# Exploring Two Teacher Education Online Learning Designs: A Classroom of One or Many?

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## Abstract

*Online learning is rapidly becoming a permanent feature of higher education. In a preponderance of instances, online learning is designed using conventional educational practices: lecture, grades, group discussion, and the like. Concerns with traditional pedagogy instantiated by course management systems raise questions about the quality of learner's online experiences. There is a need to reconsider the design of learning opportunities in light of emerging online delivery modes. This study compared learner perceptions of two online courses—one using the more traditional approach capitalizing on the affordances of Blackboard and one using the COPLS one-on-one model (Norton, 2003). Results revealed that both environments were perceived as providing a high quality learning experience. In addition, results point to the importance of self-regulation, the role of the instructor/facilitator/mentor, and the role of the group as factors influencing learners' perception of the quality of their learning experience, positive aspects of their learning experience, and challenges that influenced their learning experience. (Keywords: online learning, graduate teacher education, online groups, self-regulation, online design.)*

## INTRODUCTION

The days of viewing online education as a trend in U.S. higher education appear to be gone. With 65% of graduate programs in the U.S. offering online options and 56% of U.S. universities and colleges indicating that online education is a critical long-term strategy (Allen & Seaman, 2005), online education plays a formidable role in U.S. higher education today. It is therefore likely that educators who offer only traditional approaches will soon come face to face with decisions about offering online options, joining the ranks of online educators who provided online learning experiences to the 2.35 million online students enrolled in 2004 (Allen & Seaman, 2005).

There is a concern about the quality of online learning currently offered in higher education. In their study of e-learning trends, Zemsky and Massey (2004) found that even when faculty use e-learning for instruction they still teach as they were taught—that is, they provide lectures intended to supply basic knowledge to students. Hence, they state, "We see the success of course management systems and PowerPoint—software packages that focus on the distribution of materials rather than on teaching itself" (p. iii). This sentiment is echoed by Herrington, Reeves, & Oliver (2005),

> They [faculty] often yield to the seductive appeal of a course management system, where it is easy enough to populate a weekly schedule

with static resources and decontextualized tasks. In an effort to survive, teachers focus on content (the product orientation), rather than the process of educating the student (the customer orientation). (p. 357)

The result is online courses that emphasize the passing along of information rather than promoting learning and reflect a design that is often characterized by a model in which teachers generate the content they decide is appropriate, gather resources, group information into weekly portions or modules, and give the information to students.

Given this design model, online courses all too often mimic the practices of the classroom (Sonwalkar, 2001).

There is no pedagogy for distance learning. Although the promise is a highly interactive medium of learning that institutions can customize to meet the individual needs of students, the talking head remains the predominant mode of instruction today, and current forms of distance learning often prove to be poor imitations. (Levine & Sun, 2003, p. 21)

If online learning is to rise to the level of its promise, it is necessary to create a pedagogical model or models that enable educators to capitalize on the potentials afforded by online learning technologies. A bold new view of learning and schooling is needed—one that is not only research-based but research-validated. It must be credible and validate human experience while stretching current understanding. "There is a need not only for a strong theoretical and empirical research base, but also for design principles derived from theory and research" (McCombs & Vakili, 2005, p.1583). Herrington, Reeves, and Oliver (2005) recommend that although deriving design principles from theory and research is in its infancy it will most likely be best accomplished not by quasi-experimental studies of isolated variables but by design-based research models.

**Design-Based Research: A Framework**

Design-based research is an emerging paradigm for the study of learning in context through design that includes strategies and tools in order to help create and extend knowledge about developing and sustaining learning environments. In design-based research, learning is "engineered" and systematically studied in context. Design experimentation is concerned with the full, interacting system of learning to include tasks or problems, kinds of discourse, norms of participation, tools and related materials, and the means by which teachers orchestrate relations among these elements. "Design experiments therefore constitute a means of addressing the complexity that is a hallmark of educational settings" (Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003, p. 9).

Focusing on the development of a class of theories about both the process and means embedded in an instructional design, design-based research is highly interventionist. As such, design-based research typically studies innovative educational designs in order to investigate and study the possibilities of bringing about new forms of learning. Frequently, the focus of a design experiment

represents a significant discontinuity from typical educational practice. Thus, "The design of innovations enables us to create learning conditions that learning theory suggests are productive, but that are not commonly practiced or are not well understood" (The Design-Based Research Collective, 2003, p. 5).

