# CHAPTER V
# CONCLUSION AND RECOMMENDATION

## 5. 1 Conclusion

Based on the analysis result of students' scientific argumentation skill both in oral and written argumentation in learning energy resources, it can be concluded that the learning process of problem-based learning was able to direct students to recognize and provide arguments, and the quality of argumentation both in written and oral were mostly at level 2. Furthermore, some conclusions refer to predetermined research questions was examined as follows:

1) Students' written argumentation skills provides the highest number of components based on Toulmin's claim/counterclaim while the lowest component is qualifier. Although based on the level of argument established by Erduran, the student's written argument has the highest number at level 2. However, students have varying levels of argumentation in problem number 3 written argument. It means that students have a higher degree of argumentation in the issues they understand or have a lot of knowledge about the issue.

2) Students' oral scientific argumentation skills also produced the highest number of components in the form of claims/counterclaim and the lowest was the qualifier. Whereas based on the level of argumentation, the oral argument of students has the highest percentage at level 2 as well. But in oral argumentation, there is a difference in the quality of argumentation where 42.86% of students are able to include the rebuttal component. This means students tend to convey verbal arguments better than written arguments.

3) The learning process of problem-based learning with 5 stages is able to direct students to recognize and provide arguments, but the results of the quality of the students' scientific argumentation are still relatively low. This is due to the short duration of the meeting, so that students are not used to deliver the arguments.

4) The correlation between written and oral arguments produces two different results. In the argumentation problem of argumentation questions 1 about the relationship of increasing population with energy demand and problem number

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3 about the potential of renewable energy sources as the alternative to meets the world's energy demand no correlation was found. This indicates that the high level of oral argumentation does not affect the written argumentation test and vice versa. But in the second argumentation questions on the written about the use of fossil energy as a part of non-renewable energy sources test on oral argumentation, it was found that there was a positive correlation with the level of medium correlation. This means that between oral arguments and written arguments in problem number two there are interrelated relationships.

## 5. 2 Recommendation

Based on the findings of the research that has been conducted and concluded, there are several recommendations, which are:

1) The stage to get used to individual arguments should be longer. This is to allow students to express arguments independently.

2) The instructor must set out the rules of discussion in detail and establish a rule that makes all students involved so there is no student who remains silent throughout the discussion.

3) Problem-based learning should be performed at more than one meeting in order for the researcher to achieve firmer outcomes in scientific argumentation.

4) Teachers who lead students in the discussion should have a clear understanding and knowledge of the argument and the topic. It is easier to enhance educational engagement during the teaching-learning process to enable students to express their claims.