

T.H.E. QUEST: A STATEWIDE INITIATIVE

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Quotes and an online survey captured the impact of week long professional development sessions on faculty members' personal and professional use of technology. Technology modeling, extensive hands-on activities, and opportunities to share and network provided faculty members from 19 state universities time to learn to integrate technology into their classrooms.

New standards, new assessments, new accountability procedures, and an influx of new technology in K-12 classrooms meant that teacher candidates' coursework and field-based experiences needed to provide them with opportunities to see technology integration modeled by their professors and with opportunities to teach with technology. These changes would be needed statewide and would require professional development for university faculty members. To foster these changes in 1997 the Louisiana State Systemic Initiatives Program created the Technology Consortium for Teacher Education (TCTE) under the leadership of Lajeane Thomas. (See <http://cnets.iste.org/tcte/>.) The consortium is composed of faculty members appointed by the deans of each of the state's colleges of education. In 1999, the consortium was awarded a PT3 catalyst grant, The Technology in Higher Education | Quality Education for Students and Teachers (T.H.E.|QUEST). The grant's goal was to provide technology planning assistance and professional development in technology integration for higher education faculty members. To facilitate faculty members' access to the professional development sessions, one site was located in the northern part of the state at Louisiana Tech University and another site was located in the southern part of the state at the University of Louisiana – Lafayette.

To help us understand the challenges we would face and to determine successful methods for fostering acceptance of technology and curriculum redesign we examined the research on diffusion of innovations, computer self-efficacy, and adult learning. Diffusion of Innovations Theory provided insights into the conditions necessary for university faculty members to incorporate technology into their redesigned courses. Rogers (2003, p. 35) contends, “that the heart of the diffusion process consists of interpersonal network exchanges and social modeling by those individuals who have already adopted an innovation to those individuals who are influenced to follow their lead.” Hence, we provided faculty members with opportunities to develop interpersonal networks and opportunities to model for each other how they used technology in their teaching.

Faculty computer self-efficacy is crucial not only to the diffusion of technology in higher education but also to maximize the effects of technology adoption and integration within the classroom (Delcourt & Kinzie, 1993; Faseyitan, Libii, & Hirschbuhl, 1996). Compeau and Higgins (1995) found that individuals are more likely to increase their computer self-efficacy as a result of participating in training sessions in which they observe modeling of the use of technology, they are able to interact successfully with technology, and they are reassured that they are capable of mastering the skills. Training sessions designed in such a manner entail three of the four principal sources of information that define individuals’ self-efficacy for a given task: vicarious experiences such as technology modeling, enactive mastery experiences such as hands-on activities, and verbal persuasion including positive affirmations regarding ability (Bandura, 1997). As we developed and delivered the sessions we included technology modeling, extensive hands-on activities similar to what faculty members and their students would do in classrooms, and encouraging, positive affirmations regarding their attempts and successes.

Adult learning theory posits that adults are eager and ready to learn things that can benefit them in their present life situation, yet question if what they are learning is important. Adults are self-directed, responding to internal motivation more than external motivation with previous experiences guiding them as they learn new things (Knowles, Holton, & Swanson, 1998). We focused on designing the sessions to build on faculty members' prior experiences and to match their immediate needs as we provided them with new opportunities for learning. We also recognized that adult learners want teachers who respect them, coach them, and support them as they learn.

QUEST Professional Development Sessions

Each session consisted of three two-day classes separated by two to three weeks over the course of the semester. For example, professors began classes on Monday and Tuesday, approximately three weeks later they attended classes on Wednesday and Thursday, and three weeks after that they attended classes on Friday and Saturday. The sessions were adapted from the Georgia Framework for Integrating Technology (InTech) in the Student-Centered Classroom (Kennesaw State University Educational Technology Center, 1999). InTech materials provided the framework for developing technology infused lessons for use in K-12 classrooms. Additional materials and activities were developed to model for professors how they could infuse technology in their courses. Cottrell (1999) contends that in order to see changes in teaching faculty development workshops must focus on how to use technology to improve teaching rather than focus strictly on learning to use the technology. Direct instruction was limited to explanations of how to use different pieces of software and hardware such as *Inspiration*, *Microsoft Publisher*, *Microsoft PowerPoint*, a projection system, a document camera, a digital