A central principle of good design research is that it should focus on development and research that takes place through continuous cycles of design, enactment, analysis, and redesign (Cobb, 2001; Collins, 1992). Design studies involve a pronounced emphasis on the narrative report of the complex interactions and feedback cycles that can significantly blur the roles of researchers, teachers, curriculum developers, instructional designers, and assessment experts (Kelly & Lesh, 2000). Bannan-Ritland (2003) argues that a program of research is a design event. That is, a well crafted single study is "part of an entire scope of work from original idea to diffusion of results" (p. 21).

In the summer of 2006, the researchers had the opportunity to design two online courses reflecting two very different design models—one designed using a course management system and the other designed using the Community of Practice Learning System (COPLS) model (Norton, 2003). Thirty-one members of the Integrating Technology in Schools graduate cohort completed both online courses, offering the unique possibility of assessing the two designs from the perspective of the learner. Thus, this study aimed to capture students' perceptions, experiences, and preferences related to these two learning designs. Specifically, researchers asked three questions: (a) How would you describe the quality of your learning in each of these two designs? (b) What were the positive aspects of each design? and (c) What were the challenging aspects of each design?

**Teacher-Learner Participants**

In the College of Education and Human Development at George Mason University, new cohorts begin each fall with the intent of studying the integration of technology in schools (ITS) for five consecutive semesters. The first two semesters meet face-to-face on a weekly basis, taking two courses each semester. During the third semester, teacher-learners participate in an online summer session that begins in mid-May and ends August 1. Moving the work of the cohort to an online format during the summer allows students to plan vacations, teach summer school, and manage personal concerns such as childcare. The curriculum for the summer semester includes two online classes totaling six graduate credit hours.

It was during this semester in the summer of 2006 that 31 cohort teacher-learners enrolled in "Teaching with Desktop Publishing and Education Software" and "Web-Based Learning." While both of these courses were taught online, they were designed using two different design models. In addition to the role of researcher, the authors were the designers of these two online courses. The first author did not teach either course; neither author taught "Teaching with Desktop Publishing," which was designed using the COPLS model discussed as Design 2 below. The second author served as the instructor for "Web-Based Learning" which used a course management system described below as

### Table 1: Summary of Teacher-Learner Characteristics

| Gender | Female | Male | |
|---|---|---|---|
| | 74% | 26% | |
| Grade Level | Elementary | Middle School | High School |
| | 55% | 16% | 29% |
| Primary Assignment | Classroom | Instructional Support | Administrative |
| | 74% | 19% | 7% |
| Years of Experience | 1 – 5 years | 5 – 10 years | 15+ years |
| | 26% | 55% | 19% |

Design 1. A description of this role is further clarified in the discussion of the design model.

The cohort group members were drawn from multiple school divisions in the Northern Virginia and Maryland areas, all contiguous to the Washington, D. C. metropolitan area. The group represented the full spectrum of grade levels, subject areas, and teaching experience. Table 1 summarizes teacher-learner characteristics.

**Design 1—A Classroom of Many: A Collaborative Blackboard Course**

The first online course design's content focused on the study of Web-based learning environments for K–12 learners, using Harris's (1998) activity structures as a framework for organizing exploration of Web-based learning opportunities. Emphasis was placed on understanding each of the activity structures, examining and critiquing existing examples of the activity structures, completing activities within selected structures as though they were K–12 learners, and locating additional instances of these structures related to participants' content/grade level areas of classroom practice. Learning processes in this online course design were structured around five modules with each module engaging teacher-learners in a group discussion to synthesize explorations of particular activity structures, completing a collaborative group project, submitting a lesson idea for critique by group members, and individually writing a portfolio reflection. The course culminated in teacher-learners individually designing an opportunity for K–12 student learning that would implement a telecollaborative, global project.

