When Students Teach the Teachers: Tapping the Expertise of Students to Support Faculty Professional Development in Technology

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Abstract: Mentoring is an effective professional development strategy to help people learn how, when, and why to use technology to support teaching and learning. With funds provided through the Preparing Tomorrow's Teachers to Use Technology [PT3] grant, the University of Vermont College of Education and Social Services has created a program that enables pre-service teachers to serve as technology mentors to university professors and K-12 teachers. This paper reflects on this project and describes the benefits and challenges to both students and faculty that result from reversing the roles of teacher and student.

Background

In June 2000, the University of Vermont College of Education and Social Services (UVM/CESS) was awarded a three-year implementation grant from the U. S. Department of Education as part of the Preparing Tomorrow's Teachers to Use Technology [PT3] initiative. This grant, entitled Technology F.E.A.T., recognizes that people move through a continuum in learning and using technology **f**rom **e**ntry, to **a**daptation, to **t**ransformation. The goals of Technology FEAT are:

- To prepare highly skilled teachers who can demonstrate competent use of technology to transform teaching and learning;
- To provide professional development and support in the integration of technology in Pre K-16 instruction;
- To align teacher education programs with the *Vermont Framework of Standards and Learning Opportunities* by using and developing technologically infused, standards-based units and assessments; and
- To develop electronic professional portfolios, which challenge pre-service students to use increasingly complex levels of technological sophistication.

To meet the goal of providing professional development and support, a series of strategies have been employed by the College's PT3 grant team. Technology workshops, summer institutes, online courses, laptop incentive programs, faculty technology plans, model lessons, mentoring, and "just in time" training and support have been offered to university faculty and K-12 teachers in our partner school districts. The impact of these efforts has been noticeable. Increasingly, CESS faculty members are using technology to complement course content, to

engage students in technology-related assignments, for personal productivity, and to conduct research. Faculty web sites in the Department of Education, for example, have increased from six to over two dozen during the last two years. The emphasis on using technology in teaching and the support provided by the PT3 grant team have raised awareness within the faculty and has resulted in increased applications of technology in course work.

Correspondingly, technology usage within the undergraduate student body has also increased. Since 1994, elementary education students have been required to take *Computers in the Elementary Classroom* as part of their academic program. In the 2002-2003 academic year, the secondary education program and middle school program instituted a similar requirement, *Educational Technology in the Secondary/Middle School Classroom*, for its students. Both courses (http://www.uvm.edu/~smacleod/) cover basic computer technology skills and applications and are typically taken during a student's first year in the program. Pre-service teachers therefore are required to learn and demonstrate basic competencies in word processing, desktop publishing, paint and draw programs, spreadsheets, multimedia, Internet research, electronic mail, software evaluations, and web publishing.

After this course, however, student use of technology varies depending on course selection and field experiences. In their senior year, pre-service students are required to create a portfolio that provides evidence of meeting state and college standards for teacher licensure. Since the fall semester of 2001, a one-credit course has been offered to support elementary education students through this process. In this class, students may create either a paper or an electronic portfolio. Half of the course sessions focus on electronic portfolios. Over the last two years, students increasingly are choosing to create electronic portfolios rather than paper portfolios. Today, the number of students who create electronic portfolios has grown to over 50% of graduating seniors. This increase may be due to the fact that more students know how to publish on the World Wide Web because of the first year course in technology and the increased use of technology in some courses.

The influx of electronic portfolios has also caused a ripple effect within the college faculty. More faculty recognize the need to create assignments and activities that students can use as evidence in their portfolios. It also implies that faculty members know how to assess electronic portfolios using technology skills necessary to navigate the portfolio and evaluate it appropriately.

