9th International conference on Advanced Research in
Education, Teaching and Learning
06 - 08 December 2024
Paris, France

Teacher Innovation Project in Geology Majors: Student Perceptions and Competences Analysis

Hernan Javier Lara-Saavedra[1, *] and Erika Lizbeth Calderon-Maza[2]

[1,2] *Private Technical University of Loja, Loja, Ecuador*

Abstract

Field work activities were established such as the sampling of rocks at the mining area of El Tahual quarry (Azuay province). The other mining area Maria (Zamora Chinchipe province) comprises rhyolite and kaolin deposits, alluvial deposits, batholith of the Jurassic Zamora Intrusive Complex. 3D models of the rocks used as commodities in the ceramics industry provided by the retail company Graiman Industrial Group were elaborated using Regard 3D and Meshlab software in 3D photogrammetry. This investigation evaluated student perceptions through a survey applied to 20 students. Survey consisted of 15 items, with questions grouped into different competencies: critical thinking, creativity, risk-taking, motivation, team spirit, leadership, problem-solving and commitment, using a 5-point Likert scale. Analytical Chemistry course average improved from 6.7 to 7.48 points year-over-year. Average responses ranged from 4.45 to 4.80 (out of 5). Variances ranged from 0.16 to 1.00 Highest-rated areas: (a) Creativity (Q3: 4.60; Q4: 4.55); (b) Leadership (Q2: 4.55; Q11: 4.60); (c) Motivation (Q6: 4.70; Q10: 4.70). The overall Cronbach's alpha was 0.97, indicating excellent reliability of the instrument. Analysis of variance (ANOVA) showed that the differences between questions were not statistically significant (p=0.51), suggesting consistency in the students' responses. Survey thus proved reliable for assessing student perceptions, with potential limitations in small subgroups. The project showcased how digital tools can overcome physical limitations in geology education, providing students with continuous access to critical learning materials.

Keywords: photogrammetry, 3D models, Geology, teacher innovation