This course was designed and taught using the Blackboard course management system. Teacher-learners were divided into small groups of five or six who shared common grade level and content responsibilities. The course instructor served as course facilitator providing overarching direction and modeling. She modeled the process of facilitation to include posting questions for discussion, summarizing and redirecting discussions, and providing feedback and assessment of both group and individual projects. During each of the five modules, teacher-learners took turns serving as peer facilitator. The responsibilities of the peer facilitator were to lead and prompt group discussions, lead in the completion of group projects, and submit group products to a shared forum. Peer

facilitators were supported by the course instructor. Through e-mail, the course instructor guided the work of the peer facilitators and served as an advisor for questions and challenges experienced by the peer facilitators.

This design is typical of current design concepts for online learning in several ways. The course's design using a course management system (CMS) reflects the domination of CMSs in higher education in the United States (Minielli & Pixy Ferris, 2005). CMSs integrate features of the Internet and the World Wide Web into a single, template-based system that facilitates the design, development, delivery, and management of online learning environments. Features frequently found in these systems include management of course information, assignments, grades, and student records, delivery of tests, posting Web-based references, and communication capabilities although all of these features were not included in the study's first design.

The research literature concerning online learning designed with course management systems is robust. According to Meyer (2002), online students learn at least as much as students in face to face courses. Several studies have suggested that online learning environments lead to isolation, frustration, boredom, overload, and low course completion (Berge 1999; Hara & Kling 2000; Northrup 2002). Tricker, Rangecroft, Long, and Gilroy (2001) reported that course materials must be of high quality, that assignments must be professionally meaningful, and that high quality feedback and communication is essential. In a study of students and instructors, Spangle, Hodne, and Schierling (2002) found that written communication skills, careful design of activities that promote discussion, and timely feedback were essential in successful online courses. In a study conducted by Young (2006), online students stated that effective online teaching reflected instruction that adapted to student needs, provided meaningful examples, motivated students to do their best, facilitated the course effectively, delivered a valuable course, communicated effectively, and showed concern for student learning.

Perhaps the most distinguishing attribute of an online design model that makes use of course management systems is reliance on the group discussion board where students are either encouraged or mandated to initiate and respond to posted questions. In this design, participants have "a responsibility to each other to communicate in a timely and professional manner" (Young, 2006). This is best characterized as public communication. If carefully planned, these public online discussions can enhance collaboration and conversation among students especially if promoted by the course instructor (Maloney, 1999; Northrup 2002). They offer a place from which to discuss and negotiate meaning in an aggregate fashion (Young, 2006). Generally, postings are structured by teacher-mandated responses based on a teacher's or designated student leader's posited question or synthesis of the current discussion. Social consensus rather than debate most generally characterizes these discussions (Flores, 2006).

### Design 2—A Classroom of One: A Mentor-Learner Course

The mentor-learner course was divided into two components. The first component (2 credit hours) focused on the role of desktop publishing tools and

design principles in K–12 classrooms. Emphasis was placed on creating desktop published materials for use in the teacher-learner's content/grade level; studying and implementing design principles—contrast, repetition, alignment, and proximity (Williams, 2003); studying and implementing the design process—design, encode, assemble, publish, revise (Norton & Sprague, 2000); and connecting design principles and processes to K–12 classroom practice.

The second component (1 credit hour) focused on the role of a variety of additional educational software applications for use in K–12 classrooms. Applications addressed in this component included skill software, integrated learning systems, spreadsheets, programming and calculators, problem-solving software, and simulation software. Both components of the course were guided by an authentic education problem to be solved—developing strategies for school-wide production of professional communication by both teachers and K–12 learners in the desktop publishing component and responding to a PTO call for software requests after a fundraising event. Each component was divided into modules with textbook and Internet readings, an activity synthesizing the readings, tutorials, and applied projects. Each component culminated in the preparation of a solution to the guiding problem.

All materials were Web-based and accessible from a course Web site where materials were organized using a notebook metaphor. Each of the 31 teacher-learners was assigned one of eight mentors with expertise in both the course content and the process of mentoring online. Although mentors worked with more than one teacher-learner, they treated each teacher-learner individually, and there were no interactions between teacher-learners. Interactions focused on one-to-one mentor-learner exchanges over the duration of the course. The mentor role was designed to provide answers to teacher-learner technology questions, assist and encourage with issues of self-regulation and work flow, modify activities to meet teacher-learner's individual needs, provide feedback on submitted activities and projects, and most importantly to prompt teacher-learners to connect what they were learning with their practice. Interactions with the mentor were predominantly e-mail based. However, a synchronous tool (DigiChat) was available and used when appropriate.

