

Blackboard implementation:
Metaphoric perceptions and technical descriptions
of a cyberinfrastructure

by

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Abstract

Institutional implementation of cyberinfrastructure is largely a communicative activity, and members' utilizations of the innovation often reflect the institutional instructions (technical rationality) and members' experiences (narrative rationality) with the innovation. Based on an analysis of the institutional website, in-depth interviews with faculty, and personal observations of the implementation of Blackboard cyberinfrastructure at a major state university in America, I concluded that faculty's narrative rationality expands on the institutional technical rationality of Blackboard as an information, communication, and educational technology to reveal the political and philosophical nature of Blackboard as a technology cluster at the university. According to the institutional lists of descriptions, Blackboard is an automated, structured, user-friendly, flexible, and multimedia system which faculty have full control over its operation. On the other hand, five metaphors emerged from faculty's perceptions to describe Blackboard during implementation: *tree branches*, *7/11 store*, *river of information*, *fun game*, and *light bulb revolution*. The study noted an under-utilization of the 'educational' aspect of Blackboard in faculty's implementation, although Blackboard is generally assumed to be an educational technology. The paper suggests the potential contribution of metaphor analysis to Browning's (1992) theory of lists and stories as human communication.

Overview and Rationale

Blackboard is an online course management system first introduced in the United States in 1997. In 2002, Blackboard Incorporated acquired one of its competitors, *Prometheus* (Carnevale, 2005). Four years later in early 2006, Blackboard Incorporated acquired its largest competitor in the industry, *WebCT*. Today, Blackboard is the largest course management system in American higher education, holding approximately 75 percent of the market share (McLester, Poftak, & Smith, 2006). Rogers (2003) contends, “Subjective evaluations of an innovation, derived from individuals’ personal experiences and perceptions and conveyed by interpersonal networks, drives the diffusion process and thus determines an innovation’s rate of adoption” (p. 223). Therefore, if we want to gain an insight into the diffusion process of Blackboard, it is important to study faculty’s perception of Blackboard cyberinfrastructure in their implementation.

Not all innovations are alike. Blackboard is a unique innovation because it is a technology cluster. “A *technology cluster* consists of one or more distinguishable elements of technology that are perceived as being closely interrelated” (Rogers, 2003, p. 14 & p. 249). The distinguishable elements in Blackboard include webpages with hyperlinks (i.e. *Announcements, Faculty Information, Online Gradebook, External Links*), webhosting (i.e. *Course Documents, Syllabus, Assignments, Digital Drop Box*), online bulletin board (i.e. *Discussion Board*), electronic mail (i.e. *Communication/ Send Email*), internet-chat (i.e. *Virtual Classroom, and Chat*), online organizer (i.e. *Course Calendar*), among other functions. These innovations are put together as a package because they share the same Internet platform, and their functions are complementary to each other. In other words, Blackboard is an Intranet.

Blackboard is an Intranet platform applied to the educational context. Rice and Webster (2002) define Intranets as “organizational Internets” (p. 200), and Intranets are closed-user-group networks. Historically, the Internet was introduced to the public in early 1994 (Garrison, 2001),

and the Internet is the fastest diffused innovation in the history of mankind (Rogers, 2001, 2002). Blackboard came into the market in 1997. The innovation builds on existing technological infrastructure at college campuses, as well as faculty' prior experience with Internet technologies, such as webpages, electronic mail, online bulletin board, internet-chat and other.

Faculty's implementation of Blackboard is worthy of investigation for four reasons. First, a study of Blackboard implementation has implications for higher education. The Internet has and will continue to transform teaching and learning (Duggan et al, 2001) and education at all levels (Twigg, 2003). The significance of the Internet in education is evident in national statistics. Over 95 percent of college students are already on the Web (Cappelli, 2003). The number of online college students rose from 42 percent in 1996 to 95 percent and over 12 million students by 2003 (Cappelli, 2003). Increasingly, using emails to communicate with professors and other students, using the Internet to conduct research for class assignments, and using the Internet to connect with the university are becoming the norms in higher education.

Second, a study of Blackboard implementation has economic implications. In the United States, education and training rank fifth as the largest trade service in the country (Irvine, 2003). Cappelli (2003) believes that the higher education market in the United States offers tremendous investment opportunities. He notes that higher education in the United States represents a \$250-billion industry. Furthermore, Levine (2003) points out, "the private sector is investing in higher education at a great rate than ever before" (p. 18). He further suggests, "if current research on e-commerce is correct, the most competitive and attractive higher education institutions will be brick-and-click universities" (pp. 19-20). Furthermore, Sørnes and Browning (2004) argue that there is a need for "a combination of virtual and face-to-face contact in the learning process" (p. 125).

Third, a study of Blackboard implementation has important research implications.

According to a literature review by Rice and Webster (2002), academic literature covering the innovation of Intranet is just now appearing. It receives the least research attention as compared to other new communication technologies, such as email, voicemail, video, groupware, and fax. This present study intends to join the emerging research effort on Intranet.

Last, as previously mentioned, Blackboard is a technology cluster. Rogers (2003) laments, “the effects of using a package approach has seldom been investigated in diffusion research, although it makes sense intuitively” (p. 249), and “more scholarly attention should be paid to technology clusters” (p. 15). The present study attempts to address this complexity by investigating the institutional descriptions and personal perceptions of Blackboard individual features and the overall package as a whole as a technology cluster.

Previous studies have investigated the proliferation of computer-based learning environments (Bartolic-Zlomislic & Bates, 1999; Kumari, 1999; Mitra, Hazen, LeFrance, & Rogan, 1999; Shelton, Lane, & Waldhart, 1999), students’ interaction and participation (Coombs, 1993; Kelly, Duran, & Zolten, 2001, Mabrito, 1991; Mitra, Hazen, LeFrance, & Rogan, 1999; Phillips & Santoro, 1989; Shedletsky, 1993), students’ satisfaction (Phillips & Santoro, 1989; Westmyer, DiCioccio, & Rubin, 1998), and students’ learning outcomes (Althaus, 1997; Chadwick, 1999; Olaniran, Savage, & Sorenson, 1996; Phillips & Santoro, 1989; Shedletsky, 1993) in computer-based instruction. However, research attention seems to focus on students’ perceptions and experiences. By contrast, faculty’s perceptions of, and experiences with, computer-based instruction have received little research attention. It is important to note that students’ experience with Internet-based technologies in learning, such as Blackboard, say little about faculty’s perceptions of the innovation in their teaching. Beyond institutional adoption and students’ satisfaction with Internet-based technologies, faculty’s perceptions and implementation is

a critical step in the overall diffusion process. If faculty do not adopt and implement Blackboard, students have no access to this Intranet for their classes. Therefore, it is valuable to understand faculty's perceptions of Blackboard in their implementation experiences.