camera, interactive whiteboard, personal digital assistant, CD writer, and a scanner. The faculty members had extended opportunities to work together as they experimented with the software and hardware to explore ways to use technology to enhance their teaching. Each participant received a binder of the materials, activities, instructions, and resources used during the sessions. We encouraged participants to share their thoughts about the lessons and frequently had participants brainstorm different ways to utilize what they had learned. For example after learning to use *Microsoft Publisher* one professor created flyers to promote a new class he was offering, printed them out, and left the session with several copies of the flyers and a roll of tape. A few weeks later another professor reported that she taught her student teachers to create brochures about themselves to use as introductions for their cooperating teachers and the parents of their students.

We frequently asked professors to share their work with other participants. This not only helped to vary instruction, but also helped build participants' self-efficacy by giving them experience using technology in front of their peers. Throughout the sessions, we visited informally with each of the professors to ask about their previous experiences with technology, what they wanted to learn about technology, and how they were presently using technology. These conversations and our daily debriefing sessions enabled us to personalize the lessons for each participant.

During the sessions, we informally asked faculty members about how they were currently using technology in their university classrooms and if they would be willing to share what they were doing with the other faculty members. Many at first were reluctant to share as they did not think they were doing anything unusual or of interest to others. Once we convinced them that what they were doing in their classrooms would be of interest and of benefit to others in the

session, they willingly modeled their lessons. One professor proudly shared his graduate students' web pages showcasing their public school classrooms, which gave us intimate glimpses into the local public schools. A history professor's graphic displays of nuclear proliferation since the bombing of Japan left us breathless. These professors modeled for their peers the power of technology to enhance teaching and improve student learning.

As they learned new software, explored new hardware, and experimented with new ways of teaching, the faculty members forged bonds with faculty members from their own campuses and from other institutions. The QUEST sessions provided them with time to explore new technologies in a relaxed, comfortable working environment and to collaborate with their peers as they developed ways to integrate technology into their own classrooms. A community of learners provides not only the resources and technical support required to use technology but also the confidence to teach with technology (Ginns, McRobbie, & Stein, 1999; Hruskocy, Cennamo, Ertmer, & Johnson, 2000). Knowing that some of the faculty members attending the sessions would be intimidated by the prospect of learning to use technology, we worked hard to provide them with a friendly, collaborative, non-threatening environment in order to facilitate learning and communication (Knowles, Holton, & Swanson, 1998; Linnell, 1994; Mandefort, 2001; McKenzie, 1991; Norton, & Gonzales, 1998).

Table 1. Overview of Results

Changes in Teaching	No Changes in Teaching	Students' Use of Technology	Barriers to Using Technology
More interactive, constructivist classrooms	Reluctant to make changes	Required their students to use more technology in assignments and presentations	Lack of hardware and software
Modeling technology integration	Uncertain of their ability to use technology in their	Assisted students as they developed their technology skills	Lack of time to learn and practice using technology

	teaching		
Writing grants to purchase software and hardware for their classrooms	Already using technology so they made no changes in their teaching	Recognized the importance of their students learning to use technology in their teaching	Lack of technical support
More learner-centered less teacher-centered	Students lack of access to technology	Accessing course materials online	Lack of administrative support

Faculty Interviews

In the spring of 2002, we randomly selected twelve faculty members who attended QUEST sessions at the north site to participate in structured interviews consisting of ten questions. The questions were designed to illicit information about the faculty members' technology use, whether they made any changes in their teaching as a result of the professional development sessions, how they integrated technology in their teaching, whether they required their students to use technology, and whether they encountered any barriers when integrating technology in their teaching. The interviews were audio taped and transcribed by the researchers. Interview transcripts were analyzed using case analysis and cross-interview analysis (Patton, 1990).