The second online design was based on the Community of Practice Learning System (COPLS) design model (Norton, 2003). COPLS offers an alternative to traditional CMS-based online courses. This model centers learning at the intersection of a representative or authentic problem, Web-based instructional support materials, and frequent interactions between the learner and an expert mentor. It represents an effort to create a model for the design of online learning environments that is responsive to the world of learning in natural, informal contexts; that reflect learning characteristics evolving in a high technology society; and that expect richer and deeper understandings or learning outcomes associated with situated, authentic opportunities for learning. The COPLS model situates learning in problems derived from the context to which the content of learning pertains, builds bridges between knowledge and action/learning and practice, and promotes the learner's ability to create meaningful understandings by scaffolding learning in the context of interactions with an expert mentor. To

understand the COPLS model, abandon the notion of a classroom of many and think of a classroom of one.

This model represents a significant departure from the dominate use of course management systems in the design of online learning. As such, it creates learning conditions that The Design-Based Research Collective (2003) describes as reflecting features that "learning theory suggests are productive, but that are not commonly practiced or are not well understood" (p. 5). The learning theory that directs this models lies at the intersection of knowledge about communities of practice (Lave & Wenger, 1991), authentic learning (Brown, Collins, & Duguid, 1989), anchored instruction (Bransford, Sherwood, Hasselbring, Kinzer, & Williams, 1990), performances of understanding (Blythe & Associates, 1998), mentoring (Norton, 2005; Zachary, 2000), and expertise (Bereiter & Scardamalia, 1993).

Perhaps the most distinguishing feature of this design model is the emphasis on private communication. That is, discussion and negotiation of meaning center not on a peer group with facilitation from an instructor but on the more intimate back and forth conversation between learner and mentor. Guided by the process of preparing, negotiating, enabling, and closing (Zachary, 2000) the mentor and learner discuss content and bridges to practice in a private dialogue focusing on a kind of reflective and critical inquiry. To the dyad, the learner brings personal meanings, images of their own contexts and experiences, and personal concerns and interpretations of shared course resources. To the dyad, the mentor brings not only their personal meanings, contexts, experiences, and interpretations but their expertise concerning the contents of the course. Expertise is presented by Bereiter and Scardamalia (1993) as a reflection of "effortfully acquired abilities, abilities that carry us beyond what nature has specifically prepared us to do…" (p. 3). An expert is one who has progressively advanced on the problems constituting a field of work (in this case educational practice) and brings to the solution of problems factual knowledge, procedural knowledge, informal knowledge, impressionistic knowledge, and self-regulatory knowledge. The learner and the mentor collaborate in a kind of intellectual apprenticeship, negotiating both meanings and implications for practice of those meanings.

**Collecting Teacher-Learners' Responses**

In the summer of 2006, students began work on both courses in the middle of May and were required to complete all assignments by July 31. In the course designed within the structure of the course management system, the work of teacher-learners was structured to be completed in 10 weeks and, of necessity, all teacher-learners progressed at the same pace. In the COPLS model, students were able to structure their own work individually and in collaboration with their online mentor.

Students were asked to complete a survey in the final week of the summer session. Survey questions are presented in Table 2 (p. 482). The survey was sent electronically as an attachment and returned to the researchers as an attachment. Teacher-learners were asked to respond to seven open-ended prompts designed to elicit their perceptions of the two learning environments. Some

**Table 2: Survey Questions**

1. How would you describe what online learning is like using the Blackboard format?
2. How would you describe what online learning is using the Learner-Mentor format?
3. Use the following table to describe the positive aspects of each format? With your cursor in the last cell, press return for more rows.

| Blackboard Format | Learner-Mentor Format |
|---|---|
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

4. Use the following table to describe the challenging aspects of each format. With your cursor in the last cell, press return for more rows.

| Blackboard Format | Learner-Mentor Format |
|---|---|
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

5. Use the following table to recommend changes you would suggest in the design of each format—both content and process? With your cursor in the last cell, press return for more rows.

| Blackboard Format | Learner-Mentor Format |
|---|---|
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

