

CHAPTER V

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Based on the results and discussions that have been described, the conclusions in this research are as follows:

- a. Based on the analysis of undergraduate students' needs, it was found that biology major students of Universitas Negeri Medan Year 2019 did not do Gram staining practicum both offline and online during the Covid-19 pandemic due to obstacles in the form of space, facilities and time.
- b. Virtual laboratory design is carried out using three main applications, namely Figma to design laboratory components, Ibis Paint X to draw illustrations and Adobe Animate CC 2020 to create interactive animations. This design was designed using the Actionscript 3.0 programming language and consists of 19 scenes.
- c. Based on the assessment of media expert and material experts, it shows that the virtual laboratory on bacteria staining practicum for Universitas Negeri Medan undergraduate student met the feasibility criteria with feasibility score of 85,9 and 91,6 respectively, which categorized as “very feasible”
- d. Based on the students' response, it shows that the virtual laboratory on bacteria staining practicum for Universitas Negeri Medan undergraduate student receive positive response with feasibility score of 91,85 which categorized as “very feasible”

5.2 Recommendations

- a. To get maximum results in this research, it is necessary to conduct feasibility test with learning experts
- b. For further research, it is expected to continue the research by testing product effectiveness by doing pre-test and post-test to observe students' learning outcomes before and after applying application in learning activity