Leadership in Education and Service

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Innovations do not come from a desire to be innovative. They arise from realizing that a problem needs addressing or an opportunity such as a new technology presents itself to educate more effectively, and then trying it out. Innovation is a trial and error ("prototyping") process, during which mistakes can occur and change from the traditional way can upset people. But with refinement and perseverance, and often some luck, some of these ideas work out well and useful new techniques emerge.

Professor Bieber has brought consistent and continual innovation to education at NJIT showing a drive to improve learning as well as the community environment at NJIT.

His innovations and educational commitments include the following, each of which is detailed below.

- using Web sites and WebBoard to support educational communities, as well as NJIT's Co-op program
- videotaping CIS105M as a series of role-playing scenarios
- videotaping CIS677 as a series of (well-scripted) discussions with guest experts
- pioneering "collaborative" examinations within CIS365 and CIS677, and developing a research path formalizing this as a widespread pedagogical tool
- introducing "team-based learning" as a pedagogical approach in CIS 677
- revamping the IS Seminar to improve research experiences for the entire IS community
- developing (with Professor Hiltz) an English skills course for IS majors
- introducing a distance-only special topics course on World Wide Web standards
- educating students on the job of a professor and the important commitments of a "Public Research University"
- utilizing new media to office hours for distance and perspective students
- involving undergraduate and masters students in on-going research, and taking these students to research conferences
- grant work to improve educational library services

Letters of support from students over the years attest to Professor Bieber's success in these activities, as well as to the esteem in which he is held.

Professor Bieber also displays leadership in service, to NJIT, to the research community, and to the wider community.

At NJIT he has cheerfully served wherever asked, including several committees at the department and university levels, as well as representing NJIT on Rutgers Executive Ph.D.

committee. He has directed the MS IS program and currently directs the IS Ph.D. Program. He has served as the IS Department's *de facto* Web Master for several years. Alternating with Professor Scher, he serves as acting chair when Professor Hiltz is unavailable.

As Associate Chair for the MS IS program he streamlined the program, developed the MS IS Web site, and developed an extensive list of "frequently asked questions" for the Web site. As the newly-appointed Associate Chair for the IS Ph.D. committee he is in the process of doing the same - revamping the Ph.D. program for September 2005, developing the program's Web site, and compiling an extensive set of advising questions to post there (which he is tasked to complete this summer).

Professor Bieber is well known within the Hypermedia and Web Engineering research communities. He has served as Treasurer for the ACM Special Interest Group in Hypertext and Hypermedia (SIGWEB). He has served in numerous leadership positions in conferences and workshops. He has edited several special journal issues.

Within the broader community, Professor Bieber is an active leader in the boy scouts, where he is an Assistant Scoutmaster, troop Web Master, and Counselor for the Scholarship, Disabilities Awareness and Family Life merit badges. He also serves on the Board of Governors and as Web Master for his college fraternity.

Educational Innovations and Commitments

1. using Web sites and WebBoard to support educational communities, as well as NJIT's Co-op program
2. videotaping CIS105M as a series of role-playing scenarios
3. videotaping CIS677 as a series of (well-scripted) discussions with guest experts
4. pioneering "collaborative" examinations within CIS365 and CIS677, and developing a research path formalizing this as a widespread pedagogical tool
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8. introducing a distance-only special topics course on World Wide Web standards
9. educating students on the job of a professor and the important commitments of a "Public Research University"
10. utilizing new media to office hours for distance and perspective students
11. involving undergraduate and masters students in on-going research, and taking these students to research conferences
12. grant work to improve educational library services

1. Using Web sites and WebBoard to support educational communities, as well as NJIT's Co-op program

In October 2001 I was invited to present our use of technology to the Committee on Academic Affairs (CAA) and in November 2001 to the New Jersey Educational Activities Task Force (NJEDge.Net) Best Practices Showcase. In putting together the talk, it became clear to me that a lot of our use of the World Wide Web and WebBoard is to support communities. In particular I described four communities:

- Masters in Information Systems Student Advising
- IS Co-op Students as a community
- the IS Department (Ph.D. students, faculty and administration)
- individual IS courses as communities

In the communities above we have used a combination of the World Wide Web to provide basic information and WebBoard (or in some classes WebCT) to facilitate discussion among the participants. Often I take information that has emerged in the WebBoard discussions and add them to the Web sites, both to more formally document that information and because people generally look on the Web site first for information. (In the Co-op case the Co-op office has a very basic Web site. I created the Web sites for the MSIS program, IS Department and my courses. I created the WebBoards for the Co-op program and my courses, and streamlined the MS IS parts of the WebBoard for MSIS advising.)

