The Distributed Academic and Campus Technology Coordinator (abbreviated DTC) program at the University of Colorado, Boulder has seen initial success in supporting faculty who use instructional technologies. In this paper, we describe the inception of the program, its deployment throughout the university, our initial support strategies, and the resulting successes and failures. We conclude with a framework describing the way DTCs communicate with faculty.

Introduction

Many faculty members at the University of Colorado at Boulder (UCB) would like to integrate technologies into their teaching and research in innovative ways; however, this may require them to invest substantial amounts of time, energy, and resources that they don’t have. The administration of UCB recognizes this and has taken several steps to support faculty in their use of technology. One of these steps is creating the Distributed Academic and Campus Technology Coordinator (abbreviated DTC) program, which placed nine technology coordinators in schools and colleges across UCB (see Appendix A) to help faculty use technologies in their teaching, research, and creative works.
Each technology coordinator reports to a supervisor who works for Information Technology Services at UCB as well as an academic dean or associate dean of the academic unit they serve. The DTCs meet their mission by serving as liaisons between ITS and faculty, by training faculty to use various technologies, by assisting in projects that use technologies, and by assisting with educational technology strategic planning processes.

**History of the DTC Program**

In 1997 and 1998 the University of Colorado developed a five-year Information Technology Strategic Plan. One of the primary needs that emerged from the development of the plan was a desire by faculty for support in incorporating technology into their teaching. At the same time, the idea of providing “distributed” support, staff dedicated to the area they serve and located close to their constituents, was being investigated. The result was an initiative to provide “distributed technology support staff” within the colleges and schools of the University. Funds were allocated to hire a group of Distributed Technology Support Coordinators to provide assistance to faculty in incorporating Technology into their teaching, research and creative work.

Jim Marshall, co-director of Information Technology Services (ITS) developed a memorandum of understanding with most of the colleges at UCB to place a Distributed Technology Coordinator in the college. Three Technology Coordinators were designated for Arts and Sciences, one for Engineering and half-time positions for Business, Journalism, Law, Music and Education. The plan called for the coordinators to report both to the college and to ITS. The dual reporting structure did not fit very well within the state personnel system, so it was decided to hire the coordinators as professional/exempt staff which required approval by the board of regents. The regents approved the program and finalized the titles of the coordinators as “Distributed Academic and Campus Technology Support Coordinators” as the program would ultimately report to the Associate Vice Chancellor for Academic and Campus Technology.

A search committee was formed for each position in late 1998. ITS developed a generic job description and then worked with the search committees to finalize a specific description for each college. We began advertising for the positions in January of 1999, interviewed candidates in March, and hired our first technology coordinator in April. By June of 1999 we had technology coordinators in place for all of the positions except the School of Education. The summer of 1999 was spent in training and making preliminary contacts with departments to let faculty know that help was available.

We formally launched the program in the beginning of fall semester in 1999. Our original plan called for the technology coordinators to attend departmental meetings and offer their services to faculty. We also advertised our presence via e-mail and requested that the deans announce the new coordinators in their meetings with department heads. In some cases the coordinators went door-to-door around their area to offer services. We had expected that the coordinators would provide some training in technology tools and a lot of project-oriented work. However, we discovered very quickly that faculty had very different ideas, and that the technological sophistication of different colleges and departments varied widely. Technology coordinators
have participated in tasks ranging from offering classes on how to use e-mail or how to access the World Wide Web to constructing computer-based weather monitoring systems and coordinating multi-campus video-based classes.

We found that each college or department has its own unique needs, so a very important trait for technology coordinators is flexibility. Each of our technology coordinators has had an opportunity to define their job to fit the needs of the faculty in their area.