Changes in Teaching

Faculty members discovered that to effectively incorporate technology their classrooms would need to be learner-centered rather than teacher-centered, "... *I've turned so many of my lessons from direct instruction to indirect instruction and I'm serving more as a facilitator and a mentor than I am a direct instructor or tell all teacher.*" Another said, "*I have taught for so many years that it is really hard to try the new things. I would never have tried any of it if it had not been for my QUEST experience.*" One faculty member referred to talking less as "*probably the biggest change.*" She then readily acknowledge how difficult this change was by saying, "*Not there yet, by the way.*" The difficulty of learning not to talk and "*letting students explore and*

come to their own conclusions,” was a concern for several professors who acknowledged that it will take time for them to become comfortable letting the students do most of the talking. And, it will take time to change their teaching, *“I still lecture, but I supplement it with technology.”*

The QUEST sessions demonstrated the importance of modeling technology integration as reflected in this comment, *“... if I’m asking students to create lessons that have a technology component then I try very hard for my lessons to have a technology component as well.”* Some professors reported that the sessions had stimulated them to think about additional ways to use technology, had motivated them to use more technology, and had given them the skills and knowledge they needed to try new ways of teaching. As they developed computer self-efficacy, they were willing to incorporate technology into their teaching. As one said, *“So you all really encouraged me to have more confidence in myself and go ahead and put that (technology) in my plans...”* Another professor found the sessions motivated her to integrate technology in her teaching, *“I got—more than any individual thing you gave us over there—is the stimulation to want to do more.”*

The sessions provided extended opportunities to learn to use new software, to learn new ways to use familiar software, and to learn to use a variety of hardware. Faculty members appreciated having time and support as they learned and developed their skills *“So, opportunities like T.H.E.|QUEST for us to go and receive training for us to integrate into the classroom are certainly wonderful. But it is also good for us to have time to become comfortable on a personal level ...”* Once faculty members returned to their campuses, they began writing grants and requesting funds from their departments in order to purchase additional software and hardware. One professor reported, *“We’re setting up a model (technology) classroom.”* Exposing the faculty members to different software and hardware, giving them extended time to work with the

technology, and providing time to share their ideas for using technology with other professors encouraged them to think about ways to incorporate technology into their teaching. Enthusiastic about what they learned in the sessions they were eager to incorporate technology in their teaching and were determined to find the hardware and software to do so.

No Changes in Teaching

However, two faculty members were reluctant to make changes in their teaching and uncertain of their abilities to do so, hence, they reported using no technology or very limited amounts of technology in their teaching. One year after attending a training session a faculty member commented, *“I think I will use it. But, I have not done so just yet.”* Another faculty member said, *“I think I can use Inspiration and now that I have it available to me, I think that I will use it. But I have not done so just yet.”* Learning to use technology and being confident enough to use it in a classroom setting does not come easily to all faculty members.

Students’ Use of Technology

For new teachers to effectively utilize technology in their classrooms, traditional university teaching must be transformed to include opportunities for students to participate in the creation of curriculum-based technology projects (Pellegrino & Altman, 1997). In the interviews the professors reflected on their students’ technology use, *“We’re using technology like crazy.”* As professors’ technology skills increased, they required more technology skills from their students, *“So now I require the generation (of a ripple effect) using Inspiration. I never did that before because I think that I was not familiar with it myself and I hadn’t used it that much,”* and *“in some of my classes they just can’t wait to get to the computer when we get in there.”* As professors’ comfort level with technology increased they required their students to use more technology, *“And I use Blackboard more. And also, as an instructor I’ve use it more but I’ve had*

my students use it more because I'm doing things on Blackboard with them now that I wasn't doing." Another professor reported on her students' enthusiasm for using technology in class, *"And I'll find that in the next class when I get there 3 or 4 minutes ahead of time they'll be 6 or 8 students there ahead of me already on the computer before I even say what we are going to do that day."*

Faculty members reported providing assistance to students to insure that they could successfully complete assignments requiring technology. One stated, *"...I do a mini reminder for those who feel uncomfortable using those technologies in particular with those email attachments. Then, I do some one-on-one work with them. I do not want them to leave my class without those technology skills."* Others made sure the students not only had the skills but also had the software to complete the assignments, *"... I requested the demos from the company..."*

Professors viewed technology integration and student technology use not as an add-on but as a clear necessity for the education and professional growth of teacher candidates. They recognized that by requiring teacher candidates to use technology they were also requiring them to change their teaching, *"... if I left it to my teacher candidates... some would be just as they were taught— very traditional. I have helped them by requiring it—they don't have a choice."* A math methods professor reported that integration of technology was a clear requirement in her classes. *"They must show evidence of using technology with every math lesson that is either done in the professional development school or at the laboratory school."*

