GEOTECHNOLOGIES IN EDUCATION EVENT REPORT AND RECOMMENDATIONS

New Zealand 2005

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Location: New Zealand

Event Dates: 1-16 July 2005

Purposes:

1) Give presentation to US Ambassador and invited guests on Spatial Learning.

2) Teach Geotechnologies (Geographic Information Systems (GIS) and Global Positioning Systems (GPS) Educational Technology Institute for teachers from New Zealand, Australia, and the USA.

3) Participate in geotechnology-focused exploration of New Zealand's Cultural and Physical Geography.

Sponsors: New Zealand-American Association, Inc, GISMaped, GISetc, US Ambassador to New Zealand, and many other key sponsors and supporters who made this possible.

Institute Leaders: Anne Olsen (GISmaped), Stephanie Eddy (GISmaped), Anita Palmer (GISetc), Roger Palmer (GISetc), Joseph Kerski (USGS).

Caroline Swindells, US Ambassador to New Zealand Charles Swindells, and Joseph Kerski, at the Ambassador's home. I was honored to be able to make a presentation on spatial learning and the value of GIS in education and in society to the Ambassador and 40 invited guests. These guests included top officials from the New Zealand Ministry of Education and many others that we were privileged to meet.

USA visitors with the Ambassador and our New Zealand education colleagues.

The Honorable Robert L.G. Talbot, Chairman of the New Zealand-American Association, who were part sponsors of my trip to New Zealand, for which I am very grateful.

Resort community Queenstown, New Zealand, site of 2005 GIS institute.

Workshop Format

Hands on work with GIS and GPS in the theme-based and tools-based lessons: 80% hands-on.

Discussions on curricular implementation strategies, short presentations by teaching staff, and special guests; 10%. Participants could choose between three concurrent sessions. Evaluations received were quite positive about the entire experience. We custom-built this institute based on the needs of the participants. This represented much of the value-added component that we feel we offer to the educational community.

Workshop Themes

1. Critical thinking skills.
2. Spatial thinking.
3. Integration of geotechnologies (GIS, webmapping, GPS) with geography, science, mathematics, history, and environmental studies curriculum at the primary and secondary levels.
4. Scale.
5. How to locate, format, and use geospatial data for GIS-based projects.

Software Used

1. ArcView 3, from ESRI via Eagle Technologies.
2. Minnesota DNR Garmin utility for GPS upload.
3. Vizimap by Viziworld Inc.
4. GPS PhotoLink (demonstration).
5. Google Earth.
6. NASA Worldwind.
7. Web-based mapping tools from Land Information New Zealand and other organizations.

Anita Palmer, left, of GISetc, and Anne Olsen and Stephanie Eddy, of GISmaped. GISmaped and GISetc collaborated to bring 30 teachers from the USA, New Zealand, and Australia to the GIS institute. GISmaped is creating a full GIS-based curriculum entitled IMAGIS.

The GIS institute was held at Wakatipu High School, and we are grateful to the staff and faculty at the school for hosting us. The institute was comprised of three simultaneous tracks over three days, including GPS field work, water quality, 3D analysis of the Queenstown area, site selection, natural hazards, climate, ocean weather, population, and historical analysis within a GIS environment. Stephanie Eddy, Peter Arthur, Nick Page, Anne Olsen, Roger Palmer, Anita Palmer, and Joseph Kerski were the main instructors for the institute.

Educators at the GIS sessions, above and below, dive right in and tackled spatial analysis with enthusiasm and creativity.

The institute also featured a field trip, where we took the steamship Earnslaw across the glacial lake to learn about sheep ranching and much more on the opposite shore.

View of the Remarkables Mountains from the Earnslaw.

Above, Roger Palmer works with teachers during GPS field collection.

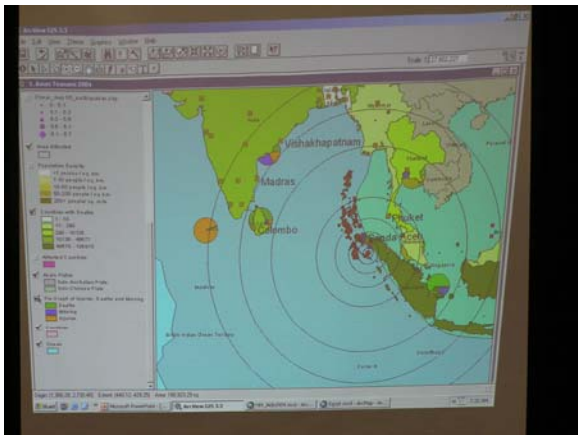
Throughout the institute, we discussed why we were using the tools we were using, the connection to the education standards, and how these technologies can be used in education. In short, the pedagogical component and the networking is equally important as the actual use of the tools themselves.

It was a pleasure to work with the educators at this institute and we all look forward to working with each other in the future.

Joseph Kerski, above, at the conclusion of the activity to create a cell-phone tower in Queenstown, using digital elevation and vector data together with ArcView and extensions.

Pete Arthur, above, conducted an excellent session on North Island volcanism.

As evident above, there was a good deal of peer mentoring and sharing at the GIS institute.



Results from 2004 tsunami analysis during the workshop.

Another excellent presentation was by Bonita Gestro, above, from Eagle Technologies. Eagle Technologies has been very supportive of GIS in education in New Zealand and are the ESRI distributors and supporters for the country.

The institute also included several excellent presentations on science, geography, and mapping. Above, Graeme Blick (left, from Land Information New Zealand) and Peter Otway presented an excellent "Surveying And Mapping in Antarctica—Past and Present."