Professional Development Needs

These examples illustrate that the faculty are acquiring new skills in using technology and that pre-service students possess basic competencies. Even so, the application of technology in teaching and using technology to improve learning remains inconsistent and sporadic. Research shows that it may take five or six years before teachers begin to use technology effectively in their teaching (Beisser, 2000). Jonassen (2003) cites research by Rowand that revealed "teachers with more than 32 hours of technology professional development were more likely to assign problem-solving activities (41%) than were teachers with no technology professional development (14%) or those with only 1 to 8 hours of professional development (24%). However, researchers such as Hank Becker state that professional development in technology must go beyond the quantity of professional development hours. Teachers need to understand how technology can be used to solve problems. If a teacher has a predisposition to traditional instructional methods, it is unlikely they will become constructivist teachers regardless of the hours of computer training they receive (MacKenzie 2001).

Pre-service teachers are expected to meet national information technology standards as a prerequisite to licensure and often as a condition of employment (NCATE, 1997; NETS-T, 2000). Therefore, pre-service teachers need experiences in authentic settings to understand how

technology can be used to support instruction and improve student learning. Unfortunately when it comes to technology, many professors who instruct future teachers are less knowledgeable about technology than their students. Many professors use technology to support course content through their own web sites but most do not model the use of technology in classroom teaching.

In addition, in-service K-12 teachers who supervise pre-service teachers also often lack the ability to implement technology effectively in their own classrooms. Pre-service teachers must provide evidence of using technology in their teaching episodes as part of the portfolio process. However, pre-service teachers are not necessarily placed in classrooms where in-service teachers actively use technology. Given this deficit of effective models and experiences, pre-service teachers are unlikely to employ technology resources when they become teachers, even though they possess the basic competencies to do so (Beisser, 2000; Mehlinger, 2002, NCATE, 1997).

The higher education faculty and in-service faculty require continued support to help them learn, use, and integrate technology. At the same time, pre-service teachers need to witness and apply technology in teaching to enhance student learning. This paper describes one professional development strategy -- using student mentors to teach faculty about technology -- that provides ongoing support to reinforce skills and concepts learned by faculty members during PT3 workshops and, at the same time, creates authentic experiences for pre-service teachers. By tapping the expertise in technology supplied by our undergraduate, pre-service students, both the faculty member and the student are able to gain new skills, applications, and perspectives about teaching and learning with technology.

Precursor

The PT3 Student Faculty Mentor Program is an outgrowth of a cooperative project between the University of Vermont and the Burlington School District called the Technology Intern Project [TIP], developed in 1997. At that time, its purpose was to help Burlington K-12 teachers learn about technology by placing pre-service teachers as technology interns in K-12 classrooms. These UVM students could earn between one to three independent study credits by participating in TIP. To be eligible for TIP, a student must have successfully completed a required course in technology called *Integrating Technology in the Elementary Classroom.* The TIP program was managed by the Burlington School District's technology coordinator. Between twelve to fifteen students participated in TIP during its first year. It was very successful and ran for approximately three years until the coordinator left the school district.

After the TIP program ended, CESS students continued to work on-campus with university faculty through the College's Technology for Teaching (TFT) lab. The support that undergraduate students offered faculty was recognized as an effective strategy to teach faculty how to learn about and apply technology to their courses. When the College received the Preparing Tomorrow's Teachers to use Technology [PT3] award, the concept of using students to mentor faculty was resurrected, and today under the direction of the PT3 grant team, undergraduate, pre-service teachers are recruited to teach education professors and K-12 teachers about the use and application of technology as PT3 Student Mentors.

The PT3 Student Mentor Project

The PT3 Student Mentor Project first began during the Spring semester of 2001. The program is administered by two coordinators, one responsible for students working with on-campus faculty, and one who works with students placed in K-12 classrooms off-campus. Each coordinator advises the pre-service teacher and serves as a liaison between the pre-service

teacher and the faculty member. The coordinator promotes the project, recruits students and faculty members, establishes project goals and objectives for the faculty-mentor pair, supports just in time support for the student mentor with technology questions, and documents and evaluates the project as a whole.