During our second year we began to move away from the most basic technology tools and into more web development tools and multimedia projects. The opening of the new Eaton Humanities building on campus created some possibilities for us. The funding for the building included money for a streaming video server. To make effective use of the server, a request for proposals was sent to faculty in Arts and Sciences asking them to develop proposals for video and multimedia projects. The technology coordinators in A&S were instrumental in helping faculty develop and implement the proposals. ITS had some space in the Humanities building dedicated to technology support and we decided to use some of that space for the creation of the Technology Experimentation Center (TEC), an area where faculty could try out the latest technologies, work on technology projects and consult with technology coordinators and other ITS staff. The facility is staffed and open for walk-in traffic each day from 10:00 a.m. to 2:00 p.m. The TEC has been a great success and has recorded over 300 faculty visits in the past 18 months. The actual number of visits is likely a lot higher because not all faculty visits are logged.

During our second year, we also established small faculty workrooms in Law and Music with mixed results. The Music room is fairly busy, but the Law facility is very lightly used.

September of 2001 marked the beginning of the third year of our program. This fall we have begun to shift our emphasis to help with a campus-wide initiative for Educational Technology Strategic Planning. The technology coordinators have begun working with departments to put together plans for incorporating technology into the curriculum. Coordinators are currently working with the Fine Arts, Communications, Applied Math and Astrophysical and Planetary Sciences departments. We are also in the process of upgrading the technology in the TEC to stay ahead of the technology curve.

**Metrics**

We realize that it is important for us to make efforts to continuously improve our service, and so we have begun to track quality metrics in our work. Because our mission is to help faculty use technologies in their teaching, research, and creative works, we think it is important to track the number of faculty we work with, the satisfaction those faculty express in our work, and the awareness of our program across campus. We also track the number of faculty who visit our Technology Experimentation Center, a place where faculty can create new multimedia content and experiment with new technologies.

In the time since we began our program (a little over two years) we have made more than 2000 faculty contacts. Also in that time, we have conducted two faculty surveys and found that 63 out
of 71 faculty agree or strongly agree that the DTC Program has helped improve the quality of their work (see Appendix B).

We also asked faculty if the DTC Program has helped them have a better understanding of the technology resources available to them for instruction (See Appendix C). 62 out of 75 faculty either agreed or strongly agreed with that statement.

We also asked faculty if, as a result of the DTC Program their use of technology in instruction is more effective (See Appendix D). 61 out of 72 faculty either agreed or strongly agreed with that statement.

And we asked faculty to rate their overall satisfaction with the DTC Program. 70 out of 77 faculty agreed or strongly agreed that they were satisfied with the DTC program (see Appendix E).

Recently, we distributed an additional survey to 100 faculty across campus in an attempt to find out how many faculty had heard of our program. We received 18 responses, and of those, 10 indicated they were not aware of our program.

When people visit our Technology Experimentation Center, we ask them to sign in on a log sheet. Not everyone does sign in, but since the TEC has opened in March of 2000, we have logged over 300 visits from people in 50 departments at the University. We estimate that the actual number of people visiting the TEC is probably two or three times greater.

We would like to continue to survey the faculty regularly to get an idea of how they feel about our services, but we would also like to begin to track the effectiveness of faculty who do incorporate technology into their teaching. Also, as a result of the survey that indicated that many faculty members are not aware of the DTC program, we have started to work with the Marketing department in the School of Business to improve the way that we market the program to the campus.

**Problems Faced**

The technology coordinators have faced a number of problems in helping faculty use technologies in their work. These problems include communicating to faculty contingency (the limits of technologies and the systems that can support those technologies), the complexity of technological systems that they might use, the possibilities for strategic use of technologies to support their work, and the procedures they need to follow to use the technologies they are interested in.

**Communicating Contingency**
When we communicate about contingencies, we are communicating about limits or boundaries: the boundaries of what the technologies can do for faculty, and the boundaries of what we can do for faculty. When we are communicating about the limits of what we can do, we encounter challenges in communicating those limits to faculty, to the Information Technology Services (ITS) community, and to the broader University community.

Because of the ratio of faculty to technology coordinators (approximately 250:1) we have had to limit what we can do for any one individual faculty member, and we have to find ways to scale our help. We address this by trying to help faculty help themselves over time. In part, we do this by scaffolding: helping them more in the beginning of a project, and slowly weaning them from our help toward the end of the project. We also encourage faculty members to connect with each other to share their technology work with each other. Through this process of scaffolding and encouraging faculty to share with other, faculty members gain a better understanding of the limits of the job we can do for them. When they have such an understanding, they tend to inform their colleagues of the limits of our work and so we help build a shared understanding of what we can and can’t do for them.

