

## ABSTRACT

Technological advances in education continue to evolve, including the use of virtual environments (VE) that are thought to improve the quality of learning. However, there is still a shortage of research that empirically tests the effectiveness of VE against the physiological aspects and performance of pupils. Based on the phenomenon, the study aims to examine the differences in the influence of virtual learning based environments on physiological aspects and performance compared to online learning course media using Experimental Design methods to measure VE influences. The experiment focuses on making VE using the Millealab platform for technology literacy courses.

The results showed that there was no significant difference in performance between the VE group and the Non-VE group. The average posttest score of the VE group was 79 (SD = 6.9), while the Non-VE group had an average score of 72.5 (SD = 9.2). The ANOVA test results showed a value of 0.092, with Sig. > 0.05, indicating that the difference was not statistically significant. However, there were significant differences in physiological responses between the VE group and the Non-VE group, especially at certain time intervals. At intervals of 5-10 minutes after the treatment was given, the average increase in heart rate in the VE group was 91 bpm, while in the Non-VE group it was 84 bpm. The ANOVA test results showed a value of 0.036, with Sig. < 0.05. At intervals of 10-15 minutes, the average heart rate of the VE group increased to 92 bpm, while the Non-VE group remained at 83 bpm. The ANOVA test results showed a value of 0.020, with Sig. < 0.05.

This research suggests that the use of virtual environments in learning can affect physiological responses, characterized by increased heart rate. Although no significant differences were found in academic performance between VE and Non-VE groups, these findings have important implications in the educational context.

Keywords — *Experimental Design, Fisiologis, Millealab, Performance, Virtual Environment*