Facilitating the Use of Web Based Learning by Higher Education Faculty

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Abstract

This article will outline a framework that change agents can use to facilitate the use of web based learning by higher education faculty. The paper begins by describing a general overview of adoption, change, and implementation theories based on the work of E. M. Rogers, Donald P. Ely, and others. The authors then describe a generic, macro level model for implementing innovations in higher education. This generic implementation model includes seven components: Resources, infrastructure, people, policies, learning, evaluation, and support. The seven components of the generic model are then adapted for use as a framework for developing strategies to facilitate the use of web-based learning by higher education faculty.

Introduction

Higher education is facing a period of crisis. Issues such as declining enrollments, dwindling public support, increasingly tense labor relations, deteriorating facilities, larger numbers of non-traditional students, and increased competition daunt higher education administrators. Compounding many of these issues, universities are being pressured to

take advantage of the ever-increasing power and availability of technology and developing theories of instruction to deliver newer, better, more accessible instruction.

Web-based learning (WBL) has the potential to address many of the problems facing higher education. Potential advantages of WBL include increased enrollments, reduced need for physical space, scheduling flexibility for non-traditional students, and fulfillment of the technological expectations of younger students (Gilbert 1995, 1996; Milheim 2001). Before universities can realize the full potential of WBL, change agents must address several important and pressing issues. The most important of these is implementation – the phase of the change process after initial adoption in which an innovation is introduced and actually used in an organization.

Universities face many barriers to the implementation of WBL. Many of the barriers stem from faculty concerns about WBL. These concerns include the amount of time it takes to develop WBL and no perceived personal or career benefit from participating in WBL (Folkstad and Haug 2002; Lan 2001; Milheim 2001; Saba 2001). In addition, faculty report concerns about administrators' commitment to WBL, (Lee 2001), issues over intellectual property, academic freedom, job security, the changing nature of tenure (Lorenzetti 2003), and the existing infrastructure of the university (Folkstad and Haug 2002; Young 2004; Saba 2001). Pajo and Wallace (2001) reduced barriers to WBL into three factors -"personal variables," "attitudinal barriers," and "organizational barriers." Developing an implementation plan that accounts for the many barriers to WBL seems

like an extremely difficult task. Fortunately, the literature, both outside of our field and within, provides a number of useful theories and strategies related to the change process.

The Change Process

There is a popular cliché that says "the only constant is change." Once thought of as a random, unpredictable event, change is now seen as a manageable process. While still not a completely predictable process, the work of a number of change researchers has produced many valuable insights into change.

One of the more interesting things about the change literature is that there isn't one universally accepted "model" of change. The literature is filled with numerous theories about what change is, how it takes place, and how to facilitate change. The most commonly cited source related to change is Everett Rogers' (1995) book *Diffusion of Innovations*. In that book, Rogers describes several theories that are common to most models of change.

One important point that Rogers (1995) makes is to define change as a process. The change process, according to Rogers, is made up of five different phases – knowledge, persuasion, decision, implementation, and confirmation. This significant idea forces change agents to view change as a process, not a single, momentary event.

Rogers' "S-curve theory" illustrates the time involved in implementing an innovation. According to this theory, a successful innovation starts out with a period of relatively

slow adoption before experiencing a period of rapid adoption, and then gradually slowing down. Even the most successful innovations go through a period of slow adoption before being widely utilized. According to the theory of "adopter categories" (Rogers 1995), people within an organization vary in their willingness to adopt an innovation. Every organization will have a few "innovators" who will be willing to quickly adopt an innovation. Others within an organization will fall into the categories of "early adopters," "early majority," "late majority," and "laggards." Change agents must accept that everyone will not want to use an innovation immediately and a certain percentage of every population may never fully adopt an innovation.