Under a student mentor's guidance, faculty members learn how to design, create, and publish professional or class web pages, to integrate technology into the curriculum, to create Quicktime movies for a variety of classroom purposes, or to create presentations with PowerPoint or HyperStudio. At the university level, professors are primarily interested in learning how to create and maintain their own web sites and how to create short video clips that document or describe teaching practices or situations. In the K-12 setting, teachers are most interested in learning how to create and maintain a class web site and/or to allow students to create web pages that link to classroom performance products. K-12 teachers see the World Wide Web as a tool to communicate with parents about classroom projects and activities.

PT3 student mentors have the option to earn college credit (15 hours per credit) or receive a stipend ($10/hour) for their service. Students may work from four to eight hours per week over a ten to thirteen week period each semester. Faculty and students therefore are engaged in this activity between forty to eighty hours a semester. Since the project began, the number of student mentors has grown from three student mentors a semester to approximately twenty-two students. University faculty participants have increased from three to over twenty (20) a semester. K-12 teachers working with student mentors have grown from two to forty (40) a semester.

Using WebCT to Build Community

An online web site (using WebCT software) has been published to create a community space for student mentors and the PT3 student mentor coordinators. The site (available online at http://webct.uvm.edu; login: pt3guest1; password: dewey) contains information that describes the student mentor project, documents both past and current projects, includes links to resources useful to mentors, and provides an electronic bulletin board to promote discussion and dialog. The goal of the WebCT site is to support the undergraduate students who participate in the project and enable them to envision the entire project instead of reflecting on only their individual contribution. It allows students to ask questions and to learn about the challenges other mentors face. Student mentors are required to contribute to the discussion board by entering two postings per week. One posting is a contribution to a community discussion board, whereas the other is a posting to either a Faculty or K-12 Journal in which the student describes the work accomplished during the week.

The site also serves as a public relations and dissemination vehicle for the project. At the end of each semester, the PT3 grant team sponsors a celebration where pre-service teachers, university and K-12 faculty, and other guests from the University come together to learn about the PT3 student mentor projects. Using the web site links, the faculty-mentor teams give short presentations about their projects. The web site supplies the faculty-mentor pair with a pre-designed presentation platform to document their work and showcase their accomplishments.

Outcomes

Notable growth in technology usage and modeling can be attributed to the PT3 Student Mentor project. Knowing that a mentor is available for ongoing support, college faculty members are increasingly borrowing laptop computers and expressing an intent/desire to create course web

sites and online projects. As faculty members gain recognition for these innovations, more faculty are expressing an interest in learning how to use technology. This "friendly competition" among the faculty not only improves courses but makes them more accessible to students.

Faculty members are also beginning to publish students' work as online exemplars. This strategy enables a professor to demonstrate expectations for student performance and, as a result, raises the standards that students are expected to achieve. Faculty members have begun to archive student work on their web sites, creating a knowledge base for other students. In an inquiry block in science, for example, students are asked to create webquests that are published online for future students to use (see http://www.uvm.edu/~inquiryb/webquest/). This strategy has been supported by faculty student mentors and has enabled the professor to provide a dynamic web site that recognizes and rewards student achievements.

One education faculty member decided to use the web environment to document and further in-class discussions. He takes student questions and feedback from the course and then posts these comments on the website along with photos. This has created a connection between the students and the professor outside of their one class time each week (see http://www.uvm.edu/~crathbon/188interaction.html).

In-service faculty in K-12 are eager to secure the services of a technology mentor in their classrooms. K-12 teachers are expanding their use and application because of the added support a mentor provides. Teachers are acquiring new skills in Internet research, web page development, and in publishing student work online to share with parents and community. For many practicing teachers, having a mentor in the classroom enables them to implement new strategies to integrate technology into their curriculum.

As a technology mentor, pre-service teachers are able to reinforce and expand their skills in information technology. This project provides them with practical, authentic experiences. Mentors frequently report that their confidence level with technology increases significantly as a result of this work. Student mentors who work in K-12 classrooms are often able to work directly with students to see how technology is used to support learning. They see firsthand how students use networks, adhere to appropriate use policies, how teachers manage limited resources, how teachers use technology to support learning outcomes, and many other useful management skills they will encounter as teachers.

