CHAPTER V
CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

5.1 Conclusion

From the results and discussion in diagnosing the misconceptions of students in work and simple machine topics, two important points need to be underlined. The first point highlights the prevalence of misconceptions among students. The analysis shows that, in general, students have 39.5% of their responses categorized as misconceptions, 25.8% as scientific knowledge, 20.8% as lack of knowledge, 9.3% as false positives, and 4.6% as false negatives. This demonstrates the usefulness of a four-tier test in calculating the percentages of misconceptions held by students. Among the five levels of conceptions, students have a higher proportion of misconceptions responses compared to scientific knowledge. Furthermore, the students' misconceptions are found to be significant across all concepts related to work and simple machines, as indicated by the percentage of students' misconceptions in all cases being above 10%. Among the three subtopics, students exhibit a higher rate of misconceptions in the types of simple machines. One possible reason for this is the lack of practical activities that bridge the gap between the concepts and real-life problems. Due to the high occurrence of misconceptions in this subtopic, several common misconceptions have been identified.

The second point that can be inferred from this research is that students have more than 50% misconception rates on questions that specifically address examples of simple machines, the mechanical advantage of pulleys, and the mechanical advantage of inclined planes. There could be various reasons for this, such as unaddressed misconceptions or difficulties in understanding these specific concepts. To enhance students' scientific knowledge and eliminate misconceptions in work and simple machine topics, it is important to improve the lessons by addressing common misconceptions directly and incorporating active learning. These strategies will not only help students build a stronger foundation of scientific knowledge but also prevent the development of misconceptions in the first place.

5.2 Implications

A four-tier diagnostic test instrument on simple machines can be used by a teacher to identify students' misconceptions to anticipate misconceptions before the implementation of teaching. The results of this research have important implications for improving the teaching and learning of work and simple machine topics. Based on the findings, several actions can be taken to address the misconceptions and enhance students' scientific knowledge. It is crucial to improve the lessons delivered in schools to actively target and correct misconceptions. Teachers can design teaching strategies that specifically address the common misconceptions identified in the study. Incorporating active learning and empirical experiences that demonstrate the correct concepts can greatly benefit students' learning.

5.3 Recommendations

This research offers several recommendations. It suggests that before a class begins, teachers should identify students' conceptions. By doing so, teachers can map student conceptions and plan the lesson to accommodate student needs. In situations where time is limited, teachers can rely on previous research to identify common misconceptions. Teachers also should place emphasis on addressing these common misconceptions. This is to reinforce students' scientific knowledge, prevent misconceptions, and eliminate misconceptions. By actively engaging empirical experiences and connecting the material with everyday life, students can challenge their existing misconceptions and construct a more accurate understanding of the concepts.

Furthermore, this research can serve as a valuable reference for future researchers. It provides insights into the misconceptions held by students in work and simple machine topics, and the effectiveness of the four-tier test in diagnosing these misconceptions. Other researchers can build upon this research by exploring additional questions to address misconception and adding questions related to the topic of work to the instrument in order to prevent bias in the research result. By continuously improving and expanding the research, a more comprehensive understanding of students' misconceptions and effective teaching strategies can be developed.