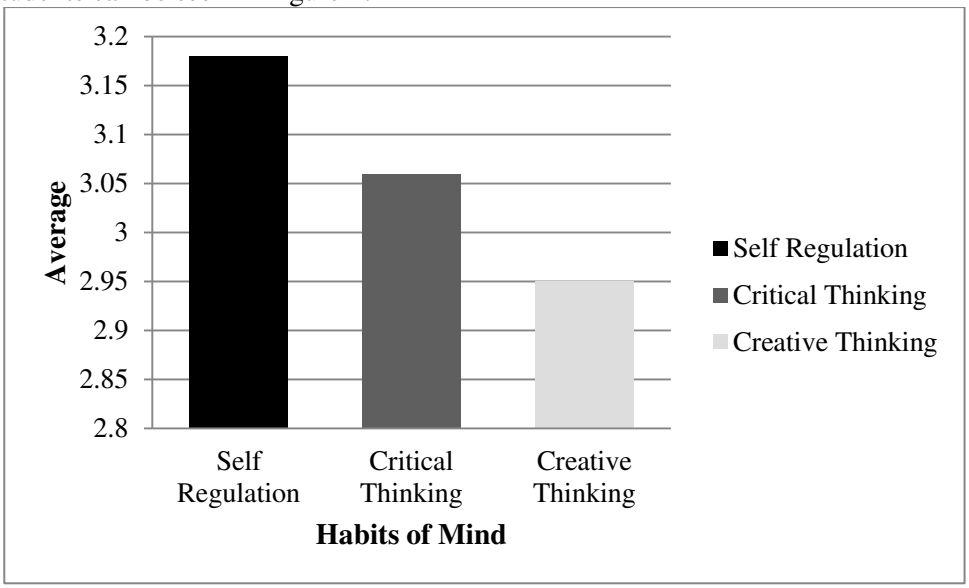

Figure 2. Profile habits of mind students

Figure 2 shows the average value of habits of mind profile consisting of self regulation, critical thinking, and creative thinking. Of the three average values, it is explained that students have high self regulation of 3.18 compared to critical thinking and creative thinking. Student critical thinking average value is in the middle of 3.06. The average value of creative thinking for students is still low, namely at 2.95.

Based on the data in Table 2, Table 3, Table 4, and Figure 2, it shows the profile of habits of mind students i.e self regulation, critical thinking, and creative thinking. However, the data is not able to explain whether there are differences between the three fields so that this study employed different test by using F test (One Way Anova). Statistical test data can be seen in Table 5.

Table 5. F test (One Way Anova) habits of mind

Habits of Mind	Average	F	Sig.	Note
Self Regulation	3.18			
Critical Thinking	3.06	15.764	.150	No significant difference
Creative Thinking	2.95			

Table 5 shows that F-test results between self regulation, critical thinking, and creative thinking wereobtained (sig. <.05). The value of F shows 15.764 and the value of Sig. .150. This means that

there is no difference between the measured variables.This shows that there are no significant differences habits of mind between self regulation, critical thinking, and creative thinking.

4. Conclusion

Profile habits of mind students shows that the average of self regulation is 3.18, critical thinking is 3.06, and creative thinking is 2.95. This explains that students' habits of mind are in a good category. There is no significant difference between self regulation, critical thinking, and creative thinking.

This study is useful to develop students' habits of mind as a nation that has a strong and strong character in dealing with various national problems.

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