6. In narrative form, compare the quality of your learning in the two environments.
7. In narrative form, compare the experience of working with a peer and a course facilitator and working with an online mentor.
8. If you were going to take another online course which format would you choose? Why?

prompts suggested using bulleted remarks while others sought more narrative reflections. Teacher-learners were encouraged to be open and honest but no confidentiality was assumed. Completion of the survey was optional, and there were no grade consequences attached. Since teacher-learners were in the third semester of their coursework and familiar and comfortable with the researchers, there were no concerns about their reluctance to express opinions and reactions. The survey prompts were not comparative in nature. Rather, teacher-learners were asked to describe their perceptions of and experiences with each learning environment. Twenty-seven surveys were received for a return rate of 87%.

Although design-based research would suggest a comprehensive look at the two designs from multiple systemic perspectives, this research report focuses on teacher-learners' perceptions and reflections specifically on the nature of the design of the two learning experiences. The survey results were in bulleted and narrative form so a predominantly qualitative approach to data analysis was selected. Qualitative analysis procedures emphasize the view of the participant and interpret the subject of study from his or her perspective. This process is inductive in that themes emerged during the process of coding and organizing data.

As a first step in analysis, the researchers used a categorizing process identified by Maxwell (2005) as coding. In the coding process, teacher-learner responses were organized into four pre-established topics: Positive aspects of the Blackboard design, Positive aspects of the COPLS design, Negative aspects of the Blackboard design, and Negative aspects of the COPLS design. As a second step, data was fractured (separated from its context) and rearranged into the pre-established organizational topics anticipated by the researchers. As a third step, each organizational topic was coded into substantive categories as the researchers used the organized data to describe teacher-learners' perceptions about each of the two learning environments. Finally, researchers examined the substantive categories and identified three themes: Self-regulation, Role of the Facilitator/Mentor, and Influence of the Group. Representative quotations were selected to reflect teacher-learners' voice.

In two cases, it was appropriate to summarize teacher-learner responses as percentages. In the survey prompts that asked about the quality of learning in each of the two designs and about student preference for one or the other design, it was possible to summarize responses as a percentage. Results are presented below.

## RESULTS
### Quality of Learning

The first research question asked: How would you describe the quality of your learning in the two environments? Analysis of teacher-learner responses indicated that the Blackboard and the COPLS course were positive learning experiences, and distinctions between the two learning environments were not related to quality. No respondents indicated concerns about or inadequacies in the quality of their learning. Teacher-learners generally agreed that the quality of their learning was robust, challenging, and positive. Sixty-three percent of

teacher-learners stated that the quality of their learning in the two courses was equal; 15% stated a preference for the Blackboard learning environment; 11% preferred the COPLS learning environment; and eleven percent made no comment. Supporting the equality of their learning experiences, one teacher-learner wrote, "I acquired valuable knowledge in both environments. The quality of my learning was very high in my opinion. Both environments challenged me mentally and creatively." Another wrote, "Both environments have allowed me to evolve to a new level as a learner, educator, and person." Several teacher-learners expanded their reflections to include awareness that the two environments were different learning experiences. One wrote, "The learning methods were different but the quality was excellent in both." Another wrote, "The quality of the learning was relatively equal just through different styles. Both courses explored different processes but I learned a lot from them both."

Fifteen percent stated that the quality of their learning was better in the Blackboard environment. Comments included, "I learned more in the Blackboard course, but that was because of the content not because of the format," "Overall I thought the quality of my learning in the Blackboard course was better … much of the material [in the COPLS course] was not new to me," and "I learned a lot of new information from it." One commented, "I learned more in the Blackboard course because I applied myself more. The content was interesting and engaging." Eleven percent stated that the quality of learning was better in the COPLS environment. Comments included, "I learned more [in COPLS] because it interested me more. I found it more useful," "I learned more [in COPLS] because [it] was more hands-on," and "I felt more learning occurred [in COPLS]. By this I mean the content we learned was very practical to our needs." When teacher-learners distinguished the quality of their learning based on learning environment, it was the course content that impacted their belief about the quality of learning not the learning environment. Two students (7%) reported that they could not comment on the quality of the courses because the "nature of the content was completely different in each." Finally, one teacher-learner (4%) made no comments about the quality of his learning experience.

