

Workforce Preparation - A Breakout Session for the “Building Strong Geoscience Departments” Visiting Workshop Program ED13C-0607

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ABSTRACT

We have designed a workshop breakout session and accompanying web based materials to assist geoscience departments in better preparing their students for professional careers following graduation. The session explores ways to obtain feedback about career preparation from employers and alumni that can be used to develop more effective curriculum, as well as departmental activities to better prepare students for employment opportunities. In addition, it identifies sources outside a department that can be used in the workforce preparation process and methods to assess any changes implemented to prepare students for the workforce. Concrete examples include feedback from a survey of recent (< 5 years) alumni at the University of Texas at El Paso, student run research meetings with built-in assessment opportunities, and a wealth of on-line resources. The session was initially tested in June 2009 at the *Strengthening Your Strong Geoscience Department* workshop. Comments from the June participants have been used to improve the session for the 2009-2010 “visiting workshop” program.

INTRODUCTION

The Visiting Workshop Program brings the knowledge gained from the Building Strong Geoscience Departments project onto campuses to support conversation and planning by the geoscience department as a whole. The program offers a range of interactive sessions based on lessons learned from previous workshops and supported by on-line resources. The program is unique because it: (1) focuses on the context of a specific department, (2) engages the entire department in an in-depth, structured discussion of topics, and (3) provides external framework and support for a department. Two-person teams visit the department to provide two outside perspectives.

One session offered by the Visiting Workshop Program is related to professional preparation of students. This session grew out of a 2007 workshop on *“The Role of Departments in Preparing Future Geoscience Professionals”* (<http://serc.carleton.edu/departments/professionalprep/index.html>) and was “test driven” at the 2009 workshop on *“Strengthening Your Geoscience Program: A Practical Workshop with Ideas and Examples”* (http://serc.carleton.edu/departments/program_revision/index.html)

The goals of this session include:

- Explore ways to obtain feedback on workforce preparation
- Determine how to use feedback to improve curriculum and outside activities
- Plan ways to assess if implemented changes are working

ORGANIZATION

The session consists of a brief presentation on where students with geoscience degrees now work, the changing of the workforce through time, and the disjoint between student and faculty perceptions of career opportunities. The presentation draws upon information from the American Geological Institute’s 2009 “*Status of the Geoscience Workforce*” Report (<http://www.agiweb.org/workforce/reports/2009-StatusReportSummary.pdf>).

Following the presentation a case study provides an example of how information from recent alumni can be used to obtain feedback on professional preparation. The session participants are then asked to conduct two activities. The first activity focuses on how to collect information from employers, alumni and others to improve workforce preparation and the second activity focuses on how to institute changes at a department and university level as well as to assess the impact of these changes.

CASE STUDY

We conducted a survey of 42 recent alumni (within 5 years of graduation) from the Department of Geological Sciences at the University of Texas at El Paso. These alumni were emailed a short questionnaire as outlined below. We achieved a 55% response rate. Of the alumni who replied 12 work for the petroleum industry, 3 are in government labs, 3 are in graduate school, 2 are in consulting firms, 3 are in academia; 10 are female, and 10 are minority. Although we sent requests to alumni who received BS, MS or PhD’s we only received responses from MS (15) and PhD (8) graduates. Nearly all alumni expressed pleasure in being asked to provide feedback that would help the department. The questions we asked, as well as some of the representative responses, are listed below.

What were your most helpful courses?

- Courses that focused on basic concepts
- Courses that had a final project
- Courses that critically discussed current literature

What were your least helpful courses?

- Team taught courses (too much information, disparate teaching styles)

What other courses would you have liked to take?

- Project Management
- Writing/Presenting for both technical and non-technical audiences
- Statistics
- Learning how to apply for research grants

What activities within and outside the Department did you consider beneficial?

- Attending professional meetings and making presentations (especially oral)
- Presentations made at local schools or to school groups touring building
- Student research colloquium (mentioned by all alumni) (see http://serc.carleton.edu/files/departments/professionalprep/doser_poster.pdf for a description of colloquium)
- What would you suggest we do outside of classes to help prepare students?*
- Interview preparation (telephone interviews)
- Exposure to fieldwork
- Students meeting with alumni
- Alumni mentors for students
- Enter “challenge” competitions sponsored by professional organizations

A complete set of 11 initial responses (collected in May/June 2009) may be found at: http://serc.carleton.edu/files/departments/program_revision/workforce_survey_results_ute.pdf

Based on this input, the department decided to implement an upper division/graduate level writing course within the next academic year and to require more field related work at all levels. We will assess if these changes have produced improved preparation through surveys/conversations with professionals who serve as judges at our annual student research colloquium, as well as surveys of alumni



Workshop Leaders and Advisors (left to right)

Cathy Manduca, SERC-Carleton College, Heather McDonald, College of William and Mary, Diane Doser, University of Texas-El Paso, Mary Savina, Carleton College, Dallas Rhodes, Georgia Southern University, Geoff Feiss, College of William and Mary, Diane Clemens-Knott, California State University-Fullerton, Randy Richardson, University of Arizona (not shown: Tim Bralower, The Pennsylvania State University, Carol Ormand, SERC-Carleton College)

SESSION ACTIVITY #1

Individuals were asked to reflect upon:

(a) Who are the major employers of your students?

(b) What feedback (both good and bad) have you received from employers and graduates about workforce preparation?

(c) How could you get more feedback?

(d) Are the knowledge/attitude/skills desired by employers changing? How?

In the June 2009 session individual responses were shared as a group.

Common employer concerns included:

Lack of problem solving/analytical skills, communication skills
Lack of field skills, GIS skills, statistics
Little sense of business, professionalism or cultural diversity

Positive employer comments included:

Enthusiasm and integrity of students
Some programs have trained students well in field skills

Ways to get more feedback:

Alumni surveys
Use University’s alumni office
Alumni gatherings at professional meetings (GSA, AGU, AAPG, etc)

SESSION ACTIVITY #2

Attendees were grouped into teams to address the following issues:

- *Team 1 – How we improve workforce preparation through curriculum changes and assess these changes*
- *Team 2 – How we make changes in other departmental activities to improve workforce preparation and assess these changes*
- *Team 3 – How we can unite with others on/off campus to improve workforce preparation and how to assess its impact*

In the June 2009 session the teams suggested some of the following ideas:

Team 1 – use a matrix of all classes to be certain that important skills are being covered in one or more classes, assess these skills through portfolios or a capstone course

Team 2 – hold orientation programs for students from 2-year colleges, if your department only graduates a small number of majors pool your exit interview/survey data with other similar schools for larger sample sizes

Team 3 – take advantage of career centers and teaching/learning centers to teach about resume preparation, interviewing, use of simple software packages

Assessment ideas (in general): if alumni/guests visit campus for presentations on professional preparation, conduct pre- and post-presentation interviews of students, form advisory boards of alumni and local professionals, design a survey for students to take when they first come to department for advising and again when they leave that answers ques-

CONCLUSIONS

The Visiting Workshop Program traveled to the University of Pennsylvania in November 2009 (see poster ED 13C-0608) and will be traveling to an additional 9 Geoscience Departments during the spring of 2010. During this process we will be continually adding to our collection of materials on professional preparation that will be posted on the “Building Strong Geoscience Departments” website.

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