Barriers to Using Technology

When asked about barriers to using technology, faculty members commented on their personal teaching style, a lack of software and hardware, limited access to software and hardware, lack of technical support, no time to learn to use technology, and an absence of

administrative support. One identified herself as a barrier to using technology, *“My own perception of myself and my style and approach to teaching.”* This professor also recognized budgetary constraints when it came to keeping technology current, *“... there’s always something either to repair or update or some new software that comes along.”* Several faculty members noted the lack of technical support available on their campuses. As one participant said, *“This is the biggest, the one thing that I have a problem with is when I get ready to use it in the classroom it doesn’t work.”* Professors were frustrated with the lack of technical support and with their own inability to troubleshoot and correct problems.

Faculty members reported their biggest barrier was the lack of time to learn to use the available technology and to explore ways to integrate technology in their teaching. One faculty member reported the main barrier to implementing technology was *“that piece of time to sit down and play with it... that’s where the good stuff comes from— when you start playing with it.”* Another faculty member commented, *“Each time I start it’s a stop. I get too busy.”*

Administrators who impede rather than support faculty members’ efforts to use technology in their teaching (Dusick, 1998; Thompson, Schmidt, & Hadjiyianni, 1995) were cited as barriers by faculty members. One frustrated professor, after outlining plans for revamping her courses to integrate technology into her classroom, remarked: *“Have I done that this semester? No. Why? Because I have administrators in my way— that are not supportive.”* The basis for administrators’ lack of support for technology integration is not always easy to identify. One faculty member offered this explanation: *“The administration at the highest levels— they don’t understand the need for this.”*

Online Survey

In Spring 2004, 533 faculty members from across the state completed an online survey designed to assess the use of technology in their teaching. Of these respondents 89 indicated that they had attended QUEST sessions at either the north site or south site. The online survey included questions about the technology faculty members used in their teaching and open-ended response items about changes in their teaching and their use of online resources.

Faculty members who attended QUEST sessions reported using a greater variety of technology in their classrooms than faculty members who did not attend QUEST sessions. Approximately 74% of QUEST participants, compared to 69% of the nonparticipants, reported using three or more different technologies in their teaching. When queried about their use of some of the basic components of *BlackBoard* course management system such as posting assignments, posting grades, making announcements, displaying course materials, sending email, providing resources for assignments, and accessing the digital drop box, approximately 81% of the QUEST participants compared to 74% of the nonparticipants reported using five or more of these basic components. The most striking difference between QUEST participants and nonparticipants was in the use of interactive components of Blackboard. Approximately 75% of QUEST participants and 48% of nonparticipants reported using interactive online teaching resources such as chat, discussion board, and interactive white board. The QUEST sessions included opportunities for faculty members to participate in chats, discussions, and lessons using the interactive white board. These activities had instructional components presented in lively, engaging formats. QUEST participants found these interactive components fun, interesting, and useful with three of four participants using some or all of these components in their teaching. The adoption rate for streaming video or personal web pages was low among participants and

nonparticipants. This low adoption rate may reflect a lack of available technology.

Approximately 18% of the QUEST participants reported using streaming video and personal web pages whereas 12% of nonparticipants reported using these technologies.

Table 2. Overview of Online Survey Results Regarding Technology Use

	Technology Use in the Classroom	Basic Components of <i>Blackboard</i>	Interactive Components of <i>Blackboard</i>	Streaming Video or Course Webpages
QUEST participants	74%	81%	75%	18%
QUEST nonparticipants	69%	74%	48%	12%

Those faculty members who attended QUEST sessions reported using more technology in their teaching and using more components of *BlackBoard* course management software. An integral part of the sessions was extended opportunities to use technology in classroom situations and to explore ways to use technology in their classrooms, which gave faculty members the confidence and the skills to incorporate technology in their teaching.