In addition to Rogers' work, many other researchers have studied the change process. One change theory specifically related to education is Hall and Hord's (1987) Concerns Based Adoption Model (CBAM). The CBAM is important for its two main concepts – "stages of concern" and "levels of use." According to Hall and Hord, people within an organization will fall into one of seven stages of concern. Depending upon which stage they are in, people will have different concerns related to technology. The concept of levels of use states that there are eight levels of use with technology ranging from non-use to renewal. Organizations can't begin at the "renewal" level and need to move through the levels in order to fully implement change.

Stockdill and Morehouse (1992) studied the factors that support change in educational settings. Their "Critical Factors in Adoption Checklist" consists of five main categories – educational need, user characteristics, content characteristics, technology considerations,

and organizational capacity. Stockdill and Morehouse's work points out the holistic nature of educational change and was influential in the development of other change strategies, including Farquhar and Surry's (1994) Adoption Analysis.

A relatively new trend in change research has been a shift in focus away from adoption and towards implementation (Surry and Ely, 2001). Implementation is the process of fostering the use of an innovation within an organization after the initial adoption decision. Perhaps the most well known researcher related to implementation is Donald P Ely. Ely (1999) writes that there are eight conditions that facilitate the implementation of an innovation within an organization (see Table 1). In theory, an organization can foster the efficient implementation of an innovation by accounting for each of Ely's eight conditions in ways that are meaningful and relevant to their unique implementation situation.

Condition	**Description**
Status Quo	Dissatisfaction with the current technology or state of affairs within the organization
Resources	Availability of materials and supplies needed to fully utilize an innovation
Skills & Knowledge	People within the organization know how to use the innovation properly
Time	Workers have adequate time on the job to become familiar with the innovation
Rewards & Incentives	Workers who use the innovation receive some sort of tangible or intangible benefit
Participation	Everyone who will be effected by the innovation has input into the change process
Commitment	Upper management within the organization demonstrates strong support of the innovation
Leadership	Middle and lower management provide active support of the innovation on a day to day basis

Table 1. Ely's 8 Conditions that Facilitate Implementation

In addition to the authors mentioned in this brief review, change agents should be familiar with the work of several other important authors. Most notable among these is Michael Fullan (2001). Fullan's work is primarily in the area of K-12 schools but many of his ideas, especially his underlying foci on the development of shared vision and capacity building for change, have direct applicability to change in higher education as well. Other authors whose work is relevant to this area include Havelock and Zlotolow (1995) and Reigeluth and Garfinkle (1994).

RIPPLES: A Model for Implementation Planning

In order to successfully implement any innovation, change agents must address both the human needs and organizational issues that affect implementation. Previous strategies for implementing technology in higher education have been presented in the literature (e.g., Perkins 1985; Armstrong 1996; Surry and Land, 2000). These strategies focus mostly on motivating faculty. While faculty motivation is a key factor, previous models do not address wider issues such as infrastructure, resources, technical support or intellectual property, nor do they provide any model to guide universities when developing an implementation plan.

In order to suggest a more holistic approach to technology implementation in higher education, the authors developed a model that has seven components The model was developed based on a review of the literature, a survey of university deans, and personal

experience as change agents (Surry, 2002; Surry, Ensminger, and Haab, 2005). The seven components of the model are: Resources, Infrastructure, People, Policies, Learning, Evaluation, and Support. Using the first letter of each component, the model can be referred to as RIPPLES. The original intent of the RIPPLES model was to provide a framework for university administrators to use in developing macro-level, systemic change strategies. The model has also been used to study the adoption of technology in academic and public libraries (Murray and Moen 2003). While not the original intent of the model, it is possible to apply the macro level framework to the narrower task of facilitating the use of web based learning by higher education faculty.

Adapting RIPPLES to Faculty Use of Web-Based Learning

In this section, each of the seven components of the RIPPLES model is briefly discussed and related to faculty use of WBL. Specific strategies for facilitating faculty use of WBL related to each component are included.

