CHAPTER V
CONCLUSSION AND RECOMMENDATION

5.1 Conclusion

The finding showed that STEM Learning on Electricity using Arduino-Android Game Based Experiment has improved STEM Literacy by -0.06, -0.12, -0.06, -0.87 for Science, Technology, Engineering and Mathematics Literacy respectively. Although the learning can adequately improve Technology and Engineering Literacy which categorized as low and fair, the STEM Learning implementation was unable to enhance Science and Mathematics Literacy. According to findings, several investigation have been analyzed based on lesson plan, worksheet and STEM Literacy based test. The brief conclusion are described as follow:

5.1.1 The lesson plan which used in three meetings was constructed to have characteristic of STEM Learning. The STEM Learning implementation which have been conducted in the class are assessed by observation sheet and considered almost complete. Even the step of introducing YWRobot and Ardunio Uno in the first meeting is missed, but the rest of learning activity which stated in three lesson plan were conducted adequately in the class.

5.1.2 There are three worksheet used as complement in STEM Learning implementation. Those worksheets help the students to more involve in MGames Science, YWRobot and Arduino Uno experiment. Moreover each of worksheet have questions to assess students' mastery in the topic of electricity. MGames Science worksheet is finished correctly by 95% students. YWrobot worksheet is finished correctly by 67% students. The last Arduino Uno worksheet is finished correctly by 88.8% students.

5.1.3 According to pre-test and post-test average in every sub aspects of STEM Literacy, STEM Learning implementation was less able to improve students science, mathematics literacy, engineering and technology literacy of the students. In addition STEM Learning implementation was conducted in only three meetings

and discontinuously. Therefore, science, technology, engineering, and technology literacy regarding electricity topic are emphasized less optimally.

5.2 Recommendation

According to the findings of the research discussed and concluded, there are several recommendation which have to be concerned for following similar research, such as:

5.2.1 For Researcher

a. Every meeting should be planned well and systematically, therefore there will be no step of learning activity missed.
b. The content of worksheet should be added with simple procedure which can support students to do an experiment.
c. The content of worksheet should be added with result and conclusion part and several question related to the experiment to asses students mastery.
d. The implementation of STEM Learning should be done continuously at least in five meetings to emphasize and develop science, technology, engineering and mathematics literacy. Therefore, students will be more comprehend the concept and the appliance of electricity deeper.

5.2.2 For Teacher

a. The research of STEM Learning on electricity using Arduino-Android game based experiment to improve 8^{th} grade students' STEM Literacy has revealed in increasing students participation and enthusiasm. Since this STEM Learning more provide hands-on activity, it will be good if teacher applies this approach in other physics topics.
b. It will be good if the teacher can apply STEM Learning approach to improve science, technology, engineering and mathematics literacy uniformly.Therefore, affective, cognitive, and psychomotor learning objective can be reached effectively.