

AN ABSTRACT OF THE THESIS OF

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Abstract approved: \_\_\_\_\_

Mark Merickel

Although there is research into student learning on the Web and other computer-supported environments, there has been little investigation into the practice and pedagogy of university Web teachers. This qualitative study used a series of interviews of eight higher education faculty to gather data on their Web teaching practices, and an examination of their Web courses to identify their pedagogies.

There was a notable difference in the way the four teachers with Web-assisted courses and the four teachers with Web-only courses used the Web in their teaching. Those with Web-assisted courses used the Web primarily as a connection to expanded resources and a supplement to their face-to-face teaching. Those who taught Web-only courses used the Web for resource access, and also used asynchronous dialogue and peer interactions to support student construction of knowledge. Moreover, the

Web-only teachers reported a shift in their roles from lecturer and expert in the classroom to facilitator and co-learner as Web teachers.

Four aspects of the Web teaching environment appear to be foundational in supporting an effective Web pedagogy: (1) the varied and extensive uses of e-mail, (2) the “think time” made possible by asynchronous dialogue, (3) distributed, hyperlinked learning, and (4) a reported shift from a content focus to process and issues because Web instructors are confident that the material is presented in the Web course as they wish it. The experiences of the Web teachers in the study would indicate that these four elements can be leveraged to improve university Web teaching and deepen student learning, perhaps even beyond results capable of achievement in face-to-face teaching.

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# UNIVERSITY WEB TEACHING PRACTICE & PEDAGOGY

by

Bonnie Bone Morihara

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

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Bonnie Bone Morihara, Author

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# UNIVERSITY WEB TEACHING PRACTICE & PEDAGOGY

## 1. INTRODUCTION AND RATIONALE FOR THE STUDY

In 1991, after a decade of preliminary work and 18 months of prototype testing by the European Particle Physics Laboratory in Geneva, Switzerland, the World Wide Web was first integrated into the Internet, a global network of computer networks (Crossman, 1997). Since that time, use of the Web for commercial, entertainment, informational and instructional purposes has grown at an extraordinary rate. From January 1991, when there were 376,000 Internet host computers (Crossman, 1997), to January 1997, when there were 16,146,000 (Cairncross, 1997) the number of hosts increased 43 times. During this same time period, the number of networks increased from 3,556 to 230,000—an increase of nearly 65 times. By January 1997 the total number of Internet users was estimated at seventy-one million with a projected number of users by January 2000 forecast at 254,000,000 (Cairncross, 1997). As networks and users multiplied, there was a parallel growth in the processing capability and speed of both microcomputers and modems. Also, as Internet capacity increased, costs of transferring information via the Internet decreased (Barker, 1995).

These factors have made Internet and Web access increasingly feasible and attractive to growing numbers of computer users.

Some unique features of the Web have enabled and encouraged this growth.

- The Web is software driven and hardware independent, which enables global access from different computer platforms. With a browser which interprets the standard protocols of the Web (hypertext transfer protocols – http; JAVA, gif and jpg, etc.) users of Windows, Macintosh, DOS or UNIX operating systems can access the Web and view essentially identical pages.
- Pages on the Web are simple to view and navigate with a number of browsers and search engines.
- The Web enables interactivity through hyperlinks, employs full color graphics and photographic images, and can incorporate animation, color video, and high quality audio.

All of these features also make the Web a very attractive medium for delivering instruction because they enable learners with different computer platforms to access instructional multimedia at a time and place convenient to the learners. Moreover, the current availability of user-friendly hypertext markup language (HTML) editors has made creating and posting attractive Web pages easier and less time-consuming. Authoring simple Web pages is now little different from

using common computer applications such as word processing programs or spreadsheets. Thus, the opportunity for computer-using but non-technical higher education faculty to develop their own Web courses has dramatically expanded. In addition, there is a growing general expectation that postsecondary institutions will have Websites to serve recruitment, marketing, administrative, informational and instructional purposes (Barnard, 1997; Institute for Research on Higher Education, 1996). Easy-to-use Web-authoring software and growing societal and institutional pressures on higher education to utilize Web technology are two major factors in an expected rapid increase in the number of higher education faculty who will decide to develop Web courses and teach on the Web.

In Rogers' (1995) studies of the diffusion of innovations, he used a standard distribution curve to show a time continuum of when people adopt an innovation and also extensively studied the characteristics of each of the adopter groups. He labeled the adopter categories as innovators (2.5% of the population), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%) (Rogers, 1995, p. 262). Based on time and numbers, the higher education faculty who have developed Web courses at this point in time are primarily in Rogers' innovator category (2.5% of higher education faculty) or in the first wave of the early adopter group (13.5%) (Rogers, 1995). Although there are

studies about student learning on the Web, I have found no systematic investigation into higher education faculty who choose to teach on the Web. Do they see themselves as Web teachers differently from the way they see themselves in a face-to-face teaching environment? Has teaching on the Web altered their pedagogy? What advantages and disadvantages do they see in using the Web as a teaching medium?

To explore the recent and largely uninvestigated phenomenon of Web-based teaching in higher education, I examined four main areas within the literature: (1) learning to be a teacher in higher education; (2) teacher learning and change; (3) teaching with technology; and (4) becoming a Web teacher. Studies in these areas are reviewed in Chapter Two.

### **Purpose of the Study**

The following inquiry-based qualitative study was intended to expand understanding about the experience of teaching on the World Wide Web in higher education. The overarching questions were: Who teaches on the Web?, Why do they choose to use the Web?, and How do they use the Web in their instruction? Questions which logically flow from the overarching questions include:

- How do these instructors learn to teach on the Web?

- How do they adapt their teaching to the Web environment?
- What advantages and disadvantages do faculty see in Web-based teaching?
- What differences do they experience between face-to-face and Web teaching?
- What impact do they think the Web environment has on student learning?
- Has teaching on the Web changed their teaching philosophies or their ideas about how students learn best?
- Has teaching on the Web had any effect on their epistemologies?

By examining such open-ended questions, the study intended to both synthesize the experiences of a particular group of Web teachers, and develop potential hypotheses or questions worthy of further investigation among larger groups of Web teachers—questions whose answers could help generate or validate theoretical understanding in the area of Web instruction in higher education.

### **Assumptions and Limitations**

This study was based on a series of interviews with eight faculty who use the Web for teaching at a single public university. One Web course per participant was also examined. These eight courses



represented eight different disciplines and included both undergraduate and graduate courses. Half of the courses were Web-only and half were Web-assisted face-to-face courses. Aspects of diversity within the participants also included gender, tenure status (fixed-term instructors, tenure-track professors and fully tenured professors), and a range of experience and expertise in teaching on the Web. This group of instructors cannot be assumed to be representative of higher education Web teachers, however, I believe their experiences and ideas are not vastly different from Web teachers at other universities, and should thus seem authentic and valid to those engaged in Web teaching at other colleges and universities.

Qualitative studies look systematically at the meanings of a phenomenon and its fit into a broader culture—in this case, how Web teaching may both reflect traditional post-secondary teaching practices and also offer new possibilities for teaching and learning. A limitation of most qualitative studies is that small sample size prohibits generalization of findings to a larger population, nevertheless, much can still be learned from an examination of the ideas and experiences of this group of Web teachers that will add to the knowledge base pertaining to Web instruction in higher education.

## Definition of Terms

*asynchronous communication* – asynchronous communication contains a time lag between production and reception. Letters, voice-mail, e-mail, and electronic bulletin boards are all examples of asynchronous communication.

*Hypertext Mark-up Language (HTML)* – a set of commands which formats pages for viewing on the World Wide Web.

*hypertext or hyperlink* – a highlighted word, phrase, or icon on a Web page which, when clicked with a mouse, connects the reader to another Web page or outside Website.

*Internet* – a global network of computers that enables the exchange of information and data.

*listserv* – a mailing list server: a program allowing members with common interests to send e-mail messages to the entire membership.

*Uniform Resource Locator (URL)* – an Internet address.

*Web course* – any course that is either completely or partially delivered on the World Wide Web.

*partial-Web course or Web-assisted course* – a course taught face-to-face which also has a Website containing substantial course material or activities.

*total-Web course or Web-only course* – a course designed for total Web delivery.

*Web teacher* – a teacher who utilizes the Web, either in a Web-only or Web-assisted manner.

*World Wide Web* – a sector of the Internet featuring hypertext and hypermedia information which can be explored with Web browsers such as Netscape Navigator and Microsoft Internet Explorer.

## 2. REVIEW OF PERTINENT LITERATURE

This chapter presents a review of the literature that guided my thinking and framed my approach to the research. As such, it also formed the basis for the interview questions (See Appendix) and my subsequent analysis of the data. Consequently, this review of pertinent literature can legitimately be looked at as establishing the lenses through which the research and data analysis were planned and interpreted. For this reason, and because I firmly believe there is no such thing as value-neutral research, I look upon this entire chapter as a disclosure of researcher bias. Because of this, I have chosen to open this chapter with a brief section on researcher bias which establishes my personal and professional background, as well as my epistemological stance.

In quantitative, positivist research, the literature review is conducted prior to hypothesis formation and is the basis for developing the hypotheses which are then submitted to testing. Qualitative research, however, is characterized by investigative inquiry into the meaning of a phenomenon. Although reading the literature presented in this chapter lead me to various conjectures and questions about university Web teachers and Web teaching, these became background for the ensuing research rather than testable hypotheses. Moreover, in qualitative research, concurrent reading of further literature throughout the

research period can be viewed as another aspect of the investigation, one which strengthens the subsequent analysis of data. In order to more clearly differentiate prior reading from reading concurrent with the research period, I have chosen to present prior reading in this chapter, and to weave subsequent literature which helped me make further sense of the data or reinforced my findings into chapters four and five.

### **Researcher Bias**

As Merriam (1988) declared, “the researcher is the *primary instrument* for data collection and analysis. Data are mediated through this human instrument, the researcher, rather than through some inanimate inventory, questionnaire, or machine” (p. 19). Being clear about and declaring who I am as a person, including my beliefs about the nature of knowledge and the relationship of the knower to the known, i.e. my epistemological stance, helps clarify who I am as a researcher and the probable biases that will influence my interpretations. In the case of qualitative inquiry, where there is a recognition that there is no such thing as value-free research (Lincoln & Guba, 1985), knowing the stance of the researcher is extremely important. As Strauss and Corbin (1994) stated, “Theories are interpretations made from given perspectives as adopted or researched by researchers” (p. 279). Theories cannot be

separated from the perspective from which they were generated and the researcher as instrument cannot be separated from his or her worldview. The researcher always brings his or her bias to the construction of the study, the collection, analysis, and evaluation of data, and the report of conclusions. As Denzin and Lincoln (1994) asserted, "All research is interpretive, guided by a set of beliefs and feelings about the world and how it should be understood and studied" (p. 13).

I believe my epistemology is best represented by a combination of Noddings' (1984) caring epistemology, Thayer-Bacon's (1997) relational epistemology, and Collins' (1990) standpoint epistemology. Standpoint epistemology posits many perspectives with no monopoly on the truth or best way of knowing; we need all perspectives in order to make sense of the whole of the experience for all participants. Thayer-Bacon (1997) made a point that resonates strongly with me when she said that unless people are listened to and feel that someone whom they respect finds their ideas interesting and valuable, they cannot develop authentic voices in that area. I believe that dialogue is the basis of deep and possibly transformational learning. "Dialogue cannot exist, however, in the absence of a powerful love for the world and for people" (Freire, 1993, p. 70). Moreover, "dialogue cannot exist without humility" (Freire, 1993, p. 71) and without the recognition that each person brings valuable perspectives to the shared communication.

I am primarily a constructivist. I believe that learners “create interpretations of the world based on their past experiences and their interactions in the world” (Cunningham, 1992, p. 36). Each person develops his or her own construction of reality which is based on that individual’s previous experiences and understandings. I believe that knowledge is dialogically and experientially constructed. Furthermore, I believe there can exist no knowable “truth” which is unmediated by individual and cultural values, beliefs, and experiences.

The previous three paragraphs outline my strongly held beliefs about the nature of knowledge and learning and the value of each person’s perspective to problem-solving and meaning-making. At the risk of stereotyping myself in some minds, but perhaps more clearly identifying who I am and what background I bring to how I interpret the world, I shall briefly describe myself. I am a white, middle-class, female educator in my 50s, originally from Michigan. My formal post-secondary education has been delivered through three public institutions: the University of Michigan, the State University of New York at Buffalo, and Oregon State University. I was an elementary school teacher of grades K-3 in Buffalo, NY for 15 ½ years. I later taught English as a second language and literacy skills to refugees and immigrants for three years and English for business purposes and American culture to Japanese businessmen for five years. A strong influence on my identity and my

worldview was my 28-year marriage to a Japanese national. An equally strong influence has been the reflection and redirection that resulted from divorce. I have long been an avid reader and book collector, particularly in the non-fiction areas of business culture, leadership and organizational development, systems thinking, technology, personal and interpersonal development, intercultural communication, Japanese culture, language learning, adult education, and learning in general.

## **Learning to be a Higher Education Teacher**

### **Teaching Models for Higher Education**

In investigating how higher education faculty learn to teach and come to envision themselves as teachers, an appropriate starting point is an examination of the various teacher roles, functions, styles and teaching paradigms that have been delineated by theorists and researchers. Five different studies are examined below, each focused on college or university teaching. Each of the studies employs slightly differing categories: paradigm, archetype, form, style, or role. Although the paradigm label implies an epistemic view, the three paradigms identified by Menges and Rando (1989) are not unlike some of the categories identified by the researchers who focused on form, style or roles. Therefore, the five studies are reported using the researcher's



terminology and are presented in order of increasing distinction of categories.

A simple model of teaching paradigms is one developed by Menges and Rando (1989) in their interview-based study of 20 graduate teaching assistants. They discovered that the participants espoused one of three teaching paradigms: content-delivery, process, or student motivation, as the defining characteristic of what it means to teach in higher education. Singer (1996) used Menges and Rando's three paradigms as the theoretical framework for her study and developed a survey which categorized faculty into one of the three paradigms depending on their reported teaching methods and beliefs. Singer's study also investigated the influence of gender, discipline, class size and class level as predictors of which paradigm an instructor would select. While these two studies recognized three broad college teaching paradigms, the following studies expand the inquiry by examining the related areas of teaching styles and functional roles of the college teacher.

Grasha (1994) delineated five teaching styles in higher education: expert, formal authority, personal model, facilitator, and delegator. Based on a thematic analysis of data from interviews and observations, Grasha concluded that all college faculty possess each of these styles and express them in varying combinations in different situations. In front of a large, undergraduate class, a professor might emphasize an expert/formal

authority blend, but use an expert/facilitator/delegator blend in a graduate student seminar. Even though five styles were identified, Grasha found that college faculty tended to exhibit the teaching styles in four primary clusters, with the expert style being a consistent element in every cluster. Grasha administered his survey, the Teaching Styles Inventory, to 381 faculty members representing 200 different U.S. private and public colleges and universities. Each faculty member rated two of his or her own classes, resulting in data from 762 classrooms across ten disciplines. Ninety-two percent of the sample fit into the four clusters as follows:

- Cluster 1: expert/formal authority (38%),
- Cluster 2: expert/personal model/formal authority (22%),
- Cluster 3: expert/facilitator/personal model (17%), and
- Cluster 4: expert/facilitator/delegator (15%).

Grasha's research also produced a list of various teaching methods associated with each cluster, as well as three factors associated with selecting a teaching style: the capability of the students, a teacher's need for control, and a teacher's willingness to build and maintain relationships with students (Grasha, 1994).

In an earlier study of classroom interactions between teachers and students, Mann and his colleagues (Mann, Arnold, Binder, Cytrynbaum, Newman, Ringwald, B., Ringwald J., & Rosenwein, 1970) delineated six

functions of the college teacher: teacher as expert, formal authority, socializing agent, facilitator, ego ideal and person. Many faculty adopted the expert or formal authority role almost exclusively, while others moved between the various functions depending on the situation. Faculty sometimes experienced conflict in deciding how to act as teachers, for example, when an individual who enjoyed giving well-prepared lectures realized that this behavior interfered with getting to know students better. In deciding who they should be as teachers, faculty also felt conflicting pressures from students, colleagues, and institutional expectations, as well as experiencing self-doubts and dissonance between how they believed they should behave as teachers and the reality they experienced in the classroom (Mann et al., 1970). Since Mann and his colleagues found this dissonance between the ideal and the reality of classroom teaching, one wonders if Web teachers have been able to adopt functional roles that are any truer to their ideals, or even if they perceive that their functional roles are different when they teach on the Web.

Reinsmith (1994, p. 132) developed yet another model that proposes nine archetypal forms of teaching in higher education and places them on a continuum from teacher-centered forms to student-centered forms. Reinsmith's nine archetypal forms are subsumed within five general teaching modes: presentational, initiatory, dialogic, elicitive, and apophatic (extinguishing a flame).

Table 2.1. *A Continuum of Archetypal Forms in Teaching*

TEACHER-CENTERED	STUDENT + TEACHER	STUDENT-CENTERED
<b>1. presentational</b> <ul style="list-style-type: none"> <li>• disseminator/transmitter</li> <li>• lecturer/dramatist</li> </ul>	<b>2. initiatory</b> <ul style="list-style-type: none"> <li>• inducer/persuader</li> <li>• inquirer/catalyst</li> </ul>	<b>3. dialogic</b> <ul style="list-style-type: none"> <li>• dialogist</li> </ul>
		<b>4. elicitive</b> <ul style="list-style-type: none"> <li>• facilitator/guide</li> <li>• witness/abiding presence</li> </ul>
		<b>5. apophatic</b> <ul style="list-style-type: none"> <li>• teacher as learner</li> <li>• absence of teacher</li> </ul>

Reinsmith categorizes presentational and initiatory modes as teacher-centered, dialogic as a mixture, and elicitive and apophatic modes as student-centered. The archetypal forms are ordered, with the apparent locus of control ranging from complete instructor control in the disseminator/transmitter role to complete student control when the instructor withdraws from the teaching role (i.e., when a course is complete). As was the case in the studies of Grasha and Mann and his colleagues, Reinsmith reported that while a professor might favor a particular teaching form, context and situation were also important factors in a professor's choice of which teaching forms to employ.