Resources

Resources refers to funding resources or, more simply, money. There are a number of costs associated with any innovation. These costs can be categorized as direct and indirect costs and initial and continuing costs. Direct costs are those that we typically think of - hardware and software purchases, license fees, and salaries. Direct costs for WBL might include fees paid to course management system providers, server space, and instructor salaries. Indirect costs can be surprises and are often quite substantial. Indirect costs related to WBL might include upgrading of faculty computers, increased demand for support services, updated and expanded use of wireless networks, the purchase of

specialized software and peripherals, increased salaries for faculty teaching overload, increased telephone, shipping and mailing expenses, and advertising and marketing costs.

Initial costs are those one-time costs that occur when an innovation is first adopted. Initial costs related to WBL include the hardware and software needed to develop and deliver courses. On-going costs are those costs that need to be accounted for each budget cycle throughout the life of the innovation. On-going costs related WBL might include annual fees for commercial management and delivery systems, Internet services providers, training, and periodic equipment and software upgrades.

When developing a plan for facilitating faculty use of WBL, change agents have to account for all four cost categories – direct and indirect costs and initial and ongoing costs. Perhaps the most important things a university can do to facilitate the implementation of WBL are to have a realistic understanding of all the costs involved and to develop a detailed, practical plan for addressing those costs.

Infrastructure

Infrastructure refers to all of the technologies associated with an innovation. No innovation exists in a vacuum. Every innovation is dependant upon a variety of associated technologies for its success. This component relates directly to both Ely's (1999) implementation condition of resources and Fullan's (2001) concept of capacity building. In order to successfully facilitate faculty use of WBL, a university's technology

infrastructure should include five components - teaching resources, production resources, communication resources, student resources, and administrative resources.

"Teaching resources" refers to the technology used to deliver instruction. This includes on campus or remote servers, server software, and modems. Commercial course management systems (e.g., WebCT, eCollege, Blackboard) are typically used to provide these resources. "Production resources" refers to the hardware and software needed to develop the audio, video, and other resources that will be used in the web-based instruction. "Communication resources" refers to the tools needed for faculty and students to interact in an online environment. These tools include electronic mail, mailing lists, chats, telephones, and regular mail. These resources are usually available at most universities or are included as part of most course management systems "Student resources" refers to the technology used by students to access and participate in web-based learning. Universities often take for granted that students have adequate technology needed to use WBL, but this might not always be the case. At a minimum, universities should ensure regular availability of open use computer workstations and peripherals for students to use to log into online courses. "Administrative resources" refers to the technology needed to manage traditional educational functions such as registration, textbook orders, and grading in an online environment. Again, most course management systems include these resources. In spite of this, it may be necessary to hire additional on campus personnel to coordinate these functions, especially if online students represent a significant increase in enrollment.

People

The people within an organization play an essential role in the change process. Any organizational change, even one technological in nature, is an inherently human process. Everyone within an organization has an important role to play in the successful implementation of an innovation. The two essential considerations for administrators during the implementation process are shared decision-making and communication between all stakeholders (Ely 1999).

Shared decision-making and communication are particularly important in higher education. Higher education has traditionally placed great pride in fostering a collegial environment. University administrators should seek out stakeholder input on a number of issues related to web-based learning. Stakeholders include administration, faculty, students, and staff. The first and most fundamental issue is the overall advisability of using web-based learning. A few of the many other issues are the courses to be taught online, scheduling of courses and instructors, instructor compensation, and the structure and format of online courses. In order to successfully implement WBL in higher education, all constituents must engage in an ongoing meaningful process of shared decision-making and communication. This is directly related to Fullan's (2001) concept of creating a shared vision for change. The need to involve higher education faculty, the people who will actually develop and teach the courses, in the decision making process is especially critical.

Policies

Every organization that adopts an innovation is forced to make changes to the way it does business. The introduction of even the most trivial new technology forces at least subtle changes to the normal routine. An innovation the size and scope of WBL will likely require fairly sweeping changes in order to be successfully implemented. . Unfortunately, due to numerous accreditation, legal, curricular, labor, and personnel issues, changing policies can be especially difficult for universities.