The research question of the present study states, "What are the descriptions and perceptions of Blackboard in its initial diffusion cycle at a large university?" Rogers (2003) explains that there are generally five steps in the innovation-decision process: knowledge, persuasion, decision, implementation, and confirmation. Based on Rogers' model, I argue that descriptions and perceptions emerged during implementation step in the initial diffusion cycle are especially critical in driving later diffusion cycle. At the individual level, initial adoption decision leads to early implementation. Descriptions and perceptions during this step give the early adopters reasons to confirm or disconfirm adoption. At the system level, if an initial adoption decision leads to a successful early implementation, positive perceptions and personal satisfaction of a successful adopter can influence the knowledge and persuasion of other members in his/her interpersonal network in the system, thus promote more adoptions. On the contrary, negative perceptions and personal dissatisfaction among early adopters can impede, or terminate the diffusion of an innovation in a social system. Therefore, faculty's perception of Blackboard in its early diffusion cycle is an important research topic.

Modeling after the article by Eisenberg et. al. (2005) employing Browning's (1992) theory of lists and stories as human communication, this paper is divided into four parts. First, the elements of communication theory and research most relevant to the study of Internet-based technologies in educational context are reviewed. Second, the sample, methods, and data-collection procedures are described. Third, I present my findings, presenting the lists and stories surrounding Blackboard, and identifying the institutional description and the most salient

metaphors faculty employed to describe their perceptions of Blackboard. Fourth, I explore the implications of the study for both institutional practices and communication theory.

Information and Communication Technology Diffusion in American Higher Education

Blackboard as an Information, Communication, and Educational Innovation

There has been a proliferation of research in the effects of computer-based learning in the past two decades (Steeple & Chris, 2002). Researchers have identified barriers to faculty implementation of computer-based technologies in their teaching practices. These barriers include lack of time (Butler & Sellbom, 2002), lack of peer support (Hagner, 2000), lack of technical support (Chizmar & Williams, 2001), lack of individual training (Engeldinger & Love, 1998; Vry et al., 1996), and equipment failures (Butler & Sellbom, 2002). However, little research attention has been given specifically to faculty's perceptions of educational innovations, such as Blackboard.

Blackboard is a technological infrastructure designed to facilitate three very specific processes: information sharing (through the use of *Course Documents*, *Syllabus*, and other features), communication (through the use *Email*, *Discussion Board*, *Chat*, and other features), and education (through the *strategic* use of features related to information sharing and communication, as well as through the *Online Quizzes* and *Online Gradebook* feature, which serves traditional instructional functions, such as learning assessment and grade report). With a n online course management system such as Blackboard, "today's faculty and specialists can choose from virtual classroom tools, simulation tools, discussion board tools, collaboration tools, content management and authoring tools, streaming media tools, assessment tools, and so on" (Pittinsky, 2003a, p. 206). In other words, the Internet is the "roadbed of a campus technology infrastructure" (Spicer, 2003, pp. 159-160). Although Blackboard has a clearly defined technical structure, its implementation is full of complexity.

Lists and Stories in Human Communication

Browning and Boudes (2005) maintain, “Narratives are useful for complexity because there are no hypotheses in complexity research” (38). Therefore, a useful conceptualization for studying the descriptions and perceptions of Blackboard during its implementation is Browning’s (1992) theory of lists and stories as forms of human communication. According to Browning, two forms of rationality operate in every group or organization: technical rationality and narrative rationality. Technical rationality is scientific, formulaic, public, and instructive. Lists usually represent the “standards, accountability, certainty, and reportability” (p. 281) in an organization. Lists consist of techniques, a set of specific steps, produced by “experts who designate steps and strategies that apply to parochial topics, such as software” (p. 283). In the case of Blackboard, the lists or technical rationality are embedded in the institutional description of Blackboard and its functions as the official university online course management system. Technical rationality can be derived from the list of Blackboard training workshops and the online tutorials available at a university’s website. The training workshops introduce the basic features and functions of Blackboard, and they teach faculty the steps to setup and operate Blackboard. In other words, these workshops represent the technical rationality of Blackboard implementation from the institutional point of view.

On the other hand, narrative rationality is romantic, humorous, conflicted, tragic, and most of all, dramatic (Browning, 1992). According to Browning (1992), “stories are communications about personal experience told in everyday discourse” (p. 285). Stories are forms of knowledge, history, and they contain multiple voices. In the case of Blackboard, the stories or narrative rationality are individual faculty’s experiences with Blackboard as an Internet-based tool in their actual teaching practices. Narratives offer the opportunity to see the world through someone else’s eyes, and to understand their perceptions. Narrative rationality can be derived from the compilation

of faculty's perceptions of, and experiences with, Blackboard. In other words, these details represent the narrative rationality of Blackboard from the individual faculty's point of view. Similar to Browning's (1992) notion of narrative and technical rationalities, Jameson (2001) maintains that narration and logical reasoning represent the state of the arts and the state of the sciences respectively. Therefore, faculty's narratives and university's descriptions represent the state of the arts and the state of the sciences of Blackboard at the university.

The relevance of Browning's (1992) theory to the study of Blackboard implementation has to do with the interplay between these two forms of rationality (p. 281). Institutional adoption takes place before individual faculty's adoption. A university introduces Blackboard to its faculty through training workshops and online tutorials, which present a list of features, functions, and instructions. Faculty then translate the list into implementation of Blackboard in their actual teaching. Issues raised during implementation and trouble-shooting then lead to the university creating specialized workshops and tutorials to aid advanced implementation. Furthermore, Browning elaborates, "Stories fill the breaks in technical rationality. Narrative rationality fills the loose coupling between intentions and outcomes" (p. 292). Therefore, our understanding of the communication process surrounding the adoption of Blackboard is incomplete if we only examine the lists and technical rationality, or the stories and narrative rationality.

With Browning's (1992) theory as a framework, this study sought to accomplish the following:

1. Identify specific Blackboard features whose descriptions/perceptions are relevant to actual implementation.
2. Employ Browning's (1992) taxonomy of lists and stories to illuminate how these descriptions/perceptions are formed and contribute to understanding of communication about Blackboard cyberinfrastructure; and

3. Discuss possible ways to expand these perceptions/descriptions and hence add to an understanding of the impacts of technology cluster in innovation diffusion process.

