

CHAPTER V

CONCLUSION, IMPLICATION, AND RECOMMENDATION

5.1 Conclusion

According to the research questions and the findings that have been conducted, the researcher concluded several conclusions. First, using a virtual laboratory in a combined laboratory resulting a significant difference of students' observing skills between combined (traditional and virtual) laboratory and traditional laboratory. Besides, using a virtual laboratory in a combined laboratory activity also resulting a significant difference of students' asking question skills between combined laboratory and traditional laboratory. Virtual laboratory increases students' motivation and desire to participate in the learning activity. The virtual laboratory also helps students to visualize phenomena easier than relating the phenomena to a real-life situation. Therefore, students become more critical and more interested in the learning activity.

Next, using a virtual laboratory in a combined laboratory activity resulting no significant difference on students' hypothesizing skills between combined laboratory and traditional laboratory. Students' prior experience with inquiry-based learning is crucial to develop students' hypothesizing skills. Teachers also need to provide students with sufficient scaffolding in order to develop students' hypothesizing skills. Then, using a virtual laboratory in a combined laboratory activity resulting no significant difference on students' interpreting and predicting skills between combined and traditional laboratory activities. Virtual laboratory constraints students to mathematise the result they gain from the experiment. Students' prior experience with inquiry-based learning is also crucial to develop students' interpreting and predicting skills.

Using a virtual laboratory in a combined laboratory activity significantly resulting a significant difference on students' communication skills. The assistance of multimedia, in the form virtual laboratory, helps students to improve their scientific ability. The explorable simulation helps students to develop their communication skills. Students can improve their communication skills by analyzing and exploring more possible phenomena in a virtual laboratory. The explorable simulation also influences students' classifying skills. The relatively short time spent in a virtual laboratory allows students to experiment thoroughly.

Then, using a virtual laboratory in a combined laboratory activity resulting a significant difference on students' planning experiment skills. Virtual laboratories increase students' desire to participate in learning activities. Virtual laboratories give students less distraction, such as equipment errors. Virtual laboratories introduce students to traditional variables, dependent variables, and independent variables better. Lastly, using a virtual laboratory in a combined laboratory activity resulting no significant difference on students' applying concept skills. Instead, students' age is more likely to influence students' applying concept results as most students are already in their formal operational stage.

5.2 Implication

Based on the results of this study, it is implied that using a virtual laboratory in a combined laboratory activity resulting significant differences on students' observing, communicating, classifying, planning an experiment, and asking questions skills between combined laboratory and traditional only laboratory activities. Contrary, using a virtual laboratory in a combined laboratory activity resulting no significant difference on students' hypothesizing, interpreting, predicting, and applying concept skills between combined laboratory and traditional only laboratory activities. A virtual laboratory helps increase students' motivation and desire to participate in learning activities. A virtual laboratory can also provide things traditional laboratory doesn't, such as visualizing phenomena, exploring more phenomena, and introducing the concept of variables.

5.3 Recommendation

Based on the findings of this study, various recommendations can be made as future references for upcoming studies, such as:

1. Gives students enough conditioning with inquiry-based learning. It is essential to give students more conditioning with inquiry-based learning. So, students will be more experienced with inquiry-based learning as students' prior experience is crucial in implementing inquiry-based learning. Students will be more accustomed to inquiry-based learning and do not need to adjust again when the researcher gives them special treatment in the type of laboratory they need to conduct.
2. Gives treatments in longer duration and various combinations. By giving treatments in longer duration and more varied combinations, the researcher can better determine whether the virtual laboratory influences students' science process skills as it will evoke significant changes in students' science process skills.
3. Analyze the influence of virtual laboratory on students' science process skills in a more well-designed statistical analysis. This research only finds out the comparison of average score between combined laboratory with virtual and traditional laboratories and traditional only laboratory. An analysis on the influence of virtual laboratory would be better to support this research.