Brett Dascombe, above, ESRI Australia Education Coordinator, conducted a presentation at the institute. It was a pleasure to finally meet Brett, and we quickly found another "kindred spirit" in geotechnologies. We spent long hours after the institute each night "tinkering" with GIS-based projects. Brett has authored numerous amazing GIS-based projects of his own.

Field Trip: School Visits

Students at the Diocesan School for Girls, Auckland, gave us excellent one-on-one demonstrations of their GIS-based projects, under the guidance of teacher Sally Brodie, below.

Students at Botany Downs Secondary College, above and below, gave us an excellent overview of the school and how they use geotechnologies in the curriculum. Stephanie Eddy spearheaded the efforts to bring GIS and GPS in an interdisciplinary way to the school.

Above, we had the opportunity to talk with Chilton St James students in Lower Hutt, below. I gave a GIS demonstration and also spoke about the differences between USA and New Zealand schools. Even better, we were able to listen to student presentations of their GIS projects, which included the siting of an ice skating rink in their community, among other topics.

Field Trip: Physical and Cultural Geography

Our field trip for the USA teachers was organized by GISetc and GISmaped. Our guides were Peter Arthur (geography teacher) and Paul Arthur (computer programmer); we dubbed Peter and Paul the Geo-Apostles, and very much enjoyed our entire time with them. We explored both the North Island and the South Island with them, including sites of significance for both physical geography and cultural geography.

Above, Joseph Kerski, Roger Palmer, Anita Palmer, institute leaders.

Our field vehicle, site of dozens of hours of interesting discussions about geography, science, geotechnologies, language differences between USA and New Zealand English, and much more.

Roger Palmer, above, collected 30 water samples from throughout the country, which he mapped and organized into a GIS-based water quality assessment activity. These included diverse samples from pools, hot springs, the ocean, thermal areas, rivers, wetlands, and ditches.

We began our field trip with a boat trip around Auckland Harbor, one of the most fascinating sites for any city in the world, with its amazing volcanoes, mangroves, and much more.

Once again, breaking out the laptops for more spatial analysis!

We visited the Wairekei Geothermal Plant, the world's first successful commercial geothermal operation.

We attended a Maori cultural experience near Rotorua.

Visiting the Wai-O-Tapu Thermal area was incredibly fascinating. New Zealand has just about every conceivable landform in a small area.

We spotted 5 whales on a boat out of Kaikoura, South Island.

Bruce Dickson, who uses GIS to analyze weather, and does other innovative geography teaching, guided us to the top of Mt Sunday ("Edoras" in The Lord of the Rings movies), from where we had an awe-inspiring vista of the surrounding glacial terrain.

Visiting 45 South Latitude, 170 East Longitude in Central Otago, South Island.

Cultural Geography: Shoe fence in Central Otago!

It may look pretty, but this is gorse, fire-susceptible thorny invasive plant that Anne Olsen's students studied using GIS and spatial analysis.

Amazing circular rocks on South Island beach.

Oamaru was one of the interesting towns we visited.

Our final stop was the International Antarctic Centre in Christchurch, where we learned about research being conducted for the past century on the Antarctic continent.

Recommendations

This institute and events like it illustrate the impact that a combination of spatial analysis, authentic, outdoor experiential learning, and inquiry-based, problem-solving learning with real-world data can have. It empowers teachers and their students to investigate their world, connect with their environment and with their community, and augment their self-image and their perceived role in the world. The workshop attendees well illustrated the wide applications of GIS and GPS throughout education—history, math, geography, teacher education, environmental studies, earth science, biology, and more.

These events emphasized interdisciplinary linkages between geography and science, and examining real-world issues in education and standards-based education. Now more than ever, it is important that educators, GIS specialists, and scientists remain involved with events such as this and with nurturing the relationships and partnerships that follow.

I believe that federal organizations have a role to play in preparing teachers and students to use our data and products, and spatial data and technologies. I believe that it is also our responsibility to do so as public service agencies. Our relationship with the event organizers has been fruitful and continues to grow.

By conducting workshops, we have the opportunity of working one-on-one with the teachers. We have the opportunity of obtaining their feedback on curricular materials that we develop. We work with educators to demonstrate ***how*** our products and spatial data in general can be used in conjunction with national science and geography standards. It does more than explaining ***what*** products are available.

The emphasis was on real-world data and technology in education, particularly geospatial and scientific information. Both the growth in educational technology and the curricular content standards present excellent opportunities for us to introduce our data and products to students and educators around the world. Students familiar with spatial data will form a geospatially-literate society. Another objective was to "train the trainers"--teachers. These trainers will themselves have already begun to network with and train other educators, administrators, and students.

By participating in this event, the attention generated from teachers and students around the world for science and for geography could be enormous, given current concern with teaching about globalization, the environment, and technology.

Acknowledgements

I thank the organizers of these events—Anne Olsen, Stephanie Eddy, Anita Palmer, and Roger Palmer for their hard work over this past year. They truly went above and beyond all expectations. I look forward to our continued collaboration. I thank all of our participants for their contribution and for making this event so memorable. I also thank Anne Olsen, US Ambassador Charles Swindells, Richard Benge of his staff, and Robert Talbot for paying my way to New Zealand and for organizing my presentation at the US Ambassador's home. I also thank

the students we met at the three schools we visited, and their teachers, including Sally Brodie. This institute was greatly enhanced by the work, enthusiasm, and expertise of Peter and Paul Arthur, our guides. I also thank Bruce Dickson for the field trip he conducted. I am certain that I am forgetting someone who worked hard on these events, but you should know that your efforts were much appreciated as well.

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New Zealand 2005 Report