Collaborative Teacher Workshops at the Visualization Center at Scripps Institution of Oceanography (San Diego)

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Within the last two years we have initiated an annual teacher workshop at the Scripps Institution of Oceanography’s Visualization Center (SIO VizCenter). These workshops are a collaborative effort that included members from multiple institutions and sub-disciplines including: the U.S. Geological Survey (USGS), the Southern California Earthquake Center (SCEC), the Birch Aquarium at Scripps (BAS), Scripps Institution of Oceanography’s (SIO’s) Institute of Geophysics and Planetary Physics (IGPP), San Diego Supercomputer Center (SDSC), and San Diego State University (SDSU). The Incorporated Research Institutions for Seismology (IRIS) generously provides curriculum materials, posters, books and many of the supplies for these workshops. Based on responses and surveys, there is clearly a need for Earth science teacher workshops in the San Diego region and a clear measurable benefit to IRIS, SCEC and NSF.

A common problem is that 3D interactive teaching materials are frequently developed without consulting classroom teachers. As teachers’ time becomes more and more valuable and the technology rapidly advances, the gap between development and practice increases. Our annual teacher workshops help to provide a local link between these two communities. Teachers frequently lack the pedagogical skills and resources required to convey Earth science concepts that are inherently 3-D in nature in ways that can be internalized by students. Teaching tools are typically limited by 2D representations (map or cross sectional views) of difficult concepts like fault plans and Benioff zones—features that are far better illustrated using 3-D data that can be manipulated and viewed interactively (Figure 1). Recognizing this, our annual teacher workshops (Figure 2) aims to provide instructional resources and much needed content knowledge for K-12 Earth Science teachers. These workshops give us the opportunity to introduce teachers, and in turn their students, to freeware 3D technological tools that can be used in their own classrooms.

One of the beauties of using the VizCenter for these workshops is that the center’s wall sized (~9’ x 29’) curved screen is easily viewable by up to ~40 people. Using the technology available in the SIO VizCenter allows us to demonstrate the use of 3D interactive visualizations to improve teaching and learning. These products can be ported directly to the classroom with minimal computer expense. Using the technology at our center, we can export the tools to almost any system (Windows NT, Mac OSX, SGI, Sun, PC Windows2000 and PC Linux). This allows access to high quality 3D interactive teaching tools, yet reduces hardware costs for an in-class visualization system to the cost of a low-end laptop (less than $1,000).

Throughout the years we have also assessed the needs San Diego teachers have for high-tech teaching tools. In our surveys we found that ~85% of the teachers had the appropriate technology in their classes to display and use our end products, but some were unable to administer their machines to download software. Almost all teachers were comfortable with using computers in teaching. Based on the teachers’ feedback we can reassess our goals and continually make updates to meet the needs of the participants.