Each of these studies implies that faculty make choices as to how they will behave as higher education teachers, but that their choices are

often constrained by tradition, context, and epistemic beliefs. In addition, Katz and Henry (1993), using the Omnibus Personality Inventory, discovered that cognitive and epistemic differences among faculty were significantly correlated to disciplinary differences. Important insights may be gained from a clearer understanding of the relationship of these various factors (tradition, context, epistemology and discipline) to a professor's teaching choices. The above studies may prove to be useful in investigating how higher education faculty who teach on the Web view themselves as teachers and make decisions about how they teach on the Web.

### **Following Familiar Examples**

One way to understand how faculty develop as teachers is through examining the models they have for teaching in higher education. Although the role perspective is different, most prospective higher education teachers feel that they know and understand the job of teaching from having spent 16-20 years in classrooms observing their own teachers (Boice, 1992; Eble, 1988). Consequently, it is common for new faculty to pattern their teaching styles and methods after teachers they have admired, and to avoid ways of teaching that they considered boring as students (Keir, 1991). Since new faculty tend to teach as they have been taught and the traditional and most common form of

knowledge dissemination in college classrooms is the expert/lecturer model (Reinsmith, 1994), this form of teaching is reinforced. Although it is certainly possible to reproduce teacher-centered, lecture-style teaching on the Web, which methods and pedagogy are used by Web teachers and why; and whether they are traditionally oriented and essentially teacher-centered or possibly are more student-centered is a key aspect of this study.

### **Lack of Training in Teaching**

A related factor conspicuous for its lack of examination in the above studies is the extent of knowledge that higher education faculty have of adult learning theories and teaching methodologies. Outside of the fields of education and educational psychology, and beyond limited training opportunities for graduate teaching assistants at some universities, very little attention is paid to pedagogy in postsecondary institutions. In fact, Tompkins (1990) claimed that antipedagogical indoctrination originating in the academy is common in graduate schools. Tompkins stated that pedagogy as subject matter is derided and colleges of education are not seen as engaging in serious scholarship. Furthermore, Tompkins reported that teaching in the academy was, in her experience, “like sex—something you weren’t supposed to talk about or focus on in any way but that you were supposed to be able to do

properly when the time came” (Tompkins, 1990, p. 655). She also recognized that there was “no vocabulary for articulating the experience [of teaching] and no institutionalized format for doing so” (Tompkins, 1990, p. 656). Boice (1991) corroborated these observations, stating that less than 5% of the 197 new faculty he interviewed were able to identify any sort of forum for discussing teaching in their institutions. In a like vein, McGill and Shaeffer claimed, “New teachers, by and large, don’t recognize pedagogy as a discipline. They usually will *not* take steps on their own to learn about teaching. They don’t take education classes, and they usually won’t attend seminars” (quoted in Menges & Rando, 1989, p. 59).

In a year-long study of five graduate teaching assistants in a university writing program, Rankin (1994) discovered a strong resistance to identifying with the role of teacher and went on to discuss how, in her observation, even veteran teachers sometimes felt personally inadequate—that they were impostors, fooling even their colleagues as to their teaching expertise. Other researchers reported similar findings that reflect a lack of attention to pedagogy in higher education, including: a widespread lack of pedagogical preparation of Ph.D. candidates; the commonly voiced assumption that if someone knows a discipline, he or she will be able to teach it; inadequate feedback from peers and department heads as to how to improve one’s teaching; and little

recognition or reward for teaching in the academy (Bass, 1993; Blackburn & Lawrence, 1995; Boice, 1991, 1992; LaPidus, 1993; Slevin, 1993; Sorcinelli, 1994). Web teachers outside of the fields of education or educational psychology would be expected to exhibit a similar lack of pedagogical training and knowledge. What may prove interesting is whether Web teachers, aided perhaps by their examination of other courses posted to the World Wide Web or by a desire to incorporate more student-directed activities into a teaching medium that they cannot instantaneously monitor as they would a face-to-face class, might incorporate teaching methodologies which reflect adult learning theories and pedagogy.

### **Creating Self-as-Teacher: Learning to Become a Teacher in Higher Education**

Keir (1991) developed the following chart (Table 2.2) to summarize the findings of how a mixture of new and experienced community college faculty (including a group that had received outstanding teacher awards) had learned how to teach.



Table 2.2. *Developing and Maintaining Teaching Abilities*

<p><b>Modeling—Remembering the “Right Way”</b></p> <ul style="list-style-type: none"> <li>• Remembering how they had been taught</li> <li>• Remembering how they <i>wished</i> they had been taught</li> <li>• Remembering learning it themselves</li> </ul>	<p><b>Creating the Best Way</b></p> <ul style="list-style-type: none"> <li>• Engaging in trial &amp; error</li> <li>• Reflection on experience</li> <li>• Just knowing what to do</li> </ul>	<p><b>Maintaining Effectiveness</b></p> <ul style="list-style-type: none"> <li>• Reflecting on experience</li> <li>• Honing techniques</li> <li>• Attending workshops</li> <li>• Reading about teaching</li> <li>• Checking with colleagues</li> <li>• Anticipating what might work</li> </ul>
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Starting out → Gaining experience → Gaining experience → Gaining experience →

Keir’s findings mirror the observations of others (Boice, 1991; Menges & Rando, 1989; Rankin, 1994) regarding the lack of teacher training and the ubiquity of learning-on-the-job in higher education teaching. In addition, however, her findings also introduce the importance of reflection in developing and maintaining teaching skills. Reflection would also appear to be a key element in teacher learning and self-directed change.

## Teacher Learning and Change

### Epistemological Beliefs of Higher Education Faculty

Kitchener (1983) proposes a three-level model of cognitive processing: cognition, metacognition and epistemic cognition. According to Kitchener's scheme, cognition is involved in such tasks as reading, memorizing, computing, and perceiving. Individuals use metacognition to monitor their progress in first-order cognitive tasks; while epistemic cognition is necessary for the complexities of ill-structured problems. When using epistemic cognition, "individuals reflect on the limits of knowing, the certainty of knowing, and the criteria of knowing" (Kitchener, 1983, p. 222). Epistemic cognition would appear to not only be required in ill-structured problems, but also may be at the root of reflection-driven change.

Although he did not use the term *epistemic cognition*, Kuhn seemed to be referring to a similar process when he talked about the astounding effects engendered by changing paradigms: "...though the world does not change with a change of paradigm, the scientist afterward works in a different world" (Kuhn, 1970, p. 121). An individual's beliefs about the nature of knowledge, what can be known, and the relationship of the knower to the known (i.e., epistemology), both guide the questions which that person is willing to ask and limit the very nature of the

inquiry of which he or she can conceive. Epistemological beliefs, therefore, would appear to be an important consideration when examining how teachers learn and change. Such beliefs would also affect how faculty members view their roles and responsibilities as teachers.

Guba and Lincoln specify epistemological differences among four major inquiry paradigms: positivism, postpositivism, critical theory and related positions, and constructivism. Epistemologically, the positivist holds objectivist views that assume that it is possible to discover the truth; the postpositivist claims that while there may be a truth, it can never be fully known; the critical theorist assumes that what can be known is dependent on the inquirer's values and beliefs; and the constructivist accepts the critical theorist's subjectivism and adds that knowledge is socially constructed (Guba & Lincoln, 1994).

Professors' epistemologies and inquiry methods have been found to be related to their disciplines (Donald, 1990; Katz & Henry, 1993). Katz and Henry, using the Omnibus Personality Inventory, also discovered disciplinary differences in four areas of faculty cognition: theoretical orientation, reflective thinking, complexity of thinking, and esthetic awareness. One of the emerging questions for the current research into Web-based teaching is whether teachers have perceived any shift in their epistemological beliefs as a result of teaching on the Web.

On the other hand, Katz and Henry also state, "...we have found that creative persons in any academic discipline resemble each other and obtain high scores in a variety of thinking modes, such as analyticalness, comprehensiveness, complexity, perceptual sensitivity, [and] intuitiveness" (Katz & Henry, 1993, p. 26). The possibility exists that the group of teachers who currently teach on the Web, being among the first to adopt this technology for teaching purposes, is a generally more creative group and might not reflect disciplinary differences as much as they resemble each other.

### **Reflective Teaching Practices**

Web-based teachers may or may not have a propensity toward reflection on their teaching practices, but experimentation with Web technology as well as with various modes of Web-based teaching is likely to have been a significant aspect of their development as Web teachers. Trying something to see if it works; assessing the results, as well as one's assumptions; generating alternatives; and acting again with deliberate intention are the essential steps in reflective practice (Schön, 1983). Reflection has been identified as a key element in experiential learning and professional change, and has received a great deal of attention in the literature (Argyris, 1992, 1993; Argyris & Schön, 1974; Brookfield, 1995; Calderhead, 1992; Copeland, Birmingham, De La Cruz, & Lewin, 1993;

Grimmett & Erikson, 1988; Keir, 1991; Langer & Brown, 1992; Schön, 1983, 1987, 1991).

One of the key aspects of professional reflection identified by Schön (1983) is the professional's ability to transfer understanding of successful practice in one context onto a unique, but similar situation. Schön claims that skillful professionals develop their abilities through experiential learning, as well as reflecting-in-action (thinking on their feet and looking for meaningful patterns) and reflecting-on-action (post hoc evaluation, along with theorizing about how to improve results). Schön explains that when professionals recognize the limits of technical expertise within complex situations with unpredictable variables, they describe their decisions and actions as resulting from "experience, trial and error, intuition, and muddling through" (Schön, 1983, p. 43). While this sounds haphazard, Schön describes what professionals actually do in such situations as either experimenting-in-action or reflection-in-action, and distinguishes between these processes and a scientific, research-based approach to the transfer of understanding. If, as noted above, reflection is an important aspect of learning from experience and changing one's actions and thinking, then the question arises as to whether reflection is always a part of significant self-chosen change. If this is the case, then one would expect that Web teachers would report

that reflection has played an important role in their choice to become Web teachers, as well as the development of their Web-based courses.

### **Innovation and Change**

Since “the measure of innovativeness and the classification of a system’s members into adopter categories are based upon the relative time at which an innovation is adopted” (Rogers, 1995, p. 22), higher education faculty who were teaching via the Web in 1998 are either in Rogers’ (1995) innovator (2.5% of the population) or early adopter (13.5% of the population) categories. Rogers identified characteristics of earlier adopters (including both innovator and early adopter categories) which may prove germane in the current research on Web teachers. Earlier adopters tend to get new ideas from impersonal sources and sources outside of their own social group; gather information from more varied and difficult-to-access sources; have well-established interpersonal communication networks; are mentally flexible and able to deal with abstractions as well as set-backs; feel more secure than anxious about change; have an affinity for innovative ideas; and, the early adopters but not necessarily the innovators, tend to be opinion leaders (Rogers, 1995).

Geoghegan (1994), focusing specifically on early adopters of information technology for instruction and mainstream faculty, identified the following differences between the two groups (p. 14).

Table 2.3. *Characteristics of Early Adopters of Information Technology and Mainstream Faculty*

<u>Early Adopters</u>	<u>Mainstream Faculty</u>
<ul style="list-style-type: none"> <li>• favor revolutionary change</li> <li>• visionary</li> <li>• strong technology focus</li> <li>• risk-takers</li> <li>• experimenters</li> <li>• largely self-sufficient</li> <li>• “horizontally” networked *</li> </ul>	<ul style="list-style-type: none"> <li>• favor evolutionary change</li> <li>• pragmatic or conservative</li> <li>• strong problem and process focus</li> <li>• risk-averse</li> <li>• want proven applications of compelling value</li> <li>• may need significant support</li> <li>• “vertically” networked *</li> </ul>

\* horizontal networks have more cross-functional and interdisciplinary links than vertical networks, which are concentrated in a single department or discipline

These characteristics, as well as the attributes of earlier adopters identified by Rogers (1995), seem to describe individuals who are open to self-directed change. Being open to self-directed change appears to be an important characteristic of higher education faculty who experiment with new and innovative teaching technologies. Self-directedness, therefore, may be a characteristic which is also present among faculty who teach on the Web.

## Teaching with Technology

### Distance Education and Technology

Distance education is defined by four broad categories: (1) correspondence study with print-based materials; (2) lessons broadcast over radio or TV; (3) satellite telecasts to remote locations with or without two-way audio/video; and (4) various forms of computer-mediated communication (Locatis & Weisberg, 1997). This review of the literature focuses only on the most recent of these categories, computer-mediated teaching.

Online education (both distance and campus-based) utilizes a wide array of computer-mediated technologies: electronic mail; news groups, bulletin boards and listservs; the World Wide Web; online databases and library collections; online journals; CD-ROMs; groupware; video conferencing; simulations and games; interactive multimedia; computer modeling; intelligent tutoring (expert) systems, such as those used to aid doctors in medical diagnoses; and even virtual reality (Barker, 1994). While it is possible to incorporate many of these technologies into a Web-based course, a basic Web course can be designed around e-mail, the World Wide Web, and instructor- and class-created hypertext documents. Since some of the more complex technologies require a great deal of development time and money, it is interesting to examine which



technologies Web teachers choose to incorporate into their courses and the benefits they see in doing so. It will also be important to discover if their chosen Web technologies reflect their espoused beliefs, epistemology and pedagogy or are more driven by the capabilities of the technology.

Huang (1997) proposes a typology of online education organized along three interrelated continua: communication, format, and levels of service. His typology could be used to classify the computer-mediated technologies listed above. Table 2.4 summarizes Huang's typology and provides examples of each.

Table 2.4. *Three Dimensions of Online Education*

<i>COMMUNICATION</i>	<i>provider-initiated</i> → → • e-mail from instructor to student	<i>receiver-initiated</i> • documents are in place on the Web, but the receiver decides when, where and how to receive the information
<i>FORMAT</i>	<i>textual</i> → → → → → • e-mail • listserv • text-based Web documents	<i>multimedial</i> • images • video • audio
<i>SERVICE LEVEL</i>	<i>simple</i> → → → → → • syllabus online • some class notes online	<i>complex</i> • full courses online • online registration, admission • online access to library databases and other campus services

One aspect which is perhaps implicit in Huang's communication dimension, but not openly addressed is level of interactivity, which is an

important factor in engaging students in active learning. Since adult learning theory stresses the importance of an interactive, open learning atmosphere (Brookfield, 1986; Candy, 1991; Cranton, 1989; Knowles, 1980), one aspect of the current study of Web teachers will be to investigate to what extent they incorporate interactivity in their Web courses.

Some studies have examined the efficacy of computer-mediated education, comparing it to face-to-face instruction. In one such study, Hiltz (1990) compared four different undergraduate courses at two colleges taught in each case by the same teacher in both face-to-face and on-line modes. The study showed that self-disciplined students were likely to achieve superior outcomes with the online courses, but those with less self-discipline, lower skill levels, or those who had to travel to gain access to a computer performed poorly or dropped out. The average participant of the study felt that both the accessibility and the quality of the online educational experience were better than in face-to-face courses. Hiltz and the instructors admitted that since the face-to-face classes and the online classes were "suited to different types of learning and assignments, [it didn't] make sense to try to test the students using the same examination" (Hiltz, 1990, p. 165). Nevertheless, they rigidly kept with the same midterm and final exams in all courses because of the requirements of the quasi-experimental research design. Whether the

Web teachers who are the focus of this research have noted any pattern in student attrition, greater student satisfaction, or the necessity to design online instruction differently from face-to-face instruction are questions to be investigated.

### **The Web as a Teaching Medium**

There are differences of opinion as to the efficacy of the Web as a teaching medium. Some look on computer-mediated communication as merely a tool, and therefore neutral in its pedagogical impact. Hannafin, Hill and Land (1997) state, "The Web enables learning but generally provides no real teaching. It affords rapid access to information, but learning is largely self-directed" (p. 97). Rosen (1997) adds, "It is important to remember that the WWW is merely a tool, as is a chalkboard, overhead projector, or VCR. Tools don't teach" (p. 1).

Others feel the Web can have a negative effect on learning. Laurillard (1993), speaking of hypermedia, says, "As an information storage and retrieval system it is a very well-designed medium. But as an educational medium, enabling the student to develop their academic understanding, it has little to offer" (p. 122). Laurillard (1993) also states that, "Shoehorning a textbook into hypertext format will distort the internal structure of its argument and the discourse will lose its

meaning. Hypertext effectively destroys the knowledge represented in textbooks” (p. 125), and, “Hypertext systems will be fascinating and motivating for students able at last to act like researchers in their field, but it will be very easy for them to produce extensively documented rubbish unless the focus is kept firmly on the quality of the knowledge they generate from these systems” (p. 126). These apparent criticisms may be seen as primarily cautionary, warning users to not blindly embrace hypermedia for teaching without also taking a critical look at its possible limitations or unintended consequences.

In a much more positive vein, Kearsley, Lynch and Wizer (1995), reviewing the literature about the effectiveness of online learning, summarized the findings in the following manner.

When compared to traditional classes: student satisfaction with online courses is higher; GPA and other measures of student achievement are the same or better; a higher level of critical thinking and problem solving is reported; and there is often more discussion among students and instructors in a course. Instructors are able to track the progress of their students in a detailed way and have a better understanding of what students are/are not learning. Finally, computer networking provides a more “authentic” learning environment in the sense that students can easily communicate with other educational professionals outside of the class group if they desire. (Kearsley, Lynch & Wizer, 1995, p. 37)

A position advocating for the efficacy of Web-based teaching is also taken by Harasim and Yung (as cited in Harasim, Hiltz, Teles & Turoff, 1995) who conducted a survey regarding the effects of online courses as

compared to traditional face-to-face courses. The reported results of the survey are summarized in Table 2.5 (Harasim et al., 1995, pp. 14-15).

