

Learner-Centered Education Grant FINAL REPORT

2003

1. Project Name and Project Director's Name. Include mailing address, phone and e-mail address.

Project Name: Connecting Disabled Students with Arizona's Landscapes through Geography LCE Education

Director Name: Ronald I. Dorn

Address: Geography Department, Arizona State University, Tempe AZ 85287-0104

Phone: 480-965-8313

E-Mail: ronald.dorn@asu.edu

2. Brief Description of Project:

The proposed modification to GPH 211 (Introduction to Landform Processes) turns the course into an internet LCE exploration of Arizona's spectacular natural landforms, with the goal of making accessible a field-based LCE experience normally denied to many disabled students. The performance objectives for GPH 211 are being met through a combination of deductive and inductive reasoning, driven by student-derived questions. Each field-based module focuses on a core area of geomorphology (e.g., understanding a hillslope - Tempe Butte, rock decay, Ice and flowing water as agents sculpting landscapes, landsliding, the Grand Canyon). On-line student exchanges drive the assessment (e.g., essay questions, research papers) that is then answered with the aid of "book learning" (textbook, extra readings, annotated images to model how to interpret other examples of these phenomena). In summary, this LCE course modification uses field modules that shift intellectual ownership of the course performance objectives to the students. These goals were met and explained in the interim report when the project was two-thirds complete. The impressive achievement of putting together a state-of-the-art LCE internet course for the very low sum in the grant proposal was possible only through the hard work of Ph.D. student John Douglass, who taught the course in the Fall of 2003 with the highest evaluations for internet courses taught at this level.

In the time since the interim report, the grant's remaining objectives have been met.

First, the most significant content material was translated into a series of K-12 lessons made available on the website of the Arizona Geographic Alliance. These K-12 lessons meet geography, science and language arts state standards. They focus on the Grand Canyon as an iconic landmark in Arizona.

Second, we modified the Tempe Butte virtual field module for use in the SQ (laboratory science) course GPH 111, and we tested the efficacy of this virtual field trip experience in comparison with real field-based education in a rigorous experimental design. Statistical analyses of pre-test and post-test results involved compared students who learn only virtually with those who learned only in the field. We did not find statistically significant differences in performance in student learning, with the exception of establishing geographic context. For most learning metrics, the virtual field trips are as effective real field trips in establishing knowledge about key concepts in introductory physical geography classes.

Learner-Centered Education Grant

FINAL REPORT

3. Goals, Outcomes and Assessments

a. Goals and Primary Accomplishments:

The goals for the project are all met. In brief summary, the college course modules are complete and were tested Fall of 2003 in the MyASU class GPH 211. The K-12 adaptations were tested in November and December of 2003 in a Title I school context. Development of the "Tempe Butte" module for Disabled Students enrolled in the the laboratory science course, GPH 111, was completed in the the Spring Semester of 2004 and tested in a rigorous experimental design.

b. Outcomes and Assessment:

The following have been achieved:

- Digitizing 2000-plus image geomorphic slide collection, to serve as comparative resources and background information for the modules
- Image acquisition for all course modules
- Completion of the on-line GPH 211 modules for MyASU course.
- Fall Semester 2003 piloting this LCE Internet version of GPH 211 (SLN 05761, GPH 211, Landform Processes). Enrollment was advertised in the ASU Disabled Student community, and enrollment reached the maximum of 25 for this writing-intensive "L" (literacy and critical thinking) course.
- Student surveys reveal tremendous satisfaction with the course material. Most complaints revolve around the difficulty of the course material, while most positive feedback revolves around enough enthusiasm over the content to have brought about a desire to experience natural landscapes in person, if physically possible.
- The existence of the course materials was noted at the 2003 Arizona Geographer's meeting, including a notation that materials would be made available to interested ABOR geography departments.
- The Tempe Butte module for GPH 211 was modified for use as a means to accommodate physically disabled students enrolled in GPH 111 in Spring Semester of 2004. Based on rigorous testing in an experimental design, the module has been modified and is posted at (http://alliance.la.asu.edu/gph111/Updated_Virtual_TB/intro/overview.html) and by accessing the introduction to physical geography website.
- The modules adapted for use in K-12 classrooms has been refined and has been posted on the website of the Arizona Geographic Alliance (<http://alliance.la.asu.edu/azga/>).

Learner-Centered Education Grant

FINAL REPORT

4. Problems or Issues:

The \$15,500 budget greatly underestimates the true cost in the development of an LCE internet course. This project has been successful because the graduate students involved (especially Ph.D student John Douglass) put in approximately four times the amount of hours than originally budgeted, and because PI Professor Dorn's effort was done on a volunteer basis. Thus, we urge the reader not to expect similar LCE course development for this price.

5. Conclusions, Recommendations and Future Directions:

Even though dollar amounts are small, the fact that ABOR encourages faculty to engage in state-of-the-art instructional development boosts morale amongst teachers committed to serving the needs of our changing learners. In no uncertain terms, the existence of ABOR-generated programs helps promote the importance of adapting teaching to the needs of modern students who learn very differently from their predecessors. Future directions should move beyond simple LCE education to focused funding on the needs of different student populations, such as the economically disadvantaged.

6. Has this project led to sustainable change in your department/college? Describe:

The project has led to three sustainable changes. First, the modules are now complete for an introductory landforms course, permitting disabled students the chance to visit field settings and experience learner centered education in a new way. Second, one of the modules was adapted for use in the large introductory physical geography laboratory science class, giving physically disabled students a chance to access the Tempe Butte laboratory in a virtual fashion. Rigorous testing of the virtual lab reveals almost statistically indistinguishable learning among students participating in the virtual lab activities. Third, the modules were modified to fit middle school classrooms, in the form of learner centered education posted on the Arizona Geographic Alliance website.

7. Impact:

a. Have other faculty been affected by this project? Yes If so, describe:

Other faculty teaching the large GPH 111 section now have a means by which disabled students can participate in learner centered education on a virtual field trip.

b. Number of courses affected/involved. GPH 211 (Introduction to Landform Processes) and GPH 111 (Introduction to Physical Geography)

c. Number of students affected. 25 in the Fall of 2003 and 210 in the Spring of 2004, with an expansion to 525 in the Fall of 2005 when the virtual field experience is made available to all introduction to physical geography students

Learner-Centered Education Grant

FINAL REPORT

8. **Significant Outcome:** What was the most significant outcome based on learner-centered principles that occurred through your project?

Physically disabled students are able to participate in learner-centered field experiences, and a rigorous controlled research design reveals that student learning on a properly designed virtual field trip is very similar to learning by students in a real field setting.