Instructional Technology Training: Developing Functional and Applied Skill Sets

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Abstract: Many instructional technology training programs focus instruction on functional skills—how to use a given technology—with little attention paid to the applied skills necessary for instructors to make the technologies relevant and valuable as learning tools. We argue that situating technology training within holistic, pedagogy-focused instructional development programs ensures that the tools will be used in ways that support learning. We present a case study that demonstrates how technology training can be incorporated into an instructional development program.

Introduction

Educational researchers have explored a variety of ways that new communication technologies (Scott 2003) can facilitate learning. When employed as tools for learning, communication technologies can be reframed as instructional technologies, encompassing a variety of media and modes, from the Blackboard course management system to the three-dimensional virtual environment of Second Life. While mastering the functional aspects of a given technology presents one set of challenges for instructors, utilizing these technologies as tools to facilitate learning presents a different (and often more significant) set of challenges, which can lead to frustration as the technology never achieves its instructional potential.

In this paper, we propose a training model that promotes the development of the critical skills necessary to employ a technology as tool for learning in addition to understanding how to operate the technology. The model is premised on the presence of an active community empowering meaningful adoption and implementation of technologies while shifting the discourse surrounding the tool from communication technology to instructional technology. We first discuss the barriers faced by instructors who attempt to incorporate instructional technologies in their teaching. Our goal in this section is demonstrate that these technologies often fail to be adopted because the function of the technology supersedes its application to learning goals. Then, we discuss the significance of language in creating an empowering community to support meaningful applications of instructional technologies. In order to contextualize our arguments, we situate them within the context of the Graduate Student Instructor (GSI) Program at the University of Texas at Austin. To this end, we present a case study that demonstrates how to simultaneously integrate functional and applied skills for the effective use of instructional technologies in an existing series of workshops and colloquia.

Through the case study, we illustrate how GSIs are well positioned to become technological boundary spanners between the typically more traditional pedagogical approaches of senior faculty and the technologically rich experiences of contemporary undergraduate students. We highlight how GSIs are uniquely situated to apply instructional technologies in ways that leverage undergraduates’ technological experiences with the course’s learning goals. We argue that GSIs can be an effective means by which barriers to effective employment of instructional technologies in the classroom can be overcome.
Barriers to the Adoption of Instructional Technologies

There is considerable variation in the degree of meaningful adoption and implementation of communication technologies in instructional settings. Crucially, implementation of instructional technologies must serve a wide range of individuals and groups. The comfort levels of department administrators, faculty, and graduate student instructors varies in their use of technology, as does their understanding of the opportunities it can afford in the classroom. Based on our decade of combined experience in developing the University of Texas at Austin’s (UT Austin’s) GSI Program, we have identified three potential attitudinal barriers to the adoption of technology.

1. **Generation Gap.** While many faculty members were introduced to the internet in the course of their professional lives, the majority of today’s undergraduate students grew up using the internet. While GSIs—positioned generationally between faculty and undergraduate students—may potentially be the agents to bridge this gap, they often model the teaching styles of their faculty supervisors, who may not be familiar with or interested in the adoption of emerging technologies. Furthermore, GSIs often teach introductory courses and laboratory sessions, with syllabi and assignments developed by their faculty supervisors and handed down from year to year.

2. **Disciplinary Traditions.** Teaching practices are often rooted in discipline-specific traditions. Even though—or perhaps because—technologies could revolutionize teaching in these disciplines, some faculty members find it difficult to let go of historically normative methods of teaching. In addition, some faculty members are wary of the considerable professional challenges promised by the adoption and adaptation of emerging technologies.

3. **Unrewarded and Risky Investments.** The decision to adopt an instructional technology also means a commitment to adopt a set of teaching practices necessary to make implementation successful, increasing the time investment that may appear overwhelming, particularly when instructors are learning how to operate the technology for the first time. Moreover, it’s risky to adopt instructional technologies. Although the majority of today’s college students grew up with the internet, some students resist learning yet another emerging technology, such as Second Life. When an implementation is not successful, even if due to factors beyond instructor’s control, the adoption of an emerging technology can backfire, resulting in poor teaching evaluations. So on one hand, an instructor may want to develop an innovative application for a particular technology to support learning, but on the other, they are frequently not give the opportunity to fail in their initial implementation.

Before instructional technologies can be effectively used to increase learning, we must address these barriers to initial adoption. The work of social scientists who have studied technology adoption for several decades has led to three theories: the Technology Acceptance Model (Davis et al. 1989), the Diffusion of Innovations Theory (Rogers, 2003), and the Social Information-Processing Model (Fulk, Schmitz & Steinfield 1990). When applied to the educational context, these three theories provide a framework for understanding why instructors adopt technology and how technology training programs can support them.