Table 2.5. *Effects of Web-based Teaching and Learning*

- |   |
|---|
| <ul style="list-style-type: none"> <li>• The role of the teacher changes to that of facilitator and mentor.</li> <li>• Students become active participants; discussions become more detailed and deeper.</li> <li>• Access to resources is expanded significantly.</li> <li>• Learners become more independent.</li> <li>• Access to teachers becomes equal and direct.</li> <li>• Interactions among teachers are increased significantly.</li> <li>• Education becomes learner centered; learning becomes self-paced.</li> <li>• Learning opportunities for all students are more equal; learner-learner group interactions are significantly increased.</li> <li>• Personal communication among participants is increased.</li> <li>• Teaching and learning is collaborative.</li> <li>• There is more time to reflect on ideas; students can explore on the networks; exchange of ideas and thoughts is expanded; the classroom becomes global.</li> <li>• The teacher-learner hierarchy is broken down. Teachers become learners, and learners become teachers.</li> </ul> |
|---|

The above results seem overly positive and thus questionable. Extensive efforts to procure the original research failed, but the table is included as a possible guide for further inquiry and checking the validity of particular findings against the experience of the Web teachers.

Berge's (1997) study of 42 postsecondary teachers who teach formal online courses indicated that these teachers promoted student-centered learning, provided student opportunities for self-reflection, incorporated online discussions; supported a collaborative learning

environment, and used authentic learning activities, particularly those based on inquiry, projects and problem-based assignments. Harasim et al. (1995) also reported that a learner-centered model was more effective online than a teacher-centered model.

The question arises as to whether teaching online attracts people who are already using active learning activities and student-centered teaching strategies, or if the Web environment provides opportunity for changing to these. Whether the subjects of this study conceive of the Web as a mere teaching tool, or whether they feel the medium itself significantly affects what type of teaching and learning can be accomplished, are key questions in the current research. Answers to these questions will also help establish whether there is a difference between how teachers define themselves as face-to-face teachers and as Web teachers, and why.

### **Learning to Be a Web-Teacher in Higher Education**

#### **What Does It Mean to Teach on the Web?**

At this point in time in relationship to the use of the Web for teaching in higher education (i.e., innovation and early adoption stages, Rogers, 1995) it is believed that higher education faculty who have developed Web-based courses have done so of their own volition.

Institutional recognition and rewards for the time spent in experimentation and development of Web-based courses are rare or non-existent (Green, 1997). Standard expectations of course development time are based on traditional face-to-face courses and have forced most faculty who wish to develop Web courses to work on them on their own time or to search for outside funding through grants (Williams & Peters, 1997). The publication of a course on the Web, which in some cases requires the research, reflection and development time equivalent to the publication of a medium-sized book is not currently recognized as a scholarly publication (M. Merickel, personal communication, October 7, 1997), so faculty continue to have pressure to publish in paper-based, peer-reviewed forums. Furthermore, those considering teaching on the Web might have uncertainty and potential anxiety about how their student evaluations—often a key element in promotion and tenure—will be affected by teaching online. These factors appear to present substantial barriers for higher education faculty, and particularly untenured faculty, in choosing to teach on the Web.

Since using the Web as a teaching medium is still uncommon enough to be classified as an innovation, research by Marcus is pertinent here because it helps explain the rate of adoption of innovations in relation to institutional culture. Marcus (Gilbert, Bass, Cartwright, Chandhok, Geoghegan, Hill, Hoge, Jette, Marcus, & Ransdell, 1995)

developed a formula for the variables that influence an individual's decision to adopt an innovation:  $A = f(R, PV, C)$ , adoption is a function of resources, perceived value to the individual and communication with other adopters. Communication opportunities and perceived value (i.e., the perceived costs and benefits within the current academic structure) are two contextual factors that may be highly influenced by the institutional culture, and the availability of resources is clearly controlled by the institution. Thus, although adoption is a personal choice, institutional priorities and culture may either support or hinder that choice.

### **Other Aspects of the Web-teaching Environment**

In face-to-face teaching, faculty regularly gauge how well they are teaching by student feedback, for example: questions asked, level of discussion, whether students seem to understand, whether they are paying attention. This immediate feedback—much of it in the form of non-verbal cues (e.g., apparent distractedness or disinterest; quizzical expressions; doodling; apparent eagerness to join the dialogue)—is generally unavailable in a Web environment, which means that Web teachers must build in alternative ways to receive student feedback.

One of the reasons that the Web-teaching environment is mentioned as empowering for students is based on asynchronous



technologies (McComb, 1994). When a forum for participation in dialogue is set up in a Web course, all students have the chance to enter the discussion, but in time-bound face-to-face environment only a limited number of students have a chance to talk. Additionally, some students need time to formulate their thoughts in the manner they wish. The asynchronous nature of many Web technologies allows students to do that.

No research was discovered which addressed a possible empowering impact on faculty because of asynchronous Web technologies, but it could be that faculty feel empowered in a similar way. It may be that faculty who prefer having time to reflect in order to have a more thoughtful response and who find themselves uncomfortable in the immediacy of the classroom, would also feel that they might have a chance to express their more authentic voices in an asynchronous Web-teaching environment. The time lag inherent in asynchronous communication allows for time to think and reflect before responding—a key element of improving practice as noted by Schön (1987)—for both students and teachers. An asynchronous Web environment could serve as a vehicle for a possible move away from direct instruction to a more facilitative approach and possibly a more student-centered focus.

## Conclusion

In preparation for an investigation into how and why higher education faculty choose to teach on the World Wide Web, this chapter reviewed four areas in the literature:

- an examination of teacher paradigms, archetypes, styles, and roles in order to discover how higher education faculty perceive of their purpose and identity as teachers,
- an exploration of the area of teacher change and the role of reflection in that change, focusing particularly on teachers' epistemologies to understand teachers' motivations for choosing particular pedagogies,
- an examination of the research and reports of faculty who have taught via the Web for what they concluded about the efficacy of teaching with technology, and particularly teaching on the Web, and
- a brief look at the area of higher education faculty developing identity as Web teachers, what that identity means to them, and why they choose to teach on the Web.

The following research is expected to generate more knowledge especially in the third and fourth areas, and it is hoped that this research will be of particular benefit to higher education faculty who are considering teaching on the Web, as well as adding to the general

knowledge base regarding the relationship of teacher identity and pedagogy in higher education faculty.

### 3. CONTEXT AND DESIGN OF THE STUDY

In broad terms, quantitatively-oriented research focuses on measuring effects, making deductions and testing hypotheses, while qualitatively-oriented research concentrates on patterns, using induction and seeking meaning. While quantitative research attempts to prove or disprove hypotheses, qualitative research seeks to provide an in-depth understanding of a phenomenon, which may become the basis for proposing theory. The research question determines the choice between these orientations (Marshall & Rossman, 1989; Merriam, 1988; Miles & Huberman, 1994). In deciding to investigate the subjective understanding of Web teaching held by higher education faculty, I chose a topic best suited to the holistic and open-ended orientation of qualitative inquiry. The very novelty of teaching on the World Wide Web offered a fertile field for discovery and new meaning-making.

#### **Developing an Area of Inquiry**

My overall question of interest was: How and why do university faculty use the Web for teaching? Four additional questions structured the analysis of data: (1) Does teaching on the Web change one's teaching philosophy, epistemology, or pedagogy?, (2) Which reasons given by teachers for Web teaching practices reflect teacher-centered interests,

and which reflect student-centered interests?, (3) What aspects of teaching and learning in a Web environment foster a new pedagogy?, and (4) What are the elements of an effective Web pedagogy?

My research strategy was a qualitative design, including naturalistic inquiry, qualitative data, and content analysis (Patton, 1990, p. 190). Since my intent was to understand the sense that university faculty made of Web teaching, the logical data gathering technique was interviewing. As Merriam (1988) pointed out, "Interviewing is necessary when we cannot observe behavior, feelings, or how people interpret the world around them" (p. 72). Based on a review of the literature, I developed a series of short answer and open-ended interview questions (See Appendix) that I believed would generate the necessary data through which I could address my research questions.

I divided my questions into three interviews, each with a different purpose. The first interview, a short-answer descriptive portion, was for simple information gathering. The second and third interviews, which were longer, had both hermeneutic and process-oriented purposes. I was interested in the cognitive, personal and professional sense that the participants made of teaching on the Web, as well as the processes they engaged in as Web teachers. I attempted to get a sense of the latter through the second and third interviews, as well as through an examination of the faculty members' Web courses. I looked at how the

Web teachers had designed their courses, how much interactivity was evident in the assignments, types of resources they used, and evidence of their Web pedagogy when I examined their Web courses.

### Participant Selection

Since I sought a diversity of experiences and opinions about Web teaching, I selected interviewees for this purposive sample with a variety of backgrounds and experience. Table 3.1 shows this range of diversity.

Table 3.1. *Diversity of Experience and Background of Participants*

Total or partial-Web course	4 total	4 partial
Hard or soft discipline	4 hard	4 soft
Gender	3 female	5 male
Tenure status	4 tenured 2 tenure-track 2 fixed term	
Years of university teaching	1, 3, 3, 11, 17, 20, 29, 40	
Years of Web teaching	1, 1, 3, 3, 3, 3, 5, 5	
Number of own Web courses developed	2, 2, 2, 2, 3, 3, 4, 5	
Web course developed by individual or team?	4 individual	4 team
Web course taught by individual or team?	6 individual	2 team
Studied Web course undergraduate or graduate level?	5 undergraduate 2 combination 1 graduate	
Number of students in partial-Web courses	25, 60, 90, 170	
Number of students in total-Web courses	3, 30, 35, 50	

Four participants were chosen from the university's Website listing of faculty with full Web courses and four from those with a substantial portion of their course dependent on the Web. All eight of the participants were in different disciplinary fields, four in pure or applied science or math disciplines (hard disciplines) and four in the humanities or social sciences (soft disciplines). Three participants were female and five were male. Other elements of diversity among the participants were years of teaching, tenure status, years of teaching on the Web, number of Web courses developed, whether the selected Web course was developed and taught individually or in a team, the level (undergraduate or graduate) of the Web course, and number of students in the course.

### **Data Collection**

Merriam (1988) defined the questions of qualitative research as "those framed to seek understanding and meaning in the data. They are predominately *how* and *why* questions. Research is focused on process more than outcomes or products" (p. 166). Although some researchers advocate totally open-ended and non-directed questioning, McCracken (1988) warned that this not only wastes interviewees' time, but can result in irrelevant material. Using a set of base questions with all interviewees also assures that data are gathered for all initial questions of interest.

I interviewed the participants in a series of three face-to-face interviews: (1) a short initial interview to explain the purpose of the research and gather descriptive data and answers to questions about innovation, (2) a guided tour of one of the participant's Web courses conducted by the participant, (3) and a longer interview to gather information, experiences, beliefs, and perceptions about teaching on the Web. (See Appendix.) Three of the participants chose to combine the first two interviews, and one eagerly accepted my suggestion to use e-mail for the third interview when finding time in her schedule proved difficult. A predictable result of conducting one interview by e-mail was its comparative brevity and absence of any asides or stories typical in face-to-face conversation. Although this interview offered convenience for the participant and the advantage of not requiring transcription, it was not as rich a source of data as the in-person interviews.

Each of the face-to-face interviews was recorded on audio tape. The first interview was used mainly to fill in two charts regarding descriptive data and innovation, although selected comments about Web teaching were transcribed. Since much of the audio portion of the second interview referred to what was visible on the computer screen and was therefore out of context when separated from the video monitor, I transcribed only comments that dealt with instructional design decisions or more general comments about teaching on the Web, and summarized specific course



comments to aid in further examination of the courses. When sections were summarized rather than transcribed I included tape counter designations for ease in locating original source material. I fully transcribed all participants' third interviews and these are the source of most of the quotations included in the discussion of research results. Quotations are identified with the instructor's name followed the number of the interview and line numbers of the transcription. Thus, Peter 3, 128-132 refers to lines 128-132 of Peter's third interview.

### **Interview Settings**

The interviews were conducted in private in the participants' offices, with three exceptions: one participant suggested that our initial meeting be in a coffee shop, and two participants took me to small computer labs for the second interview to show me their Web courses. Among the eight participants, three used Macintosh computers, one used both a UNIX and a Macintosh, and four used Windows®-based computers to develop their Web courses. The two most technologically intensive courses were written in Perl, HTML, and some JAVA. while the other six used HTML and JAVA.

In addition to the in-person interviews, I used e-mail for follow-up questions and clarification when necessary.

## Naming Conventions

Pseudonyms were assigned to all participants to guard confidentiality and to help readers to be able to differentiate among quotations. I decided to use a naming convention that reflects three of the categories of interest: total or partial-Web course, hard or soft discipline, and gender.

The participants with courses developed for total Web delivery were assigned a name beginning with the letter "T," while those with courses partially delivered by the Web were assigned a name beginning with the letter "P." Further, those in pure and applied science or math fields (hard disciplines) have one-syllable names, while those in the humanities or the social sciences (soft disciplines) have two-syllable names. I also assigned participants names that reflect their gender.

Table 3.2 shows the pseudonym system.

Table 3.2 *Pseudonym System*

Pseudonym	Total or Partial	Discipline	Gender
Tammy	total	soft	female
Ted	total	hard	male
Travis	total	soft	male
Thomas	total	soft	male
Paul	partial	hard	male
Pam	partial	hard	female
Peg	partial	hard	female
Peter	partial	soft	male

Use of these three descriptors could mask other significant ones, so I determined to remain open in this regard by looking for other meaningful categories and by sorting emerging themes according to other descriptors from Table 3.1 such as number of years of Web teaching, technical expertise of the Web teacher, and course enrollment.

### **The Analysis Journey**

I first transcribed and marked line-numbered interviews for significant information gathered from the direct questions asked. The annotated interviews were then re-copied onto colored paper, a different color for each interviewee to identify at a glance which individuals (and which categories—male/female, hard *versus* soft discipline, and total *versus* partial-Web teacher) had the most to say about any particular topic. I then cut the marked sections to use in sorting into categories and themes. From this point on I worked primarily with the quotations on the colored strips, sorting and coding them into significant categories and looking for overarching themes. In some cases I made multiple copies of certain quotes which fit into more than one category.

Originally, I coded and separated the quotations into the four broad divisions which had served as the basis for the participant

questions. This made some sense of the data and also allowed me to discard many interesting but peripheral quotations.

Next, I took the coded quotations and began weaving narrative around them. In so doing I found myself abandoning the broader categories and concentrating on distinct topics. The findings grew as I attempted to include all participants' voices and reinforce the importance of various points by stacking quotes.

It was at this point that I turned to my peers for a debriefing, asking them to read the results holistically and question my organization and presentation of the data. In this, my colleagues Janice McMurray, Jean Moule, Sylvia Twomey, and especially Susan Fish were extremely helpful. I found that explaining my rationale, talking about implications, and reflecting with them on what I had learned helped me to step back from the details and see the bigger themes once again. This dialogic and reflective process took me back to my original questions regarding Web teaching, and led me to a reorganization of the myriad of topical details around themes which re-addressed my reasons for undertaking the study: first, a desire to understand the relationship of teaching philosophy, epistemology, and pedagogy to choices about how to teach on the Web, and second, a search for the important elements in a pedagogy of effective Web teaching.

## Trustworthiness

The trustworthiness of a research study in conventional terms is established by internal validity, external validity, reliability, and objectivity. Lincoln and Guba (1985) proposed equivalent measures for establishing trustworthiness within a naturalistic paradigm. They paralleled internal validity with credibility, external validity with transferability, reliability with dependability, and objectivity with confirmability.

A prime way to establish credibility is triangulation, two modes of which are the use of multiple data sources and different research methods (Lincoln & Guba, 1985). In this study a series of three interviews with eight different participants and the actual Web pages making up the participants' courses were the sources of data. Two different methods of collecting the data were interviewing and an empirical examination of the participants' Web courses by the researcher.

Another activity which adds to credibility is peer debriefing, which is "a process of exposing oneself to a disinterested peer in a manner paralleling an analytic session and for the purpose of exploring aspects of the inquiry that might otherwise remain only implicit within the inquirer's mind" (Lincoln & Guba, 1985, p. 308). As mentioned in the description of my analysis journey, I found peer debriefing to be a very helpful activity.

Transferability in a naturalistic study can only be established by providing enough of the context to enable the reader to decide whether or not he or she can equate to and learn from the experiences of the informants. As Lincoln and Guba (1985) say, "the naturalist cannot specify the external validity of an inquiry; he or she can provide only the thick description necessary to enable someone interested in making a transfer to reach a conclusion about whether transfer can be contemplated as a possibility" (p. 316). Some components of thick description include selecting a purposive sample of informants, providing sufficient information about the informants and their contexts, and allowing the informants intentions to be heard through extended and situated quotations. I have attempted to do these three activities.

Dependability (reliability in the conventional quantitative research paradigm) is much more difficult to establish in naturalistic inquiry because it relies on replication of results. Qualitative results based on in-depth interviews with a small group of informants, however, cannot be replicated. An argument can be made that there can be no credibility without dependability and thus it is unnecessary to establish dependability separately (Lincoln & Guba, 1985). A technique which can be used to establish dependability is an inquiry audit. Although this study is not of the scale to demand an inquiry audit, I have retained the audio tapes, transcribed and line numbered interviews, coded quotation

strips, and researcher notes on the analysis and evaluation of the data which could provide an audit trail.

Providing an audit trail is one method of establishing confirmability (Lincoln & Guba, 1985). Other prime sources of confirmability are member checks (verifying intent and accuracy with participants) and confirmation of findings by experts within the same field. Feedback from the participants after reading the results chapter confirmed that I had accurately represented their views, and only one minor correction was made to my assessment of the components of the Web courses. I also sought feedback and confirmation on the findings and conclusions from my major professor, Dr. Mark Merickel, who has developed and taught more than ten Web-assisted and Web-only courses, including one which placed in the top ten in an international competition in 1998 sponsored by the Paul Allen Foundation.

