Assessing the Impact of 3D Printed Terrain on Teaching Topography in Introductory Earth Science Labs

The purpose of this project is to evaluate the impact of 3D printed topographic terrain on student learning of topography in the Western Michigan University GEOS 1000 course, Dynamic Earth. Learning to effectively read topographic maps is challenging for students because topographic maps contain 3D representations of terrain and features that are displayed on a 2D surface map. Despite the use of teaching tools such as physical models, 3D projections, and coupled systems incorporating both physical models and 3D projections together, teaching students to correctly analyze and interpret these maps remains a challenge for earth science educators. This project will introduce 3D printed terrain, accurately printed from a section of a laboratory teaching quadrangle map, into the existing Dynamic Earth lab session. This study hypothesizes that using 3D printed terrain coupled with the 2D topographic map from which the models were printed will enhance student learning of topographic map skills. Using the 3D terrain with its associated contour maps may help students bridge the gap between the 2D map and 3D landscape, as they are able to “see” the landscape rather than have to mentally visualize it. We also hypothesize that after working with the 3D terrain on part of the map, students will be able to transfer map reading skills to other parts of the map and ultimately to other, more complex maps.