Beyond Technology

Pre-service teachers and faculty have benefited in more ways than simply increasing their use and application of technology. Through this experience, new relationships have developed between professors and students. Whereas the student shares knowledge about information technology, the professor or teacher contributes knowledge about teaching -- course design, goals and objectives, and desired learning outcomes – that the pre-service teacher may not have. The mentor helps the professor learn new skills, and the professor helps the mentor appreciate the application of technology to solve authentic problems. Faculty members report that they enjoy the one-to-one relationship that develops with a student mentor. They also enjoy testing their ideas for class assignments and projects with students. Student mentors can assist a faculty member in understanding how a reading or assignment will be interpreted or received. This sense of colleagueship is especially appreciated. The following is one student mentor's reflection about her relationships with professors as a result of this project:

> *Working with faculty members was a blessing in disguise. I was working with faculty members that I looked at with great admiration for the wealth of knowledge they had regarding education. As a mentor, I was able to share knowledge I had of technology with them. This "leveled the*

> *playing field" so to speak. The conversations were suddenly between colleagues and age and career status didn't matter. This role reversal taught both faculty member and student a tremendous lesson.*
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> *I worked with faculty members on websites for courses I had already taken. In this respect, I was able to offer a perspective on behalf of all students on what was needed for the site. While designing the site for the literacy block, I found myself having many conversations with Jane that had to do with the literacy block and how to use the website as a tool to enhance her teaching. This is where I think the technology really made sense. Technology shouldn't be a separate piece of the puzzle, it should be hidden within other objectives.*
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> *As a mentor amongst faculty members, I would be in the education office and have many professors ask for advice or assistance, not just the ones that I was "assigned" to. By being visible in the department, more and more faculty members became willing to try something new. They began to share success stories with each other that helped encourage them to try something new. I was the voice saying, "yes, you can definitely do that and I'll help you." Having that support and camaraderie, keeps the ball rolling. That's fantastic.*
>
> *And the last piece that carries weight for me. First year out of college and I had handfuls of resumes and cover letters and applications out all over the state. I applied for a technology integration position thinking, I could do that. I know how to do that. I had the job leaving the first interview. Two months into my job and my employer told me, I hired you based on the experience you had with the PT3 Grant. Without it, our district would not have hired a first year teacher. No more said!* (Sexton, R., personal email, January 14, 2003)

In the K-12 setting, the mentor has the opportunity to work directly with students and assist a classroom teacher to use technology to support the curriculum. Field-based teachers report that having a mentor has enabled them to put into practice ideas that they have imagined but have been unable to implement. The products created by this joint effort are visible because most of the work has been published on the World Wide Web. By working closely with a faculty member, student mentors gain confidence in themselves as teachers. They take pride in their work and appreciate the contribution they are making.

The reversal of traditional roles – with the teacher becoming the student and the student becoming the teacher – creates a new paradigm for learning and professional development. In this model, the mentor is not the "expert" in the traditional sense. That is, the mentor is not another teacher or a graduate student, not someone with years of experience or a long list of credentials. Rather, the student is an undergraduate – perhaps even a first-year student.

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faculty to embrace this role as a way of demonstrating new models of teaching to their pre-service students.

Through the establishment of a student faculty mentor program, campus and field-based faculty are improving their technology skills, and students are refining theirs and putting them into practice. In some cases, faculty members still rely heavily on the mentor to "do the work" rather than undertake the responsibility to learn the technology themselves. However, we are beginning to see more and more faculty members request a mentor to help them learn how to maintain their websites or edit their own digital videos. This approach is helping us meet our faculty's professional development needs in technology and is giving our pre-service teachers more experiences and opportunities to apply technology in teaching. As a result, both parties come closer to meeting national education standards in information technology.