In the chapter which follows, I have allowed the participants' words to describe their experiences and thoughts, with only brief summations or analysis at the end of sections. The quotations were chosen because they seemed to best represent the various participants' Web teaching ideas and practices. In doing this, many similar but redundant quotes were discarded, leaving those which seemed to be the most cogently or articulately phrased to represent a particular idea. I was encouraged in this culling by Wolcott's admonition: "The critical task in

qualitative research is not to accumulate all the data you can, but to 'can' (i.e., get rid of) most of the data you accumulate" (Wolcott, 1990, p. 35).



## WEB TEACHERS ON WEB TEACHING

### Introduction

This chapter introduces and illustrates the major themes which surfaced in an analysis of the interviews and Web courses of eight university instructors and professors. The chapter is broadly divided into four major areas:

- an overview description of the Web teachers, their courses and the institutional environment
- a second section which addresses Web teacher identity and roles, motivations for teaching on the Web, and how these Web teachers learned to teach on the Web
- a third section which discusses the nature of a university education and the role of Web teaching in the university
- a final section which includes participants' ideas about how the Web environment supports student learning and discusses necessary elements in an effective Web pedagogy

The study participants teach undergraduate and graduate-level Web courses in eight different disciplines at a single land-grant state university. The group consists of two instructors, two tenure-track professors, and four full professors; consequently, I generally chose the

generic term “teacher” rather than distinguish between instructor and professor.

In order to maintain a connection between speakers and comments and still maintain confidentiality, the participants in this study were assigned pseudonyms which reflect certain characteristics. Thus, the four professors or instructors who were chosen for their Web-only (i.e., courses that are Totally delivered over the Web) courses have names beginning with the letter “T,” while the four who taught Web-assisted (i.e., courses which are Partially delivered over the Web) courses have names which begin with “P.” In addition, teachers from pure and applied science or math fields were assigned one-syllable names, while those in the social sciences or liberal arts were given two-syllable names. The pseudonyms also reflect the actual gender of the participants.

Although I generally let the participants’ words speak for themselves, the reader may find it helpful to keep the following overarching questions in mind since these have guided my organization of the data as well as the subsequent interpretation and implications which are discussed in Chapter Five.

1. Does teaching on the Web influence one’s teaching philosophy, epistemology or pedagogy?

2. In examining reasons Web teachers give for their beliefs or actions, which of these basically reflect teacher-centered interests and which are focused on student interests?
3. What unique aspects of teaching and learning in a Web environment support a new pedagogy?
4. What are the elements of an effective Web pedagogy?

### **Web Teachers, Web Courses, and Institutional Environment**

In order for readers to gain a clearer understanding of the Web teaching situation of the participants, I have placed this section which compares the Web teachers and their courses and contextualizes these within the institutional environment at the beginning of this chapter. Since this section provides an overview of the participants and their courses, it should provide readers some background for understanding and evaluating the subsequent sections.

#### **Comparing the Web Courses and the Web Teachers**

Aspects of the participant's Web courses and how they were developed are summarized in Table 4.1. A few interesting patterns can be discovered by examining the table, however, with only eight participants,

no generalizations can be made to the larger population of university Web teachers.

Table 4.1 *Aspects of Participants' Web Courses*

	Tammy	Ted	Thomas	Travis	Pam	Paul	Peg	Peter
face-to-face meetings?	0	2 exams	1	0	regular schedule	regular schedule	regular schedule	regular schedule
textbook?	no	yes	yes	no	yes	yes	yes	yes
password protected?	no	portions	no	portions	no	no	no	no
class e-mail?	yes	yes	yes	yes	yes	yes	yes	yes
# of students in selected course	3	25	35	50	90	170	30	60
undergrad or graduate course	G	U	U	U	U/G	U	U	U/G
self or team developed?	team	team	team	team	self	self	self	self
self or team taught?	self	team	self	team	self	self	self	self

Two of the total-Web course teachers had no face-to-face meetings with class members, a third Web teacher had a single, 50-minute orientation meeting, and the fourth had no class meetings, but required students to take proctored exams. None of the partial-Web course teachers used the Web portion of their course to substitute for regularly scheduled class meetings. Although one of the partial-Web teachers made it clear to students that they did not have to attend lectures and could

read the material on the Web, he nevertheless gave regular lectures and reported that few students skipped them. (Paul 1<sup>1</sup>, 129-130)

All of the Web-supported courses and two of the Web-only courses required a textbook in addition to the Web pages.

The two most technically sophisticated Web-only courses had password protected portions of their Web courses, with just certain sections accessible to public viewing. All of the other Web courses examined had no password protection and were freely available to anyone surfing the Web in addition to class members. As Tammy insisted, however, her Web course was in many aspects essentially a content outline, and the true substance of the course was in the feedback and interactions with teacher and fellow students (Tammy 2, 118-119).

Other interesting patterns can be seen in Table 4.1. First, the Web-only classes generally had lower student enrollment than the partial-Web classes. Although this could have been pure chance, in at least one case it was planned. One of the Web-only teachers indicated that she would never have a large enrollment for two reasons: (1) it is a capstone-type, graduate-level course, and (2) she limited her initial offering of the Web course to a maximum of ten students and had decided that she would never allow the

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<sup>1</sup> Quotations and references to the interviews are identified by the participant's pseudonym, the number of the interview, and the line numbers of the transcribed interview. Thus Paul 1, 129-130 refers to lines 129-130 of Paul's first interview.

numbers of students to be so large that she could not have sufficient online dialogue with each. (Tammy 1, 222-229)

Another notable pattern is that all of the Web-only teachers collaborated with others in developing their courses, while the partial-Web teachers developed their courses on their own. Also, while most of the courses were taught by the individual instructors, two of the Web-only courses were partially team taught, using colleagues to share in responding to and giving feedback to students.

Table 4.2 shows a relative comparison of five aspects of the study participants and their Web courses: (1) the level of technical expertise of the participant, (2) Web teaching experience, as judged by a combination of years of Web teaching and number of courses designed and developed, (3) the complexity of the course as reflected in navigation and levels, (4) the amount of student/teacher interactivity supported by e-mail or Web assignments; and (5) the amount of student/student interactivity supported by e-mail or Web assignments. Participants were placed on a continuum from low to high. Grouped names separated by commas indicate minor qualitative differences within the grouping. The order and location on the chart reflects the researcher's weighting and perspective. No absolute scale is implied.

Table 4.2 *Relative Comparison of Participants and Web Courses*

	LOW	HIGH
1. technical expertise	Thomas Tammy Peter Paul Peg, Pam, Travis	Ted
2. Web teaching experience	Peter, Tammy, Thomas Pam, Paul Peg Ted Travis	
3. Web course complexity	Paul, Peter Pam, Tammy Peg, Thomas Ted, Travis	
4. online student-teacher interactivity	Peg, Pam, Peter, Paul <i>e-mail</i>	Thomas, Tammy <i>e-mail</i> Ted <i>e-mail, dyads, small group, whole class</i>
5. online student-student interactivity	Paul, Pam, Peg, Peter <i>little or no group work</i>	Thomas <i>e-mail</i> Tammy, Ted <i>e-mail, dyads</i> Travis <i>dyads, small group, listserv</i>

Table 4.2 was developed to aid in discovering patterns rather than to compare individuals in some competitive manner. Since the names indicate gender, hard versus soft disciplines, and total versus partial-Web courses, the chart can be examined for patterns in each of these areas.

Two pre-research gender-based suppositions were that females might exhibit less technical expertise, Web experience, and resultant Web course complexity (items 1-3) and that females might emphasize cooperative work (Belenky, Clinchy, Goldberger & Tarule, 1986; Tannen, 1990) and interactivity in their courses (items 4 and 5) more than males. Although the same two males dominate the high end of the chart in all categories, no gender-influenced pattern is evident among the remaining participants in any of the categories. In fact, the three females in this study, being innovators and early adopters of Web technology, may share

similar characteristics with their male counterpart innovators. It will be interesting to see if teaching pedagogies change as more mainstream female faculty begin Web teaching.

There are some minor patterns evident within discipline areas. With one exception, the participants with the highest level of technical expertise and the most Web teaching experience are all in pure or applied science disciplines. There is no pattern within hard or soft disciplines, however, when comparing Web course complexity or student/teacher and student/student interactivity.

By dividing the participants into partial-Web course teachers and total-Web course teachers, some interesting patterns can be seen. Although it might be logical to assume that those teaching Web-only courses would have greater technical knowledge than those teaching Web-supported courses, this was not the case with this group of Web teachers. In fact, technical expertise ranged from novice to expert across the entire group of eight participants, with two of the total-Web course teachers being the most technologically inexperienced, followed by the four partial-Web course teachers with increasing levels of technical expertise, and culminating with considerable experience and technical knowledge in the remaining two total-Web course teachers.

In the area of Web teaching experience (item 2), there is no pattern that would distinguish partial-Web from total-Web teachers. In Web



course complexity (item 3) and amount of student/teacher and student/student interactivity supported by electronic means (items 4 and 5), however, there is a clear difference between partial-Web course teachers and total-Web course teachers. These are predictable differentiations and reflect how the two groups have chosen to use the Web for instruction: as a supplement or as an alternative to face-to-face teaching.

### **Institutional Environment**

It is important to describe the institutional and collegial environments within which these Web teachers developed their Web courses and their approach to Web teaching since these environments provide the background for their actions and decisions. Support and encouragement, neglect, and institutional obstacles were all a part of the reported experiences of the Web teachers who participated in this study. Since participants were sometimes critical of their departments or the university, identification of speakers has been omitted in this brief overview of the institutional environment in order to protect confidentiality.

Examples of indifference, opposition, or support. All eight participants experienced institutional indifference or resistance at some

level: department, college, or university administration. One of those who experienced indifference expressed it this way:

I've been free to do whatever I needed to do with my classes, but my colleagues haven't really . . . evaluated it as of yet. But I don't feel as though I've been hindered in any way. . . . Ignored? I think so, but not from a negative standpoint. They don't surf the Web.

Another who talked of being ignored said somewhat indignantly, "No one cares enough to even go look [at the course]. You're trying to do something innovative, you're working, and they don't even care enough to access the site." Yet another participant declared that he was "very supported by students, [but] much less supported by the administration." He felt he was, in fact, "ignored . . . at the highest levels."

Some spoke not just of indifference, but of resistance to using the Web as a teaching medium. For instance, one said there was "a lot of controversy in the department, concern over whether or not technology is a responsible way to teach." Another admitted, "There was no support [from the department head] or at the college level, in fact [that was definitely] one of the hindrances." A third Web teacher made the assertion that, "There's no reward on this campus for doing the very thing that they claim they want to do, which is distance education."

Non-support was shown more tangibly for some of the participants by a lack of resources and essential equipment. Two of the participants had to purchase their own computers in order to develop their Web

courses. As one explained, "...my computer in my office could not even handle *Windows*®. So I ended up buying my own computer at home in order to do the work." Downplaying personal money spent for computer hardware, the other asserted that the most practical approach to developing a Web course was, "Don't wait for the money, just do it," because money for hiring a programmer or a secretary to type the material would be likely only through a grant.

In fact, three of the participants did receive some grant money for Web course development which enabled them to buy out some of their own time or hire graduate student programmers or professional help from the media center. One of those who received help from the university media center admitted, "I could not have done it without the workshops that were available. . . . I started out not knowing anything, so I could not have done it without their help."

Though there was only occasional backing from departments, colleges or the university, support and encouragement from colleagues and peers was a different matter, with nearly all of the participants reporting having received moral or technical support from particular colleagues in their own departments, across campus, or at other universities. As one explained, "I usually turn to [Web teachers in other departments] for help or for sharing ideas. Even the idea of Web pedagogy—I didn't even know really what that was until [a colleague

across campus] started talking about it.” Another told of encouragement from peers at other institutions. “I’ve also had a lot of moral support from colleagues at other universities. “This is great that you’re doing this. We need more of these. Once you get it up and going, let us know.” Praising input from two colleagues, a third Web teacher declared, “It was a great group effort! It’s my course. I thought it up. I did it. But their input [was] essential!”

One new professor told of arriving at the university and finding material for a course he was assigned to teach “already . . . up and running on the Web,” so he decided that “with all of the technology available . . . around here, it just seemed . . . to make sense to continue with that tradition and use it as an opportunity . . . to learn how to do it.” Nevertheless, this same professor remarked that although there was approval and support for using the Web as a supplement to face-to-face teaching in his college, there was “a high degree of resistance to making [Web teaching] replace face time with faculty.”

Sources of resistance to Web-based instruction. Some of the Web teachers in this study sought to identify sources of resistance to Web-based instruction that they perceived. One identified three possible reasons: historical assumptions (“A lot of people are very resistant to this type of teaching. And I think it’s a holdover from the old correspondence courses”), the fear that if they acknowledged the efficacy of Web teaching,

teaching via the Web might be expected of unwilling faculty, and a feeling of being overwhelmed (“So many people are frustrated because they have to do everything, all from scratch”).

Rogers (1995) describes four major attributes of innovations which affect their adoption:

- compatibility—“the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters” (Rogers, 1995, p. 224)
- complexity—“the degree to which an innovation is perceived as relatively difficult to understand and use” (Rogers, 1995, p. 242)
- trialability—“the degree to which an innovation may be experimented with on a limited basis” (Rogers, 1995, p. 243)
- observability—“the degree to which the results of an innovation are visible to others” (Rogers, 1995, p. 244)

The reasons for faculty resistance cited above by the Web teacher seem to be best interpreted within Rogers’ categories of compatibility, complexity, and possibly trialability. Regarding the aspect of complexity, Siegel (1997) noted, “Many faculty are reluctant, or even resistant, to the adoption of any aspect of an instructional technology infrastructure because they perceive it as too difficult or complicated to learn and use” (Siegel, 1997, p. 6)

Another Web teacher noted two additional sources of faculty uneasiness with moving toward Web teaching. Reflecting that one source of opposition to Web teaching may be rooted in academic and social elitism, he related:

A colleague of mine . . . made this observation that what she sees is that when people are making these embittered objections to distance ed [including Web courses], that she always detects a tone of gender and race bias and economic status. . . . I understood exactly what she was talking about, because it goes back to that thing of, "Well, what if everybody could get a degree? What good would it be?"

He further observed that in Web courses you may "end up dealing with giving the student more control and more autonomy. And I think a lot of people are just rebelling against their instincts that they're losing control." This notion was corroborated by Woodlief (1997) when she noted the effects of incorporating online dialogue and interactive document creation into a course.

The usual power model of the classroom changes dramatically as student "voices" are heard more distinctly, and many teachers, even those most committed to a more collaborative, decentralized, and "democratic" class, find themselves challenged far more than they had expected. (Woodlief, 1997, pp.1-2)

Another of the Web teachers gave his opinion that Web-based instruction "should be integrated into the entire university. And it shouldn't be Web-only versus face-to-face teaching. It should be, 'Here's a tool, let's learn it.'" Nevertheless, he admitted that faculty buy-in didn't exist because "the ownership of [Web-based instruction on this campus]

has never gone to the teaching force, our faculty. And with that as a backdrop, [there isn't] a whole lot of chance for success." Finally, summing up the environmental situation and referring to non-acceptance of Web teaching within the academic community, another Web teacher reflected, "you can't do any of this kind of stuff until the culture changes. And there are great blocks to changing the culture."

Summing up this section on institutional environment, except for the new professor who arrived to find the structure for a Web-supported class already in place, all of the other Web teachers in this study perceived either resistance or indifference to their Web teaching efforts from some of the faculty in their departments, their department or college heads, or the university administration. The resistance or indifference they encountered, however, was not strong enough to deter any of them from using Web-based instruction. In fact, when asked directly, every one of the participants considered themselves to be innovators or early adopters of Web teaching and seemed to pride themselves on their creativity and independence. This is consistent with the characteristics of early adopters described by both Rogers (1995) and Geoghegan (1994). (See Table 2.3).

Some of the opposition was to Web-only teaching rather than to Web-assisted teaching. Three of the four partial-Web teachers expressed personal and pedagogical reasons for not teaching in a Web-only context,

and one of these noted that the feeling against Web-only teaching was common among the faculty in his college.

### **Teaching on the Web**

This section of the chapter deals with various aspects of teaching on the Web: teacher identity and roles and to what extent these change between face-to-face teaching and Web teaching, why this group of teachers has chosen to teach on the Web, and how they learned to teach on the Web.

#### **Teacher Identity and Roles**

Intriguing distinctions arise when analyzing the perceived differences between face-to-face and Web teacher identities and roles. The four teachers who use the Web to supplement their face-to-face teaching did not distinguish between their Web teacher and their face-to-face roles or identities. Indicating that his role as Web teacher was indistinguishable from his face-to-face role, Paul declared, "Face-to-face Web teaching is what I do" (Paul 2, 234). Focusing more on identity, Peter reflected, "My persona is not any different, I don't think, from what they see on the Web or what they see in the classroom" (Peter 3, 430-431). Pam expressed thoughts similar to Peter's. In Peg's case, while she perceived her identity to be basically the same on the Web or face-to-face,



she noted that student feedback indicated that she was “hard to approach” (Peg 3, 294-295) because of her formal academic lecture style. She explained that students “find it easier to e-mail me on the Web than [ask questions] in the classroom” (Peg 3, 278-280).

The teachers of Web-only courses, on the other hand, did perceive a real difference between both their identities and their roles as face-to-face teachers and Web teachers. Both Tammy and Thomas indicated that the Web environment hindered an expression of their authentic selves.

