ABSTRACT

Risma Riyanti Ahadiyat. 2025. *Application of Web-based on Multiple Representation on Immune System Material to Improve Learning Outcomes in the Cognitive Domain*. **Pembimbing I: Prof. Dr. H. Toto Sutarto Gani Utari, M.Pd. Pembimbing II: Cita Tresnawati, M.Pd.**

21st century learning has utilized digital technology in the teaching and learning prosess. However, in biology learning, the media used is still not fully effective and interactive, resulting in low learning outcomes for student. The purpose of this study was to determine the improvement in student`s cognitive learning outcomes on the immune system material after the implementation of a web-based multiple representation approach. The method used was apre-experimental design with a one-group pretest-posttest design. The study population was at SMA Negeri 23 Bandung, in class XI-5, with a sample og 36 student selected using purposive sampling. The instrumen used was a multiple-choice test consisting of 25 questions. The result of this study showed an average pre-test score of 75 and an average pos-test score of 96, with an N-Gain value of 0,78 in the high category and a significance value of 0,05, indicating a significant improvement in cognitive learning outcomes from C1 to C4. This indicates that the use of web-based multiple representation by presenting images, videos, diagrams, tables, and 3D models can halp students remember information, relate and explain the meaning of the imformation obtained, apply conceptual understanding, and elaborate by relating the concepts that have been learned in greater depth.

Keywords*: Web-based, Multiple Representation, Cognitive laerning outcomes*