GEO-NEEDS: STAKEHOLDER NEEDS ASSESSMENT FOR BROADENING PARTICIPATION IN THE GEOSCIENCES AT TWO-YEAR AND MINORITY-SERVING INSTITUTIONS

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ABSTRACT

Despite a significant investment of resources, the geosciences remain one of the least diverse of all science, technology, engineering, and math (STEM) disciplines, with underrepresented minorities making up ~8% of the geoscience-related workforce. Although this pattern of underrepresentation has been attributed to numerous factors, our NSF-funded project focuses on the lack of access to undergraduate geoscience courses and programs of study at two-year technical and community colleges (2YCs) and minority-serving institutions (MSIs) with two related goals: (1) identify barriers and opportunities for better use of existing resources that engage underrepresented students in the geosciences at 2YCs and MSIs, and (2) explore what an "ideal model" of resources, partnerships, professional development, and ongoing support for faculty and institutions might look like.

To reach these goals, we convened four focus group meetings in August 2015. The 40 participants were drawn from four key stakeholder groups: 2YC and MSI geoscience instructors, 2YC and MSI administrators, organizations that create and/or disseminate geoscientific resources and educational materials, and researchers with expertise in equity, access, and diversity in either the geosciences or broadly in higher education. Through brainstorming activities, discussions, and an ideal model activity, we elicited participants' views of the current status of geoscience instruction at 2YCs/MSIs and their recommendations for expanding access to the geosciences for underrepresented students at these institutions. In July 2016, we supported 20 instructors from 2YCs and MSIs to attend the Earth Educators Rendezvous (EER) and a follow-on Geo-Needs workshop. Here participants developed an action plan detailing a course, curriculum, or extracurricular program that would expand access to the geosciences for their 2YC/MSI students.

Products of this project include the 2015 Focus Group Meetings Report and Executive Summary, a collection of resources and recommendations derived from the 2015 focus group meetings, and a collection of action plans derived from the EER workshop. All materials are available on the Geo-Needs website: http://serc.carleton.edu/geoneeds/index.html.

THE GEO-NEEDS PROJECT

Geo-Needs is an NSF-funded project that seeks to explore barriers and opportunities for enhancing geoscience instruction at two-year colleges (2YCs) and minority-serving institutions (MSIs) so that these student have greater opportunities for employment in the geosciences. Two primary activities were conducted, a series of focus group meetings with stakeholders, and professional development for 2YC/MSI faculty.

Overall Project Goals:

1. Identify and clarify barriers and opportunities for better use of existing instructional resources that engage underrepresented students in the geosciences at 2YCs/MSIs
2. Explore with stakeholders what an "ideal" model of resources, partnerships, professional development, and ongoing support for faculty and institutions might look like.

Academic Administrators:
This meeting was focused on administrators to help identify potential sustainable opportunities for enhancing existing geoscience instruction and establishing new instruction at 2YCs and MSIs.

Instructors:
At this meeting, we focused on the needs of individual 2YC/MSI instructors for reaching and engaging currently underrepresented students in the geosciences.

Education Researchers:
At this meeting, we focused on opportunities to engage geoscience education researchers in addressing enduring questions about the recruitment, retention, education, and workforce preparation of underrepresented students

Resource Providers:
This meeting focused on how resource providers interact with 2YCs and MSIs to provide timely and responsive instructional resources, materials, and tools.

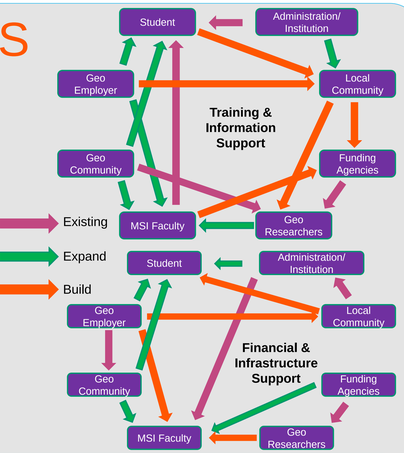
2015 FOCUS GROUP MEETINGS

Participant Demographics	#
Total Participants	40
Total Higher Education Institutions and Organizations	34
Total Higher Education Institutions	27
MSIs Represented	8
2YCs Represented	11
4YCs Represented	15

Administrators/Instructors	#
Total Administrators	5
Total Instructors	16
Higher Education Institutions Represented	17
MSIs Represented	7
2YCs Represented	10
Higher Education Institutions w/ Geoscience Programs	12
Higher Education Institutions from Illinois	7

Education Researchers	#
Total Education Researchers	11
Institutions/Organizations Represented	10
Institutions/Organizations w/ Geo Program	8
Geoscience Education Researchers	3
Geoscience Education Researcher	4
Higher Education Researcher	4

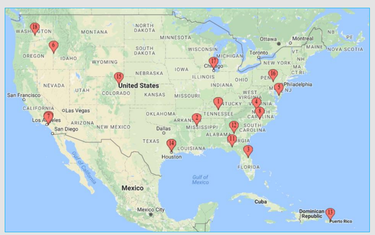
Resource Providers	#
Total Resource Provider Participants	8
Organizations Represented	8
Federally Funded Organizations	5
State Funded Organizations	3



Four 3-day workshops were held at the Northern Illinois University Conference Center in Naperville, Illinois, USA.