Tammy lamented:

I don't think my personality comes through on the Web as it does in face-to-face teaching. I think that sometimes with face-to-face teaching you can more easily relay enthusiasm for a subject matter, which is then typically contagious. . . . That's much more difficult on the Web, because it's just written. (Tammy 3, 494-500)

As Thomas put it, “I have more fun on a face-to-face basis in terms of just kind of interacting with the students. . . . And maybe [I'm] . . . a little more formal on the Web” (Thomas 3, 373-376).

When asked about any differences in his identity, Ted responded, “There's no question about [there being a difference. On the Web] I'm sort of the anonymous face behind the thing” (Ted 3, 940). Later Ted made the point that, unlike in his face-to-face classes, his Web course allowed students to see him in a role and identity that they might not otherwise recognize: that of an author.

They get to know two different sides of me. . . . They see me communicate on the Web [through e-mail feedback] and they see me as an author [of the Web pages], which is a different view than as just the reciter. So I think it has changed the relationship, and I think probably for the better. (Ted 3, 999-1004)

Three of the Web-only teachers commented on their changing roles from lecturer/expert in their face-to-face classes toward that of mentor, coach, and co-learner in their Web classes. "I think you really are more of a coach than a lecturer on the Web, in a Web-only class," observed Ted. (Ted 3, 944-945). "I think I'm more mentorish on the Web and more authoritative in the face-to-face. Well, that fits the medium. I'm more hierarchical face-to-face and more *heterarchical* on the Web," said Thomas. (Thomas 3, 410-412). Moreover, although Thomas felt that he had always had a coaching style of teaching, he stated that teaching on the Web had further "refurbished, reactivated or reaffirmed" (Thomas 3, 489) his facilitative role. Similarly, Tammy was pleased that the online dialogues in her Web class had engendered a true learning community and readily admitted that she "enjoyed it a whole lot more because [she] was much more engaged [and] was really being a learner as well throughout the process" (Tammy 3, 272-274).

In summary, the partial-Web teachers felt that both their face-to-face and their Web teacher roles and identities were the same. The Web-only teachers, on the other hand, felt that their full personalities were

not evident on the Web. They also experienced a shift in roles from primarily lecturer/expert in the classroom to author of Web pages and mentor, coach, and co-learner when teaching on the Web.

### **Why Teach on the Web?**

One of the main purposes of this study was to discover faculty motivations for choosing to teach on the Web. Some of the reasons given by the participants will be explored later in greater depth in the context of various aspects of Web practice and Web pedagogy.

When asked directly, this group of teachers identified a variety of reasons why they taught on the Web—some personal, some practical, and some pedagogical. Enjoyment and creativity were major motivators, as voiced here by Pam, Peter, and Thomas. “It’s fun for me and fun for the students” (Pam 3, 43). “There’s something fun and creative about it for me” (Peter 3, 97-98). “Bottom line, real heart-felt reason? Oh, I think just to do something that’s different” (Thomas 3, 151-152).

Thomas, Peter and Ted mentioned other personal reasons. Thomas reported that part of his motivation to teach on the Web was “to get ahead of the curve” (Thomas 3, 152) in an emerging technology. Peter noted that creating his Web pages helped him plan his class better. “There’s something very organized about it, I think. . . . It forces me to be orderly” (Peter 3, 98-104). Ted focused on the temporal freedom afforded

by asynchronicity. "I think part of my motivation is personal. . . . It gives me the freedom [in my schedule] that I need to do some of the other things that I do" (Ted 3, 592-606).

Nearly every participant noted practical or cognitive benefits to students as a motivator to teach on the Web. Although seven of the eight examined courses had a majority of on-campus students, the possibility of reaching students at a distance was important, even to those who used the Web to supplement their face-to-face teaching. Peg stated, "Essentially, I feel I can reach out to more students and more people" (Peg 3, 140-141). Paul, too, mentioned the convenience of having his lecture notes on the Web for students who cannot attend class. "I've had students who've written thank you notes saying, 'Thanks for having that available. I didn't have to come in. I didn't feel good'" (Paul 2, 133-135).

Tammy had the only course in which a majority of students were enrolled off-campus, and she admitted that this was her major motivation for developing a Web-only course.

The primary reason was that I wanted this to be a distance course. And that this provided a vehicle to do that—it provided a logical vehicle to do that, much more so than other technology for distance, like EdNet or other kinds of things. The course lent itself to this type of technology for distance. (Tammy 3, 228-232)

Other benefits for students were listed. Peter stressed the importance of student access to materials and resources, stating, "if they lose the syllabus they can print it right off. They have easy

access to drop me a note. . . . There's just a way that they feel like they're given as much of the resources that they need" (Peter 3, 120-123). Stating her belief that "no professor can give a student every single bit of knowledge that he or she needs—especially in these large-enrollment classes" (Pam 3, 160-162), Pam commented that the material she made available on the Web allowed her students to "teach themselves" (Pam 3, 45). Peg, who has long relied on slides, images and overheads in her face-to-face teaching, mentioned that an additional motivation for Web teaching for her was that it provided an inexpensive means to make her visuals available for students (Peg 3, 4-5).

An additional motivator for Peter was the allure of making polished presentations using an innovative technology that students might encounter in their careers.

There's a kind of polish that goes with the course in doing it this way that I think makes students, as the consumer, more confident that they're getting a quality kind of thing. Again, if it's done badly then it's a total reverse effect, but I think they perceive that they are being sort of brought up to speed with the technology, and at the same time being treated somewhat professionally by the teacher in that way. (Peter 3, 112-118)

Finally, citing actively engaged students as the ultimate goal of student learning, Ted declared, "I think that ultimately I teach on the Web because I feel that combining the Web with lectures and with other things is the most effective way to reach the most

students. It gets my students to work more. It gets my students involved more" (Ted 3, 592-595). Woodlief (1997) concurred, stating, "For teachers who are convinced that students learn to think better by writing and responding critically to the course materials and to each other's written responses, . . . the Web offers an unequaled tool for facilitating student-centered discussion" (Woodlief, 1997, p. 1)

Although the reasons for teaching on the Web have been addressed above through representative quotes and in some subsequent quotations, the reader may be interested in a summary table which arranges the reasons by order of frequency. The names of the participants who mentioned each of the reasons have been included so that the relative overt importance of the various motivations of this group of Web teachers can be judged visually. Nevertheless, readers are cautioned against assuming that because a particular individual did not mention a specific reason, that it is not part of his or her motivation or interest in Web teaching. Although a Web teacher might agree to particular reasons for teaching on the Web if shown a list, it would be unlikely for all of these motivations to surface during open-ended interviews.

It is interesting to note that the majority of these reasons are primarily teacher- and teaching-centered. Student-centered,

constructivist reasons for teaching on the Web are most strongly evident in reasons 4, 5, 11, 12, and 13.

Table 4.3 *Reasons for Teaching on the Web*

	REASON	MENTIONED BY
1.	curiosity and creativity, i.e., to explore a new and interesting teaching medium	Tammy, Ted, Thomas, Travis Pam, Paul, Peg, Peter
2.	to make professor's notes, explanations and ideas available to students	Tammy, Ted, Thomas, Travis Pam, Paul, Peg, Peter
3.	to connect to outside and up-to-date resources	Tammy, Ted, Thomas, Travis Paul, Pam, Peg, Peter
4.	to provide a vehicle for asynchronous reflective dialogue	Tammy, Ted, Thomas, Travis Peg, Peter
5.	to provide a convenient way for all students to ask questions or make comments	Tammy, Thomas Pam, Peg, Peter
6.	to give instructor flexibility in teaching schedule	Tammy, Ted, Thomas, Travis Peg
7.	to serve distant students	Tammy, Travis Paul, Peg, Peter
8.	to disseminate knowledge to non-class members	Tammy, Travis Peg, Peter
9.	to make sure essential content knowledge for which students are responsible is available	Ted Pam, Paul, Peg
10.	to make slides, graphics, and images readily available to students	Pam, Paul, Peg
11.	to support multiple ways of knowing and learning	Ted, Travis
12.	to facilitate dyad or small group learning	Ted, Travis
13.	to facilitate autonomous learning	Travis Pam
14.	to organize and professionalize professor's lectures	Peg, Peter
15.	to be up-to-date, on the cutting edge	Thomas Peter
16.	to give instructor flexibility in office hours	Travis Pam
17.	to provide prerequisite background knowledge	Peg

## Learning to Teach on the Web

The participants in this study used various combinations of experimentation, reflection, observation, and emulation to develop their style and approach to Web teaching. By necessity, those who began developing Web courses as Web technology was initially being developed were innovators and experimenters in the same sense that Rogers (1995) describes innovators. As Travis declared, he learned by “error and trial. There was no[thing] else” (Travis 3, 272). Ted echoed this, saying, “Basically we learned it by the seat of our pants at the start. But with intentionality. I mean we didn’t ever go into this saying, ‘Oh, I’ll just put some stuff up on the Web” (Ted 3, 251-254).

As one of the earlier adopters of Web teaching in this study, Ted’s story of how his Web course was developed is outlined here. He talked openly about technological problems as well as pedagogical challenges and satisfactions. He described how he and a colleague had been looking for a way to teach a crucial prerequisite course in a way that more students would pass it, stating that they

realized there were some things we could do with the Web that were just not feasible in a classroom setting. So, this was written as a Web-only experience in an attempt to actually teach better. One of the things that we realized from the outset that we could do is include a lot more active learning, a lot more interactivity than you can in a classroom setting, which tends to be, especially in large lectures, extremely passive. (Ted 2, 73-78)



Ted related that he and his colleague had examined their understanding of the subject matter, the technology, and education, and realized that an integration of the three might help them discover possible pedagogies for teaching their course on the Web (Ted 2, 99-102). He gave an example, explaining how the technology available on the Web had allowed them to simulate real-world complexity and uncertainty in a way that was impossible in a textbook.

One of the things that we came up with is implementing the black box function. . . . The idea is that there's a function that really is unknown, that you can put in a value and get an answer back, but you really don't see the function. . . . And just the fact that we could use the technology to accomplish some pedagogic goals, that's really what we're most proud of. . . . And it is effective; I mean, it works! (Ted 2, 103-110)

Going on to talk about some of their frustrations regarding the technology as he and his colleague were first putting the course together, Ted admitted, "Half the things didn't work. We ended up with blank pages on a lot of browsers. The issues were enormous. It was definitely a pioneering effort similar to cutting down the trees, going into the forest, not knowing the route" (Ted 2, 114-117).

Finally, describing the process of dialogue and reflection he and his colleague engaged in to shape their Web course, Ted observed:

I'm not sure that I really have [learned how to teach on the Web]. I mean the simple answer is by experience, but from the very start we spent a whole lot of time thinking about it. In fact, . . . we decided very consciously to throw out the pedagogic techniques that we'd been using, and to say,

‘What can we do with this medium?’ . . . I don’t think that we went all the way over, and to a large extent a lot of the tools weren’t there, but we essentially learned by thinking about things. (Ted 3, 148-158)

In contrast, Tammy developed her Web course nearly a year later when there was growing interest in using the Web for teaching. Tammy explained that she joined newly developed “workshops . . . and did a lot of exploring. Spent time just looking at different people’s Websites and kind of surfing the Web . . . looking at what other people had put on the Web” (Tammy 3, 48-51). Then she “participated in a Web-based conference on Web-based teaching. . . [which] provided . . . a much better framework of how to classify various kinds of Web instruction, and where [her] class fit in” (Tammy 3, 71-80). Like Ted, Tammy remarked that she had spent considerable time thinking about the Web medium and discussing with colleagues how to best utilize the Web for teaching.

The role of reflection was huge! I remember a colleague and I, after each of the workshops, we’d get lunch and we would . . . just talk things through. . . . I still had not in my mind this framework of how you organize a class on the [Web]. . . . I still had not quite figured that out and it really did take some time for reflection of not thinking linearly. . . . That took some . . . reflection time of what I really . . . wanted it to be, and the purpose of it. (Tammy 3, 53-63)

Thomas also indicated that he frequently thought about his Web course. “I think about [how to best utilize the Web] all the time. And that’s one of the reasons for this particular revision that’s being undertaken now. And whenever I do projects with the students,

especially non-Web projects, I'm thinking, 'How could I put this on the Web?'" (Thomas 3, 52-55).

The partial-Web course teachers, on the other hand, seemed to be less concerned with specific Web pedagogy than the total-Web course teachers. With the exception of Peg, who observed, "I think it's a little egocentric to think you know how to teach on the Web" (Peg 3, 12), the partial-Web course teachers tended to focus more on technique and technology. When asked how she had learned to teach on the Web, Pam answered that she had learned mainly by looking at other's Websites and downloading their source code, as well as looking specifically at content, page design, graphics and backgrounds (Pam 3, 18-24). Both Peter and Paul indicated that they had taught themselves "just by doing it" (Peter 3, 25). Furthermore, both stated that they didn't look at source code on other Websites (Paul 3, 12; Peter 3, 26).

The partial-Web course teachers used the Web while lecturing in their face-to-face classes and as a resource supplement to their in-class teaching, which might help explain why their Web teaching concerns were more mechanical and tool-oriented than the Web-only teachers, who were concerned with setting up and facilitating an effective teaching and learning environment entirely within the confines of the Web and the Internet.

Time and complexity. Designing and implementing Web courses takes considerable up-front time. Ted voiced an opinion about the time involved that seemed to sum up the feelings of all of the participants, “[Face-to-face teaching], from my own point of view, requires a whole lot less preparation [than Web teaching]” (Ted 3, 651-652). As Paul said, “I do spend a lot of time thinking about formatting and laying things out that I wouldn’t otherwise have to do. If I were just to give a cold lecture with figures and let students write down as fast as they could, . . . that would change how I do things” (Paul 3, 185-191).

Compared to a Web-assisted course, the instructional design of a Web-only course generally involves more complexity and requires more development time. Pam pointed out the necessity of “anticipat[ing] all kinds of learning styles” (Pam 3, 118), while Paul focused on the need to incorporate interactivity when developing a Web-only course.

My feeling is that if you want to make a purely Web-based teaching course, there’s a hell of a lot more considerations that you have to make than what I have done in mine, because I have that contact element. If you’re going to do solely Web-based teaching I think that you have to have things far more interactive than I do. (Paul 3, 171-176)

Talking about the complexity of developing Web-only courses, Travis remarked, “The truth is, even now, that the number of completely online courses is still pretty small. And that blows me away! And [a colleague’s] comment on that is, ‘Well, that just shows how hard it is.’ Well, that’s true” (Travis 3, 281-284).

Despite the up-front development time, however, the Web teachers experienced certain freedoms as a result of having the structure of the course in place before the first class session. As Tammy commented, “Definitely [there is] complexity up front in a Web-based course, however, . . . once it was on the Web, then in the teaching I didn’t have as much prep time each week” (Tammy 3, 539-541).

### **Where Does Web Teaching Fit in a University Education?**

This section recounts questions raised by the participants about the nature of the university experience and what might be lost in a completely online education, presents some of their ideas in the ongoing dilemma over the necessity of face-to-face interaction, and puts forth the participants’ predictions about the future of university Web-based teaching.

### **What is a University Education?**

Five of the eight participants struggled with the idea of an education delivered totally over the Web and whether it could or should replace a traditional on-campus college education. As Ted asserted, “The experience of going to a university is not simply taking a collection of classes” (Ted 3, 572-573). Peter emphasized the differences between a campus-based and a Web-based education.

It's not that I think it's a bad thing. We've just got to recognize it's not the same thing as a traditional college education. And if all we want people to have is degrees and allegedly some corpus of knowledge, I think we can deliver that . . . , but essentially it's a correspondence course. . . . I think it's the interpersonal kind of stuff [that] really just adds a lot more— and not just interpersonal student-teacher, but student-student. And so I think we need to not so much decry [a Web-delivered education] as the worst thing that could ever develop, but just recognize that it's a different animal, and not try to pretend that we have to create it to be the same thing. (Peter 3, 860-871)

Travis indicated that he “would not be happy to see education go 100% to online methods” (Travis 3, 820-825). Ted felt similarly about a completely Web-delivered education, asserting:

I don't think that totally online courses are as effective, or as appropriate as a mixture of everything from . . . traditional lectures to field trips to labs to—, I mean, there's a whole spectrum of views into a particular pedagogic experience. And I don't think that if you get only one of them . . . you're going to be as effective as if you get two, and I don't think you're going to be as effective if you get two as if you get three. (Ted 3, 522-528)

Tammy expressed her concerns about a totally distance-delivered education, focusing on the problem of developing oral communication skills in students.

Many of these students are wanting to be instructors, and . . . oral communication skills are very important. . . . I wouldn't want our whole graduate program to be like this because I think there'd be areas [where] our students would be really lacking. (Tammy 3, 648-654)

She also pointed out that students would miss “some real positive things about that feeling of connection with the university, with the traditions, and with just being a part of campus life” (Tammy 3, 342-344).

Because if they’re shopping around, if they don’t feel any connection with one university over another, then they’re going to be just taking courses here and there that may fit into a package, but may not. And I think that that’s not good for the student. (Tammy 3, 348-351)

Moreover, as she admitted, “retention of students will be terrible” (Tammy 3, 347-348).

Tammy also shared her impressions about where distance education fits into the curriculum of a university, and especially about questions of the quality of distance-delivered courses.

I think there is still an uneasiness among higher education [faculty] with distance education . . . because we tend to view our identities as campus-based. . . . And so . . . there is a skepticism in terms of the quality of . . . how [distance] delivery can work. . . . Even though we don’t have all that much quality control of coursework on campus, there’s still a view that quality control would be much more lax with distance [delivery]. (Tammy 3, 313-331)

Concentrating on the outcomes of a university education, rather than the location or delivery methods, Ted stated, “What the university has to do is figure out what we’re actually marketing. And this is where I think the world will have to change, and should change in response to distance education” (Ted 3, 563-565). “What we need to start doing is thinking . . . of our programs in terms of outcomes and in terms of what it is that we’re actually giving a student” (Ted 3, 570-572).

