

Building strength through curriculum reform and ‘community’ development

Carolyn H. Eyles and Susan Vajoczki

School of Geography and Geology, McMaster University, Hamilton, Ontario, Canada

Background:

McMaster University is a ‘research-intensive, student-centred’ university with over 18,000 full-time students. The School of Geography and Geology (SGG) was created in 1997 through amalgamation of the former departments of Geography and Geology. A large number of faculty retirements (20 out of a combined faculty of 30!), declining student enrolment in undergraduate geology programs, and budget constraints precipitated this event. When SGG was initially formed, many of the existing faculty members were already involved in research with an ‘environmental’ focus (e.g. environmental geoscience and environment & health) and it was decided to further develop this area of strength with a limited number of immediate new faculty hires. An ‘environmental’ focus for the School was particularly appropriate as McMaster is located in an urbanized and heavily industrialized region of southern Ontario where students and the community at large are concerned with environmental issues. Senior administrators committed to additional resources if undergraduate enrolments in the School increased and we have hired 14 new faculty members since 1998.

Undergraduate programs

One of the first tasks of the new School was to revise and restructure all undergraduate B.Sc. programs in order to meet changing societal and employer needs and to attract more students. Impending professional certification for practicing geoscientists in Ontario was an additional stimulus to curriculum reform. Prior to program design a series of surveys were conducted to collect information from in-program students, alumni, and potential employers regarding the characteristics of an ‘ideal’ geoscience graduate. Survey results showed that the ‘ideal’ graduate should have a broad geoscience background, but should be specialized in a particular field, should have been exposed to ample ‘hands-on’ (experiential) learning and should have well developed personal transferable skills (e.g., problem-solving, critical thinking, communication skills). This information allowed us to design a B.Sc. Honours program in Earth & Environmental Sciences (EES) that included a common ‘core’ program, specializations (Geosciences, Hydrosciences and Geochemistry), systematic personal skills development and opportunities for experiential learning. The program fully meets the academic requirements for membership of the Association of Professional Geoscientists of Ontario. This single B.Sc. Honours program replaced seven separate programs offered by the former Geology and Geography departments and is proving to be very successful. Student enrolments in the EES program, and in courses taught in the School, are increasing every year and the core-specializations program structure has now been adopted by all other departments in the Faculty of Science.

Senior administrators at McMaster recognize the positive effects of such innovative curriculum reform and are encouraging similar efforts to be made in other departments within the university. Innovative curricula and instructional methodologies are highly valued at McMaster (the McMaster medical school has received international acclaim for

its PBL approach) and SGG has gained a positive reputation for having developed a new and successful undergraduate program. Senior administrators seek faculty members from SGG to serve on numerous committees examining and implementing educational initiatives at McMaster.

Development of a successful 'department'

Creation of a successful undergraduate program has contributed greatly to the development of a strong geoscience 'department' at McMaster but is not the only factor involved. SGG developed with a focus on environmental geoscience, allowing development of a 'critical mass' of faculty in particular research fields and encouraging research collaborations. SGG faculty members bring in over \$2.8 million of research funding annually. Both graduate and undergraduate students are excited by 'environmental' applications of geoscientific research and our graduate program is strong. Many undergraduate students are employed each summer as research assistants, and gain first hand experience with field, laboratory and data management projects.

SGG was successful in obtaining modest funding for educational initiatives (from internal and external sources) that have helped in the growth of an 'educational culture' within the School that involves all members of the community and includes undergraduate and graduate students, teaching assistants, faculty, staff and administrators. The funding enabled SGG members to implement innovative teaching methodologies and enhance experiential learning opportunities and skills development in a number of courses. This funding also allowed the development of information sessions and workshops for instructors to exchange information and develop teaching skills. Teaching workshops are held for graduate and undergraduate teaching assistants at the beginning of each academic year. Both graduate and undergraduate students are also involved in community 'outreach' activities that include classroom visits to elementary and high schools. Members of the undergraduate student society have been particularly involved in the design and delivery of a 'Rock and Mineral Road Show' to Grade 4 students in local elementary schools.

The success of SGG is also related to the development of a distinct community to which individuals (students, faculty, and staff) have a 'sense of belonging'. Opportunities for active learning and small group learning have been particularly important for encouraging identity with the SGG community. Field trips and field camps are integrated into the EES program at all levels (even at level I with over 350 students!) and allow close student-faculty-staff interactions as well as invaluable practical experiences. A strong academic advising system, with a dedicated advisor and continual tracking of student progress also helps undergraduate students realize their value as members of the School. Regular social events and an active undergraduate student society create opportunities for informal interactions between members of the community.

The success of SGG is due to a combination of factors – enforced change (amalgamation of two departments), carefully planned curriculum reform and ongoing development, funding for educational initiatives and creation of a 'community' to which all members have a strong sense of belonging.