While the majority believed the learning environments were equal in quality, there remained a definite preference for one format over the other. When asked which format teacher-learners would choose when taking another online course, 30% of the teacher-learners chose the Blackboard format as their preferred learning environment. Group interaction and the structure afforded by Blackboard to keep learners on task were the reasons teacher-learners expressed for their choice. As one teacher-learner wrote, "I would probably choose Blackboard because it is more structured and it keeps me on a schedule." Another wrote, "I think that there is a lot to be learned from others and that is just not really possible when you are working independently." Fifty-two percent of the learners indicated that the COPLS environment would be their choice. There were three main reasons consistently cited for this decision. One reason centered on the ability to work at one's own pace: "I liked to work at my own pace and get things done a bit ahead of schedule most of the time. I also liked this course better because I did not have to wait for any of my peers to complete

assignments." A second reason for choosing the COPLS model was reliance on self to complete work: "I think I learn better when I am responsible for the work." The final reason was the consistent presence of and interactions with an expert: "Using a mentor kept my attention and I appreciated the expert feedback. I suppose I like a true and tested leader.... I also liked the relationship and one-on-one teaching that occurred in the mentor format." For 18% of the teacher-learners, the choice of format did not matter or depended on the content to be learned. One wrote, "Either, I enjoyed both experiences.... I found them to be effective ways of learning and processing new information." Another wrote, "If I were going to learn how to use a specific software tool, I would choose an online mentor [COPLS]. If not, I would choose a course using discussion forums [Blackboard]."

### Perception of Positive and Challenging Aspects of Each Learning Environment

To answer the second and third research questions—what were the positive aspects of each environment and what were the challenging aspects of each environment, surveys were qualitatively analyzed to identify emerging themes related to the guiding research questions. Teacher-learners' comments about the positive and challenging aspects of each learning environment focused on three themes: issues related to self-regulation, the impact of the facilitator or mentor, and the influence of either the presence or absence of a peer group.

#### Self-Regulation

As teacher-learners reflected on their experiences in both learning environments, all of them commented that the demands on managing their time and the workload were much more difficult than they had anticipated. They had expected a lighter workload and more time free from their studies. They were surprised at the amount of work and time commitment that succeeding in an online course demanded. Their survey responses reflected comments like "[I felt] tied to the computer," "both courses were much more work than I anticipated," "there were a lot of assignments for such a short period of time," and "the challenge in both courses was the time involved." These issues of coping with a demanding workload and unanticipated time commitments impacted how they perceived each of the learning environments, noting both positive and challenging aspects related to issues of self-regulation.

Teacher-learners remarked that the structure of Blackboard with specific timelines for completing modules and a group format allowed them to offload self-regulation requirements, centering self-regulation externally in the features of the learning environment. Comments such as "I felt pressure from my group because they were good and dedicated. I think that was really good for me" represent this feature of the Blackboard design. Others remarked that Blackboard "really forces me to stay on task and to stay disciplined in turning in assignments," "is more structured and it keeps me on a schedule," and "forced me to stay on top of things." Conversely, some teacher-learners felt the structure of the Blackboard environment interfered with their ability to structure their time in such a way that they could complete assignments in a timely fashion. They ex-

pressed difficulty "finishing on time" and "keeping it a priority." One summed it up by stating, "If you are the type of person who likes to get things done right away and your group members are the opposite that causes added stress."

Issues related to self-regulation were also an important part of teacher-learners' perceptions of the COPLS learning environment. A majority of the teacher-learners noted that in the COPLS model self-regulation moved from the external regulating features of Blackboard to the need to take charge of their own self-regulation. Responses included, "I was having to constantly evaluate myself and my work," "responsibility falls on the individual making him/her more disciplined," "didn't need to rely on anyone else to complete assignments on time," and "I like to take control of my learning whenever possible." One respondent felt that the design of the COPLS learning environment is one where "you can't escape your duties and obligations." There were no direct references to self-regulation challenges associated directly with the COPLS model although one teacher-learner did write that "The [COPLS model] gave me too much flexibility." Challenges associated with the model emerged more directly in later themes associated with the absence of a group.