Emphasizing the validation possible from tracking student outcomes, Tammy predicted, "There will be less scrutiny of Web-based courses, less questioning of the quality of Web-based courses as it matures and as we have some outcomes information" (Tammy 3, 102-105).

Again focusing on how outcomes are measured, Ted commented:

All the research in distance learning shows that, according to standard measures of performance, classroom instruction does not hold an advantage over distance instruction. . . . I am perfectly willing to believe . . . that if I give a standard multiple choice test, or even kind of the typical essay tests . . . to students who have studied Tolstoy over the Web and Tolstoy in a lecture room, that they'll be about the same. I'm not willing to necessarily believe that the conceptual process that those students have gone through is the same. And that's something that speaks to the inadequacy of our assessment, not to the robustness of distance learning. (Ted 3, 493-505)

Is face-to-face necessary? There was a noticeable difference in the Web teaching philosophies voiced by the teachers who taught or were currently designing Web-only courses and those who used the Web as a supplement to their face-to-face teaching. While the total-Web teachers believed that they could structure high quality learning experiences completely online, those with partial-Web courses were insistent on the importance and necessity of face-to-face interaction with students. Paul, for instance, asserted, "I think that face-to-face teaching is an absolutely essential component to Web teaching, to be honest with you. And part of



that is that students see how I go through the notes, how I do things, what things are emphasized, and so forth. That human element is critical” (Paul 3, 161-164). Peter concurred, noting his belief that “more quality teaching comes when you have to be face-to-face with people because there’s more to teaching than just communicating words or ideas” (Peter 3, 203-206). Furthermore, Peter stated

I have not used it to replace me, and that’s a genuine decision. . . . I feel no peace about saying, “Well, we’re going to cancel class for an hour this week because you see everything that I think here on these notes. Just read them and then go to work.” I really feel like the [face-to-face] connection between student and teacher is pretty important for them to actually learn. I think they catch on more that way. (Peter 3, 337-343)

Pam affirmed the importance of “look[ing] into the faces of your students and judg[ing] whether or not they are actually receiving and digesting the material. Are they bored? Excited? Intimidated?” (Pam 3, 146-148). Pam also declared, “I like the face-to-face because of the spontaneous questions and discussion that comes from the students. I like cracking jokes in class and getting a reaction right away. I like hearing the oohs and ahhs when I put up a really cool Website or do something cool with *PowerPoint*®” (Pam 3, 107-111).

Although Paul and Pam both felt strongly about the need for face-to-face interaction, they were each working on Websites where they would have limited or no direct involvement with students. Paul noted

that he was negotiating with a publisher to write a text that would have a Web component (Paul 1, 31-35). Pam asserted that “the human component is still essential” (Pam 1, 12), nevertheless, she felt that there were appropriate uses of Web-only instruction. Referring to a Web-only course that she was developing with a colleague, Pam explained:

That course would be appropriate to have [as Web-only] because it’s software training, . . . and we turn away so many students who can’t get registered for it in time. If we offered it over the Web, that should increase the number of students who can take that course. (Pam 1, 47-51)

All of the total-Web teachers taught face-to-face courses in addition to their Web-only courses. Like the partial-Web teachers, they clearly enjoyed the positive interactions in a classroom. Speaking of being in front of a class, Ted remarked, “I think face-to-face teaching in a situation where the students are responding positively and I’m getting positive emotional feedback is a feeling like performing, which I also enjoy doing” (Ted 3, 965-968). Admitting that he enjoyed Web-only and face-to-face teaching for different reasons, Ted talked of competing choices.

If I had a choice, I would probably teach everything on the Web because it gives me more temporal freedom. But then again, if I had a different choice, I’d teach in class because I enjoy the— you know, I mean, we all like to feel important. (Ted 3, 972-976)

A partial-Web course teacher who was concurrently developing a Web-only course also remarked that she would not want to teach completely

online, but that current assumptions about differences between face-to-face and online interaction do not fit more sophisticated technologies. “I don’t think I’d want to teach all Web, or all distance, where you never see the students. However, that’s a biased answer based on the old paradigm. The Web, the Internet, now is so much more interactive” (Peg 3, 320-323). Almost as a warning about the reality of classroom lecturing, Thomas implied that just being physically present in the same room does not ensure effective communication. “You can get up in front of a classroom and talk and have no idea who the hell’s out there or what they’re thinking” (Thomas 3, 645-647). Thomas speculated that some of the concerns about not having face-to-face interactions might disappear with time. He reported that when some of his students had compared traditional classroom teaching to distance education and insisted that “you have to have personal contact” (Thomas 3, 134), he cautioned them to consider, “If you’re just born now, and you don’t have the previous 19 years, then this will not be an issue” (Thomas 3, 136-138).

Taking an objective overview, Ted commented, “The lack of contact—I don’t see it as a weakness, I see it as a difference” (Ted 3, 745-746), and went on to note a benefit of not being face-to-face. “The anonymity is something that draws out people in ways that haven’t been [fully explored]” (Ted 3, 748).

## The Future of University Web Teaching

This group of Web teachers was both optimistic and circumspect about the future course of university Web teaching. They readily acknowledged a growing market for Web courses. Citing organizations devoted primarily or entirely to Web-delivered education such as the Western Governors University and the University of Phoenix, Tammy said, "I think there's a lot more competition for higher education because many, many companies are wanting something that's very University of Phoenix-like" (Tammy 3, 222-225). Cautioning universities to heed both the market and societal changes, Ted warned, "[The Web] does threaten the economic well being of universities. I think there will be universities that fold and collapse because of it. Bob Dylan once said, 'He who is not busy being born is busy dying,' and that's where we're at" (Ted 3, 784-787). Ted further observed:

Back starting with radio, . . . the people that are our students and are our public have been getting the majority of their information from the electronic media. [Universities, however] have been delivering it primarily orally and secondarily in print. And there's no question in my mind that that gap is not stable and cannot survive for a long period of time. (Ted 3, 793-798)

Ted went on to state his belief that "the opportunities . . . are just endless. I mean from marketing, from the point of view of access, from the point of view of changing the structure, from the point of view of helping students by adding components" (Ted 3, 766-769). Then, with an

eye on the economic bottom line, Ted observed, "So the question really is, how can you make money off of it? Because, you see, we're not in a position, as an academic community, to do something that's going to run up a huge bill, no matter how good it is for teaching" (Ted 3, 414-417).

Focusing on various aspects of educational collaboration in regards to the future of university Web teaching, Travis remarked, "Collaboration just comes so natural in the sense that people are going to connect to you. I mean I get e-mail all the time, people that [say], 'I saw your so-and-so and I linked to it'" (Travis 3, 298-300). "Even if you don't do anything, just leave your stuff out there, people are going to come and use it. So then the [question] becomes, how do you actually design collaboratively amongst institutions, between cultures, across the educational sectors?" (Travis 3, 306-309).

And finally, while talking of transformational changes, Travis painted a picture of exciting potential for university Web teaching.

It seems to me that what could be the case, that through the Web, and whatever it shall become, through this distributed medium, that the role of higher education in society could become much more, much more integrated and robust than it ever has been in the history of the entire academy, which is 800 years! It's been this isolated institution and all of the sudden we have the capacity to be right there in people's living rooms! (Travis 3, 327-333)

As she considered the future of Web-based teaching in the university, Pam predicted a "very, very bright future! Virtually—no pun intended—unstoppable. As the Web continues to get big, so will Web

teaching I think. This appears to be inevitable for higher education in general, despite the critics here and there” (Pam 3, 28-31).

In summary, perhaps Ted said it best when he noted, “On a more fundamental level, we’re talking about a change in communications” (Ted 3, 788-789). “I don’t think the question is if there will be a future; I think it’s inevitable. I think the question is, how will it play out?” (Ted 3, 381-384).

### **A Pedagogy for the Web**

This last portion of the chapter presents participants’ ideas about how the Web environment supports student learning and effective student/teacher communication, and discusses their thoughts about the necessary elements in an effective Web pedagogy

#### **The Web and Student Learning**

The topic of this study is university-level Web teaching. Teaching, however, cannot meaningfully be separated from student learning, which was a major concern of all the Web teachers. This section presents the reported perceptions, beliefs and experiences of the participants as they discussed their ideas about how the Web affects student learning.

Peg declared that Web teaching and learning might not support some students’ learning styles because it is so dependent on reading and typing with no oral interaction. “There are some students that just don’t

feel free about sitting there and type, type, type. They don't think that way" (Peg 3, 464-465). On the other hand, as Peter noted, "A Web page obviously doesn't have to be just text, and so for the student who is much more . . . visually able to communicate, there'd be some really interesting options there" (Peter 3, 187-190).

Alluding to multiple intelligences (Gardner, 1985) and differing learning styles, Ted asserted:

There are some pedagogic advantages from the point of view of communication. The Web reaches students. I believe—I have no firm research on this but I'm going to make a statement nonetheless—the Web speaks to students with particular learning styles that are not spoken to in the classroom situation. (Ted 3, 716-720)

Acknowledging differing learning paths, Travis explained how he and his colleagues had worked to build multiple modes of learning into their Web course.

So the idea is this. They got the passive receptive learning with heavy visual, the active textual learning, which is directive—"Write this down and do this." And then, this interactive learning [dyad, small groups, and listserv assignments]. And so by making a series out of those three different modes of learning, our idea is that we'll catch most of [the students]. (Travis 2, 474-478)

Tammy voiced her opinion that students learn best when they have a chance to apply multiple modalities to contextualized learning situations. "I think, for the most part, what I find is that . . . students learn best with much more applied kinds of experiences that are both visual as well as talking as well as writing" (Tammy 3, 384-386).

Moreover, stressing the role of dialogue and feedback in understanding, Tammy warned against assuming that students learn well simply from reading (Tammy 3, 387-390). Peter expressed a similar opinion.

Just having it written down for folks is not enough, and it makes me more cautious again about things like distance learning, where people are going to read stuff and not have a conversation with you about it. I just think you never know if you understand something until you have to articulate it back. (Peter 3, 280-285).

The efficacy of dialogue and feedback in supporting and strengthening meaningful learning is well established (Bohm, 1996; Burbules, 1993; Vella, 1994)

Peg asserted that the Web forces students to take a more active role in their learning.

The Web really emphasizes it's up to them. . . . When you're standing in the classroom lecturing, if they haven't opened the book, they at least hear something. So they can just sit there and sop it up and never have to really study, and scrape by with a "C." But when you have it on the Web, . . . they have to open up the Web and actually do it. And if you have interactivity and the requirement to do assignments, they can't just sit there. (Peg 3, 230-237)

Speaking of interactivity and online dialogue, Woodlief (1997) also noted "the electronic 'meeting of minds' means that every single student can become an active learner, collaborating fully in the development of ideas and learning at his or her individual pace, not passively taking notes" (Woodlief, 1997, p. 1)



Increased student responsibility for their own learning, however, has inherent problems. Both Travis and Ted noted that time management was a significant problem with many students. According to Ted, "What we've observed in our classes is that time management becomes an amplified issue—it's what students were poor at to start with, and they're poorer at it when they get in this situation" (Ted 3, 742-745).

The easy availability of Web resources also has some negative implications. Pam indicated that the Web might provide "temptation for students to download Web pages and submit it as their own work" (Pam 3, 63-64).

Peter and others noticed that a perhaps natural outcome of using Web resources in a class was that more and more students use the Web for their research.

I can't bring up many resources in a class. I don't have time to talk about that many things, so there's a way of sort of expanding the available resources to the class [via the Web] that I think is more realistic. And it's more realistic that a student's got to click on a link and take a look as opposed to going to the library and getting a book. (Peter 3, 578-583)

Although it may be more realistic to expect a student to do a Web search instead of a library search, Thomas noted that in some instances this has led to poor quality work. "I think research seems to be a little less thorough because it's so easy to get—to search a subject, get it . . . , print

it out, and you don't really know what you're doing. You're just getting it" (Thomas 3, 288-291).

Since the majority of Web documents are not peer-reviewed, there could be questions of trustworthiness and accountability. As Peter explained, "There's some stuff about the Web that makes me a little nervous—the whole lack of accountability of anything. . . . [Someone] produce[s] something, it's out there, you can't tell, for example, if it's a document that's trustworthy. Can you trust the statistics, or whatever?" (Peter 3, 195-198). Tammy was also concerned about problems she saw with Web-based research.

Most of the students are doing almost all of their research on the Web, as compared to other ways. In many respects they get a whole lot more up-to-date information, . . . but they also find some sites that you go, 'Oh, dear!' So [there's] that whole idea of what is a good Website? And why would you believe this information? (Tammy 3, 591-599)

Speculating about the appeal of impressive-looking Web pages, Pam summed up the problem, "Students think that because it's on the Web it's accurate" (Pam 3, 62).

Amount and quality of interaction. Many of the Web teachers commented that the Internet and the Web supported a higher level and type of student-teacher communication. "I get students contacting me more outside of class. . . . My schedule is such that it's really hard for students to just casually [stop by to] say hello. And I do have several of

them that will do that over the Web” (Peg 3, 475-481). Paul indicated that e-mail and the Web facilitated a unique type of interaction “in the sense that [sometimes] I have students who are far away, or students who have a question and they don’t want [the others] to see who is asking the question” (Paul 3, 265-268). Thomas also noted that students who might either be excluded or exclude themselves from in-class discussions or questioning had an alternative route of participation through e-mail and the Web.

In a classroom maybe you have a handful of people who are going to be involved, and then you may have 20 who are excluded for a variety of reasons. . . . Whereas on the Web, I don’t think you have that same exclusion because people . . . can choose [to communicate]. . . . And as I respond to somebody, then I’m not excluding other people, because I’m dealing with what was sent me. (Thomas 3, 578-589)

In a similar vein, Awalt (1997) described his experience with the use of electronic journals to supplement his face-to-face teaching.

I have discovered articulate, thoughtful persons lurking behind reticent demeanors in class. . . . Freed to mull over their responses and not plagued by the threat of the stream of the discussion moving on without them while they ponder, they began writing lucid, insightful, and sometimes poignant responses (Awalt, 1997, p. 2).

Peg summed up her feeling about the efficacy of e-mail and Web-based communication: “With [large] class sizes [the Web offers] the ability for students to follow up with questions” better than in the classroom. (Peg 3, 432-433).

Paul noted the difficulties he encountered in using a class listserv to promote lively discussion of various open-ended scientific issues.

When I did it last year I tried to set it up as an online discussion where I would post a question [and] students would [answer and discuss each other's ideas online]. That didn't work nearly as well as I would have liked. Maybe if I managed it a little more it would have. The approach the students had to this was, they wrote back their answer and that was it. They didn't want to read somebody else's answer and reply to that. (Paul 2, 88-92)

Paul then related that when he subsequently taught the course, he gave up on the idea of promoting student-student dialogue and simply posted the discussion questions and had the students e-mail their responses to him. "The only interaction was actually between me and them, where I would reply to what they had written and also evaluate how well they had talked about the question" (Paul 2, 96-98).

Explaining that he plays a very active role in leading and guiding electronic discussions in his Web class, Travis described his strategy for using students' e-mail.

So what I'll do is I'll pull together those messages—different times, different threads—and I'll cut them up, put them back together, and I'll say, "Look how interesting this is. Five different people have the same assumption." Well, here I'm also teaching something about assumptions. And then put it back [on the listserv] and create that discussion. (Travis 2, 422-427)

Further explaining his goal of guiding student learning as unobtrusively as possible, Travis admitted, "I know exactly where we're going here, but from the students' view it's got to look almost like I'm simply responding.

It's not a very heavy-handed leadership. So it's very Socratic in a certain sense" (Travis 2, 409-411).

In talking of how he worked to promote interactivity, Travis delineated different levels of discourse dynamics that he had incorporated into his Web course: peer-peer, intra-group, inter-group, and global discussion, "where everybody talks to everybody". (Travis 2, 431-433). He confirmed that guiding whole class discussions online is extremely difficult.

Interestingly, the global discussion, since it's just setting up an e-mail list and putting everybody on it, is where most teachers tend to start. And yet I have found that of all the models, this is the most difficult one to write a designed activity for. So it's fascinating that the technology misleads us into the hardest, what I think is the hardest thing. It's really hard to write a good activity for this. (Travis 2, 428-438)

### The Need for a Web Pedagogy

Teaching on the Web is sufficiently different from teaching face-to-face to raise various questions about instructional design, the nature of teacher/student interactions, and the process and outcomes of student learning. As Tammy commented, "I think that the Web technology has allowed us to think about different ways that students learn, probably more so than if we were doing the same thing over and over again" (Tammy 3, 409-412). "I realized early on that I could not just take the

class as I taught it and just put it up [on the Web]. It wouldn't work. So there was a sort of rethinking" (Tammy 3, 619-621). Numerous researchers have also confirmed the importance of designing instruction to take advantage of the computer-mediated environment rather than simply trying to replicate face-to-face teaching methods (Haughey & Anderson, 1998; Ives & Jarvenpaa, 1996; Johanson, 1996; Jonassen, 1991; Jonassen & Reeves, 1996; Najjar, 1996; Porter, 1997; Roblyer, Edwards, & Havriluk, 1997; Romiszowski & Mason, 1996; Van Dusen, 1997).

Peg summed up the pedagogical confusion of many who teach on the Web, stating

One of the most frustrating things I think I find about this is, I still don't have a handle on truly what I think is effective [Web] instruction. I kind of know, but I can't quite explain it. It's not just adding some questions and having students react to it and then give the answer. But there's something about the Web that really . . . requires some kind of unique instructional strategy. And I'm not sure what it is. (Peg 2, 113-120)

Stressing the re-design necessary for an effective Web course, Peg declared,

If you can print your Web course and it gives the students the same caliber of information and learning as if on the Web, then you've got something wrong. You shouldn't be using the Web. That's an expensive technology that's not accessible as easily to the students, and you should be just printing out your course and giving it. Write a textbook. (Peg 2, 123-127)

Travis also focused on the need to provide unique educational opportunities in a Web course.

