OEDG Track 1: Expanding Geoscience Diversity through Simulated Field Environments for Students with Physical Disabilities

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Introduction

- Objectives and Timeline of the Project

Audience

- Demographics, grade level, numbers involved

Specific Needs

- Barriers to entering geosciences
- Our Specific Approaches to meeting those needs and addressing these barriers

Preliminary Results

- Any Impact to date and its supporting evidence

Lessons Learned

- To date

Open Questions and Discussion

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Introduction: Objectives

1. Obtain additional data related to the geological formations of the study
2. Integrate the data into a virtual environment to emulate a typical field experience
3. Conduct usability studies with the mobility impaired community
4. Assess the efficacy of the virtual environment to provide an effective educational alternative to field experience
5. Plan for a broader quantified study of the cave and karst system module for an OEDG Track 2 submission.

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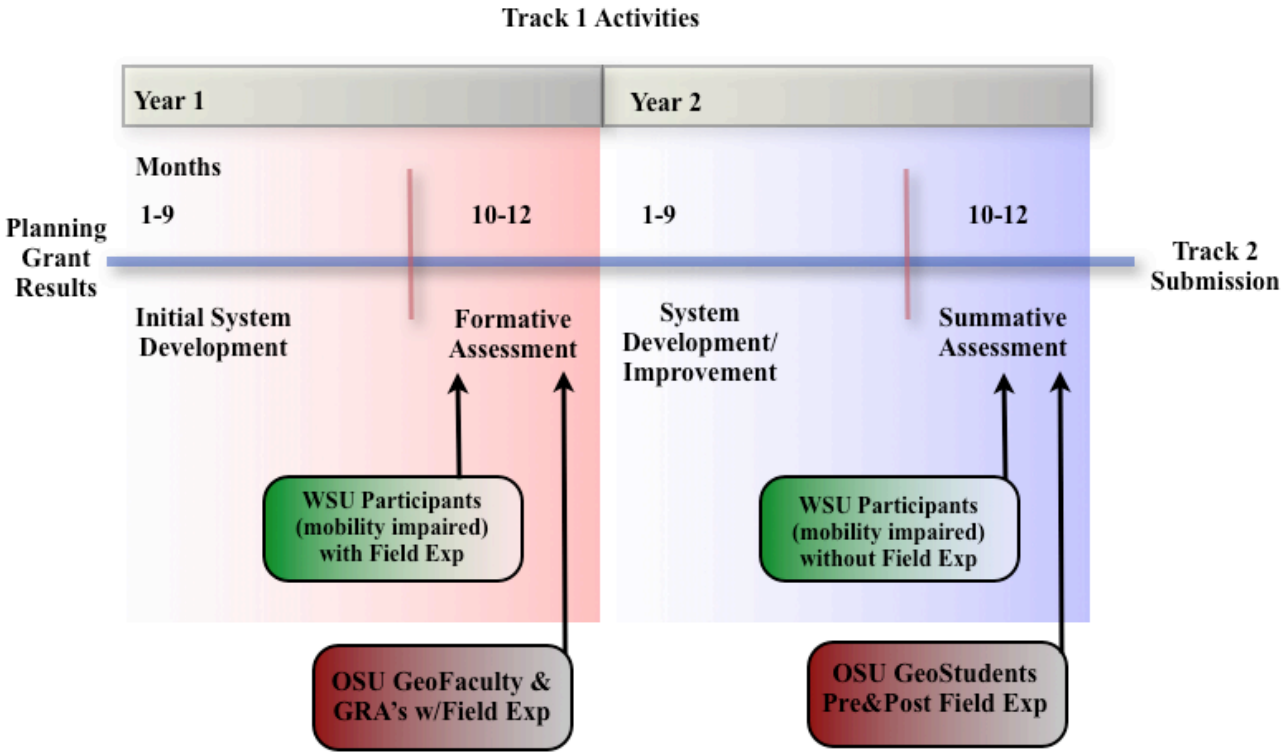
Introduction: Timeline



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Audience

- ~1.4 million students, reported having a disability of some kind (NCES, 1999; Locke, 2005)
- According to the American Geological Institute (AGI), during the 1995–1996 school year, the total U.S. undergraduate enrollment in the geosciences was estimated at 32,932; of this group, only 59 students (0.17%) were identified as disabled (AGI, 2006; Locke, 2005).
- 8 Million Americans with Mobility Impairments
- Geoscience remains one of the sciences with the lowest participation levels for persons with disabilities (Locke, 2005)

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Audience

Demographics (Planning Grant Study)

- 6 Students with mobility impairments (WSU)
  - 5 congenital, 1 acquired
  - 3 female, 3 male
  - Ages 19-44 (average of 21 without outlier)
  - 5 undergraduate, 1 graduate
  - 3 white, 2 African American, 1 Asian
  - No science majors

Demographics (Track 1 Study)

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Specific Needs

Barriers to entering geosciences

Emphasis on Field experience Geoscience field-based coursework offerings in most geology and earth science departments are reappearing nationwide (AGI, 2009; Whitmeyer and Mogk, 2009).

Locke identified a traditional conceptualization of fieldwork that ultimately suggests that “geoscience careers are only for the strong and able-bodied” (Locke, 2005, p. 2). Those students who do not fit this able-bodied profile are therefore marginalized, and excluded from traditional geoscience fieldwork (Nairn, 1999; Hall et al., 2004; Hall and Healey, 2005).

Our Specific Approaches to meeting those needs and addressing these barriers

- adoption and adaptation of emerging and enabling technologies to meet the needs of the under-represented population.
- develop a synthetic (virtual) environment tailored to emulate a field study of cave geology.

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Preliminary Results – lessons learned

Content knowledge:

- Enhanced interpretation skills

Barriers:

- Physical
- Psychological (increased self-efficacy)
- Societal

Unanticipated outcomes:

- Group unity/ inclusive of instructional staff
- Frustration for lack of control in decision-making
- Implicit and indirect fears
- Pros and Cons of independence

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Preliminary Results – moving forward

- Interest in content and gratitude for inclusion
- Involve individuals with physical disabilities in the planning process
- Analysis of barriers to inclusion in field-based learning environments
- Interfaces to accommodate persons with physical disabilities

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Preliminary Results – moving forward

Initial LIDAR data integrated into Unity3D

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