

CHAPTER V

CONCLUSION, IMPLICATION, AND RECOMMENDATION

5.1 Conclusion

Meta-affective and meta-cognitive-based training is less effective for developing students' meta-affective, meta-cognitive, and transformative competencies. Three points in the study topic or problem must be highlighted in this conclusion in order to address it. Firstly, meta-affective tendencies as a quality that students have in relation to their emotions while studying for their classes. The affective awareness and affective regulation dimensions combine to form meta-affective. Both integrated and separate training did not have a significantly different impact on students' meta-affective. This means that the combination of meta-cognitive and meta-affective training implemented by students with the assistance of teachers in science learning (integrated training) and students who implement it independently during science learning (separate training) does not significantly increase students' meta-affective.

Firstly, students' meta-affective, there was no differences in initial and final conditions in both integrated and separate training. In affective awareness, there is a pattern of increase in the type of positive emotion in both training groups, except for "enjoyment" which increased only in separate training. Meanwhile, negative emotions decreased equally in both training groups. These data indicate that negative emotions are more difficult to reduce, either with the help of the teacher or by the students themselves. In affective regulation, meta-affective and meta-cognitive training, both integrated and separate from science learning, have the same impact. This situation also explains that in affective regulation, junior high school students can use meta-affective and metacognitive strategies independently or with the assistance of teachers.

Secondly, students' meta-cognitive, there was no differences in initial and final conditions in both integrated and separate training. In knowledge of cognition, the separate training group saw good changes. Junior high school students are capable of autonomously applying their understanding of cognition. To help students become independent learners, thinking and metacognitive skills must be

strengthened. There are three sub-dimensions, namely: declarative knowledge (DK), procedural knowledge (PK), and conditional knowledge (CK). In regulation of cognition, positive changes happened in the separate training group. According to these findings, junior high school students are capable of implementing independent regulation of cognition. Students can more effectively regulate cognition by themselves than being helped by the teacher. There are five sub-dimensions, namely: planning (P), information management strategies (IMS), monitoring (M), evaluation (E), and debugging strategies (DS). All of these sub-dimensions showed positive changes in separate training.

Lastly, students' transformative competencies, there was no differences in initial and final conditions in both integrated and separate training. The emotional journal is something new for teachers and students during science learning, because usually things related to emotional management are discussing specifically in counseling guidance courses or during discussion sessions with psychologists. Science teachers sometimes implement the meta-affective indicator "asking students to make personal emotional journals and discuss them" but also the same percentage of science teachers never implement this indicator in science learning. On the meta-cognitive indicator, although it is not the highest percentage value, there are also many science teachers who never implement the indicator "asking students to make personal learning journals" and the indicator "clarifying personal learning journals". Whereas recognizing students' cognitive strengths can underlie the creation of autonomous learning.

5.2 Implication

Even though the statistical test did not show a significant difference between the initial and final conditions in the students' meta-affective, meta-cognitive and transformative competencies. However, the analysis of the data per indicator, shows that there are several conditions that indicate a more effective implementation of meta-affective and meta-cognitive strategies with the help of teachers (integrated training) or students independently implementing them (separate training). In order to provide students with the opportunity to participate in tasks appropriate to their ability, needs, and level for effective teaching and learning, science teachers should

ensure differentiated classroom activities and should be flexible in adapting different meta-affective and meta-cognitive strategies or approaches.

5.3 Recommendation

The limitations of this study, particularly weaknesses related to the research method, data collection techniques, and the sample involved. In terms of research methods, training for equalizing perceptions and workshops with science teachers who will teach meta-affective and meta-cognitive strategies only took place twice before the study. Activity one is a shared understanding of each strategy, followed by activity two by including ten meta-affective and meta-cognitive indicators in the lesson plan that has been prepared by the teacher before the workshop.

In the technical aspect of data collection, filling in the pre-test, post-test, emotion journal, and learning journal was carried out outside of science learning hours in class, so that the collection did not match the set time. It takes multiple checks and personal correspondence with the student concerned. In addition, the duration of the study follows government regulations in the implementation of learning according to science topics. This is for the reason that this research does not interfere with the regulation of the implementation of learning in schools. Therefore, there is a difference in the length of the study, namely in the 9th grade with the topic "Soils" for two weeks, while in the 7th grade with the topic "Forces" for four weeks, and in the 8th grade with the topic "Light and Optics" for four weeks.

Finally, on the aspect of the sample involved, in the sample of 9th grade students, it was in accordance with the plan, namely one class as integrated training and another class as separate training. However, in the sample of 7th and 8th grade students, there was a change at the beginning of the study because it followed the school's policy of implementing online learning where two classes were made into one large group for the implementation of learning to be more effective in time. Therefore, there are two classes as integrated training and two classes as separate training. This is quite difficult in controlling and implementing the effectiveness of the research.

Three recommendations can be offered based on the study's limitations. Firstly, science teachers should keep including indicators of meta-affective methods in their lesson plans. Students will benefit from this since teachers will be required to evaluate students' affective qualities in accordance with curriculum requirements. Teachers have evaluated students thus far, but no specialized learning has been provided to identify and control students' affective. Secondly, conduct extended workshops with the participating science instructors, especially incorporating a teaching simulation (peer teaching) with the insertion of indicators of meta-affective and meta-cognitive strategies. This will advance the research one step beyond that which has already been done. This is done in order for the teacher to become accustomed to it and make the transition of teaching from affective to cognitive aspects less noticeable. Finally, this research design included testing on students' conceptual understanding of the science issue being studied, but it was not completed since there were too many fillings made in a short amount of time. In order to test students' cognitive aspects, it is intended that future study will do so as well. In order to be more thorough, testing all of the government's suggested characteristics, namely affective, cognitive, and skills