Methodology

Site and Participants

This study was conducted at a major American university (hereafter referred to as the University in the rest of the paper) in the state of New York in Fall 2002. In order to protect the identities of the participants and the University, the names of the participants and the state the university is located at have been changed. Only the professional titles and the academic affiliations with different colleges remain factual.

The University is located in a metropolitan city, and it serves approximately 35,000 students. The University historically has a strong teaching mission, although it has recently developed a research reputation for the institution. Before embarking on data collection, I received approval from the institutional review boards from the University.

As previously noted, Blackboard came into the market in 1997. The University was one of the early institutional adopters with substantial student populations, and it adopted Blackboard in Fall of 1999. There were only six faculty members in the pilot program. The number increased sharply to 153 in Spring of 2000. The number of Blackboard faculty continued to increase to 232 in Fall of 2000, 513 in Fall of 2001, 864 in Fall of 2002, 1,459 in Fall of 2003, 2,618 in Fall of 2004, 3,502 in Fall of 2005, and 4,080 in Fall of 2006.

The participants in this study are full time and part time faculty, as well as graduate teaching associates who teach their own classes at the University. They come from all seven academic colleges at the University. They represent a diverse group of college instructors with a wide range of age, gender, ethnicities, disciplines, and teaching experiences.

Data Collection

The interview data come from Part II of a three-part multi-method project to study the diffusion of Blackboard at the University. Part I is an online survey to determine predictors of earlier adoption time, and Part III is a communication network analysis to identify the opinion leaders who drive Blackboard early diffusion at the University. On November 3, 2002, a discussion regarding recruitment was initiated with the Blackboard coordinator. After the invitation email draft has been approved by the director of ITS, on November 11, 2002 at 1:24 PM, the Blackboard coordinator sent out an invitation e-mail to the all the Blackboard faculty on the e-mail distribution list in Fall 2002 semester. The invitation email contained a web link to the consent form and online survey questionnaire. The consent form and questionnaire were posted under my website under the University server.

Interested and willing faculty participants clicked on a link on the online consent form, which took them to the survey questionnaire [Part I of the Blackboard project]. After completing the survey questionnaire, participants clicked the SUBMIT button at the end of the questionnaire, and were taken to an invitation for a face-to-face interview [Part II of the Blackboard project, which this paper is based on], which participants were able to decline or accept by clicking one of two different buttons. Those who accepted the invitation for a face-to-face interview then entered their names and contact information before clicking the second SUBMIT button. Either decision, participants who completed the online survey were taken to the “Thank You” page, which indicated the conclusion of their participation in Part I.

Interview participation was completely voluntary, and no monetary incentive was provided during the recruitment and interview process for Part II of the project. 44 faculty submitted contact information and indicated interest for an interview. However, only 32 interviews were completed in Spring of 2003. Limited time availability towards the end of the semester among the participants

did not allow the completion of the remaining eight faculty interviews. Although a list of questions was prepared for the interview (see Appendix A), I employed a semi-structure style during the interviewing process. Certain participants strayed from the interview questions, but they took the interviews to interesting places where they had other insights to share. Instead of bringing participants back to the interview questions, I simply followed their lead. All the interviews were completed in the Fall of 2002 semester.

“Narrative recognizes the meaningfulness of individual experiences by noting how they function as part of the whole” (Polkinghorne, 1988, p. 3). Qualitative researchers usually continue collecting data until the analysis reaches saturation. In other words, researchers stops collecting data when additional participants’ narratives add little to the conclusion already reached. Although I am uncertain if the total number of 32 participants represents saturation, the initial participant recruitment method limited further recruitment after the online survey concluded. Snowball recruiting did occur once when a teaching assistant happened to stop by a Blackboard faculty’s office during the interview process, and the faculty suggested including his teaching assistant in the interview. This teaching assistant’s narrative is included in the reported number of 32 participants, because the teaching assistant also teaches his own classes with Blackboard.

In addition to the interviews, I personally taught as a graduate teaching associate with Blackboard during my graduate career at the University. I went through the adoption process, took Blackboard workshops, attended Blackboard users group meetings, and took notes of my observations as my personal Blackboard implementation process took place, along with the rest of the Blackboard faculty in my interpersonal networks. I had two years of experience teaching with Blackboard at the University at the point of data collection. This experience introduces a component of reflexivity in the data collection and analysis processes.

Data Analysis

I take a narrative perspective (Browning, 1992) to analyze the data. Interviews lasted between 35 minutes to 60 minutes per session, resulting in about 26 hours of interview recorded on audiotapes. Data analysis took place throughout the data collection process. Then all 32 interviews were transcribed by a professional transcriber in Spring of 2003. Then the data analysis process was interrupted as I was finishing up the quantitative analysis for my master's thesis [Part I of the Blackboard project].

In Fall 2006, I started my doctoral program and I picked up the project again. During the second round of data analysis, I listened to all 32 interviews on audiotape twice while following the transcripts closely on the computer screen. I stopped and took notes along the process, looking specifically for responses with narrative and with metaphorical qualities. Although not every participant talked about their Blackboard implementation experiences (as some wondered off to other non-Blackboard related teaching and institutional issues), narrative rationality embedded in metaphors emerged from 16 participants' narratives. I then focused the analysis based on these 16 participants in order to fine tune the metaphors emerged from the data.

In addition to analyzing faculty's narratives, I also analyzed ITS's website, paying careful attention to the descriptions of Blackboard, its features, training workshops, and online tutorials. The next section will discuss the background of Blackboard adoption process and the findings.

Findings

Narratives are often told within contexts of histories and interactions, and these contexts shape the telling of, and the meaning in, the narratives (Ewick & Silbey, 1995). At this point in the paper, it is important to provide a brief overview of the Blackboard training policy and official faculty's Blackboard adoption process at this institution during the time of data collection. The Office of

Instructional Technology Services (ITS) has a specific unit called Blackboard Administration (Bb Admin), which oversees the operation of Blackboard system at the University. The Blackboard coordinator, who is the staff person in charge of the unit, works in conjunction with the a few ITS staff members and graduate assistants, in creating promotional flyers, faculty training workshops, training schedule and online tutorials, trouble-shooting and technical support in managing the Blackboard system at the University. Materials related to Blackboard is promoted through the ITS website, which has a subpage for Bb Admin.