A synthesis of these adoption theories suggests that technology adoption is influenced by three categories of factors: (1) an adopter’s functional skills in operating a technology, including factors such as ease of use and complexity; (2) an adopter’s ability to apply the technology in meaningful ways, including factors such as usefulness and compatibility; and (3) an adopter’s support community, including factors such as observability and diffusion networks. Not only do these categories reflect the critical distinction between functional and applied skills, they also reflect the importance of developing an active and empowering community behind instructional technology adoption. We turn, therefore, to a discussion of how the discourse used to frame communication technologies as instructional technologies can lead to the creation of such a community.

The Language of Instructional Technologies

A critical factor associated with how instructors use a technology is the tone and tenor of the language they use when referencing it. Underlying metaphors, often introduced in training programs during the early adoption stage, guide the use of technologies. For example, do trainers characterize Blackboard as a tool for mass communication and document storage or as online environment where teaching extends beyond the classroom and learning happens on students’ home computers, smartphones, and iPads? The language used by those engaged with the technology can set institutional tone, impacting how adopters approach implementation.
The term “instructional technology” encompasses a wide range of programs, platforms, and devices that have been shown to facilitate classroom instruction. Such technologies range from the chalkboard to the three-dimensional virtual environment of Second Life and include blogs, wikis, message boards, chat rooms, document-sharing programs, and webcams, among many others. The programs, platforms, and devices themselves are not instructional technologies; rather, they are communication technologies that facilitate information sharing among individuals. When employed as tools for learning, they become instructional technologies.

In Kee’s (2008) terms, the distinction is between information and communication technologies (ICTs) in contrast to instructional and educational technologies (IETs). A technology can be both an ICT and an IET, based on how it is used. Consider two examples. If Blackboard is used simply for information dissemination as a document repository and as a medium for online announcements and broadcast e-mails, it is an ICT. If Blackboard is used to engage students with course materials as a medium for rich, ongoing discussion beyond the classroom with the instructor’s guidance and feedback, it is an IET. If an online message board is used as a medium for the instructor to disseminate class readings and homework assignments, it is an ICT. If the board is used as a medium for students to post questions about difficult concepts in the chapter and to receive responses from other students and the instructor, it is an IET. Instructors must understand the distinction between IETs and ICTs if they are to incorporate technology successfully as a tool for learning.

Kee (2008) suggests that one useful distinction between ICTs and IETs can be understood in terms of the relationship of the technology to time: whether it is “time-efficient” or “time-consuming.” He characterizes ICTs as time-efficient, serving to streamline communication through broadcast e-mails and to simplify information dissemination through document repositories. He characterizes IETs as time-consuming, providing time for planning and testing as effective tools to facilitate learning. Kee’s distinction is helpful for understanding instructors’ training needs, i.e. the effective use of IETs is based on an instructor’s skill at designing courses that can be supported and enhanced with technology. This requires that they master the tool as an ICT while also mastering application of the tool as an IET. An instructor’s use of a technology as an IET builds on his or her ability to use it as an ICT.

This distinction illuminates underlying assumptions in the discourse surrounding technology as it relates to learning. These terms are the lens through which we understand the function of the technology and which constrains the role that a technology can play in the classroom. The under-use of technologies as IETs can be explained by the metaphors instructors embrace for the technologies they use (Kee, 2007). How we label particular technologies creates metaphors for those who use the technologies. Metaphors provide the interpretive frameworks and guiding worldviews that shape the production of human thoughts and actions. Lakoff and Johnson (1980) argue that we live by the metaphors in our language.

If the metaphors used by the community supporting the adoption of an IET (e.g. an academic department) frame the tool as a component of instruction rather than as a tool for communication, the community will experience the tool as a means to a pedagogical end. If the community’s metaphors focus on the employment of the tool as an end in and of itself, adoption is less likely because the connection between the tool and learning is not made explicit.

Being sensitive to these metaphors is critical when we compose titles and develop agendas for training workshops and in describing the use of technologies in syllabi. For instance, if workshop titles focus on a technology (e.g. “Using Message Boards in the Classroom”), then participants will expect to only learn about the tool. If titles focus on pedagogical principles (e.g. “Creating Engaging Discussions on Message Boards”), then participants will expect to learn teaching strategies supported by the tools.

By adopting language that focuses on learning through technology, we are able to overcome two of the barriers to adoption noted in the previous section: (1) we frame IETs as support systems for traditional disciplinary approaches to learning, and (2) through this framing, we decrease the risk of using IETs because they are coupled with established pedagogical programs. In the section below, we discuss the critical role that training programs can play in shifting the discourse to learning, particularly in the case of GSIs, as they serve to lessen the generational gap barrier to IET adoption.