Lessons Learned

From this project, we are learning that our undergraduate students are valuable and underutilized resources whose expertise can be used to improve our community of learners. Clearly, faculty members are recognizing the talents, especially in the area of technology, that students possess. From the colleagueship that develops in a mentor relationship, faculty are realizing that conversation and discussion about their courses with their students are valuable and help them improve their own instructional practices. This paradigm is building a stronger sense of community both within and outside the College. Students who work as mentors feel ownership in the products they help to produce and develop stronger, personal ties to their professors. Students who work in partner K-12 school districts create new relationships between the University and the school district. Student mentors are considered a valuable resource in a K-12 classroom, and the school districts appreciate the connection this association provides.

Faculty members and student mentors come to appreciate the effort and time that is involved in using technology to support learning. In these first two years, it is clear that everyone involved needs to devote more time to develop successful projects and that the work is ongoing. Student mentors need increased support from the PT3 grant team to ensure that they feel confident in their own ability to teach others about technology. The faculty-mentor pairs need to set realistic and achievable goals. Faculty especially need to devote time to think about and plan for work with their mentors. Faculty members must commit to learn new skills actively and not let the mentor do their work for them.

Both on-campus and off-campus faculty are using pre-service teachers to learn how to create web sites or improve basic skills. We are therefore observing the entry and adaptation stages of using technology. To support a shift to the transformation stage, more direct intervention from the PT3 grant team would be required. A transformative model would require frequent planning meetings with the PT3 coordinator, the faculty member, and the pre-service teacher to discuss desired student learning outcomes associated with a lesson or activity where technology is used. Currently, pre-service teachers are reactive to faculty requests (for example, expanding a web site or helping students learn basic skills such as cut and paste) rather than being proactive in envisioning new instructional strategies where technology plays a supportive role in learning. The PT3 coordinator could provide guidance to the faculty-mentor pair about how technology could be used to support higher-order thinking skills, to create greater collaboration and communication within learning groups, to create authentic learning activities, and to use technology to develop deeper understanding of classroom concepts. Intervention at this level would increase the time and commitment of all parties, precious commodities for professors, teachers and students. Nonetheless, greater involvement at conceptual levels would undoubtedly increase effective technology integration practices in teaching.

Future Models

PT3 grant funding will end June, 2003 and consequently, the future of the student mentor project is uncertain. Unless new funding sources are identified, the College will be unable to support the student mentor project as it exists today, and new models will need to evolve. At the very least, college faculty members could continue work with individual students, perhaps using independent study credit as an incentive. Work study funds for eligible students may be a way to pay for a few faculty student mentors within the College The K-12 community may be able to engage pre-service teachers as mentors, again for credit, as part of service learning opportunities. These solutions lack an organized, coordinated approach to the project but would allow the concept of using students to support faculty growth in technology to continue in a more limited capacity.

New projects where students are used as mentors are likely to develop. Recently, the College and a local school district submitted an application for 21st Century Community Learning Center grant funds to create after school learning programs. In this proposal, funds were included to employ pre-service teachers to assist classroom teachers with technology-related curriculum and activities. Another idea under development is to employ high school students to serve as mentors to K-12 teachers taking graduate-level courses related to technology integration.

The Center for Teaching and Learning, a "learning commons" for University of Vermont faculty (http://ctl.uvm.edu/), has shown an interest in using the PT3 Student Mentor Project as a model to implement a technology intern program to assist university faculty with technology related projects. This initiative would expand this project to any interested student or faculty within the University, but does not include an outreach to the K-12 community.

When Students Teach the Teachers

Even with a cloudy future, the realization that students can support faculty professional development is likely to endure within the College. Especially on-campus, faculty better understand the benefits to be gained from faculty-mentor relationships. It is difficult to predict if this mentoring model will transfer to other, non-technological, applications, but this project has set the stage for faculty to acknowledge and endorse the benefits of intergenerational mentoring. Star (2000) notes that intergenerational mentoring relationships are beneficial because they "encourage collaboration, foster active learning, provide less authoritative structures, engage dialog, create communities of learners, advocate life long learning, and contribute to future professional development." These attributes have all been evident in the PT3 Student Mentor Project and will hopefully continue to guide the College of Education and Social Services to create new strategies to support authentic learning experiences for both the faculty and its students.

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