Besides Bb Admin and ITS, the Center for Teaching and Learning (CTL) is also central in the Blackboard diffusion process at the University. CTL offers a variety of teaching workshops, forums, and conferences throughout the academic year for full time and part time faculty, as well as graduate teaching associates who teach their own classes. CTL is also involved in the University's New Faculty Orientation, which introduces new full time faculty to the institutional teaching mission, tradition, and resources on campus. Blackboard is often mentioned during CTL's workshops, forums, and conferences. ITS and Bb Admin are often present at CTL's events, and New Faculty Orientations. Overall, ITS/ Bb Admin and CTL are the two major information sources (or institutional agents) in promoting the adoption and implementation of Blackboard on campus. I describe this communication process and diffusion direction as *top-down* and *inside-out*.

In addition to the official institutional sources, many faculty learn about Blackboard through informal interpersonal networks. Blackboard often comes up in conversations among faculty in the hallway, during lunches, after faculty meetings, and with students (who have taken a course with another Blackboard faculty). Some Blackboard adopters are graduate teaching associates who are graduate students teaching their own classes, and they learned about Blackboard through taking a class with, or assisting in a class taught by, a Blackboard faculty. Some Blackboard faculty are part time faculty who also teach at other colleges or universities in

town who use Blackboard or another similar online platform. Finally, some faculty learned about Blackboard through conversations with their colleagues at another college or university, sometimes in a different city or state. I describe this communication process and diffusion direction as *bottom-up* and *outside-in*.

When a faculty becomes interested in Blackboard, the faculty usually goes to the ITS website and sign up for the *Introduction to Blackboard* workshop. According to the ITS website,

Introduction to Blackboard Workshops are offered monthly during the semester and more frequently at the beginning of each semester. Attendance at an Introduction to Blackboard Workshop is required for all instructors.

These workshops teach faculty the institutional approach in setting up and managing a class with Blackboard. An interested faculty can also contact Blackboard coordinator to schedule for a one-on-one training. The *Introduction to Blackboard* workshop is a required training before a faculty can access and activate the Blackboard shell associated with his/her class. A one-on-one training is available for faculty who are unable to attend the introductory workshop during the scheduled time. It is available also for faculty who feel competent to explore Blackboard on their own with a brief introduction. The Blackboard coordinator conducts the one-on-one training sessions. The policy is that every faculty has to go through a standardized training and instructions before having access to Blackboard. Therefore, every Blackboard faculty has been exposed to the lists of descriptions or technical rationality of Blackboard at the institution. Bb Admin also hosts a monthly forum called Blackboard Users Group (BUG). Various issues related to the technical problems of Blackboard and teaching strategies are often discussed during the BUG meetings. There are often cookies and sodas provided during the meetings, and they are run by the Blackboard coordinator.

Whether the information about Blackboard flows from top-down and inside out (Blackboard Administration/ITS and CTL to faculty), or bottom-up and outside in (faculty to

faculty, student to faculty and vice versa, part time teaching at multiple institutions, or outside colleagues to faculty), each interaction affords the challenges and opportunities associated with potential adoption and implementation. To accomplish this, they rely not only on their personal intuition and judgment on the functions and potential advantages of Blackboard, but also on descriptions and perceptions about Blackboard offered by the University, other faculty, students, and colleagues. The earlier in the diffusion process, the more critical are these perceptions and descriptions as they have the most impact on the rate of adoption for the rest of the diffusion cycle, since information about Blackboard is limited. Once Blackboard has become widely diffused, faculty are likely to have knowledge about the innovation already. The next section identifies the key descriptions (i.e. lists and technical rationality) and perceptions (i.e. stories and narrative rationality) of Blackboard in the early stage in the diffusion process that I identified through the ITS website and my interviews.

Descriptions and Perceptions of Blackboard

Like other Internet-based innovations, such as electronic mail, websites, online bulletin board, and Internet-chat, providers design technical descriptions of the innovation to guide users' implementation, but users subjectively make sense of objective innovation based on their personal experience with it. Based on the website analysis, the idea of Blackboard as 'an automated, structured, user-friendly, flexible, and multimedia system which faculty have full control over its operation' emerged from the institutional descriptions. On the other hand, the following metaphors emerged to describe Blackboard from faculty's perceptions of the cyberinfrastructure and its features.

- Email/ Blackboard as Tree Branches
- Course Documents/ Blackboard as 7/11 Store
- Discussion Board/ Blackboard as River of Information
- Blackboard as Fun Game
- Blackboard as Light Bulb Revolution

Common to each of these innovation-metaphor pairs is that they are sites of perception construction and description modification, tools with which faculty work on the lists and stories associated with their implementation of Blackboard. Each of these innovation-metaphor pairs is discussed in turn.

Email/ Blackboard as Tree Branches

Email is a communication feature in Blackboard. Before Blackboard was available at the University, many faculty collected students' email addresses by passing a sign-in sheet on the first day of class for students to write down their email addresses. Faculty then created a class email distribution list in order to communicate with their students via electronic mail outside of class. One common problem in this method was the difficulty in reading hand-written email addresses on a piece of paper, resulting in errors and frustration in creating an accurate email distribution list. For classes with a small number of students, some faculty provided grade incentive for students to send an email from individual student accounts directly to the faculty, in order to prevent errors in typing up an accurate list. For classes with a large enrollment, this solution became time consuming and unpractical.

With the introduction of Blackboard, it provides a central system where faculty and students can log in and send electronic mails between faculty and students, as well as between students and students. However, in an earlier version of Blackboard at the University, there was a technical issue with the *Email* feature. Each Blackboard faculty and student account was assigned a dummie email address of nobody@university.edu. This was the default account until the user (faculty or student) updated their accounts manually. Otherwise, emails would be sent to this dummie account, and the electronic mails never reached the intended recipients. Kris, a part time lecturer in the College of Arts and Letters shares about her frustrating episode,

What's awkward about it is for example that the way email addresses get linked to Blackboard. I'm not familiar with the actual technical details of how these things work. But for example, ... my email address was never really plugged into this feature, so I ended up being nobody@university.edu and tons of my students ended up being nobody@university.edu. They don't realize that it's coming from nobody, which is a default user name. And I didn't even realize that that was happening until a little while later. Which is totally bizarre.