### The Role of the Facilitator and the Mentor

Whether learning in a classroom of many like Blackboard or a classroom of one like COPLS, teacher-learners were never alone. The design of both learning environments included the presence of a guide with expertise in the content and some level of skill in teaching online. In Blackboard, this included a course instructor knowledgeable about Web-based learning and peer facilitators who received additional support from the course instructor. In COPLS, this was reflected in the role of the online mentor who had both theoretical and practical experience with desktop publishing and educational software in the K–12 classroom. The role of the course instructor, the peer facilitator, and the online mentor was perceived by teacher-learners to have a significant impact on their learning experience and perception of the learning environment. When teacher-learners perceived the instructor/facilitator/mentor as skilled, knowledgeable, and responsive, that role was viewed as a positive contributor to their perception of the learning environment. When teacher-learners perceived the instructor/facilitator/mentor as unresponsive or not thoughtful about the course content, the role was viewed as interfering with the quality of their learning and learning experience.

In the Blackboard learning environment, there were both a course instructor who served as master facilitator and rotating peer facilitators. There were many positive impacts expressed by teacher-learners concerning the role of the course instructor. The course instructor was viewed as supportive, encouraging, and important. Teacher-learners appreciated the feedback of the course instructor and remarked many times about the importance of the thought-provoking questions asked by the course instructor. Two responses capture the essence of the positive impact of the course facilitator: "The discussion was better when [the course instructor] was part of them—maybe because she had a better focus of where she wanted it [the discussion] to go," and "My experience with work-

ing with [the course instructor] was great! She was very organized, efficient, available, encouraging, and helpful. She kept the group on track at all times and was always there to offer suggestions, positive feedback, or clarifying directions. The course ran very smoothly. Having a dedicated facilitator is what makes or breaks this type of an online course." Only one teacher-learner viewed the peer facilitator's role as contributing to the positive aspects of the Blackboard course: "Working with peer facilitators and working as a peer facilitator was very powerful." Three teacher-learners commented on the ability to experience the facilitator's role as a positive aspect of the Blackboard course. In many instances, however, teacher-learners found working with a peer facilitator to be a challenging aspect of the Blackboard learning environment. One wrote, "Working with a peer facilitator has definite drawbacks. The quality of discussion and group products depends entirely on the motivation and commitment of the student facilitator."

In the COPLS learning environment, the online mentor's role was viewed as positive when it included mentors who provided timely answers to teacher-learner technology questions, gave supportive assistance and encouragement, worked with teacher-learners to modify activities to meet their individual needs, were prompt in providing insightful feedback and recommendations, and asked evocative questions that extended teacher-learner thinking and helped them connect their learning and their practice. One wrote, "I was more comfortable working with a mentor—the questions were more pointed—the answers more sure." Another wrote, "You will absorb valuable insight from your online mentor in the responses she has to your work. Working with an online mentor was a great experience. Communicating one-on-one enabled me to gain almost immediate feedback to questions and projects completed." A third wrote, "I enjoyed the role of the mentor.... I appreciated the expert feedback.... I also liked the relationship and the one-on-one teaching that occurred." Finally, one teacher-learner stated, "[My mentor] was very quick to respond to my questions, problems, and submitted projects. She always came back with positive feedback, thought-provoking questions, helpful suggestions, and encouraging comments and compliments. It was comforting to have that kind of support and encouragement through these sometimes overwhelming courses."

Conversely, when the online mentor failed to provide timely feedback, minimized interactions with teacher-learners, and was not receptive to the individual's learning needs, the role of the online mentor was perceived to be a challenging aspect of the learning environment. Representative of the challenges expressed by teacher-learners, one wrote, "There were times when my mentor was away from the computer for an extended period of time. This impeded my progress as I couldn't continue without her feedback on some assignments." Another wrote, "Even though we had an online mentor, it did not make a difference. The online mentor helped as much as she could but it was difficult for me to ask her questions." A third wrote, "Working with the online mentor was more difficult. It was hard to know where the mentor was coming from with comments; it takes more time to develop a rapport with a disembodied e-mail...." Finally, one teacher-learner wrote, "You are your own teacher."

*The Influence of the Group*

In the Blackboard course, the role of the group had a significant impact on teacher-learners' perception of the learning environment. The group was sometimes seen as a powerful source of support, insight, and collaboration. