ADDRESSING DIFFICULTY IN CALCULUS LIMITS USING DYNAMIC GEOMETRY SOFTWARE (DGS)

STARR CLYDE L. SEBIAL[1], VILLA ALTHEA C. YAP[2]

https://orcid.org/0000-0003-2413-7418[1], https://orcid.org/0000-0002-2373-8484

starrclydesebial@jhcsc.edu.ph[1], altheayap82@gmail.com[2]

JH Cerilles State College, Philippines[1], Zamboanga del Sur National High School, Philippines[2]

ABSTRACT

Given basic and piece-wise functions, students can solve various limits through algebraic procedures and rules, but mostly failed to locate them from the graphs of these functions. A pre-experimental one–group design was employed to address the problem in a form of remedial sessions for the sixty-two (62) grade 10 students in the Science & Technology Engineering Program (STEP) curriculum, on the first quarter of S.Y. 2019-2020. An attempt to bridge the gap between procedural steps on solving limits and finding its location from the graph were done through a series of simulations using the interactive graphing environment of a Dynamic Geometry Software (DGS) together with its dynamic tools and sliders. The flexible and interactive simulations, comprising graphs of basic and piece-wise functions linked with dynamic texts of algebraic process of solving limits, were designed to provide opportunities for students to explore the underlying geometrical relations in real-time response. The system would provide immediate feedback whenever the learners move the arbitrary location of the point, thus confirming and diagnosing their responses, visualizing the actual location of limits, provided they exist. The results revealed a statistically significant improvement on the students' achievement as reflected from their pretest (M=6.02, SD=2.68) and post-test (M=13.39, SD=1.35), t(62)=-19.99, p<.001, d=2.54. The remedial sessions with the integration of the DGS simulations were found to be effective in addressing the difficulties of the students in dealing with limits. The overall results of this study provide evidences and valuable details for Mathematics teachers, school administrators, and policy makers to enhance curriculum designs and teaching pedagogies regarding Mathematics teaching and learning.

Keywords: dynamic geometry software integration, remediation, difficulty in calculus, pre-experimental, Mathematics achievement