CHAPTER V

CONCLUSION AND SUGGESTIONS

5.1 Conclusions

Based on the analysis and discussion of the results in this study, several conclusions can be drawn as follows:

1. The Mathematics Learning Module Based on Project-Based Learning Using Augmented Reality (AR), according to the validator's ratings, falls into the very valid category with an average percentage score for the material of 82.97% and an average score for the media of 84.84%. The validation result for the Teaching Module averaged 87.41%, and the validation results for the tests measuring the improvement of mathematical concept understanding were considered valid with revisions by experts.
2. The Mathematics Learning Module Based on Project-Based Learning Using Augmented Reality (AR) is categorized as very practical, with a teacher's response score of 93% and an overall student response of 81%.
3. The Mathematics Learning Process using Mathematics Learning Module Based on Project-Based Learning Using Augmented Reality (AR) meets the effectiveness criteria, as seen from:
   a. The classical learning completeness, which reached 97%.
   b. The achievement of each learning objective/indicator was met: for Indicator 1 of mathematical concept understanding, the score was 100%; for Indicator 2, the score was 91.18%; for Indicator 3, the score was 100%; and for Indicator 4, the score was 79.41%.
   c. The learning time did not exceed the usual time allocated for lessons.
   d. The students' understanding of mathematical concepts has improved, as seen from the increased ability in each mathematical concept indicator and the high N-Gain value of 0.7 between the pretest and posttest.

5.2 Suggestions

Based on the research results and conclusions above, several suggestions are made as follows:

1. Since The Mathematics Learning Module Based on Project-Based Learning Using Augmented Reality (AR) has met the aspects of validity, practicality, and effectiveness, it is recommended that teachers consider using this learning module as one of the self-learning resources for students, which can be applied both in the classroom and at home.
2. The Mathematics Learning Module Based on Project-Based Learning Using Augmented Reality (AR) can serve as a reference for developing other learning modules on different topics to enhance students' understanding of mathematical concepts, whether in the same or different levels of education.
3. For other researchers who wish to conduct similar studies, it is suggested to add more features to the learning module for broader application and utilize devices with adequate specifications and ensure a stable internet connection.
4. For other researchers who wish to conduct similar studies, it is recommended to implement this learning module on a wider scale in schools, as the module has not yet been widely implemented in other schools.
5. Future researchers are advised to include an observation of the teacher's activities a key indicator of effectiveness. This will ensure that the quality of the learning implementation is measured not only by student result but also by the teacher's performance in facilitating the AR-based PjBL model.
6. Future researchers are encouraged to apply this AR-PjBL model to other topics requiring high spatial visualization, such as solid geometry (three dimensional figures) or trigonometry.
7. Future researchers are advised to expand into immersive technologies like Virtual Reality (VR), Collaborative AR, or Tangible AR, integrated with STEM or Ethnomathematics approaches to deeply contextualize abstract mathematical concepts (x and y) and strengthen student's long-term memory.