International Journal of Teaching and Learning (INJOTEL) e-ISSN: 3025-8308
Vol. 3 No. 1 2025, pages: 230~249

HANDS-ON LABORATORY ACTIVITIES FOR TEACHING CELL TRANSPORT MECHANISMS IN SENIOR HIGH SCHOOL BIOLOGY

Marinel Agravante-Destacamento
Faculty, Bantayan Science High School
marinel.agravante002@deped.gov.ph

ABSTRACT

The research assessed the academic performance in General Biology 1 of the Grade 11 STEM students at a science high school in Bantayan Island, Cebu, using the developed hands-on laboratory activities for the following competencies: (a) explaining transport mechanisms in cells (diffusion, osmosis, facilitated transport, active transport) and (b) differentiating endocytosis and exocytosis. Results of the pretest showed 40% and 38% in the control and experimental groups, respectively; both did not meet expectations based on the national agency's grading system. However, the post-test results of the experimental group increased to 91%, which exceeded the Outstanding threshold. Statistical analysis using a t-test revealed the following findings: (a) the conventional setup produced significant mean increases across multiple competencies in the control group (i.e., diffusion-.001, osmosis-.001, facilitated transport-.021, and active transport-001 in competency one), but the minimal increase in knowledge in exocytosis and endocytosis at .620 (competency 2) did not approach statistical significance, (b) the experimental group produced statistically significant mean increases (all at .001) demonstrating how well the hands-on method improved students' comprehension of cellular transport systems. In the comparison between the mean gains of the two groups, there was a statistically significant difference, with the experimental group showing more considerable mean gains. Moreover, the five themes that emerged during interviews with selected students, supplemental and collaborative, developing practical skills and long-term memory, and time constraints, provided a foundation for the successful implementation of the study. Hence, hands-on laboratory activities for teaching cell transport mechanisms in senior high school Biology are recommended.

Keywords: Science Teaching; Biology Teaching; Hands-on Activities; Cell Transport Mechanisms; Senior High School