Since this was a common and unresolved technical problem for a period of time at the University, it was one of the main topics brought up during the *Introduction to Blackboard* workshops, as well as many individual training sessions and BUG meetings. The problem was finally solved later. The instructors of record and registered students then had their official email addresses with the University automatically entered into the Blackboard system. With the new version of Blackboard, here is the online description of the *Email* feature of Blackboard based on ITS's website,

Blackboard has a built-in email function that allows both instructors and students to email individual course members, or the entire course roster. Students, instructors and teaching assistants are automatically added to the mailing list when they enroll in the course. Instructors have overall control of this feature and can limit student access to emailing instructors or teaching assistants only. Instructors control this feature in the communication area of Site Management. Attachments can be sent when emailing via Blackboard, and the Digital Dropbox feature also allows instructors and students to electronically share documents.

Students cannot change their email addresses in Blackboard. Due to the integration with the SIMS/R system, students must change their email in their official records. Instructors may change their email directly in the Blackboard system. Your email address will not be correct in the new system until you change it using the Personal Information link on the My [University] page.

This description explains the automatic email account enrollment in the system, the scope of email communication among users, faculty's control over students' email communication, restrictions on students' email address updates, and information sharing in the form of sending attachments. It suggests Blackboard to be an information and communication tool. The technical rationality in this institutional description emphasizes system automation, faculty's control over students' access to communication, and the University's control over students' modification of information.

On the other hand, faculty's perceptions of the *Email* feature after the initial nobody@university.edu problem has been solved, provides the narrative rationality for

Blackboard. Donald, a full professor in the College of Sciences says,

... I find the ability to send out an email to students saying grades are up, or to send out an email to everybody saying, ... that paper outlines need to be in on this particular date, these [emails] are really helpful things for getting that information across to students... So Blackboard is like a tree. The trunk is the instructor with information, with branches reaching out to students... The students are ... the leaves... And each of them is connected back to the trunk through Blackboard.

A key phrase in Donald's perception is emails as 'branches reaching out to students.'

Marilyn, a graduate teaching associate and a graduate student in the College of Arts and Letters shares the same metaphor,

You know ... technology continues to grow, it never really exhausts itself and I'm always thinking of new ways to try to use it, I mean because I think that technology is the future, you know, to use the biggest cliché. Technology really is the future... So I try to incorporate as many different elements of technology as I can... You know, I guess you could equate it to a tree, you know, it seems typical like a tree. You know, how the roots, you know, and then you are the stalk or whatever and things just keep branching out from there.

Once again, the imagery of 'branching out' is apparent in Marilyn's perceptions. The metaphor of *emails* (or Blackboard technology) as *tree branches* describes a single tree trunk (i.e. professor) is connected to many leaves (i.e. students) through growing branches (i.e. emails). Beyond simply the communication feature of Blackboard, this metaphor gives the picture of the professor (i.e. trunk or stalk) with information and knowledge (i.e. water and nutrients) actively 'reaching out' (i.e. branching out) to students (i.e. the leaves). The narrative rationality reflected in this metaphor suggests a hierarchical relationship between faculty and students and proactive communication from faculty to students. The next metaphor is related to the information function of Blackboard.

Course Documents/ Blackboard as 7/11 Store

Course Documents, along with other features such *Syllabus*, and *Digital Dropbox*, make file and information sharing between faculty and students possible. Faculty can post documents online, and

students can download them anytime and anywhere with Internet access. The key to using this feature effectively is to set up an organized structure or system of folders. According to the online tutorial on the ITS website for setting up *Course Documents*,

Gather your course materials and content in a central location. Include items such as the syllabus, handouts, slide shows, lecture notes, projects, assignments, quizzes and discussion topics. If you do not already have these saved as electronic files, do so now. Determine which files you want the students to be able to read on screen, and which need to be downloaded. Save the files that are to be viewed on screen as HTML (from within their originating program). Decide where everything is going to go within the course site. Remember that creating folders will help you organize your materials so your students can easily find them. We recommend that all non-content related materials (like your syllabus) be placed in the Course Information section and that course content be placed in the Course Documents section.

This paragraph taken from the online tutorial is a classic example of lists with technical rationality. It provides a series of steps and sequences. It suggests planning and decision, as well as organization and categorization. In other words, it shows that the *Course Documents* feature make Blackboard a structured system for file and information sharing.

However, according to faculty's narrative, what stands out about *Course Documents* is its availability and accessibility, like a convenient store that operates 24 hours a day and seven days a week, and they are at every corner. In other words, Blackboard is available anytime and anywhere with Internet access. Blackboard makes instantaneous materials distribution possible. Here is the narrative by Sandra, a doctoral student in the College of Health and Human Services who also teaches her own classes at the University,

...I need something that if I can't communicate with my students until midnight or I can't get around to it because I am busy, I can upload the documents at midnight, but I want it to be in their hands the next morning, but I can't get in here [to campus] and get it copied before class...

Sandra's story reveals the availability and instantaneity of Blackboard information distribution capability. She shares how a busy instructor can distribute course materials via Blackboard even late at night. This feature saves her the trouble of getting to campus early the morning before she has to teach her class. Her students can download and print the materials before coming to class, and this arrangement makes course materials distribution instantaneous.

Furthermore, Lissie's narrative points to the availability of Blackboard anywhere with Internet access as a feature of Blackboard. Lissie is a part time lecturer in the College of Arts and Letters for many years, and she is also an active member of the Part Time Faculty Union.

I'm always thinking oh I've got to get to Blackboard and do this, this, and this, or oh I should put that on Blackboard, or you know, and I do a lot of them. I have Blackboard at home, at night. There's no reason I need to be here [on campus]. So I'll just say to myself, well I'll put this, this and this on Blackboard for tomorrow and I'll do it after dinner. You know so that I get back to Blackboard at home. So it seems like it's something that's always there.

Lissie points out the availability of Blackboard not simply at anytime, but anywhere as well. She has access to it at home, and there is less of a need for her to be on campus. She can work from home. In the next excerpt, she explains that Blackboard is also available anytime and anywhere to her students. Posting documents online can save her times from repeating herself. She continues,

It [Blackboard] makes things so easy. I don't know how many times I've said to students, "Don't worry, it's on Blackboard. Just look at Blackboard. Don't make me repeat it 50 times, I don't have to." So that makes my life a lot easier.

Blackboard facilitates file exchange in a time efficient fashion. Nick, an associate professor in the College of Engineering, shares,

As I grade materials, I don't have to waste time in the classroom returning materials. I can return them directly and resend them to the student [via Blackboard] the minute I finish grading them. I think that's it.

According to Nick, Blackboard is time efficient because he does not have to use class time for returning graded materials, because he can now return materials outside of class time. Kenny, an associate professor in the College of Health and Human Services says, "It's kind of an extension of the classroom."

