

The Interconnection Between Students' Meta-Affective, Meta-cognitive and Achievement in Science Learning

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Abstract—Meta-affective ability reflects by students' awareness on their emotional while meta-cognitive ability describes when students concern about their strategies to think during science learning. Furthermore, these abilities can be affected on students' achievement especially in conceptual mastery about science. The present study aims to analysis whether there is interconnection or not between these three variables. An instrument set of Meta-Affective Trait Scale (MATS) and Metacognitive Awareness Inventory (MAI) was distributed to 205 Indonesian secondary students (7th grade= 102, 8th grade= 103) while students' achievement presented by students' science score. Data were analysed using Pearson correlation analysis. The finding describes that the correlation between students' meta-affective and meta-cognitive is significant with strong value as well as students' meta-cognitive and achievement. In contrast, there is no correlation between students' meta-affective and achievement.

Keywords—students' meta-affective, students' meta-cognitive, students' achievement, science learning

I. INTRODUCTION

Students often feel anxious when they started new classroom environmental both with new classmate and lesson. This feeling can reflect to how students can identify part of their anxious and how to solve this problem [1]. Unfortunately, students sometimes cannot solve their anxiety, so teacher has opportunity to facilitate students during learning process. The proposal of meta-affective learning can be as one kind of solution. The fact shows that freshman student who has anxious during learning physics in the beginning course, can solve her problem with managing meta-affective strategy to enjoy the challenge and uncertainty in the end [2].

In science learning, scientific text is an important source for guiding student to comprehend the material. Find the main subject in article be one kind of problem for students. Meta-cognitive ability can be solved for this problem [3]. Furthermore, students also have difficulties when doing experiment activity. Even though the experimentation

competency is core for prove a data, solve a problem, answer a hypothesis and this activity is support students' concept mastery in science. Afterwards, meta-cognitive ability can support this experiment activity in inquiry learning [4].

Students' achievement as output from science learning should be detected by external factor which can support or inhibit this aspect. Our hypothesis shows that there is interconnection between (1) students' meta-affective and students' achievement, (2) students' meta-cognitive and students' achievement, and (3) students' meta-affective and students' meta-cognitive. To sum up, this research objective is identifying the interconnection among these variables.

II. METHODS

This study is correlational research which is correlate between students' meta-affective, meta-cognitive and achievement among secondary students. The correlational research or sometimes called associational research focus on interconnection among two or more variables and no manipulation for these variables. Different with experimental research, there is no treatment in correlational research [5-7].

An instrument set of Meta-Affective Trait Scale (MATS) and Metacognitive Awareness Inventory (MAI) was distributed to 205 Indonesian secondary students (7th grade= 102, 8th grade= 103) while students' achievement presented by students' science score. Data were analysed using Pearson correlation analysis. Meta-Affective Trait Scale (MATS) which has been formed by questionnaire, consists of affective awareness and affective regulation dimension [8]. Meanwhile, Metacognitive Awareness Inventory (MAI) has two dimensions namely knowledge of cognition dimension and regulation of cognition dimension which shared by questionnaire [9].

III. RESULTS AND DISCUSSION

This section describes about correlation index between students' meta-affective, meta-cognitive and achievement.

Students' achievement following to score which comes out from mid-term session in science. The correlation result for general data among secondary students shown as Table 1. Students' meta-affective described by MATS, student's meta-cognitive written by MAI, and students' achievement showed by SA.

TABLE I. CORRELATION COEFFICIENT AMONG STUDENTS' META-AFFECTIVE, META-COGNITIVE AND ACHIEVEMENT

		MATS	MAI	SA
MATS	Pearson Correlation	1	.583**	.120
	Sig. (2-tailed)		.000	.087
	N	205	205	205
MAI	Pearson Correlation	.583**	1	.203**
	Sig. (2-tailed)	.000		.004
	N	205	205	205
SA	Pearson Correlation	.120	.203**	1
	Sig. (2-tailed)	.087	.004	
	N	205	205	205

** . Correlation is significant at the 0.01 level (2-tailed).

There is significant positive correlation among students' meta-affective and meta-cognitive as well as between students' meta-cognitive and students' achievement. But, in contrast there is no correlation between students' meta-affective and students' achievement.

As the input, meta-cognitive strategies or metacognition is helping student on focusing on achievement especially conceptual knowledge about science. These studies such as on students' science achievement for 7th-grade [10], content knowledge for 8th-grade students [11], physics learning for secondary school students [12]. Furthermore, metacognition is the significant predictors of science achievement for 7th-grade students [13], there is a very strong relation between the metacognitive and cognitive strategies [14].

When students have difficulty in cognitive and metacognitive during learning process, the negative attitude and emotion as an impact to this condition. Therefore, these meta-affective and meta-cognitive are fundamental aspects which work simultaneously. Meta-affective and meta-cognitive training give positive impact to students for manage their self-regulated when comprehend a main subject [15]. Moreover, students' reflection on their emotion and behaviour as a part of self-efficacy which is be core in learning process. Consequently, teaching process should be train students to construct their self-efficacy and emotion [16].

IV. CONCLUSIONS

The finding describes that the correlation between students' meta-affective and meta-cognitive is significant with strong

value as well as students' meta-cognitive and achievement. In contrast, there is no correlation between students' meta-affective and achievement.

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