Adapting retention, tenure, and promotion policies to reward the use of technology is one of the most effective ways for motivating faculty to integrate technology into their teaching (Surry and Land, 2000). Developing web-based courses is a difficult and time-consuming process. Many faculty, already under intense pressure to publish in order to receive tenure or promotions, will be understandably unwilling or unable to take on additional burdens related to web-based learning. It's unrealistic to assume that faculty will accept the additional burdens and risks associated with web-based learning without some incentive (Folkstad & Haug, 2002; Lan 2001; Milheim 2001; Saba & Young, 2001). Universities may also have to adapt existing policies related to student fees, prerequisite courses, faculty evaluations, testing, degree requirements, and residency requirements, among others, in order to successfully implement web-based learning.

Learning

When implementing WBL, change agents should consider learning outcomes as much as technological or financial outcomes. In general, there are two ways that any technology

can enhance the instructional goals of a college. First, technology can have pedagogical benefits. Technology such as WBL can allow teachers and students to interact in dynamic new ways, resulting in increased cognitive or motivational outcomes. Second, technology can have access benefits. WBL can allow a university to reach new student populations or to serve current students in new ways. (Bridges, 2000; Milheim, 2001) The challenge for change agents is to define the pedagogical and access benefits they hope to achieve through WBL and to communicate those goals to faculty. From the individual faculty member's perspective, pedagogical benefits may more compelling than access benefits. Penberthy and Millar (2002) concluded that it is critical for innovations to be matched to learning outcomes in order to disseminate innovation in higher education. Change agents must, therefore, seek to understand and maximize the potential pedagogical benefits of web-based learning in order to facilitate faculty use of WBL.

Evaluation

Evaluation should be a major component of any implementation plan. There are four areas of evaluation that administrators should consider. First, there should be an evaluation of technology in relation to learning goals. The main evaluation question in this area would be "Is web-based learning allowing the faculty members to do a better job teaching their students or to reach new populations?" Second, there should be an evaluation of the WBL technology itself. This evaluation would include an ongoing assessment of management and delivery alternatives. The goal of this evaluation is to improve the WBL experience for both faculty and students. Third, change agents must evaluate their effectiveness in working with faculty, both individually and collectively.

Ely's eight conditions provide the foundation for formulating these evaluation questions. This evaluation would determine the factors that have either facilitated or impeded integration of WBL by faculty at various points throughout the process. It is especially important to evaluate the effectiveness of each strategy for various sub-groups (e.g., faculty in different departments) and adopter categories (e.g., innovators, laggards). And fourth, a benefit/cost evaluation should be used to determine the return on investment for WBL. The cost/benefit evaluation should be on a unit-by-unit and university-wide basis.

Support

Support refers to technical and pedagogical support for faculty and students. Faculty will need training on how to use the WBL system and, perhaps more importantly, in how to teach in an online environment. Faculty will likely also need assistance in developing and uploading media elements into their courses. Faculty with large enrollments may require assistance in responding to large volumes of electronic mail or online discussions. Students may require assistance with registering for courses, accessing course elements, acquiring and using specific software needed for their computers, and with hardware and software compatibility problems. Web-based students will also need assistance with content and curricular questions. Universities will have to plan for support in each of these areas, perhaps on a 24-hour basis, in order for WBL to be successfully implemented.

Conclusion

Change is difficult. There's no such thing as an easy change in any organization. Dictatorial, top-down change strategies will meet significant resistance given the culture of collegiality and shared governance in academe. Facilitating faculty use of web-based learning is an essential part of the WBL implementation process. In spite of the problems associated with implementing web-based learning, change agents can develop plans to overcome resistance and produce meaningful, profound, and lasting change. Web-based learning offers many potential benefits to institutions of higher education. In order for WBL to be effectively implemented, however, change agents should plan carefully. Careful planning that includes all components of the RIPPLES model can help to avoid many of the common problems associated with change.

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