Starting Fall'97 I often joined my distance and on-campus sections in many on-line activities. This increased the number of on-line participants and helped achieve critical mass. This had the added benefit of making the distance students feel less isolated as they interacted with campus students. When we also brought in the Mount Laurel campus section into this on-line discussion, making these students feel more a part of the main campus. This joined or "mixed mode" discussion also gave the traditional section students the many advantages of on-line discussion. This mixed mode generally works quite well, though a few of the traditional section students do resent the additional work that the on-line discussion entails.

I actually do not believe that the MSIS advising system has reached the stage of being a community yet; it better illustrates an information service where some of the knowledge is gathered and shared through questions and answers on WebBoard. The depth of discussion that occurs in the other three communities doesn't take place in there yet. We are planning to foster a more vibrant on-line community for our masters and undergraduate students during the coming year.

I ran a training session in the following summer to explain my use of WebBoard for the Co-op program and am on-call to help any professors out in implementing this themselves. In March 2002 I was honored at the annual Career Services award ceremony to receive the "Faculty Service to the Cooperative Education Program" award for these innovations with the Co-op program.

2. Videotaping CIS105M as a series of role-playing scenarios

In Fall'97 I volunteered to tape CIS105M, the COBOL prerequisite for the core CIS365 course. I decided against taping a straight lecture, as with my CIS365 tape. Instead I have

arranged with one of my research assistants to act out a scenario each class for the students. The RA, Praveen Ramanathan, plays a project manager and I play a COBOL consultant. We taped a series of 25-minute discussions, in which the client had a problem and I explained how to solve it with COBOL. We believe this is more interesting to watch than a traditional lecture.

3. Videotaping CIS677 as a series of (well-scripted) discussions with guest experts

CIS677 is the introductory survey course, covering a different topic in Information Systems each week. Instead of taping my lectures, I decided to tape CIS677 as a discussion. Each week I invited an academic guest and sometimes also a practitioner. Guests included professors from NJIT (Roxanne Hiltz, Murray Turoff, and three Ph.D. students), Rutgers (Nabil Adams), NYU (Hank Lucas and Jon Turner), and for one class a telephone link from the University of Texas at Austin (Sirrka Jarvenpaa). Each discussion was well-scripted so it would cover the important theories and concepts that I would have covered in my lectures. But being a discussion taped in front of a live class, the atmosphere was more informal and lively, with students asking questions that sometimes really put us on the spot!

4. Pioneering "collaborative" examinations within CIS365 and CIS677, and developing a research path formalizing this as a widespread pedagogical tool

The Collaborative Exam is an integrative process that actively engages students in the full life cycle of examinations. The core idea is that students design exam problems, solve them, and then evaluate and grade their peers' problems and solutions. Designing problems and evaluating solutions challenges students to (a) analyze course materials in order to determine the most important aspects for assessment, (b) critically assess their peers' understanding of a subject, and (c) deliberate how fully a body of information (the solution) fits their own understanding of course materials and the problem posed.

Students learn from this process in several ways. They learn from creating questions, from reviewing the questions that others create, from answering questions, from grading the answers, from reviewing the second-opinion grading on their answers, and from reviewing other people's answers and grading justifications.

I developed this approach in 1999, and have tried the Collaborative Exam in CIS677 for several semesters and CIS 365 as a formal experiment with control and treatment sections and conducting surveys. Subsequently Jia Shen has run experiments in several other classes for her dissertation thesis. The experiments show that students perceive that they indeed learn more, that they like this format better and that they would recommend it for other classes.

I am currently extending this approach into a full methodology called CLASS (for Collaborative Learning through Assessment). I have written some preliminary grant proposals to fund this research, and shall write a major proposal this summer to try to fund it on a large scale, involving several departments and professors at NJIT.

5. Introducing "team-based learning" as a pedagogical approach in CIS 677

During Fall 2004 and Spring 2005 I am utilizing a new approach called team-based learning (TBL) in CIS677. In searching for a way to make team projects more effective, I had the good fortune to stumble across Michaelsen et al.'s [2004] book on TBL. TBL is structured to avoid the problems associated with groups and group work, such as scheduling problems and uneven participation. The class period is devoted exclusively to team activities. Outside class is devoted

exclusively to individual activities and preparation for class. Because lecturing is assumed to take up valuable time repeating the information in the course materials, the professor does not lecture. Instead the professor acts as a mentor, designing study materials and working in-class individually with each team as they collaborate on activities. (Designing challenging class activities involves a large amount of preparation for the professor.) So far several students have come up to me to express their enthusiasm with the approach, and I am experiencing livelier classes and more engaged students than ever before. I also am working with a Ph.D. student, Liz Avery, to refine the TBL approach for distance learning.