- Each meeting considered specific questions that speak to the overall project goals.
- Each engaged participants in small group and whole group discussions, brainstorming sessions, guest speakers, collaborative web authoring, and individual reflection.
- A major focus of the meetings was developing an "ideal model" that envisioned the stakeholders, resources, training, support, and funding needed to increase the involvement of minority students from 2YCs/MSIs in the geoscience workforce.

2016 EARTH EDUCATORS RENDEZVOUS WORKSHOP



EER Workshop Participant Demographics	#
Total Participants	31
Participants supported by Geo-Needs	18
Geo-Needs participants from 2YCs	9
Geo-Needs participants from 4YCs	9
Geo-Needs participants from HBCUs	6
Geo-Needs participants from HSIs	6

Expectations:
Participants supported by Geo-Needs were expected to:

- Attend all five days of the 2016 EER
- Attend a social/networking dinner hosted by Geo-Needs
- Attend the 2-day Geo-Needs workshop
- Submit an action plan following the workshop

All Geo-Needs workshop participants were expected to:

- Attend the 2-day Geo-Needs workshop
- Submit an action plan following the workshop

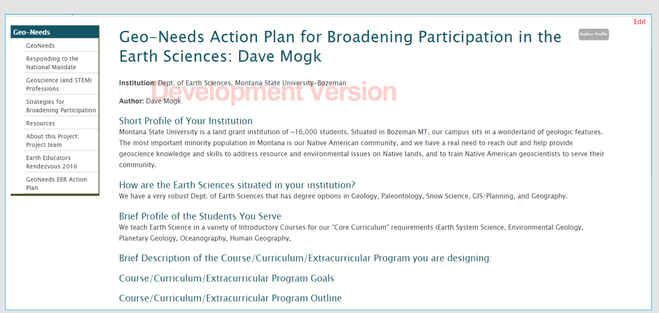
EER Workshop Goals:

1. Build capacity of 2YC/MSI individuals and institutions to offer geoscience courses and programs.
2. Offer professional development to faculty and administrators with limited experience in the geosciences.
3. Help participants create an Action Plan to increase participation of students from underrepresented groups in the Earth Sciences.

EER Workshop Agenda

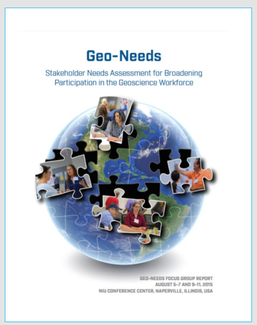
Day 1: Thursday July 21
8:30-8:45 Welcome and Introduction
8:45-9:15 Participant Introductions
9:15-9:45 A Focus on Your Students
9:45-10:15 Writing Time/Break
10:15-11:00 A Focus on your Course/ Curriculum/ Program
11:00-11:15 Reflection, Homework (work on action plans)
11:15-11:30 Evaluation Road-Check

Day 2: Friday July 22
8:30-11:15 Individual writing time with periodic group check-in
11:15-11:30 Wrap-Up and Evaluation



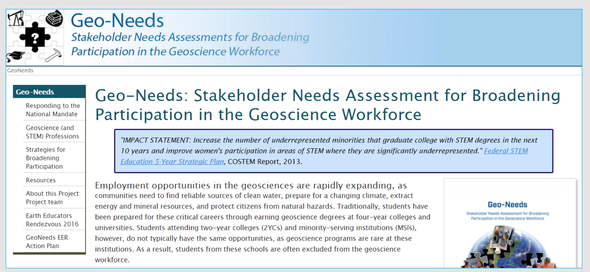
PRODUCTS AND RECOMMENDATIONS

2015 MEETINGS REPORT AND EXECUTIVE SUMMARY



PROJECT WEBSITE

http://serc.carleton.edu/geoneeds/index.html



On the website:

- PDF of the Meetings Report and Executive Summary.
- Resources to support broadening participation in the geosciences for underrepresented students.
- Resources contributed by 2015 and 2016 participants
- Ideal models with actions needed to broaden participation.
- A collection of action plans sharing examples of work being undertaken by 2YCs and MSIs (coming soon!)

Key Recommendations for Broadening Participation in the Geosciences at 2YCs and MSIs:

1. Institutions need to focus more on support for the whole student and the cultural context of instruction. Mentoring and other forms of individual student support are critical to recruitment and retention efforts. Faculty want support for adapting curricula and instruction to local places and contexts.
2. Geoscience needs more proactive and positive marking with underrepresented students, parents, and communities. Outreach efforts, both within the institution and in the institution's community, should focus on portraying the geosciences as a career path contributing to the good of society.
3. Personal connections are needed to sustain diversity efforts. Individuals as well as institutions must build and sustain partnerships between 2YCs, MSIs, and 4YCs to create multiple pathways to geoscience careers.
4. Future efforts should focus on developing pathways for specific 2YC or MSI contexts (e.g., workshops just for urban, Hispanic-serving institutions and their faculty). Regional partnerships between 2YCs, MSIs, and 4YCs are critical to sustaining these pathways.

ACKNOWLEDGEMENTS

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