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Disciplinary Health and Geoscience Departments

Geoscience Departments and Maintaining Disciplinary Health

The health of a discipline is dependent on two components – a broadly accepting and educated public and a corps of well-trained professionals in the discipline. The balance of these two factors often varies depending on specific circumstances. Some disciplines can lean on the broad - but general - understanding of their work, such as philosophy. Though there is not a large number of philosophers currently employed today, not only is there a large body of the population who have taken philosophy classes in school, but a public perception of the discipline's role is widely accepted. On the other extreme, many people in the public have never taken a physics course, nor truly understand the discipline, but they recognize the well-trained population of physicists at work both in academia and industry and the products of their work.

One may argue that the geosciences currently are lacking on both components of disciplinary health – geoscience presence in education continues to face negative downward pressures, and there exists a perception of a dwindling corp of professionals. Though both arguments may be partially correct, the data collected by AGI in its disciplinary health surveys indicate that geoscience departments play a defining role in the health of the geosciences and many are doing well. As of the start of 2005, there are 903 identifiable geoscience departments in the United States, with 879 granting some sort of degree. This is a substantial change from 1990, when 838 departments existed in the United States and only 652 granted degrees. So where is the crisis?

The crisis is that there are shifts of power and success factors in the universities, often driven by numbers of students and political perception of a subject area. One crucial component for the geosciences is bulk education of the public through introductory geoscience courses. The number of students taking an introductory level geoscience course has remained steady from 1990 to the present, with approximately 250,000 per year. Today, nearly 8% of all students currently enrolled in a college degree program have taken at least one geoscience course. What is changing is the proportion of students taking GEOLOGY compared to the broader GEOSCIENCES - from 245,000 in 1990 to 175,000 today. The rest are touching the discipline through tailored courses in environmental science, meteorology, and similar non-hard rock courses.

Likewise, enrollment of majors has also seen remarkable internal shifts. In the 15 years since the divorce of geoscience enrollment trends to energy prices, gross geoscience enrollment has largely remained steady at approximately 18,000. However, traditional geology enrollment appears to be collapsing, with enrollments around 10,000. This shift may be viewed as a strategic redefinition within the

discipline, however, the numbers also suggest a potential false economy. The growth in the number of departments since 1990 has largely been from increased geoscience teaching in geography programs and the formation of new environmental science programs with earth science components. However, in that same period of time, over 50 long-standing geoscience departments have merged, been eliminated, or otherwise have stopped teaching geoscience. As best can be determined from the data collected by AGI, many of those failed departments folded AFTER they attempted transitioning into environmental science programs. In chasing students, they failed to recognize their own strengths.

Historically AGI has been able to establish five categories of departments: major research, medium-sized programs, liberal arts, community college, and non-geoscience institutions. Traditionally, the major research programs produce the vast majority of faculty and industry professionals. Today, there are about 35 departments in this category at mostly major state universities with comprehensive B.S. and Ph.D. programs.

The medium-sized programs traditionally produce the majority of bachelor and a large proportion of the master's degrees in the geosciences. This category, numbering perhaps 450 departments in all, is where most of the recent turmoil has occurred, with closures such as George Washington University and marked decreases in enrollments. Medium-sized programs, which tend to be at state and private institutions of many sizes, including major universities and even some smaller private schools, is also where many of the environmental transformations have occurred, with limited evidence of long-term success.

The liberal arts programs, mostly at liberal arts colleges, perhaps 50 departments today, represent the long-standing core of geoscience programs. Though some departments have been lost, a number show growing strength in their enrollments. On average, these programs have maintained fairly traditional geoscience programs while providing flexibility in their program to address institutional needs.

Community college programs used to be an area of strength for the geosciences, providing introductory science classes to the general population. However, over 40 community college programs in the last 5 years have disappeared or stopped all teaching of the geosciences. This shift also has set in motion the trend towards only degree-granting departments surviving. In 1990 fully 20% of geoscience departments did not grant degrees. Today, that number is now only 3%.

Another category for consideration are the departments that do not exist! Only 21% of colleges and universities have any formal geoscience courses taught on their campus. Though many of these 3000 institutions represent a small percentage of the total college-age population, it also demonstrates substantial political, philosophical, and economic factors that geoscience departments must be geared to face.

What appear to be the disciplinary-level keys for long-term departmental success? Focus on building on the core competencies of the existing program is central. The large research programs continue to recruit and place student successfully, and continue to represent the source of nearly all new US-educated geoscience faculty. These programs have established critical mass and are generally part of the cultural framework of those institutions. The other area of strength is in the liberal arts programs which have maintained their core programs through time. One part of the success of these program may be based on the idea put forward by Ed Roy of Trinity University – Liberal Science Education. Though we do not consistently collect numbers on this, a reasonable number of liberal arts geoscience graduates go on to non-geoscience careers. This is a critical component of satisfying the needs of disciplinary health – these graduates represent the core of the geoscience-aware public, and in their capacities as doctors, lawyers, teachers, and other professionals represent important ambassadors for the discipline as they bring to bear their geoscience education on other endeavors.

The crisis is change. Departments needing to change rapidly for survival are not succeeding. Departments that build on their core competencies continue to demonstrate that they can move with the cultural shifts needed to continue to attract students. Though the student is now often viewed as “The Customer,” sometimes the customer is not always right.