The perception that Blackboard is 'an extension of the classroom' almost mirrors the first metaphor of *Email/ Blackboard as Trees Braches*, because returning graded materials is similar to emails 'reaching out' to students. However, the metaphor of *Blackboard as 7/11 Store* implies two specific nature of the innovation. First, it suggests the informational aspect of Blackboard. Similar to a 7/11 store with basic items consumers need at anytime, Blackboard provides basic information and documents students need for the course at anytime. The specific label of '7/11' suggests its

availability, accessibility, convenience, and time saving benefit. Second, similar to a 7/11 store which serves as an extension of regular stores that operate during a certain business hours, Blackboard serves as an extension of the classroom that only facilitates meeting during scheduled class time.

Padgett and Allen (2001) maintain, “It is to narrative (and, in particular how actors make meaning through narrative of their organizational experience)... that we must look if we are to understand the process of organizational change” (p. 92). Faculty’s narrative rationality in Blackboard implementation revealed by the first two metaphors also suggests a fundamental shift in the nature of work in higher education. When Blackboard becomes an extension of the classroom, work becomes convenient and flexible, easy and time saving, efficient and instantaneous. At the same time, the traditional boundary between work and home becomes blurred. Faculty send emails, upload documents, return assignments outside of classroom and from home with the justifications that Blackboard can make up for communication and activity that did not take place or do not need to take place in the classroom. The third Blackboard feature is also a tool that takes teaching and learning beyond the traditional classroom.

Discussion Board as River of Information

The *Discussion Board* is an online bulletin board where users can post messages and responses to each other’s messages. According to the ITS Websites,

The Discussion Board can be used in a variety of ways. It can be used as a place for students to connect with each other, share ideas, concerns and questions about assignments and readings, or it can be used as a place for focused discussions about course materials and projects. Blackboard allows the instructor to set up a number of discussion forums within each course, so you can use it for as many purposes as you would like... Plan on adding one new topic to the discussion board each week. Make sure this topic requires students to formulate an answer and back it up with facts to demonstrate their understanding... Monitor and respond to student threads and encourage students to do the same.

Although this description suggests that *Discussion Board* can be a social and educational space, the bulk of the description focused on how faculty can create a educational space for students. It

explains the multiplicity of spaces within a single site, and the specific strategies to promote student participation. It is another classic example of technical rationality because it provides a list of specific steps for planning and facilitation with frequency instruction for monitoring students' discussions.

Faculty's narrative rationality paints the big picture of Blackboard's role in the information age, and the quality of discussions generated online. First, *Discussion Board* is site for information sharing online. Adam makes a good point about the importance of information sharing feature of Blackboard. Adam is an adjunct professor in the College of Sciences. He has just retired from the industry, and started adjunct teaching at the University the year he was interviewed. He says,

We live ... in an information age, where information knowledge is very important. And Blackboard, in my opinion, is a great vehicle to easily allow us to share information, so I think it all has to do with the information exchange within an information age where it's very vital that the students have access to this information. So, I think it all has to do with the fact, the importance of sharing information.

Second, the quality of discussion generated on Blackboard can be intensive and extensive.

Gonia is an assistant professor in the College of Arts and Letters, and she recalls,

Well the class that I was teaching... had a lot of discussion groups and ... they had to discuss a lot of things back and forth, and that [Discussion Board] was a really good tool for that.

Gonia's students created an intensive forum on Blackboard, and that contributed to the learning experience among the students. Note that in the analysis thus far, Gonia's narrative represents the first example of educational use of Blackboard for learning purpose, beyond simply for information sharing and communication. On the other hand, Laura thinks Blackboard allows the instructors to be transparent in the teaching and learning process, therefore, making information sharing extensive. Laura is a graduate teaching associate in the College of Professional Studies and Fine Arts, and she also teaches part time in a junior college in town.

When I can't be there physically, Discussion Board provides an area for discussion to talk to each other about questions that they might have.

Blackboard's availability and accessibility make information sharing via Blackboard intensive and extensive. Donald says,

Blackboard is kind of like a river people can visit... it's a flow of information and people can come to it and take out information.

In the metaphor of *Discussion Board/ Blackboard as River of Information*, this river can have both deep and wide, with multiple streams diverging and conversing at different point in the flow.

Collectively, faculty's narrative rationality highlights the intensive and extensive qualities of information sharing among students through Blackboard. In the process, the instructor can become transparent. This implies a shift in instructor's role and responsibility in teaching because of Blackboard. Students become active information providers, not simply as passive information consumers.

The first three metaphors are related to Blackboard and its distinguishable features, such as *Email, Course Documents, and Discussion Board*. Here I introduce another faculty's narrative related to the metaphor of 'river,' but it is about teaching with Blackboard in general as time consuming. Her name is Luna, and she is a full professor in the College of Education. She tells me,

Teaching with Blackboard is like swimming through mud. Well it, yeah you dive into the water and you're kind of excited about diving into the water and it was real clear. You know it looked like Virgin Islands or something and then it begins to get real mucky around you and you can't really feel what you should do next and you can't figure things out and you have to always ask people. So the content of the discipline, which is so mostly in your head, is now kind of muddy because you can't get it out through this medium. I mean you have to keep swimming through this mud and you just feel like it's just dragging you down and then the water begins to clear, you start to catch on and so forth. But the swim was a lot longer than it is in regular teaching.

The issue of time is complex in Blackboard implementation. On one hand, Blackboard can save time by facilitating certain tasks (i.e. return graded assignments and avoid repeating previously mentioned information) that can take up face-to-face class time with students. On the other hand, the slow initial learning curve with the innovation and medium for teaching can be time-consuming, especially if faculty are used to teaching with the traditional face-to-face style. Luna's metaphor of 'swimming through mud' provides the imagery of struggling in transition to

Blackboard. I will also transition from discussing metaphors related to individual features to metaphors solely of Blackboard as a package.

Blackboard as Fun Game

Before examining the stories related to Blackboard as a package, it is important to look at the institutional description. The description of Blackboard taken from the ITS website reads,

Blackboard is an easy-to-use online course delivery and management system. Using Blackboard's graphical point-and-click interface, instructors can incorporate learning materials from word processing, audio & video, spread sheets, and presentation files without ever learning HTML.

The technical rationality embedded in this description emphasizes the ease and flexibility of Blackboard. First, it is easy to use because it has a graphical point-and-click interface, and faculty do not need to learn HTML codes. Second, it is flexible because it supports a wide range of multimedia formats ranging from texts to audio and video.