The bottom line is . . . if what you're doing online does not provide something educationally that they cannot get in the classroom or by other means, then the disvalues are going to override the means that you're using, and to the students it's going to be frustrating and they're going to resent it. (Travis 3, 426-435)

Peg emphasized the uniqueness of the Web teaching medium, insisting that there is

one thing a lot of people don't differentiate, and that's information on the Web versus teaching on the Web. And I think that's really critical. And that's something that I swear some people never get. But as we move towards more Web courses, . . . we have to remember and understand that these are not just books with a few activities thrown in. (Peg 3, 629-634)

Travis further warned that most Web course developers rarely consider pedagogy. "What we continue to find is that the degree to which some kind of pedagogical theory is the real driver of the thing, rather than the technology, is even smaller yet" (Travis 3, 285-287). As Peter remarked, "It's real easy to get caught up in all the technology, and sort of think like you've got to make this thing totally snazzy—with all kinds of moving animation and video—when it just gets in the way, you know, the novelty of it gets in the way of the teaching" (Peter 3, 152-155).

Ted declared that "most of what people say about Web pedagogy is that they don't understand it" (Ted 3, 225-226).

Essentially it boils down to maybe one or two fundamental principles. One is that teaching on the Web is not the same as teaching in the classroom. Second is that communication is very important. And beyond that there's [argument] about this tool and that tool, . . . but I don't think we've really gotten beyond the recognition that teaching for this medium is not the same as teaching for another medium. (Ted 3, 235-241)

Talking further about his own efforts to identify effective Web pedagogy,

Ted said:

So what I'm very interested in doing . . . is to try to understand how you evaluate this technology that is proliferating and multiplying at an enormous rate, and start getting pedagogic criteria for what's good and what's not. Or not what's good and what's not, but what it does and what it doesn't do. And start to change the conversation over from one of looking at the possibilities in terms of what I can put on the Web, what I can deliver, what I can do, how long it takes, what I can build, to a much more student- and professor-centered conversation that's saying, "What is it that I want to accomplish? And what is it that I want the students to learn? And how can I save myself time?" which is very important. And all of those kind of issues. And start evaluating things according to those metrics, not according to the metrics of biggest, fastest, cheapest. (Ted 3, 477-489)

Finally, making a prediction about which universities and faculty will succeed in the area of Web teaching, Ted reflected, "Those universities that are successful, those faculty that are successful, are going to have to start relying on a team approach, and universities are going to compete—and this is the important point—not on the technological level, but on the pedagogic level" (Ted 3, 456-460).



### Developing a Web Pedagogy

Overall, the Web pedagogy of the partial-Web teachers was not considerably different from their classroom pedagogy; the Web was an enhancement and extension of their face-to-face delivery. Paul and Pam, both partial-Web teachers in hard science fields, described how students used print-outs of their Web pages as note-taking aids. "All they have to do is sit and try to understand what . . . I'm talking about. They don't have to write fast. They have the figures. They've got everything there. . . . I'm able . . . to prepare students before they come to class" (Paul 3, 221-225). Pam provides her students with the same type of content outline.

As it stands now, I think most of my students go to the Website and download the notes and print them out, because the way that I lecture in class, I cover a lot of material very quickly and they like to have the notes in front of them ahead of time so that they can fill in—basically the notes are the text that I have on all of my *PowerPoint*® slides—so they at least have that. . . . So it is sort of an outline. (Pam 2, 51-56)

Pam explained that although she believes that note-taking is an important skill, she nevertheless decided to provide the note-taking outline "because my students have convinced me that there's too much material that I'm covering for them not to have notes, or not to have help in taking notes" (Pam 2, 62-64).

Since the Web lecture notes are written by the instructor teaching the course, they serve as a guide to the instructor's ideas about which content and concepts the students should master. As Peg declared, "No textbook does it like I want them to have it" (Peg 2, 138). Paul emphasized that his students appreciate this meta-guide to his thinking.

The prime thing that students tell me they like about my lectures as a Web-based course is that my lectures flow directly from the Web, and when they look at the Web, they know exactly the way that I'm talking, and they know exactly what I'm thinking. They have everything there before I say a word, and so they follow much easier with that. (Paul 3, 214-219)

Similarly, Pam felt that having her lecture notes on the Web could possibly support more active learning in classroom discussions. Since her Web notes provide an overview of the material, in essence, she is providing an advance organizer (Ausubel, 1968) for student thinking. In providing the Web lecture notes, she said she has tried to impress upon her students that "perhaps this [would] free [them] up to think more in class and to have more questions and discussions" (Pam 2, 66-67).

A freedom with strong pedagogical implications is the release from worry about lack of time to cover all necessary content within available class hours. Peg stated that she had found that incorporating the Web into her teaching had "change[d] totally" (Peg 2, 97) the way she used her lecture time. "I feel that you can do a lot more discussion and practical application and less dissemination of knowledge" (Peg 2, 99-100). Ted

related that, in one of his Web-supported classes, he was able to focus more on concepts and process, since he knew that the content detail was available to the students at the Website.

I'm willing to do a lot more examples and things, because I don't have the fear any more that if I don't cover a topic in class it won't be covered. So that leaves me free to cover less and do more examples. And I think that that overall has been an enormous improvement in my teaching. (Ted 3, 676-680)

### A Pedagogy of Asynchronicity

An important pedagogical effect noted primarily by the Web-only teachers was that asynchronous communication supports both student and teacher reflectivity, and this reflectivity can lead to deeper and more meaningful learning than face-to-face communication. This same effect has been noted by various researchers, including Cahoon (1998); Eastmond (1998), Harasim (1990); Holt, Kleiber, Swenson, Rees, & Milton (1998), and Schrum (1998). Ted observed that asynchronous communication gives "students an opportunity to quietly reflect on things and communicate those reflections" (Ted 3, 614-615). Also alluding to the time for thinking that is engendered by asynchronous communication, Thomas remarked, "I think that on the Web it's easier to deal with issues and concepts and ideas than it is in the classroom" (Thomas 3, 569-571). Tammy pointed out that in-class discussions rely on students' memories

of what they've read, while asynchronous Web discussions allow students time to recheck, rethink and focus on the question. "The students went back and read the stuff. They were writing it. They were much more thoughtful in their comments about what they were saying. They had spent more time with it" (Tammy 3, 262-265). Because her students were more deeply involved in the material, Tammy found that her role changed.

What I found my role ended up being was much more engaged with the subject matter because they'd ask these questions. . . . I would need to then go back to the readings, or even other readings, or find new things. I found my own research in the area having to expand. . . . I enjoyed it a whole lot more because I was much more engaged. I was really being a learner as well throughout the process. And so it was much more exciting for me to see these things that the students were coming up with. (Tammy 3, 265-275)

Two of the Web-only teachers regularly employed a technique that would be impossible in a face-to-face situation: assuming a student identity in dyad assignments and electronic discussions to guide the construction of knowledge. As Ted explained it:

One of the teaching techniques that has come out of this is, if there's an odd number of students, then you have to somehow create one. And the natural thing to do is to do that as a professor, and we've discovered that professors like to do that on purpose because it is a use of the technology that was unexpected, but it's enormously powerful and that's the ability to actually take on the persona of the student. (Ted 2, 146-151)

Another benefit of asynchronicity was noted by Peg. As she said, in the classroom, “if you have a *PowerPoint*® or slide presentation, it’s only up there for a certain amount of time, but if it’s on the Web, students can go back to it and really think about it, really look at it, study it” (Peg 3, 442-445).

### **A Pedagogy of Hypertext**

The Web teachers in this study used hyperlinks in various ways: a navigational device for moving within the Web course, a tool allowing a certain amount of student autonomy in establishing personal learning paths, a didactic tool displaying foundational knowledge that students can access when necessary, and a way to link to outside Web-based text, multimedia, and various human resources.

Definite pedagogic advantages of hypertext were noted by some of the Web teachers. For instance, Peg stated that time and schedule constraints in face-to-face teaching forced her to take prior student knowledge for granted, however, hyperlinks in her Web course allowed her to provide needed background material.

Mainly what I’ve done is not assume the information I do in lecture—that they should have had in prerequisites. On the Web I don’t assume that and I add that in. And that’s why I think the Web course is much better than [a traditional lecture-based course]. (Peg 3, 425-428)

Peg explained that she had written her Web course so that the text presented factual material, and to keep the students thinking about how the facts they were learning could be applied to real-life problems, she interspersed the text with applied questions using hypertext to imbed answers and explanations. “They click on it if they don’t know, and there’ll be the long, more informal explanation of the applied” (Peg 3, 158-159). Focusing on similar uses of hypertext, Woodlief (1997) stated, “Hypertext documents allow the teacher to share information, insight, and questions in a much less intrusive, ‘authoritarian’ manner, essentially ‘behind’ the text. . . . Much more is contained in the hypertext document than could possibly be mentioned in a class” (Woodlief, 1997, p. 3).

Ted, too, spoke about the advantages of a hypertext-supported pedagogy, explaining that hypertext allows learners to access information in a way that supports their cognitive needs. “You can give [students] references that are multilayered and sort of follow the model of the Web—this sort of distributed references—that allow them to pick and choose in an intelligent fashion, as opposed to giving them a . . . book that’s out of date when you give it to them” (Ted 3, 615-621).

Travis told of when he first became aware of hypertext and realized it could solve a teaching problem. Speaking of an earlier classroom-based version of his Web course, Travis related trying to

engage students more fully by developing reading packets and assignments tailored to specific perspectives, and then allowing students to join the learning group that most closely matched their own personal worldview.

That was interesting because they were all excited. . . . But logistically it was a nightmare. . . . I spent most of my time being a manager. Plus, you couldn't lecture much in that environment. So I would find my lectures being on elements that were common to all of them. . . . But the lecture became a kind of almost intrusive thing to do. And the small group discussions were the thing to do. But then I couldn't be in all those discussions, and when I joined one it changed. So there seemed to be these limitations. The course was running on autopilot with me as the air traffic controller. And so I was looking for ways to go beyond that and be able to make more choices, but it was unrealistic in the classroom. (Travis 2, 367-384)

Travis went on to describe his excitement when he first realized that hypertext could support what he had been struggling to do in the classroom. In 1993 a colleague first showed him the Web, "which that time was called Mosaic" (Travis 2, 386) "What I saw was that the hypertext allowed for creating paths to—It hit me all at once—Wow! This is a way to individuate and really guide the education up front" (Travis 3, 6-11).

Ted also customized student learning by incorporating what he referred to as "conditional links" (Ted 2, 212) into his Web course. He used conditional links to send students "to different URLs" depending on their answers to online quizzes, and various

other parameters (Ted 2, 213-214). As Ted explained, he used hyperlinks as the basis for “a dynamically regenerated syllabus” (Ted 2, 218) which addressed individual students’ differing needs.

Travis talked more extensively than any of the other Web teachers of the uniqueness of learning in a hypertext environment, the questions involved, and opportunities for teachers to use and structure learning to make it more personally meaningful.

Hypertext is so strange in some ways. When a writer writes, I mean just about any writer, one of the values in writing . . . is you write in a way to capture and direct the attention of the person, of the audience. Almost everything’s directed toward that in some way. But with hypertext, you’re writing that way, but then when you hypertext a word, link a word, that word now has at least a dual use, in the sense that you’re emphasizing something here, and at the same time, emphasizing that the person could or should leave. In other words, you’re directing them towards the meaning of the text and away from it altogether, simultaneously! What the effects of that are, and how you use that, is still very baffling. (Travis 3, 52-62).

Right now we pretty much treat links as if they were all the same species. You know, basically you see a link on a page, a blue word or an icon . . . , and you link and you go somewhere else. However, *why* you go somewhere else, and how those two pages or two parts of the page . . . are connected, is variable. And we could use those variations in purposeful ways to teach people by actually experiencing the change. For example, you could create associative links that only showed that there was some kind of common element between the two, and that what was happening was that you were linking the commonality. Or, there could be some kind of historical link that showed that there was some kind of generative relationship between these two. . . . Or, you could do additive links . . . where you could take two



elements and add them together and get a third different thing. (Travis 3, 80-95).

And so what I'm looking for is a language of hypertext such that we're able to think in terms of using linkage as a method for students to actually navigate the thinking. An example would be the way that a site is designed. . . . I think that the way you design a Website actually produces or is conducive or inconducive to certain ways of thinking. (Travis 3, 117-122)

On this last point, Travis went on to give an example and to pose intriguing questions about how a Website might possibly be designed to demonstrate the historical marginality of women.

And then one asks, well, where would women fit in here? Because, in fact, in the history of it, women are marginalized, were marginalized and still are marginalized, I mean purposely, deliberately, maliciously. And so, if you're going to create a site that includes women, . . . what values do you want to present? How do you want to show that? Do you just now include the women as [if] they should always be there, or were always there, or is there something within the hypertextual structure that indicates the difficulty women have had of being in the picture at all? (Travis 3, 136-145)

And finally, Travis summed up why he feels that developing a pedagogy of hypertext is so important.

For better or worse, when we create a site using these linkages, we're actually manifesting our conceptions of the subject matter. I think it's really important for educators to be aware of that, and to be wary of it, because they could do weird things, like exclusions. And then if we do become aware of it, then we could think about how to use that in a very powerful kind of way. . . . That's why it's different than narrative form. (Travis 3, 147-153)

Similarly, Gilster (1997) warned that “hypertext as a reading medium is unusually sensitive to manipulation” (Gilster, 1997, p. 130) because hyperlinked ideas are perceived as being most important, while unlinked ideas might be dismissed by unwary readers. The author of a hypertext document can “lay out an argument through the omission or addition of particular items that support the point being made” (Gilster, 1997, p. 131).

In this final section of the chapter the Web teachers related that although some students might have difficulties with the heavy reading and writing emphasis of Web-based instruction, they felt the Web supported multiple ways of knowing better than the traditional classroom. They noted, as well, that the Web environment is especially conducive to self-directed learning, but that self-directed Web learning has inherent problems of time management and the evaluation of questionable Web-based resources.

The Web teachers also related their frustrations and their successes in promoting online dialogue. The total-Web teachers, in particular, observed that asynchronous online dialogue with and between students deepened student learning and engagement with the material. Primarily the total-Web teachers related their opinions about the need for a Web pedagogy and discussed the importance of the elements of asynchronicity and hypertext in Web pedagogy.

## 5. CONCLUSIONS, IMPLICATIONS, AND QUESTIONS

The four questions which guided my analysis of the Web teachers' courses and interviews form the basis from which I have discussed conclusions and implications of this study.

1. Does teaching on the Web change one's teaching philosophy, epistemology, or pedagogy?
2. Which reasons given by teachers for their Web teaching beliefs or actions reflect teacher-centered interests and which are focused on student interests?
3. What unique aspects of teaching and learning in a Web environment foster a new pedagogy?
4. What are the elements of an effective Web pedagogy?

Although these questions cannot be answered definitively, it is useful to consider such speculations and concerns when examining a practice and pedagogy as new as Web teaching.

### **Web Teaching Philosophies and Pedagogies**

There was a clear distinction between the ways that the partial-Web teachers and the total-Web teachers used the Web. Although both the partial-Web and total-Web teachers used the Web for current resources and requisite background, and to organize their lecture notes,

the total-Web teachers also used the Web as a venue for students' reflections and assignments, and utilized online dialogue to support the construction of knowledge. This is a significant pedagogical difference. For the partial-Web teachers, the Web course was primarily a depository for information. For the total-Web teachers, however, it also became an interactive vehicle for the support of inquiry, dialogue, problem-solving, and reflection. The focus of the Web-assisted courses—admittedly just a portion of the full face-to-face course—was primarily on content, whereas the Web-only courses incorporated both content and process.

A question which arises from these two clearly differentiated ways of Web teaching is how the epistemologies of the Web teachers might influence the way they have chosen to use the Web for teaching. Possibly a Web teacher with an objectivist epistemology might favor a directed use of the Web which expands access to resources, while a constructivist might encourage the self-directed learning and meaning construction evident in the Web-only classes.

A related phenomenon regarding Web teaching and teacher change is the evolution of roles noted by the Web-only teachers from lecturer/expert to guide, facilitator, and co-learner. Expectation and tradition are so strong in the face-to-face university classroom that professors retain the expert role even when acting as facilitator or delegator (Grasha, 1994). In the mostly self-directed learning

environment of the Web-only classes in this study, however, the professor became more of a facilitator (Thomas 3, 410-411; Travis 3, 925-926; Ted 3, 944-945) in the online dialogue and feedback on assignments, as well as a co-learner (Tammy 3, 269-275).

Given the distinction between the pedagogical uses of the Web-only courses and the Web-assisted courses, the question remains: Does teaching on the Web change one's teaching philosophy or epistemology? At a deep fundamental level, I did not discover any evidence that it does. Although Web teaching expanded and strengthened each teacher's instructional repertoire, I believe their use of the Web conformed to their individual teaching philosophies and epistemologies. When asked if Web teaching had changed her teaching philosophy, for instance, Peg replied, "No. It just helped me obtain it better" (Peg 3, 365). Thomas' reply to the same question was that Web teaching had not changed his philosophy "deep down" (Thomas 3, 479), but had "reaffirmed things that [he had] always felt" (Thomas 3, 479-480).

### **In Whose Interest?**

The partial-Web teachers asserted the importance of face-to-face interaction with students in order to ensure learning. They spoke of the need to adjust their teaching to visual and oral feedback from students. They talked about being able to judge students' body language and

knowing when to wait, when to provide an example, or when to rephrase an explanation. Although nearly every conscientious teacher uses this type of feedback to adjust his or her teaching, I wonder if the desire to see students' immediate reactions might also include an "I am the expert" expression of the need to monitor and manage student learning. Travis voiced similar suspicions when he said that in a Web-only environment, "You end up dealing with giving the student more control and more autonomy. And I think a lot of [faculty] are just rebelling against their instincts that they're losing control" (Travis 3, 895-897).