A Training Program Model: Merging Functional and Applied Skills

Instructor or faculty pedagogical training programs are one vehicle available at many universities through which we can enact the shift in discourse from ICT to IET. Successful training programs that incorporate technological training assist instructors and faculty in acquiring the skills necessary for making technology both accessible and relevant to students (Summerville & Reid-Griffin 2008; Huiyu, Yan, & Geng 2005). Effective programs depend on three crucial developments: (1) communities focused around the technology, (2) instructors understanding how the technology can be applied to support student learning, and (3) instructors feeling comfortable in manipulating the functional aspects of the technology. For technologies to have lasting impact in the classroom,
instructors must receive training addressing both the functional and applied skills necessary to use the technology to foster student learning.

The sets of functional and applied skills necessary for using an instructional technology vary based on the technology’s mode of interaction, its interface, and its application. Associating the technology with the learning outcome is critical to successful implementation and long term retention of the technology in the classroom. The functional skills facilitate the applied skills necessary to achieve the learning outcome. The applied skills are crucial in forging the relationship between the function of the technology and the learning outcome. Without the applied skills, a disconnect exists between the technology and the learning outcome.

Training programs must help instructors achieve two outcomes: (1) mastery of the tool as a technology and (2) mastery of the technology as a tool for facilitating learning. When an instructor does not have a firm understanding of how a technology can be used to facilitate learning, the technology may actually detract from learning. If instructors cannot make explicit for students the relationship between the technology and their learning, students may view the technology as a gimmick or may view the instructor as using technology for the sake of appearing innovative.

At the programmatic level, one strategy to ensure that technology training addresses both functional and applied skills is to situate functional training within the context of holistic, pedagogy-focused instructional development. When technology training occurs in the context of pedagogical training, instructors’ attention shifts away from simply mastering the tool toward understanding the connection between the tool and learning. As we discussed above, this shift in focus is initially (and crucially) signaled in the title of the offering. By re-focusing instructional support on best practices in teaching and learning, we emphasize how those practices can be complemented by technological tools. Instructors see that they can use existing learning and professional development communities for support in more effectively implementing technologies. Thus, an empowered support community should not be focused on the technology, but on effective pedagogy enacted through technology.

With this approach, the focus is on the interaction of instructor and learners in fashioning desired outcomes; again, technologies are means, not ends. In order for new instructional technologies to have a lasting impact on the quality of the education that we provide for our students, training programs must focus first on the goal of developing effective instruction in the classroom, followed by functional training for the technology as a tool to facilitate learning. Meaningful implementation is possible only if instructors see the value of adopting technologies in the classroom. To illustrate how IET training can be incorporated into existing instructional development programs, we present a case history of the GSI Program at UT Austin and of how the program can shift from a focus on ICTs to IETs.

A Case History: The Graduate Student Instructor Program

The GSI Program at UT Austin was developed in 2004 in response to findings from research conducted at the university. Seeking to fill a gap in the professional and pedagogical development of graduate students, we established technology training as one of the critical components of the program. In 2002-2003, staff in the Division of Instructional Innovation and Assessment studied technology use at UT Austin in an attempt to evaluate, among other things, “faculty use of technology … and … faculty use of course management software” (Gaede et al. 2003).

The study provided GSI Program developers with seven recommendations that guided incorporation of technology into the training program (see Gaede et al. 2003). Unfortunately, missing from these recommendations—and this is critical—was an explicit call to integrate technology and learning. The recommendations of that study, despite its authors’ best intentions, emphasized the technology and its use over the teaching and learning that the technologies are designed to support.

The program was comprised of three core components: (1) an online, teaching best-practice repository, (2) an annual colloquium, and (3) a workshop series. To demonstrate how the GSI Program shifted their focus from training in ICT use to IET use, we provide examples of how the program can modify its offerings from a focus on functional training in the operation of the technologies to applied training in the use of the technologies to enhance learning. The proposed approach is based on mapping technological tools to the learning objectives of a particular pedagogy-focused offering.

The online, best practice repository provided a venue for more experienced instructors to share from their teaching experiences what has worked, targeting their less-experienced peers. The venue served two purposes—it normalized pedagogical-oriented communications and it responded, albeit indirectly, to the call of Austin and McDaniels (2006) for “informal conversations” (p. 60) to encourage scholarly development. Instructors submitted their stories to program staff, who edited the stories and published them to the divisional website. Under this original formulation, the interactive capabilities of ICTs were not exploited to take advantage of their potential to become
IETs because the spontaneous interactivity afforded by ICTs such as wikis were rejected in favor of having more institutional control over content associated with the divisional website.

