Overview: Dr. Belanger stimulated revision or creation of several courses in the Environmental Management program. Water quality analysis will become an organizing theme of introductory chemistry courses, various stream analysis techniques will be incorporated into ecology courses, and writing an Environmental Impact Statement for a real, local project is the focus of the senior capstone course. Successful grant writing has funded much curriculum development and acquisition of equipment.

Introduction

In February of 1997, Lake Erie College received a three year NSF Curriculum Development Grant entitled “Trying Science, Undergraduate Curriculum Reform” (DUE-9652843). The focus of this undertaking is to revise both major and non-major science courses away from a more traditional passive lecture mode of science teaching to a more active, hands on approach. Among the objectives (see Appendix A) for each new and revised science course are the following:

♦ focus on real-world problems using a collaborative approach
♦ utilize computer technology to solve problems
♦ work on outside of classroom problems requiring data collection
♦ institute a practical skills component using appropriate scientific tools

My goal in attending the Stressed Stream Analysis program was to familiarize myself with current technology and practice in aquatic ecology, then to apply the experiences to the appropriate biology and environmental management courses to help meet the goals and objectives outlined in our grant. To date, there are four instances where I feel I have put to use the experiences gained in the SSA program.
Trying Science: A Grand River Course

"Trying Science" is a series of new interdisciplinary courses that meet the College's general education requirement in the sciences. The first course in the Trying Science series, offered in the fall of 1997, had as a theme the Grand River and its watershed, which encompasses most of our county. In addition to looking at the biological and physical aspects of the river, students addressed environmental management issues as well as historical and cultural impacts of the river on the citizens of Lake County. The instructor of this course used SSA information on hydrology and stream chemistry as part of group projects associated with the impact of urban development on stream quality. Non-science students enjoyed and benefited from employing standard scientific equipment and procedures in water analysis. In the future we plan to try a modified version of stressed stream analysis as a focus for group projects.

Natural Resource Management Course

In the fall of 1997 I taught, for the first time, a resource management course that is a core requirement for the Environmental Management program. I successfully incorporated a number of elements from my SSA experience. Students were able to work directly with materials such as the IDRISI software tutorials, and hopefully came to appreciate the tremendous problem-solving capabilities of GIS technology. In many classes I was able to incorporate some concept or procedure we worked with during our SSA experience. In some cases I discussed the role of analytical equipment that our department does not have such as atomic absorption spectrophotometers or autoanalyzers, but because I had worked with these tools during our summer program, I felt comfortable in explaining their role in environmental analysis.

Several classes were given over to an examination of chemical and biological techniques for aquatic monitoring. Students were able to see the application of water quality indices using benthic macroinvertebrates or fish as indicator organisms. In addition, we discussed the techniques of Stressed Stream Analysis to identify and monitor non-point pollution. See Appendix B for the list of topics for this course with the topics most impacted by SSA in bold.

Environmental Research and Problem Solving Course

This course, which I offered in the spring of 1998, is the capstone experience for senior Environmental Management majors. In the latter half of this course students worked in teams to produce an environmental impact analysis for an actual project in our county, the construction of a high-level bridge over the Grand River, a state designated "wild and scenic river". This project has been hotly debated for several decades, but is apparently close to becoming a reality. An actual environmental impact analysis is in process, but is not complete. Choosing this project lent itself well to the EIA process. It is an actual local project, the environmental impacts could be significant, and there are a
large number of stakeholders. Students came to realize first hand the role of politics in environmental management.

I was able to use the materials presented in the SSA workshop as a foundation for preparing the students to tackle this analysis. Students visited the proposed site, talked to local and state officials and collected materials from the local engineer’s office. Guest speakers included representatives from the Ohio Department of Natural Resources, Lake Metroparks, and the Lake County Planning Office. Had I not had the opportunity to carry out a similar analysis as part of the SSA experience, it is unlikely I would have attempted a similar experience with this class. A copy of the topics list for this class with SSA-related topics bolded is included as Appendix C. In the future I would allow more time than I did to editing the final document. A number of the non-traditionally aged students got very interested in the process and everyone considered it a valuable learning experience. They hope to be able to compare their document to the EIS generated by the environmental consulting firm hired by the county.

NSF Grant Evaluation and a Byproduct

During the SSA summer program, Dr. Michele Hluchy from Alfred University (NY) spoke to the participants about funding opportunities, especially in regard to NSF programs. During her presentation Dr. Hluchy stated that participation on a NSF grants review panel was a valuable experience for anyone planning to submit grants to the NSF. She also mentioned the value of including participation in the SSA program as a component of a grant request.

In the fall of 1997 I received an invitation from NSF Division of Undergraduate Education to serve on a review panel for proposals submitted under the Institution-wide Reform of Undergraduate Education in Science, Mathematics, Engineering and Technology. Keeping Dr. Hluchy's comments in mind, I accepted the invitation and spent three days in Washington reviewing grant proposals. The experience was indeed very worthwhile. I gained significant insight into the selection and evaluation process that I feel I could not have acquired had I not actually sat at a table with five other reviewers and dissected proposals in detail.

In November of 1997 the Lake Erie College science faculty submitted a grant to the NSF's Instrumentation and Laboratory Improvement (ILI) program to fund a project entitled: Enhancing Undergraduate Curriculum Reform with an Interdisciplinary Science Computer Laboratory (DUE 9850643). A similar request had been submitted the previous year and was not funded. Our plan is to change, in a major way, laboratory experiences to incorporate the simulation and modeling ability of new science software. We felt this was critical in a small liberal arts institution with limited laboratory facilities and equipment. A key component of the software element of the grant was a request for GIS software that could be used by a wide range of students in an interdisciplinary fashion. We stressed the value of equipment for education students as well as science majors. In the grant we emphasized the role of the SSA program in our thinking about the value of GIS software.
In May of 1998 I received a call from NSF indicating the grant was being recommended for funding by the Collaboratives for Excellence in Teacher Preparation (CETP) program. I strongly believe that had I not been exposed to the insights of Dr. Hluchy regarding NSF funding, and the value of participating in a NSF review panel experience, that the grant request submitted by the College would not have been as strong as it apparently was.

The Future

In the fall 1998 semester I plan to incorporate a number of elements from the SSA program into my Ecology course. The class project will likely focus on a stressed stream analysis of a local watershed. In the spring of 1999 the Environmental Management Program is scheduled to offer an introductory-level GIS course. The introductory chemistry professor plans to use water quality testing issues as a theme in his courses to engage the students in a real world application of the principles of chemistry. This approach stems in large measure from discussions I have had with him regarding experiences and techniques covered in the SSA program.