We also have difficulty communicating the our limits to our Information Technology Services (ITS) colleagues. They are spread over two campuses and so we don’t always see them regularly. So when we do have a chance to talk to them (usually to communicate on behalf of a faculty member) we try to help ITS staff members to see the limits of what we do. For example, sometimes we need to explain that our main job is not to do desktop support for faculty.

Another problem we face when working with faculty is we see a gap between the time and energy many faculty want to spend on a technological project, and the time and energy they need to spend on activities that will get them tenure or that will help them in their post-tenure review. To address this problem, we try to help them budget time and energy they need to invest in working with technologies. Sometimes after an initial consultation with faculty, we discourage them from using technologies, or we encourage them to scale back their plans for the technologies. Another way we address this problem is we act as liaisons between professors and the Information Technology Services staff to assemble a team of ITS people to help them. Sometimes we do this through a formal proposal process and sometimes we do this on an informal basis.

When faculty members start a technological project, they often aren’t aware of the implications of adopting a technology. For example, they may not realize that a technology may not be supported by our ITS staff, so they may have to work without technical support or they may have to go off-campus for support. They might also be using a technology that is experimental and buggy. And they may be using a technology that costs too much to scale up to a computer classroom or lab setting.

When we work with faculty who are not aware of implications like this, we try to communicate to them early on that they need to plan for the cost of the project (both in terms of time and money needed to make the project succeed). We also help them to plan for support for their project. We encourage them to think of the technological support (hardware and software support) as well as the social support (training, assistance in running equipment, etc.). Most of
all, however, we try to help faculty consider whether the technologies they are working with fit their teaching style (lecture-, discussion-, or project-oriented). We try to help them consider whether the technologies they are considering will work well with their students’ learning styles (visual, auditory, kinesthetic). And we try to help them consider whether the technologies they use work well with the content of their message (is their message a long, complex argument, is it a juxtaposition of images, etc.).

Faculty members also come to us with a variety of limits on their learning. That is they have a variety of requirements that we must meet in order to help them effectively. They have differing needs for the pace of instruction, they have differing abilities for working with technologies on their own, they have differing learning styles, and they have differing information modality preferences.

To address this variety of learning contexts, we adjust the pace and scope of our training and consulting to meet the ability and interest-level of each faculty member. We also develop various modalities of training such as face-to-face training, classes, documentation, and web-based training. This lets faculty choose the modality that works best for them. While early on, we try to help faculty by showing them how to use technologies; over time, our goal is to help them become self-sufficient in their technology-learning so that they need our help less and less.

Many faculty members also do not think about the end of the technology life cycle when maintenance costs may rise, and they may need to either retire a technology or give it new life in some other form. To address this problem, we have begun to work with faculty early in a project to help them to plan for ongoing maintenance (not just for short-term use and maintenance). We also help them to plan for a period of use of a technology and a point of retirement; or we help them plan to move the content of their technological curriculum module to a new technological platform. Recently we have worked with an Italian professor who decided to retire her course web site. She felt it had run its useful course, and it was time to allow it to stay on the server, but not to be refreshed anymore. In contrast to this, we also worked with a Chinese professor who had an eight-year-old videodisc project that could no longer run on the hardware and software we support on campus. The design of information, and the way she taught the information were still relevant to her teaching, but unfortunately, that design and content were embedded in obsolete technology. So, she decided to work with our graphics specialists to capture the content from the videodiscs and to transform it to a format that could work on a DVD. It is our work with this professor that helped us to realize we may need to plan for a potential rebirth of a technology curriculum module at some point.

