

CHAPTER V

CONCLUSIONS AND SUGGESTIONS

This chapter presents conclusions obtained based on the results of the research and discussion that have been described in the previous chapters, as well as suggestions that can be taken into consideration for further research and development. The conclusion was prepared based on the answers to the formulation of the problems that had been determined, including the implementation of the Roblox-based quartet card educational game, the response of students' learning motivation, and changes in students' understanding of the concept of social studies after using the developed educational game.

5.1 Conclusion

Based on the results of the research and discussion that has been described in the previous chapters, the following conclusions can be drawn.

1. The implementation of the Roblox-based quartet card educational game was successfully developed using the ADDIE model through five stages: needs analysis, design, development, implementation, and evaluation. The game is designed as a 2–4 player multiplayer game based on a 2D view on the Roblox Studio platform with the Luau programming language, integrating eight categories of IPAS Phase C material, namely systems and body health, ecosystems, water cycles, energy, the solar system, the geography of Indonesia, sound and light, and history and heroes. Functional testing results using *the black box* method on 23 test scenarios across seven main functional groups showed a 100% success rate, proving that all game features were running as planned.
2. Students' motivation to learn after using the Roblox-based quartet card educational game was measured using *the Intrinsic Motivation Inventory* (IMI) instrument for 30 respondents. The measurement results showed an average total IMI score of 5.99 from a scale of 7 or equivalent to 85.54%, which is included in the Very High category. The four subscales showed consistently high results, with *the Interest/Enjoyment* subscale obtaining the highest score of 6.10 (87.14%), followed by *Value/Usefulness* of 6.06 (86.55%), *Effort/Importance* of 5.91 (84.40%), and *Perceived Competence* of 5.88

(84.05%). These results show that students respond positively to the use of educational games on all aspects measured.

3. The improvement in students' understanding of science concepts was measured using *pretest* and *posttest* methods analyzed with *Normalized Gain* (N-Gain) on 30 respondents. The calculation results showed an average N-Gain value of 0.19 which was included in the Low category based on the criteria of Hake (1999). This low N-Gain value illustrates that the game has not provided a significant improvement in students' cognitive test scores. This condition is influenced by the limitations of the implementation context, which is only one meeting with the coverage of eight IPAS categories, so the time available for concept classification exercises through games is relatively short.

5.2 Suggestions

Based on the results of the research that has been conducted, there are several suggestions that can be considered for further research and development:

1. The next research is recommended to test the validity of the content of the IPAS material used in the game by involving validators from the field of education, such as science teachers or curriculum experts. This step is important to ensure that the content of the quartet card is in accordance with the learning outcomes of IPAS Phase C and is suitable for use as a learning medium in elementary schools.
2. The N-Gain value obtained is in the low category (0.19), so one playing session is not enough to form an optimal understanding of concepts. Further research is suggested to expand the context of implementation, for example by providing more than one game session or integrating the game into multiple meetings, so that students have repeated opportunities to interact with IPAS material through games.
3. The questionnaire instrument used to measure motivation and playing experience should be simplified in terms of language in the next study. Given that the respondents are elementary school students, statements on both the IMI and GUESS-18 scales need to be adapted using shorter sentences, familiar vocabulary, and tested first so that students understand each item correctly.
4. The results of the GUESS-18 evaluation showed that the Play Engrossment (75.33%) and Usability/Playability (77.33%) dimensions obtained the lowest

scores compared to the other dimensions. Developers are advised to improve the game's interface to make it more intuitive and strengthen design elements that encourage player engagement, such as through the addition of visual effects, a more responsive feedback system, or a variety of in-game challenges.

5. This research is limited to grade VI students in one school with eight categories of science subjects. Further research can expand the scope of the subject to more schools with diverse characteristics, as well as consider the addition of other categories of IPAS material to improve the completeness of the game's content.
6. Games can be developed by adding a concept explanation feature or material feedback after each game session is completed, so that students not only learn through the game mechanics but also get explicit reinforcement of concepts.