The second iteration of the repository takes advantage of the opportunity to place participants in direct contact with wiki technologies, making them responsible for creating, responding to, and managing the content that they find valuable. For instructors interested in contributing to the repository, a workshop—Social Constructionism in the Classroom—which would guide participants in using wikis to construct a knowledgebase that reflects the specialized knowledge and experiences of instructors in the class. This revision to the repository allows instructors to learn the functional skills required to create and manage a wiki, while giving them experience applying the wiki in an educationally meaningful way.

The annual colloquium was a larger, real-time, face-to-face manifestation of the exchanges conducted virtually through the repository. Instructors attended interactive teaching presentations led by their peers from across campus. In its original iteration, the colloquium provided an opportunity for experienced instructors—the potential presenters—to engage experienced training support staff to refine their teaching and advance their professional development. Presenters were required to consult with GSI Program staff and, if necessary, adjust their presentations to include an interactive component and to optimize the likelihood of cross-discipline applicability. The colloquia provided formal professional development opportunities as well as modeling opportunities for instructors at various stages of the developmental continuum.

The reformulation of the colloquium provides participants with the opportunity to attend a workshop entitled Creating Engaging Professional Presentations, where they develop a sense of audience and presentation skills, including incorporation of appropriate and engaging presentation technology. This workshop conceptualization combines the functional skills required to operate Microsoft PowerPoint with the applied skills required to map certain functions of PowerPoint (e.g. media streaming) to the learning outcomes of the presentation.

The professional development workshops were designed to meet the needs of participants at various stages of professional and pedagogical development, from courses on time management to courses covering assessment, teaching with technology, and understanding students. Certificates were available for candidates who completed all the workshops in a series, as well as two electives. Many of the workshops addressed the generic teaching skills that Park (2004) suggests should be mainstays of instructor training. Austin (2002) has spoken of the need to create opportunities for instructors to “think deeply about teaching” (p. 114), especially in areas such as learner characteristics and teaching with technology. Therefore, certificate candidates were also required to demonstrate that they had thought deeply about the content of the workshops by producing an essay. They were asked to address how the concepts they had covered related explicitly to present or future teaching experiences, by offering a course design or lesson plan.

In the original formulation, most workshops were split between sessions that offered training for technology and sessions that offered training in teaching, with instruction for the former provided by instructional technology specialists and for the latter by faculty development specialists. This split structure served to create a distinction between technology and teaching. A revised workshop structure minimizes this distinction by incorporating technology training into relevant, pedagogy-focused workshops that highlight a particular technology. The new hybrid workshops would be co-taught by faculty development and instructional technology specialists, focusing on how particular technologies can help improve student learning.

To make the connection explicit, a comprehensive re-naming and re-framing of the workshops reflect a focus on learning. For example, under the former iteration, separate offerings existed entitled Blackboard: Enhancing Communication and Designing Effective Discussions. The Blackboard session focused on developing the functional skills required to set up a discussion board and chat room. The Effective Discussions workshop focused on developing strategies for organizing, creating, and facilitating discussions. Under the hybrid approach, the Blackboard session is incorporated into the Effective Discussions workshop, effectively framing Blackboard as an IET instead of simply an ICT. The discussion board and chat room features of Blackboard are presented as tools to facilitate discussions that extend beyond the classroom. Teaming specialists in instructional technology and faculty development makes explicit the relationship between the functional aspects of Blackboard and its pedagogical application.

Conclusion

We have highlighted the distinction between functional and applied skills required for adopting and implementing ICTs as IETs. An instructor’s competence in operating a technology constitutes a functional skill. While training focused on functional skills is important in empowering instructors to use a technology with ease and
without anxiety, it incompletely addresses barriers to adoption by suggesting its principal utility is as an ICT tool, good for information dissemination and simple communication.

An instructor's capacity to make technology relevant to student learning constitutes an applied skill, which requires connecting the functions of a technology and student learning outcomes, matching a technology with existing teaching practices, and recognizing how a technology can promote more meaningful learning as compared to existing methods. We have advocated situating training in functional skills within training in applied skills, by designing events that increase the visibility of emerging technologies alongside best teaching practices, and by fostering an active and empowering community receptive to using metaphors that frame ICTs as IETs. When instructors recognize the advantages of emerging technologies within the support structure of this type of community, they are ready to overcome barriers to the adoption of technologies.

By focusing our case history on a GSI training program, we have highlighted the unique position of GSIs as technological boundary spanners, able to bridge the traditional, established pedagogical strategies of senior faculty with the potential to use innovative IETs in support of student learning. Through GSIs, we can shift the metaphors surrounding technology in the classroom from its function to its application.

References


