CHAPTER V

CONCLUSION, IMPLICATION, AND RECOMMENDATION

5.1 Conclusion

Based on the research question and the results gathered in this research, the researcher summed up several conclusions. Firstly, the implementation of STEAM based learning in heat transfer topic applied to 8th grade of junior high school is already in line with the lesson plan. The implementation of STEAM based learning activities has a percentage of 91.7% which can be interpreted as almost all activity are executed. Although, due to time constrains, the last stage of STEAM based learning (correction stage) could not be conducted. However, STEAM-based learning may be viewed as an alternative learning approach that can be implemented with Junior High School students.

Secondly, implementing STEAM based learning in learning heat transfer topic can stimulate students' creativity. It is proven by the results of students' creativity on each dimension. The resolution dimension reach the greatest percentage 96.19% classified as "very good", novelty dimension classified as "enough" with the lowest percentage 63.49%, and elaboration & synthesis dimension are in the middle which obtained 75.40% classified as "enough". Besides, student's creativity in every groups is also being analyzed to see the whole profile of students' creativity. It divided into three category, including very good (group 3 and 7), good (group 1 and 6), and enough (group 2, 4, 5). Overall, students' creativity in learning heat transfer by implementing STEAM based learning is defined as "Good" with a percentage of 78.36%.

Lastly, there is a significant difference in students' concept mastery after applying STEAM-based learning in the heat transfer topic. It can be noticed by the result of Wilcoxon S-R analysis which obtained 0.00 at the 5% level of significance with a large effect size, thus the alternative hypothesis is accepted. Therefore, the implementation of STEAM based learning improves students' concept mastery in learning heat transfer topic. It can be seen from the total N-gain result from pre-test and post-test score that is 0.70, which classified as medium improvement. Thus, the implementation of STEAM

77

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based learning gives a significant effect towards students' concept mastery in learning heat transfer topic.

5.2 Implication

Based on the result and discussion of students' creativity and concept mastery on the use of STEAM based learning in learning heat transfer, it was showed that STEAM based learning can stimulate students' creativity in learning heat transfer. It can be seen from the final work of the project which then assessed by CPAM rubric (Creative Product Analysis Matrix). The results showed a "Good" category of creativity. Therefore, STEAM based learning can improve students' concept mastery in learning heat transfer. It can be seen from the result of pre-test and post-test. The results showed the significant differences which indicates the improvement of students' concept mastery in learning heat transfer topic after implementing STEAM based learning.

5.3 Recommendation

Based on the findings and conclusion of the research, the researcher made a several suggestions for further research. Firstly, the researcher should set a time allocation for each stage during implementation of the STEAM based learning. It is also important to consider the meeting to conduct this research to complete every stage of STEAM based learning. Also, the researcher needs to reconsider a correction stage to be applied in STEAM based learning activity due to time limitation in online learning. Therefore, the researcher needs to consider the related level of cognitive domain on the test item as it relates with the STEAM based learning activities.

Secondly, it needs a further consideration of the implementation of STEAM based learning in online, since the learning process are required a lot of time and project activities. A further researchers with a similar interest in STEAM-based learning may broaden the research to include additional subjects or variables related to the recent issue. However, STEAM-based learning may be used as an alternate teaching approach for science teachers in order to promote students' creativity and concept mastery.