EDUCATION-TECHNOLOGY SUPERSTAR PRESENTATIONS

We, Domingos Begalli and Mike Fried of Physical Sciences and Steve Franklin of OAC, propose a seminar series of *educational-technology presentations*. These will aim mainly at the UCI campus of technology aware educators, though they will include educationalists from other Southern California campuses.

Section 1 lays out a rationale and a rubric for gathering an audience and choosing speakers. Section 2 lists speaker sources and relevant expertise of the proposers. It also mentions future venues where the initial idea could attact a large audience. Section 3 is an example format for presentations. We will start with an audience for each seminar of about 25. It will include faculty Dean Stern and the Chairs of Physical Sciences have identified from their activities during the last decade, not necessarily from Physical Sciences alone. Each invitee will receive a personalized e-mail invitation. A flexible arrangement will allow adjustments during the Spring quarter to our invitation scheme. Section 4 gives a budget for funding three presentations during Spring quarter 2000.

1. Technology: What we have more of than five years ago

We have less money and less time. Further, asking hundreds of educators to investigate technology independently is a time waster. We must all share secrets for cooperative use of technology; cooperation that goes beyond proprietary programs for special environments. There are many reasons for using technology. Here, however, are two, relevant to university education and student interaction.

1.1. **Projecting Knowledge Data.** In theory it is getting easier to display information graphically and textually to assess relationships, change, dynamics, and cause and effect in science and mathematics curriculum. In practice, technology experts often dedicate considerable portions of their careers to designing proprietary examples illustrating effective knowledge display. A savvy presenter on this topic would illustrate graphical topics for vector calculus, physics and chemistry courses that could appear appearing in typical classrooms using the web. Example goal: How moderately technical faculty could base lessons on tough topics using maple, or mathematica presentations.

This topic involves analyzing the phenomena to which our classrooms strive to educate students. Articulating the goals of research and knowledge acquisition is inherent in actions that Project Data. Researchers discover explanations. So it is appropriate they benefit from tools that can help them design and present their explanations.

1.2. **Researching Learning Data.** Even managing moderate size classes effectively is time consuming. Analyzing student responses to course material —as in exams and problem sets —is a theoretical piece-of-cake. In practice it overwhelms instructors. Students need frequent and consistent responses. Without

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assurances they are learning a model supporting the course's ideas, students revert to memorizing details and superficial imitation of the instructor's blackboard topics. Many bog down, lose interest, and drop courses. Shortening the distance between student needs and instructor limitations would immensely improve many modern classrooms on the following aspects.

- Retaining minority students
- Enhancing active interaction between professors and students through project and portfolio creation
- Revealing why —despite good instructor evaluations —fundamental topics didn't work

There is great uncertainty on the relationship between personal classroom successes and national outcries about school failures. Present classroom and curricular goals lack a cohesive view crossing between disciplines.

Example presentation goal: Show faculty how they can improve the quality and quantity of their evalution of students, to catch persistent class room difficulties. Evaluation of the classroom beyond one or two exams and a final is very difficult even with a dedicated grader. Further, typical paper exams at mid-term and finals rarely tell the dynamic story behind classroom difficulties.

Many courses with magnificent educational standards are templates for hundreds of classes each quarter in our nation's universities. Yet, lone instructors with their hearts on their educational sleeves, only occasionally succeed and very often fail to penetrate to the heart of stubborn student deficiencies and misconceptions. There is a huge gap between the response to successes and the concern for failures. The system that evaluates courses is meager. It records successes in student-evaluation scores. It occasionally hands out a teaching award. It records failures as dropout rates and unfilled skilled jobs.

Speakers on this topic would address the gap between teacher performance evaluation and persistent needs of cohorts of students. Further, we would choose entertaining speakers who also present insights on these serious goals. We would choose intellectually talented Education-Technology Superstars.

2. Sources of superstar presenters

- A crisis experience at the University of Rochester resulted in their Mathematics Department using technology in a mass tutorial and recitation setting. **WeBWorK**, a collection of on-line courses with automated evaluation running through the complete calculus series, was awarded the 1999 International Conference on Technology in Collegiate Mathematics Award for Excellence and Innovation with the Use of Technology in Collegiate Mathematics. UCI interaction with a Rochester speaker could guide enhancing the **IQ**–Zot Dispatch technology at Irvine (see §2.1).
- The *Computer Assistance Group* at the Department of Mathematics, Virginia Tech provides mini-module training services in installing software (like Mathematica and Matlab), computer connections, to all students enrolled in any mathematics course. They Their system of FAQ maintenance and tracking of updates and patches generates solid use of technology in classes, by taking the burden of training off instructors.