On the other hand, faculty's narrative rationality for Blackboard implementation suggests a game and a revolution. Kathy, an assistant professor in the College of Professional Studies and Fine Arts describes Blackboard as a 'toy.' She adopted Blackboard the first semester she was offered a tenure-track position. She has been teaching with Blackboard for about two years at the time the interview was conducted.

[it] kind of felt like a little kid with a new toy in the beginning. And then it was like now I was a teenager and the toy was kind of old and whatever.

Kathy points out the 'fun' aspect of Blackboard, especially in the beginning stage of adoption and implementation. Her story shows that the 'fun' aspect can wear out over time. However, Rocco, a graduate teaching associate in the College of Business Administration, thinks the 'fun' aspect of Blackboard can grow over time. He says,

I guess I could compare it to like, ... sort of like learning how to play a sport or something like that, where in the beginning it's kind of like you've got to learn the rules and you've got to kind of like figure out how the game is played, but once you've figured out how the game is played then you can start using tricks and you can start getting fancy. You can start earning points, or whatever you want to call it, through the use of these

tricks. And I think about it like that, like in the beginning it was kind of like I didn't really know how it worked, got to learn these rules, got to figure it out, and now that I've figured it out it's like oh sure, now I'm playing the game. Now I can go and I can do some tricks and, you know, that kind of stuff and it makes it a lot more fun.

Rocco's narrative reveals two interesting perceptions of Blackboard as being a game. First, there are basic rules of how the system operates. These rules are referred to as 'lists' and 'technical rationality' in this paper. Second, once the 'lists' of rules have been mastered, he can get 'fancy' and start 'earning points.' Earning points is essential in the 'game' metaphor, and it also implies competition among players. Julia, an assistant professor in the College of Arts and Letters shares how Blackboard can 'earn points' for her in her tenure promotion case.

For our promotion and tenure, so every year we get reviewed and we have to quote five significant items in there. And one of my five was the use of Blackboard. And so it was suggested to me by another new faculty member outside the department, I don't know who suggested it to her, but I hadn't really thought of that. And then when I consulted with the senior people in my department who were going to promote my case for promotion and tenure committees, they said that yes, in fact that that would be a good thing to do. To have, that that was a strong, significant item... in the sense that I'm going to get credit for having done it...

Julia's narrative shows that Blackboard can be used for her promotion and tenure case. Her narrative rationality reveals the political reason for implementing Blackboard. More importantly, because stories reinforce what is and what is not valued (Coopman & Meidlinger, 2000; Keyton, 2005), her narrative reveals the issues of power and hierarchy at the University. In other words, teaching and teaching with technology are valued at the University, thus Blackboard can contribute to a faculty's power in the hierarchy of the University.

Collectively, these narratives create the metaphor of *Blackboard as Games*. Games can involve a toy, or a sport with players, rules, and tricks. Games can be fun in the beginning and then it gets boring as the players 'grow up.' Games can get more fun as the players master the basic rules and begin to 'get fancy.' Games imply competition, and it motivates players to 'earn points.' Joe, an instructor with the College of Extended Studies states, "Blackboard, that's the only game in town." With the idea that the University is like a town where people live and work together, the

discussion takes us to the last metaphor of how Blackboard can be like a light bulb to a town of people back in history.

Blackboard as Light Bulb Revolution

Adopting Blackboard requires spending time to learn new skills, and taking time to set up the course. Furthermore, once it is in use, it requires time to communicate and interact with students through Blackboard, update the site, and trouble-shoot. During the interview, I asked participants if they were going to continue teaching with Blackboard, everyone said yes. And I asked why, the answers point to the qualities suggested in the four preceding metaphors discussed. Blackboard makes communication, and information sharing available, accessible, instantaneous, intensive, extensive, and fun. Beyond the classroom, Blackboard makes instructors transparent, makes work convenient, easy, and time efficient. In addition, it helps junior faculty earn point in their promotion cases. Barthes (1995) maintains that narrative is like a life force, it gives us reason to believe and go on. Faculty's narrative rationality for Blackboard implementation gives them the reason to believe in their decision to adopt Blackboard, and to continue using it.

The last metaphor in this paper is derived from the narrative of Terry, an associate professor in the College of Health and Human Services, as she describes *Blackboard as Light Bulb Revolution*. According to her metaphor, once a light bulb gets turned on with electricity, people can never live without it. In other words, Blackboard is revolutionary.

Yeah, I think it's sort of like when Thomas Edison introduced the light bulb because it's really...it works; it's good. You know the first light bulbs were pretty sorry affairs but they were, and a lot of people were scared of them, didn't want to use them. You know he had to do all kinds of tricks to get people to put electricity in their house and it's the same kind of thing. Once you have it you know nobody can believe they didn't have it... When he introduced electricity... people were terrified of it. They didn't know what it was. They thought it was filled with gas. You know there are all kinds of crazy things and you know once they had electricity in that house they probably couldn't believe they ever actually used gas lamps.

Terry's metaphor points out the initial hesitation and fear of Blackboard, and later dependence on it. It shows that an innovation like Blackboard can drastically shift the way faculty teach. Once the

shift has taken place, faculty cannot return to the previous state, implying a fundamental change in teaching philosophy, and dependence on Blackboard for facilitating information, communication, and education at the University.

In this paper, I presented Blackboard and its three specific features as sites where institutional descriptions and faculty perceptions generate a complex understanding of the technical and narrative rationality for Blackboard implementation. More specifically, the technical rationality embedded in the institutional descriptions describes Blackboard as an automated, structured, user-friendly, flexible and multimedia system which faculty has full control over its operation. This rationality emphasizes steps and sequences, organization and categorization, planning and decision, monitoring and control, ease and flexibility. On the other hand, five metaphors emerged from faculty's narrative rationality. These metaphors show that Blackboard cyberinfrastructure supports the availability, accessibility, instantaneity, intensive and extensive quality of information and communication among faculty and students. As an extension of the classroom, Blackboard makes the work of teaching both time efficient and time consuming. It promotes a transparent role of the instructor, and a proactive role of both the instructor and students. In the larger context of teaching at the University, Blackboard can have a fluctuating degree of fun, but it can also help a faculty 'earn points' in tenure-promotion cases. Once Blackboard cyberinfrastructure has become a fundamental part of teaching for a faculty, s/he cannot return to the traditional way of teaching, practically and philosophically.

