Separating the representation from the science: Training students in comprehending 3D diagrams

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1. The Problem

As the 3D diagrams used to explain geology concepts (Kali and Orion, 1996)

2. Objectives

Determine what visual properties cause the comprehension problem

3. Methodology

11 participants recruited from Rutgers University

4. Summary of Analysis

Participants solved 11 / 15 problems on average

5. Example From the Verbal Protocol Results

Angled cross-sections (cutting planes) cause confusion

So do curved layers

6. Discussion

The comprehension problems arise in part because these deviations forced participants to mentally re-orient their viewing perspective and thus, increased their cognitive load.

7. Implications for a Training Program

Students need to learn that a problem is the solved similarly regardless of the orientation of the cutting plane or information plane relative to the viewing plane.

8. Future Work: Test Proposed Training Plan

Increase cutting plane angle to vertical from 0 to 45 in small (5-10) steps

9. References


10. Acknowledgement

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