Another teacher-centered interest regards the role that the lecture plays for the instructor. The majority of the Web teachers in this study, including the total-Web teachers, admitted to enjoying the performance aspect of lecturing. Delivering a lecture before students casts the instructor in the expert role, which is a traditional instructor-centered form of academic teaching. However, in a Web-only class, where more autonomy is given to the student, and asynchronous dialogue is a primary teaching/learning mode, the student's voice may surface more readily (Tammy 3, 261-265). Retaining the expert role may be more in the interest of the teacher than of the learners.

Another question concerning whose interests are served surfaced in the Web teachers' discussions about what students might be missing in a university education if they had a totally online education. Concerns

voiced about what students might forfeit by studying over the Web— university traditions, athletic spirit, school pride, camaraderie, alumni loyalty—may reflect a nostalgia on the part of university faculty and an effort to retain the hallowed halls mystique of their own remembered student days more than an accurate look at today's realities. Many of the arguments for on-campus instruction assumed traditional 18-23 year-old students, despite increasing numbers of older students with family or job responsibilities, who may be either time- or place-bound. Such students have not been served well by traditional campus-bound courses and present a new market for Web courses.

Another “In whose interest?” question surrounds the recognition that Web teachers get from being innovators and trend setters. The Web teachers in this study clearly enjoyed being on the leading edge of an innovative technology. As Thomas said, it is “very thrilling and exciting just making and designing . . . the [Website]” (Thomas 3, 422-423). Having skills that few other faculty possess as yet and producing instruction that sets them apart from the ordinary university teacher could be highly ego-driven. There is a great deal of pride and self-interest in creative endeavors, which is reflected in quotes similar to Paul's, Ted's, and Travis'. “I had one of the first complete Web courses on the campus” (Paul 1, 67-68). “We accomplished in one summer using three students what [other] people have invested millions of dollars in, and did a better

job of it" (Ted 2, 133-134). "It's my course. I thought it up. I did it" (Travis 2, 512). Whether student interests are also served well can only be judged in the evaluation of the resulting Web course.

Finally, a shift in roles that synthesizes the "In whose interest?" question is the co-learner role experienced by Tammy. Tammy summed up this shift very well, confessing that she had never experienced the same level of dialogue or depth of learning within a face-to-face classroom. She pointed out that the time limits of the class period constrained discussion to more superficial comments, while online asynchronous dialogue prompted her to expand her "own research in the area. . . . [She] enjoyed it a whole lot more because [she] was much more engaged and . . . was really a learner as well throughout the process" (Tammy 3, 269-274). Having a true learning community, where both student and teacher are co-learners, seems to be in the interest of student and teacher alike.

### **Four Foundations of a Web Pedagogy**

The experience of the total-Web and partial-Web teachers highlighted a number of aspects of the Web teaching environment which could foster a new pedagogy. Four in particular are: (1) the extensive use of e-mail, (2) the "think time" made possible by asynchronous



communication, (3) "hyperlearning" possibilities, and (4) the freedom of the instructor to concentrate on processes and concepts.

E-mail is certainly not unique to Web classes, but it is a prominent feature in each of the eight Web courses reviewed in this study. The Web teachers noted a number of advantages of e-mail communication which I believe could nurture a new pedagogy. Peg noted that students found it easier to ask questions via e-mail than in person. Both Thomas and Paul spoke of e-mail as a way for students to ask questions with less fear of embarrassment than in the classroom. Thomas declared that e-mail could increase student participation beyond what is possible in a time-bound classroom. Travis and Peter observed that e-mail interaction tends to lower the professor/student power differential common in a university classroom. Tammy and Travis incorporated assignments into their Web classes that required students to communicate by e-mail with off-campus subject matter experts. Travis, Thomas, and Peter regularly used questions and reflections posted by students as the starting point for mini-lessons for the whole class. Lastly, both Thomas and Ted noted that there were benefits from the anonymity possible on the Internet: "the facelessness of it . . . could also be a strength in terms of issues of pre-judgment and attitude and bias" (Thomas 3, 190-191).

Although e-mail is a form of asynchronous communication, I believe there are additional benefits of asynchronicity for both the

learner and the instructor. Asynchronous communication was discussed earlier in this chapter in the section comparing partial-Web and total-Web pedagogies, but its significance to a new Web pedagogy bears further examination here. The total-Web teachers reported that Internet-assisted asynchronous communication offered time and opportunity for thoughtful reflection which supported deeper learning. Tammy, in particular, compared the superficiality of ordinary classroom discussions with the deep reflection and mindfulness that she observed in asynchronous online dialogues (Tammy 3, 242-276). Because of additional time to think, learners may be more reflective when writing as opposed to speaking. Learners also deepen their understanding when they must actively construct knowledge rather than passively receive it.

There is also a dynamic typical of face-to-face discussion that is missing in asynchronous dialogue. In face-to-face discussions many participants do not listen well, but instead tend to compete for "airtime." As Ted noted, "students don't listen in class—we don't listen to them; they don't listen to us" (Ted 3, 752-753). Using asynchronous, text-based dialogue, however, increases the active "listening" capacity of the reader since "it's very difficult to read without listening" (Ted 3, 750-751). Thus, the asynchronous, text-based structure of current Internet technology supports more meaningful learning and comprises another important foundation for a new Web pedagogy.

The connection to a vast network of global resources combined with the hyperlink capabilities of Web technology is another key foundation for a new pedagogy. Spiro, Feltovich, Jacobson and Coulson (1992) outlined a theory of cognitive flexibility that applies to knowledge acquisition in ill-structured domains. Their theory can be illustrated through a metaphor of criss-crossing the landscape: viewing a situation multiple times from the perspective of differing standpoints, which increases the likelihood of making meaningful connections and of transferring the learning to unique situations. Spiro et al. (1992) proposed that this metaphor also represents the way that hyperlink-supported learning (which they call random access instruction) functions. In addition, the multilayered, non-linear characteristics of hyperlink-supported learning may align much more closely with human cognition and a brain-based learning model (Caine & Caine, 1991, 1997; Jonassen, 1991; Kearsley, 1988; Lanza, 1991; Najjar, 1996). These factors help explain why I believe that hypertext theory and its application to teaching and learning is a major foundation of an effective Web pedagogy. Yet, as Travis admitted, his "first, and still one of the most interesting challenges, was what do you really do with hypertext?" (Travis 3, 50-51). How to design instruction so that it effectively utilizes hyperlinks and dynamic databases is still little understood and presents opportunities for further study.

A fourth foundation for a new Web pedagogy is the shift to a more process-centered orientation made possible by making course content accessible on the Web pages. As Ted said, "I don't have the fear any more that if I don't cover a topic in class it won't be covered" (Ted 3, 677-678). Both partial-Web and total-Web teachers reported that having content material on their Websites—as they wished to present it, not as a textbook presented it—freed them to "cover less and do more examples" (Ted 3, 679), to "work more on issues and the student point of view" (Thomas 3, 532-533), and have more "discussion and practical application and less dissemination of knowledge" (Peg 2, 99-100) in the teaching of the course.

A focus on issues, the student point of view, and increased levels of discussion and dialogue reflects a "dynamic, interactive model that involves students in their own learning process" (Ashe & Buell, 1998, p. 8). The effectiveness of this type of interactive, process-centered learning is well supported by research. (Ashe & Buell, 1998; Costa & Liebmann, 1997; Fogarty, 1997; Holt et al., 1998; Najjar, 1996).

### **Other Lessons Learned**

In addition to the four foundations of a Web pedagogy discussed above, two other effects experienced by the total-Web teachers offer

promise of further benefits from university Web teaching: the natural tendency toward collaboration between Web teachers noted by Travis (Travis 3, 294-309), and the peer learning resulting from team development of the four Web-only courses and team teaching of two of the Web-only courses. As Ted emphasized, “those universities that are successful, those faculty that are successful, are going to have to start relying on a team approach, and universities are going to compete . . . not on the technological level, but on the pedagogic level” (Ted 3, 456-460).

Other lessons learned from the reported experiences of the eight Web teachers are discussed below under the headings of enrollment limits for Web courses, use of Web resources *versus* textbooks, designing Web courses for adult learners, social and cultural ramifications of Web teaching, and who can be a Web teacher.

Enrollment limits for Web courses. The numbers of students in the Web-only classes in this study (3, 25, 35, and 50) were significantly less than the enrollment totals in most of the Web-assisted classes (30, 60, 90, and 170). Very large class sizes almost require a content-centered pedagogy. If one has a student-centered, process-based pedagogy, however, smaller enrollment totals are needed because of the increased levels of student/teacher, student/student, and student/resource interactivity required. Increased student/student interaction and peer

dialogue must be employed as Web classes grow larger because Web teachers do not have the time to individually mentor each student online. Especially in Web-only classes, without a method to divert some of the online feedback responsibility from the instructor and handle some of the more tedious aspects of tracking and grading, each new student added to the class increases the teacher's time investment and responsibility. Interactivity and dialogue seem to be crucial in supporting student construction of meaning in Web courses, but reading student reflections and composing replies is time intensive for the teacher. Both Ted and Travis used dyad assignments that promoted peer teaching and learning and de-emphasized direct teacher feedback. They also shared feedback responsibilities with other colleagues. Techniques which boost student interactivity and dialogue without increasing teacher time must be extended if Web courses are to remain student-centered.

Web resources versus textbooks. Six of eight teachers in the study required a textbook in addition to Web resources. A few also required journal readings that were not available online. Such requirements may cause few problems for on-campus Web course students, but may be troublesome for distance students. On the other hand, if a Web teacher favors Web-based resources because of their easy accessibility as compared to textbooks and journal articles, students may not be exposed

to many of the classic seminal sources. A related issue is the common practice of many students to print out Web pages so they have hard copies which they can read or review later. This essentially makes a textbook of the Web course and circumvents the advantages of hyperlinked random-access learning.

Also, since Websites are often not peer-reviewed, questions of trustworthiness of data and interpretations can arise, as pointed out most clearly by Tammy (Tammy 3, 597-599) and Peter (Peter 3, 195-198).

Designing Web courses for adult learners. As a whole, face-to-face university courses are often designed for the 18-23-year-old student and many tend to assume an "empty vessel" role for the student. There is nothing inherent in the structure of the Web to preclude designing a course in the same manner, but the pedagogy practiced by the Web-only teachers in this study seemed to treat students more as autonomous adults who are responsible for their own learning.

When Web courses are designed for on-campus students, as were all of the Web-assisted classes, they may be aimed at the same 18-23-year-old audience. When Web courses are designed for distance students, however, there seems to be a recognition that the students might be adults, and a consequent higher trust level in the students as self-directed learners.

Social and cultural ramifications of Web teaching. These were only briefly mentioned by some of the Web teachers and no solutions were proposed. Therefore I have chosen to list these and other concerns that I have as questions which deserve further study, or which need to be raised and considered when developing Web courses. Various cultural considerations for Web instructional design are presented more fully in Henderson (1996).

- Given that social and educational inequities have a powerful impact on the life chances of individuals, to what extent does using the Web for teaching limit access for those from lower socioeconomic or ethnic minority backgrounds?
- How well do Web courses accommodate learners with disabilities?
- To what extent have the values and ways of knowing of women and various ethnic groups been ignored by white, male Web teachers?
- Do some people need face-to-face interaction in order to support their learning styles?
- Does the anonymity of the Web empower some learners and, at the same time, disempower others?
- How will the nature of the university and the experience of being a student change as more Web courses are incorporated into the course schedule?



Who can be a Web teacher? It is possible to develop an effective and well-designed Web course without a great deal of technical knowledge, as was done by two of the Web-only teachers. Citing her own experience developing a Web course, Tammy observed, "Anybody could really do this, I think that's the thing" (Tammy 2, 264). Furthermore, there are many ways to effectively use the Web for teaching. The opinions of the participants in this study indicates that most college level courses would support student learning more effectively with the addition of a Website and Web-based activities. Moreover, although the Web environment can support educational efforts ranging from rich additive elements to transformational changes in teaching and learning, each teacher who uses the Web will generally use it in a way that supports his or her teaching philosophy. All of the partial-Web teachers felt that the addition of the Web element to their face-to-face teaching significantly improved their courses, adding modalities and expanded learning opportunities. Likewise, all of the total-Web teachers felt that the Web-only environment supported their important pedagogical goals and promoted student outcomes that they were less able to achieve in the traditional classroom relationship.

## Conclusion

This study sought to make some sense of the phenomenon of Web teaching through examining the reported experiences and beliefs of eight university Web teachers and diagnosing their Web courses. If there are still unanswered questions regarding the innovation of Web teaching, it is not unexpected. As Rogers warns us,

No innovation comes without strings attached. The more technologically advanced an innovation is, the more likely its introduction is to produce many consequences—some of them anticipated, but others unintended and hidden. A system is like a bowl of marbles: Move any one of its elements and the positions of all the others are inevitably changed also (Rogers, 1995, p. 419).

The Web courses examined here suggest that the four aspects of a Web teaching environment listed earlier in the chapter (i.e., e-mail, asynchronous communication, hyperlearning, and the freedom of the instructor to concentrate more on concepts and process since the content is covered on the Website) are elements that can be leveraged to improve university Web teaching and deepen student learning, perhaps even beyond results capable of achievement in face-to-face teaching.

In addition, if university Web courses were designed to encourage dialogue and meaning-making, if learners had choices about topics, resources, and applications, if learners' opinions, ideas, and experience were valued—in short, if learners were treated more like adult peers, it

seems that both the satisfaction in teaching and the joy in learning would expand.

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**APPENDIX:**

**INTERVIEW QUESTIONS**

### SESSION 1: Descriptive Questions

1. What is your job title? (tenure-track?) (tenure?)
2. How long have you been teaching college?
  - Here: \_\_\_\_ years
  - Elsewhere: \_\_\_\_ years
  - Any non-college teaching or training experience?
3. Do you teach graduate as well as undergraduate courses?
  - Are your Web courses undergraduate or graduate courses?
  - Do you have beliefs about the effectiveness or appropriateness of Web-based teaching at the undergraduate *vs.* the graduate level?
4. Does your Web course incorporate face-to-face class meetings? How often? How long?
5. How long have you been teaching on the Web?
6. How many college level Web courses have you taught?  
Undergrad \_\_\_\_; Graduate \_\_\_\_
7. What courses have you developed (or helped develop) as Web courses?
8. Did you develop your Web course on your own? If not, who assisted you
  - in the design process? What skills did they contribute?
  - in the development process?
  - in the delivery process?
9. Are you working on any new Web courses now? (Which?) Do you have plans to do so in the future?

### Questions About Innovation

1. Roger's (1995) studies on innovation divides innovation adopters into five groups, the first 3 of which are *innovators* (2.5%), *early adopters* (13.5%), and *early majority* (34%). Which category would you say you belong to as far as Web teaching is concerned?
  - This category applies to your Web-based teaching. How about other innovations?

- Do you put yourself in the same category in your face-to-face teaching (i.e., adoption of innovative teaching methods in general, disregarding technological tools)? Explain.
2. Characteristics:
    - Are you creative? A risk-taker?
    - Are you a networker? (Locally? Globally? Most utilized communication modes?)
    - Are you reflective?
  3. How have you been supported, hindered, or ignored in your Web course development?

### SESSION 2: Guided Tour of Web Course (*Interview guide*)

Course title:

URL:

Password:

Look for, ask about:

- access to course elements by guests; use of passwords and coded identities
- course management
- capitalizing on Web environment
- “look” of course
- course navigation (single or multiple pathways? directed or open?)
- what s/he is most proud of
- what s/he would like to modify next time around
- what’s missing, or what s/he would like to add (time? know-how?)
- other evidence of pedagogy and epistemology
  - ✓ instructional decisions
  - ✓ learning activities: individual, group
  - ✓ learning activities: Bloom’s taxonomy; active vs. passive
  - ✓ S↔T and S↔S feedback and interactions
  - ✓ assumptions about student learning
  - ✓ assumptions about nature of knowledge

### SESSION 3: (*structured inquiry*)

#### Web Teaching Questions

1. When were you attracted to the Web as a teaching medium? Why?
2. How did you learn to teach on the Web?
  - effect of viewing other's courses
  - help from colleagues
  - role of reflection
  - other?
3. What do you think is the future of Web-based teaching?
  - at this university
  - in higher education generally
  - as an alternative to higher education
4. Why do you teach on the Web?
5. SWOT analysis of Web-based teaching:
  - strengths
  - weaknesses
  - opportunities
  - threats
6. Has teaching on the Web changed the way you teach? How?
7. Has teaching on the Web caused you to think differently about student learning? If so, how?
8. What effect do you feel your gender has had on the development of your Web courses and your Web-based teaching in general?

#### Comparing face-to-face and Web-teaching

1. Is your identity as a face-to-face teacher different from your Web teacher identity? How?
2. Do you see your role as a face-to-face teacher differently from your role as a Web-based teacher? Explain.
3. Do you prefer face-to-face or Web teaching? Why?



4. How would you compare face-to-face and Web teaching regarding ease or complexity?
5. Has teaching on the Web changed your philosophy of teaching in any way? If so, how?
6. Have you changed instructional practices in your face-to-face courses as a result of your Web-based teaching?
7. If you have a Web course that you have also taught face-to-face, how did you change the face-to-face course to adapt it to the Web environment?
8. What are you able to do in the Web environment that is difficult (or impossible) face-to-face?
9. What are you able to do face-to-face that is difficult or impossible on the Web?
10. In comparing face-to-face and Web-based teaching, has the nature of your interactions with students changed? How?

### Teaching Philosophy

1. How would you describe good teaching?
2. Can you think of a motto or metaphor that guides you in your teaching?
3. Do you have a particular conviction or set of beliefs that are important in your teaching?

### **SESSION 4: Individualized follow-up (*e-mail or in person*)**

- questions emerging from data analysis
- remaining unanswered questions