The Implementation of Blackboard: Implications for Practice and Theory

Using Browning's (1992) approach, I generated specific themes based on institutional descriptions of Blackboard, and faculty's metaphorical perceptions of their implementation experiences with Blackboard cyberinfrastructure. Technological infrastructures have long been characterized as

scientific, logical, technical, objective, and lifeless. I found, however, that the experience of cyberinfrastructure implementation a combination of technical and narrative rationality—both lists and stories had their place in this communication process. Both forms of rationality were demonstrated across a range of features—emails are not simply for communication, but they represent faculty ‘reaching out’ to students; adopting Blackboard is not simply to facilitate teaching and learning, but to help Junior faculty ‘earn points’ in their tenure promotion cases. As Browning and Sørnes (2004) maintain, “there is no preferred use of the technologies” (p. 55), the case of Blackboard cyberinfrastructure implementation reveals this complexity.

There are five main implications from this study. The metaphors of ‘*tree branches*,’ ‘*7/11 store*,’ ‘*river of information*,’ ‘*fun game*,’ and ‘*light bulb revolution*’ reveal the communication, information, educational, political, and philosophical aspects of Blackboard cyberinfrastructure implementation. Although Blackboard is generally assumed to be an educational technology, the educational usage of Blackboard did not emerge as the most prominent rationality for Blackboard implementation in the present data set. This conclusion suggests either an under-utilization of Blackboard as an educational technology at the University, faculty’s lack of strategies in using Blackboard as an educational technology, or both. Besides being present at certain orientation events, the first implication for practice is that the Office of Instructional Technology Services/Blackboard Administration and the Center for Teaching and Learning can foster an even closer relationship by combining resources in creating more information, training, and support for faculty in using Blackboard as a strategic educational tool, taking them beyond using Blackboard simply for information and communication among faculty and students.

Drawing from the previous observation, the second implication for practice is for this collaboration to create a more frequent forum (physical or online) where faculty can discuss the complexity of Blackboard beyond being simply an educational technology. Perhaps the narrative

rationality emerged from faculty's perceptions of Blackboard can translate into institutional descriptions of Blackboard, blending narrative rationality into institutional descriptions online, at workshops, and during BUG meetings. Technical rationality is usually linear and predictable. However, complexity is an inherent nature of technological infrastructure implementation. Practice could benefit from acknowledging this complexity, rather than assuming a stable, linear, and predictable process. Taking this one step further, once the complex narrative rationality is incorporated into the institutional descriptions, faculty's stories can become a part of a grand narrative that guides and drives future Blackboard diffusion, adoption, and implementation at the University.

Third, based on the analysis of faculty's narratives, the metaphors of '*tree branches*,' '*7/11 store*,' and '*river of information*' highlights the features of Blackboard and their information, communication, and educational functions. The metaphors of '*fun game*' and '*light bulb revolution*' of Blackboard as a package reveal the political and philosophical natures of Blackboard as a technology cluster. This conclusion suggests that when a few innovations are put together as a package for adoption, it requires political and philosophical considerations by adopters. A technology cluster as a package (rather than a single innovation) can lead to political and philosophical consequences in the organization. For example, because the scope of a package is larger than a single innovation, it can cause a technological divide between those who adopt and those who do not adopt. Those who can work with the package 'earn points,' and those who cannot 'lose points.' Furthermore, once a package is adopted, it changes existing habits to a larger extent than a single innovation can, thus leading to a shift in the nature of work.

Fourth, Giddens' (1984) Structuration theory can be applied to studying information and communication technologies (Browning & Stephens, 2004). Structuration is "the process of producing and reproducing social structures through member's social practice" (Tenkasi &

Boland, 1993, p. 91). In that sense, diffusion can be understood as a structuration process, where the communication of an innovation produces a diffusion structure (i.e. Blackboard policy, training workshops, BUG meetings, and etc), and this diffusion structure is reproduced by faculty's social practices (i.e. implementation, trouble shootings, and etc.). The practical implication is for the ITS/Blackboard Admin and CTL to frequently update, revise, and expand existing training workshops and conferences to attend to the evolving diffusion process due to the recursive nature between diffusion structure and faculty's implementation. The notion of recursive diffusion cycles is more useful than an extended and linear diffusion process.

Finally, Browning's (1992) theory is rich in highlighting the technical and narrative aspects of communication processes. However, he does not specifically emphasize the metaphorical qualities of narratives. Pratt (2001) argues,

... metaphor has been at the origin of many developments in organization theory. Research for the book revealed that metaphor is prevalent throughout the language of business.²We found that more than 25% of articles over the past 35 years in the *Harvard Business Review* relied on the deep use of metaphor to convey their central meaning. In particular, concepts or characteristics from the military, the human body, organisms, journeys, the brain, and sports were attributed to organizations metaphorically. For example, the concept of culture derives from anthropology, the concept of strategy derives from the military, and the concept of structure derives from architecture. (p. 478).

Pratt's argument establishes the significance of understanding metaphors in organizational studies.

Edelman (2004) argues that concepts are maps of perceptions, and Ramachandran (2003) maintains that metaphors are maps of concepts in the human minds. In other words, metaphors are maps of maps of perceptions, making metaphors the highest level of mental imageries. Tenkasi

and Boland (1993) argue, “narrative is a complex web of metaphorical references” (p. 96). Lakoff and Johnson (1980) claim that we live by the metaphors of things and concepts in our lives.

The present paper shows the analysis of metaphors in members’ narratives can contribute to the understanding of the highest level of narrative rationality. At the practical level, change agents (i.e. ITS/Bb Admin and CTL) can incorporate the identified metaphors into their promotional messages to facilitate future Blackboard diffusion cycles.

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Appendix A

Interview Guide

1. What classes and class levels do you teach?
2. Which class do you teach with Blackboard? How would you characterize the nature of your Blackboard classes in general, or specific?
3. Which Blackboard features did you think you were going to use before your implementation?
4. Which Blackboard features did you end up using?
5. How did you incorporate them into your existing teaching practices?
6. Which class do you not teach with Blackboard? How would you characterize the nature of your non-Blackboard classes in general, or specific?
7. Are you going to continue using Blackboard in your teaching? Why/why not?
8. Now, pretend I am a faculty in your department who has never heard of Blackboard, how would you describe Blackboard to somebody like me? Tell me more...
9. To conclude the interview, I would like to ask you to reflect upon your experience teaching with Blackboard for a few seconds. What metaphor, analogy, imagery, or description comes to your mind?