Pattern Identification or 3D Visualization? How Best to Learn to use Topographic Maps

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Abstract: Students have trouble using and interpreting topographic maps. Experienced map-users identify patterns of contour lines representing topographic structures and visualize that information in 3D. Novices struggle with both recognizing 2D patterns and visualizing 3D structures from contour lines. In this study, the Pattern Identification group received instruction focused on identifying contour patterns for three topographic forms, the 3D Visualization group received instruction focused on visualizing three forms in 3D, and a control Text-based Instruction group received basic written instruction. The Pattern Identification group performed better than the Text-based Instruction group on a measure of topographic map use. The 3D Visualization group performed between the two groups. Performance on a perspective-taking test predicted skills for map use in all three groups, and the Water Level Test predicted skills for map use in the 3D Visualization group. Learning to identify meaningful contour patterns appears to be the most effective strategy for novice map-users.