

Teaching Geography with 3-D Visualization Technology

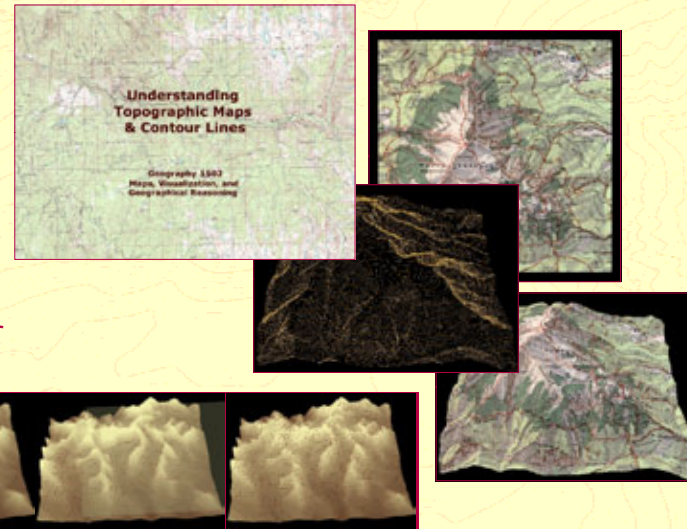
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INTRODUCTION

GeoWall systems are affordable immersive visualization tools that allow scientists and students to view data in 3-D. We developed 3-D visualization exercises and incorporated them into several courses in our department to enhance teaching and learning. Eighty percent of the students surveyed stated that GeoWall helped them stay focused on the lecture. Ninety percent of the students said they would like to see more 3-D visualization in future courses¹. We are also extending the technology to the Master of GIS program, making it available to students for individual project work.

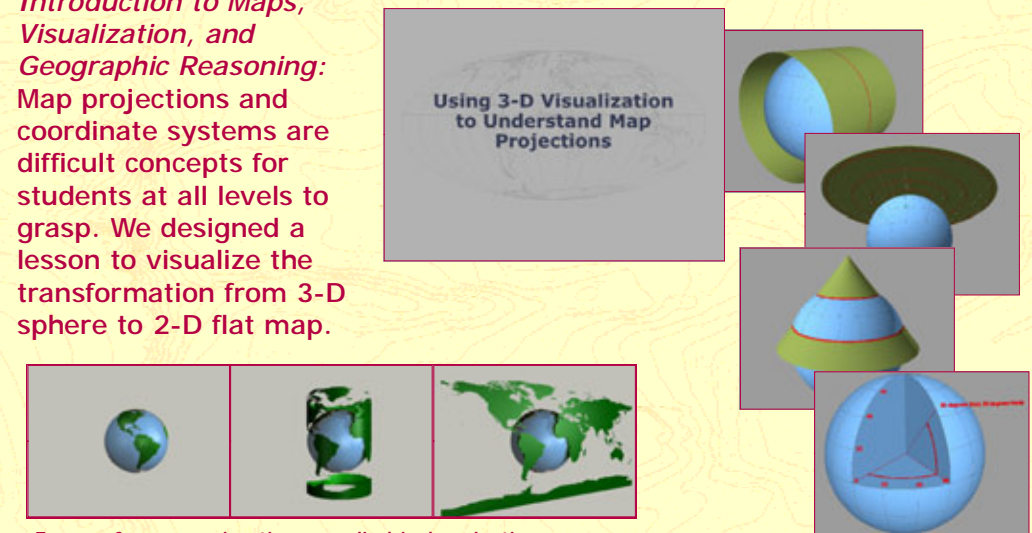
IN THE CLASSROOM

Introduction to Maps, Visualization, and Geographic Reasoning: Many students have an extremely difficult time learning how to read 2-D maps that represent 3-D surfaces. We developed a lesson to help students conceptualize contours and terrain surfaces better in a 3-D environment.



Frames from an animation generating contours

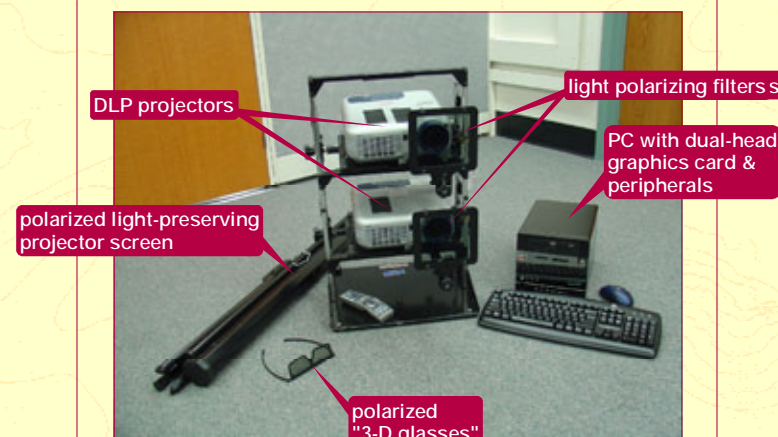
Introduction to Maps, Visualization, and Geographic Reasoning: Map projections and coordinate systems are difficult concepts for students at all levels to grasp. We designed a lesson to visualize the transformation from 3-D sphere to 2-D flat map.



Frames from an animation on cylindrical projections

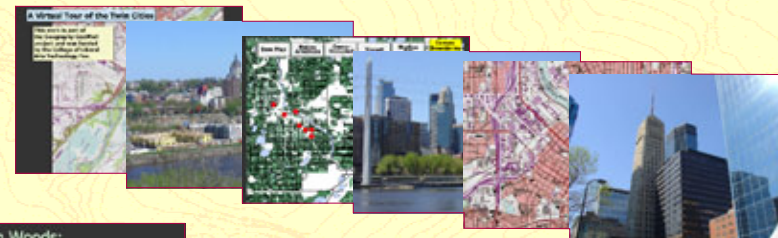
GEOWALL HARDWARE

Our department assembled a GeoWall with off-the-shelf components readily available from local vendors for less than \$7500.



Fieldwork is an invaluable tool for teaching geography, but large class sizes often make fieldtrips impractical. Integrating 3-D maps and stereophotography, we created 'virtual field trips' for two intro courses.

Geography of the Twin Cities: A 3-D tour of key neighborhoods and landmark buildings in St. Paul and Minneapolis.



Biogeography of the Global Garden: The Big Woods, in southern Minnesota, offers a glimpse of presettlement vegetation and is a perfect natural laboratory to teach students about vegetation change.



¹Source Cited: Anthamatten, Peter and Susy S. Ziegler. 2006. Teaching Geography with 3-D Visualization Technology, *Journal of Geography* 105: 231-237.



Acknowledgments

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ADVANCED GIS AND GEOGRAPHY STUDENT PROJECTS

Students can also create their own 3-D projects for the immersive viewing environment. Giving students the opportunity to engage first-hand with the GeoWall system developing their own geovisualization projects will give them useful applied experience with an emerging technology.

