

CHAPTER V

CONCLUSIONS AND SUGGESTION

5.1 Conclusion

Based on the results of the research and discussion regarding the development of a Problem Based Learning (PBL) e-module using Canva on the topic of molecular shapes, several conclusions can be drawn as follows.

1. Based on the results of the initial needs analysis in the define phase, it was found that the chemistry learning process, particularly regarding molecular structures, still faces various limitations from both the students' perspective and the learning materials used. Students struggle to understand abstract concepts due to their limited ability to visualize three-dimensional molecular structures. Additionally, learning that remains dominated by a teacher-centered approach results in low levels of active student engagement in the learning process. The learning media used, such as textbooks and worksheets, have not been able to optimally facilitate conceptual understanding or enhance student motivation. This situation indicates a gap between learning needs and the available media.
2. Based on the results of the design stage, a Problem-Based Learning (PBL)-based e-module using Canva has been successfully designed. The design includes the selection of appropriate media and formats, as well as the development of an initial e-module structure consisting of introduction, learning activities, and closing sections. The e-module is systematically arranged, visually attractive, and aligned with the PBL syntax, making it suitable to support the learning of molecular structure material.
3. Based on the results of the development stage e-module has met the feasibility standards based on BSNP criteria. The results of material expert validation obtained an average score of 89.38% with a "very feasible" category, while media expert validation obtained an average score of 90.56%, also categorized as "very feasible." These results indicate that the e-module is appropriate in terms of content, presentation, language, visual

design, functionality, and learning integration, making it suitable for use in the learning process.

4. Based on the results of the disseminate stage, the effectiveness of the e-module is demonstrated by the significant improvement in student learning outcomes. The average pretest score of 39.29 increased to 82.43 in the posttest, exceeding the Minimum Mastery Criterion (KKM). The N-gain value obtained was 0.71, which falls into the high category, with 57.14% of students in the high category and 42.86% in the moderate category. These results indicate that the PBL-based e-module is highly effective in improving students' understanding of molecular shape concepts.
5. Student responses toward the developed e-module were very positive, with an overall average score of 85.33%, categorized as "strongly agree." The effectiveness aspect obtained the highest score (85.71%), followed by attractiveness (85.29%) and usability (85%). These results indicate that the e-module is attractive, easy to use, and effective in supporting learning. Therefore, the PBL-based e-module using Canva is well accepted by students and can enhance motivation and independent learning....