In addition to communicating about the limits of our work we also communicate with faculty about the limits of technologies. For example, we have a faculty member who would like to eventually hold a chat with approximately 300 students simultaneously and have streaming video in the chat session. We have had to tell her that her dream is still beyond the boundaries of what we can do technologically for her. Also, we have had to tell her that her dream is probably beyond the state of social conventions currently governing chat rooms. And we have had to tell faculty that their requests that we create curriculum modules for them is generally outside the boundaries of what we can do for them (except in the context of a proposal process).
Another way we communicate contingencies is in helping faculty see the risks in what they do. We try to help them see the technical risk they take on if they adopt a technology. That is, it may be buggy and may not work as they hope in a classroom setting. We also try to help them see the potential career risk they incur when they work with technologies. We help them to get a sense of how much time and energy they will likely devote to using technologies. And we help faculty understand potential legal risks they may incur. This might be because they want to use material that may be covered by copyright law, or it may be because their web site may not meet ADA guidelines for accessibility.

Communicating Complexity

When we communicate about complexity, we are in part communicating about the layered nature of technology; the fact that technology consists of hardware, software, and several layers of human support, such as training, maintenance, and assessment. For example, some faculty we work with think of technology as a stable and reliable tool, so they can become frustrated when the hardware fails, when the software causes unpredictable performance, or when support staff are not able to debug their problem during a class period. If we can spend time up front helping them to see that such problems are possible, we think it helps them better prepare for problems they might encounter.

In addition to communicating with faculty about the layered nature of technologies, we also communicate with them about problems with scalability. Often faculty will not be aware that a technology might work well in a desktop environment, but it may have difficulty when it is placed in a lab (or campus) setting. For example, occasionally two software products in a lab setting can interfere with one another, so lab managers have to make a call about which product will need to be pulled from the lab.

Another scalability problem we communicate about is the problem of taking a technology that is used in a small class and scaling it up for use in a large class. The professor who we mentioned previously who wanted to have 300 simultaneous chats with streaming video is dealing with a scalability problem. She can hold chats with a few students, but when she moves up to 300 she faces a social (control) problem and a technological limitation. So we try to help professors like this see the scalability problems they might face.

To address problems of technology complexity and scale, we spend time with faculty members helping them to see who is working “behind the scenes” to support their technology use, and to plan for the support they will need. We find that usually the best time to do this is in reflecting with a faculty member on why a technology didn’t work as planned. We do this in part by building relationships with faculty and by working with them on an ongoing basis to understand how technologies include hardware, software, as well as the human support to use those technologies.

Communicating Possibilities
At times when we communicate with faculty, we are communicating about possibilities that the technologies open up or that they don’t support. In talking about possibilities, we are trying to help faculty see what is missing or assumed about a technology (we call this alternity) and we are trying to help them see what new technologies can help them do (we call this opportunity).

When we are talking about alternity, we are doing things like helping faculty see that NetScape Composer, for example, does not support frames; even though faculty often naturally assume that a web page composing program like Composer should support frames. Another example of communicating about alternity is helping faculty see that sometimes programs like Microsoft Word might not handle running headers in a 300-page document as well as it handles them in a 20-page document.

When we are talking about opportunity, we are often helping faculty to see how new technologies have made it possible for them to do something in a new way or in a better way than before. For example, the availability of wireless computing has made it possible for us to talk to a first-year writing teacher about having a mobile “lab on a cart” that she can wheel into her classroom. Likewise, the advent of video editing software has made it possible for us to capture video and save it in a format like QuickTime, which a professor can then use to have fairly precise control over the play head when showing video in class. Previously professors would only be able to get close to the segment of video they wanted to show when they used a VCR’s fast forward or reverse buttons.

One way we address the problem of helping faculty to see possibilities is by helping them see a broader set of uses for a technology. We do this by pointing out to them the limits of the features of technologies. We also introduce to faculty the best practices of their colleagues, and encourage them to work with one another. For example, recently a French professor created a media-rich presentation on the culture of the people of Mali. This presentation incorporated images, sound, and text. The professor who created it didn’t know that PowerPoint could show images and sound. However, when she found out what PowerPoint could do for her, she told her colleagues about it and he agreed to allow us to show her PowerPoint presentation as an example of a best practice.