Changes in Teaching

When asked about changes in their teaching QUEST participants acknowledged that their teaching had become more interactive, constructivist, learner-centered, and project-based as they incorporated technology into their teaching. A mathematics professor wrote “... *much less lecture. Since technology eliminates some of the tedious computations of the past, my questions are on a higher thinking level.*” One professor commented “*I’ve changed my approach to lecture/discussion days because of Discussion Board postings on assigned readings. I take my cue from students rather than deciding ahead of time what we’ll talk about.*” One faculty member reported using WebQuests, Internet sites, and *BlackBoard* in his classes and noted, “*I didn’t do any of this before T.H.E.|QUEST.*” Other professors offered these comments about

changes in their teaching “... *I now use a more facilitated, less directed approach;*” “*I use more hands-on activities that involve students in how to use the technology for their own purposes;*” and “*I have purposefully swapped out non-tech based activities/resources for technology based ones.*”

No Changes in Teaching

Of the eighty-nine QUEST participants who completed the online survey five participants indicated they were not using technology in their teaching. One simply stated, “*No. Don’t use.*” One QUEST participant reported no changes in his teaching because of a lack of release time to learn to use technology, “*I don’t know how to do it well, and I have not been given the time to learn.*” Some reported no changes in their teaching because prior to the professional development sessions they had been using technology in their teaching, “*Little if any. I have been using PowerPoint and the Internet since the mid-90s*” and “*I haven’t really. I do the same things I would do with a chalkboard or handouts. I simply use technology instead.*”

Students’ Use of Technology

Some QUEST participants require students to access course materials online, use technology in class presentations, use technology to complete class projects, and include technology in their lesson plans and unit plans. One recognized that requiring students to use technology was beneficial to their future endeavors, “*Students gain experience and knowledge using technology that will be so much a part of their future work environments.*” One faculty member noted that requiring students to use technology resulted in, “... *more hands-on activities that involve students in how to use the technology for their own purposes.*” Another faculty member reflected on using technology in teaching, “*There is much more discovery-motivated learning.*”

Not all faculty members required students to use technology to complete course requirements, as one psychology professor responded, *“having computer skills is not necessary in the coursework I am teaching.”* When asked about putting course materials online several faculty members noted that putting course materials online meant that students did not have to come to class. But as one faculty member commented, *“Some students use this as an excuse not to come to class. Though these are in all likelihood those who would find another excuse if the materials were not online.”* Others cited students’ lack of access to technology as their reason for not requiring students to use technology, *“... the computers the students have at home are so old the equipment cannot handle the technology used at the university.”*

Barriers to Using Technology

QUEST participants reported that barriers to using technology included access and problems with the hardware. Equipment that works one day and not the next, classrooms that are not wired, presentation equipment that varies from one classroom to another, Internet links that do not always work, and sporadic Internet access were all reported as barriers to using technology in their teaching. Faculty members expressed frustration with hardware that did not work and at not being able to solve their technology problems, *“Different computers show the information differently when it is printed off; ‘Glitches’ I don’t know how to fix.”*

Another barrier reported by faculty members was the amount of time that was needed to maintain *BlackBoard* and web sites, do online quizzes, answer email, and respond to discussion postings. However, one faculty member noted, *“Creates a tremendous amount of work up front. Saves a lot of time in the long run.”*

Conclusions

The QUEST sessions incorporated key components of the theories of diffusion of innovations, self-efficacy, and adult learning by providing faculty members opportunities to develop social networks, observe the modeling of technology integration, and experience successful interactions with technology while participating in hands-on activities. The sessions provided faculty members with time to learn to use technology and to practice using technology. Changes in faculty members' teaching as a result of the QUEST sessions included more interactive constructivist teaching, modeling technology integration, writing grants to obtain more technology, and more learner-centered less teacher-centered classes. Those who made no changes in their teaching were reluctant to make changes in part because they were uncertain of their ability to incorporate technology in their teaching. Some commented that they made no changes after the session because they were already using technology in their teaching or because their students lacked access to technology. Most professors reported that after the sessions they required their students to use more technology to complete assignments as they recognized that it was important for their students to learn to use technology in their own teaching. Additionally, they required students to access course materials online and to utilize interactive features of Blackboard. When faculty members returned to their campuses they faced barriers that included lack of time to continue to develop their skills, lack of sufficient hardware and software, lack of technical support, and in some cases an absence of administrative support. While most of the faculty members who attended QUEST sessions reported changes in their teaching, not all faculty members did.

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