

CHAPTER V

CONCLUSION, IMPLICATION, AND RECOMMENDATION

5.1 Conclusion

Based on the research questions and the finding of the development of 'ChemFUN' android-based application to explore students' understanding of chemical representation on matter topic, there are some conclusions of this research as described follows:

- 1) The ChemFUN Android application can be developed through four stages. The first stage is deciding stage. In this stage, the researcher tries to analyze the content and also the application used for development. The second stage is the designing stage. In this stage, the researcher starts to make a flowchart of the application and make a storyboard. The third stage is the development stage. In this stage, the researcher started to develop the application based on the deciding stage and designing stage, and all need to be precise. The fourth stage is the evaluation stage. In this stage, the application was brought to the expert judgment to be reviewed. After that, the application was revised based on the expert and reviewed by teachers and students. The final revision is based on the teachers' and students' responses through the questionnaire.
- 2) The application got a review from five expert judgments. The final average score on the content quality is 3.64, followed by a language category with an average score of 3.65 and the design category with an average score of 3.60. Although it still has a low score on audio, spelling, and grammar, it has been revised. The average for all categories is 3.63, which is very good, indicating that the ChemFUN Android application was ready to be reviewed by teachers and students after it was revised in some aspects.
- 3) The application got a review from six science teachers. The final average score on mobile connectivity is 3.72, followed by the materials category with 3.67, the user interface with an average score of 3.67, and the learning experience

category with 3.61. It still got a low score on the design and interactivity, but the average of all scores shows a 3.67, which means very good. It is indicating the ChemFUN Android application is ready to be used in learning matter after the design and interactivity aspects were revised.

- 4) The students also give a review regarding the application. The final average score on mobile connectivity is 3.61, followed by the materials category with an average score of 3.45, the user interface with a 3.62, and the learning experiences with a 3.45 average score. The students give a low score on the design, interactivity, and quiz questions. However, the average score of all categories is 3.53 or very good, indicating the ChemFUN Android application is ready to be used in the learning matter after the design, interactivity, and the questions in the quiz were completely revised.
- 5) The ChemFUN Android application comes with compatibility only for the Android operating system. There are many buttons the user can interact. The materials show the chemical multiple representations view and the interconnections between macroscopic, microscopic, and symbolic views in guided inquiry. Currently, the application just got one version, the English version, following the matter topic in the Cambridge curriculum.

5.2 Implication

Based on the research finding, this research produced an Android application that can explore students' understanding of chemical representation on matter topics. The results from the experts, science teachers, and students show positive feedbacks, and the application was completely revised. Indicating the ChemFUN Android application is ready to be used in the learning activity to explore students understanding of chemical representation on matter topics. Also, this kind of research can be done with different chemistry topics, whether in National Curriculum or Cambridge Curriculum.

5.3 Recommendation

Based on the research finding, there are some recommendations regarding the

development of 'ChemFUN' android-based application to explore students' understanding of chemical representation on matter topics. The recommendations were addressed to other researchers and teachers, who can impact the future development of the application and learning environment. The recommendations were described as follows:

1) Other Researcher

The application can still be developed in so many ways. There are many features on the Unity software that can make the application more interactive and more fun. However, it requires a basic knowledge of a programming language, which is C# programming language. Another researcher should learn first about the C# to unleash the true potential of Unity software, known as the best development software to create games and other applications. The software for design also needs to be considered. This study only uses the Canva platform. Another researcher can even use more advanced software like Adobe Photoshop or Corel Draw to make a figure or an animation. It is also possible that other researchers develop the application into two languages which are English and Bahasa Indonesia, and two curriculums which are Cambridge and the National curriculum. Last, for the future research, the researcher can measure students understanding quantitatively based on the previous instrument.

2) Teacher

The teacher can consider the ChemFUN Android application as a learning media for students to learn Matter topics. However, there are still some materials that are better to explain directly to the students. Suppose the teacher wants to implement the application. In that case, they also need to make strategies, so the learning activities are not wasted to let the students play the application. For example, the teachers can show the macroscopic level thing directly, not just showing a picture in the application, because the macroscopic thing can easily be found and brought to the class.