- Jim Lightbourne: Head of the Division of Undergraduate Education of NSF. He encourages technology grants and suggested speakers. FIPSE also funds technology proposals. Assessment issues in Math-Science technology are difficult. Technology as an organizational tool applies to all courses with inadequate student preparation and deficient class room resources.
- Jerry Porter at Penn, secretary of MAA, promotes technology aggressively. Ladnor Geissinger, at Institute for Academic Technology (IAT) (ladnor.iatmhs.unc.edu) has developed technology for learning (a package called Exploring Small Groups, for example).

2.1. **Proposer expertise.** The seminar will take advantage of the proposers' expertise and continuing projects in this area. The proposers have a growing collaboration related to Mike Fried's instructional technology developed under Sloan Foundation funding. His software aimed at magnifying instructor educational savvy to do the following.

- Establish quality student/instructor e-mail communication.
- Gather student evaluations as electronic (e-mail) Interactive Questionnaires (**IQ**s).
- Manage a process for developing individual and team projects in ordinary classrooms.
- Collect weekly comment files for students and teaching assistants.

As documented in the MAA published article **Interactive E-Mail Assessment** (see www.math.uci.edu/ mfried/#ed) one outcome from this was **Zot Dispatch**: S. Franklin and L. Meglioli III, *Documentation for Zot Dispatch*, comment system for EEE-class resources at UCI, http://www.oac.uci.edu/X/W6/forms/zot-dispatch/, 1996. Domingos Begalli and Mike Fried have an ongoing project of enhancing Zot Dispatch to provide a web-based version of a much more of the Sloan technology for interacting with classes and colleagues.

3. Format for presentations

UCI faculty-staff people would cohost a series of three (one per quarter) presentations —each of two hours —at a site appropriate for the potential presentation audience. The proposers, Steve Franklin, Mike Fried and Domingos Begalli, have planned a particular event, as cohosts, to launch the series. They would model differing faculty-staff roles over education-technology issues.

3.1. **For spring 2000.** A high quality question asking period promotes the possibility for a speaker influencing his or her audience. We will choose speakers who might generate grant and community fund seeking cooperation. To encourage this, the reception period would include orchestrated introductions of the speaker to the community. Here is a likely parsing of the two hour session.

Intro: 15 minutes. Welcome, news about upcoming presentations, goals of this forum and introduction of the Main Speaker.

Talk: 50 minutes. The main speaker.

Q&A: 20–30 minutes. Q-A period, with possible guest comments.

Refreshment: 35 minutes. Reception, with introduction of the speaker to people interested in cooperative efforts.

3.2. **Possibilities for the academic year 2000-2001.** This seminar activity is especially sensitive to presentations with strategies for enhancing faculty interaction with students. As Fried's projects show, it is possible to provide mathematics students with research experiences through a *proposal-project rubric* in regular second year calculus classes with 65 students. Technology, however, is necessary for the *organization*, *management* and *evaluation* of serious student projects. Without such projects, students never get undergraduate experiences in writing mathematics.

Such evaluation tasks are akin to what students get in humanities classes where their writing assignments are not identical, though assessment stresses their basic writing skills. Peter Li has proposed taking this seminar idea to a larger venue, possibly supported by the **Math-Sciences Research Institute** at Berkeley, or a similar Institute at UCLA. Both have large education mandates.

4. Budget for one quarter

Speaker Honorarium. \$500 $\times$ 3 speakers \$1,500.
Speaker Travel, perdiem and dinner. \$600 $\times 3 =$ \$1,800.
Refreshments for talks. \$67 $\times$ 3 speakers, \$200.
Total of this request. \$3500.
Contributors have given the following: Total \$3500.

- NSF grant of Mike Fried \$1500
- Academic Computing, Associate Director Dana Roode and Executive Vice Chancellor William Parker \$400
- Physical Sciences Dean Ron Stern \$800
- Mathematics Department Chair Peter Li \$800

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