An example of encouraging collaboration is when we told an ancient history professor about an innovative web site that classics and fine arts professors were creating. The history professor decided to contact them to see if he could contribute images and pages to their site, which is used in teaching classics courses.

Another way we help faculty envision possibilities for technology use is having a request for proposal (RFP) process that offers technological services such as video server space and instructional design assistance. The RFP process is familiar to faculty members and is broadcast to a wide audience. The review of the proposals was done by a team composed of both faculty and ITS staff. This process created possibilities for both faculty to have their projects accomplished with expert help and an opportunity for ITS to work with faculty who had creative ideas.
Our School of Education (SOE) has developed a unique framework for communicating technological possibilities to their faculty. The SOE’s framework guides people in viewing a technology as either a communication tool, as an instructional tool, as a cognitive tool or as a management tool. This framework helps faculty view envision possibilities for technology from four different perspectives. We think it has potential as a brainstorming and planning tool.

**Communicating Procedures**

A very common way we talk to faculty is in procedural communication. We help faculty learn how a particular technology functions and we help them see how they can use a technology to be more effective in their work. Frequently technology coordinators work one-on-one with faculty to teach them a technology. We also hold seminars on tools such as Microsoft PowerPoint, NetScape Composer, and Macromedia Dreamweaver.

In addition to helping faculty learn how technologies function, we also teach things like web site design so that faculty can learn ways to be effective in reaching their audiences. We might give them advice on presenting their syllabi online, or we might work with a faculty member to create an online quiz using WebCT. We also help faculty see examples of best practices that their colleagues have created.

As we communicate procedural knowledge to faculty members, we find we need to be flexible. We adjust the pacing of our training, and the degree to which we complete a task for faculty. We also find ourselves consciously transforming our training to match the learning styles of faculty (e.g. visual, auditory, tactile) as well as the modality preferences of faculty (e.g. face-to-face, print, e-mail, etc.).

**Descriptive Framework**

To summarize the kinds of communication we engage in as technology coordinators, we have created a descriptive framework (See Appendix F). We think this framework will be useful for directors of IT organizations who might want to hire technology coordinators. We also think it will be helpful for us as we communicate with other employees in our Information Technology Services group to tell them the kind of work we do. And finally, we think this framework might be helpful for communication researchers.

Our framework names four kinds of communicating we do. We communicate about contingency (or limits). We communicate about complexity. We communicate about possibilities, and we communicate about procedures.

We certainly engage in forms of communication not covered by this framework, but we feel this framework describes a significant part of the communication we engage in as technology coordinators. It is based on brainstorming sessions with our technology coordinators as they described the challenges and successes they have been involved in during the first two years of our work at C.U. Boulder.
We hope to continue to refine this communication framework and to use it to build a shared understanding among ourselves, our ITS group, and our academic administrators about the nature of our work.

Acknowledgement

We would like to acknowledge the contribution of the Distributed Academic and Campus Technology Coordinators at CU Boulder who provided us with examples of their challenges and successes for this paper. They are Kristeen Burkhardt, Cheri Cathey, Judi Dressler, Dennis DuBe’, Steve Gabbard, Doug Kirby, and Jackie Snook.
Appendix A: Organizational Chart of Distributed Technology Coordinators
Appendix B: Survey Response on DTC Program Improving the Quality of Work of Faculty

Faculty responses to two surveys asking if the DTC program has helped improve the quality of their work.
Appendix C: Survey Response on DTC Program Helping them Understand Resources Available to Them

Faculty response to two surveys asking if the DTC Program has helped them better understand the technology resources available to them for instruction.
Appendix D: Survey Response on DTC Program Helping Improve Faculty Use of Technology in Instruction

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Faculty response to two surveys asking if the DTC Program has helped them improve their use of technology in instruction.
Appendix E: Response to Survey on Overall Faculty Satisfaction with DTC Program

Faculty response to two surveys asking their overall satisfaction with the DTC Program.

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Appendix F: Framework Describing the Communication of DTCs

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