6. Revamping the IS Seminar to improve research experiences for the entire IS community

For Fall 2004 and Spring 2005 I have been running the IS Community Research Seminar. This is a flagship component of our Department, and often cited as one of our most valuable assets. Coordination includes managing all aspects of student moderating and refreshments, inviting speakers, scheduling, announcements, maintaining the seminar WebBoard, and monitoring student research internships. I put procedures in place for a different Ph.D. student to serve each week as moderator, introducing the speakers and choosing three additional Ph.D. students to act as *ad hoc* discussants. This Spring I worked with department faculty to restructure the seminar to incorporate more small group research. The second half of the seminar now consists of three small research group break-out sessions, attended by much of the faculty and students.

7. Developing (with Professor Hiltz) an English skills course for IS majors

ENG598: The MS IS program requires students to read and critique many academic research articles. (Part of the IS Department philosophy is that an understanding of the underlying theories and concepts in the field will give students a much deeper understanding of the field than other universities provide.) Most students, however, have never experienced an academic research article and find this reading requirement quite challenging. Roxanne Hiltz and I got together with Jerry Paris of the English Department in Fall 2001 to try and alleviate this situation. We came up with the idea of a readings course that would be assigned to any U.S. student with poor humanities grades in their undergraduate coursework and any foreign student scoring less than 60% on the verbal portion of the GRE exam. The course, ENG598 ran for every semester until overall enrollments dropped. We currently are looking for ways to introduce English skills back into the curriculum for Ph.D. students.

8. Introducing a distance-only special topics course on World Wide Web standards

CIS485/786 (WWW Standards Special Topics Course) Fall 2001: To my knowledge, this was the only World Wide Web standards course taught at any university. Since no text was available for this topic, almost all reference material was available only on the Web. I also wanted experts in Web standards to be able to participate in the class. It made most sense to conduct this class entirely on-line.

All class participants worked in teams of three to research and present several Web standards each week. In addition, I required the graduate students to work together to develop weekly presentations on themes concerning Web standards. We made extensive use of WebBoard. All presentations were posted as comments inside WebBoard conferences, and people could ask questions and discuss these directly. In addition, as with CIS677, I split the class into separate

discussion groups of about 15 and asked them to try. Within the discussion conferences, I asked students specifically to "synthesize" or tie together the week's topics.

9. Educating students on the job of a professor and the important commitments of a "Public Research University"

A colleague at Boston College shared this idea with me originally. A college professor's job is very poorly understood by some very important constituents: students, legislators who provide funding, and the public at large who have some indirect influence over educational decisions and decision-making. My colleague would take time out each semester in each of his classes to discuss the responsibilities of our profession. He felt students should hear this every semester from multiple sources. It helps students understand why we have to miss classes, why we have limited office hours and aren't always available, and especially in justifying why many of us only spend 6 or 9 hours a week in the classroom. ("Are we at the golf course the other hours?") Communicating our full responsibilities may inject some reality checks into both educational and budget reform.

So, every semester I take time out to explain to my classes (traditional or distance) what the job of a professor is. It also gives me the opportunity to explain NJIT's commitment as a Public Research University. I have posted the handout I give students on my Web site. (I most recently did this last week in my CIS677 class.)

10. Utilizing new media to office hours for distance and perspective students

Starting 2002 I started taking advantage of technology to be more accessible to students in office hours. Besides scheduling office hours on campus in the late afternoon and after 9 p.m. for evening students, I began scheduling office hours two days a week from home using Instant Messenger. This enables me to hold office hour five days a week and be totally accessible to distance learning students. My home page lists three instant message services, the option to talk by phone, and of course I am available by email in addition to these "same time" options.

I also tried the option of meeting through Active Worlds, a virtual reality environment, but found this option ineffective.

11. Involving undergraduate and masters students in on-going research, and taking these students to research conferences

In addition to having been the primary advisor for 7 Ph.D. students, to date I have worked with 77 masters project students, 5 masters thesis students, 27 undergraduate students and one high-school student on development projects related to my research. I have taken undergraduate, masters and Ph.D. students to conferences, in some cases using grant funds to pay for airfare and meals. I feel it is important to show them the larger context of their research work.

12. Grant work to improve educational library services

I am the PI or Co-PI on over $2.4m of federal grant funding to improve educational library services. Through our library integration and library recommender systems projects we will be improving library services at NJIT, using the entire student and researcher community as a testbed. We hope to show that people are able to do their projects involving library resources more effectively and that they will learn more through the improvements we make. This

research is funded primarily through the NSF's National Science Digital Library program, which focuses on educational library resources.

Reference

Michaelsen, Larry, Arletta Bauman Knight and L. Dee Fink (editors), Team-based Learning: A Transformative Use of Small Groups in College Teaching, Stylus Publishing, LLC, Sterling VA, 2004.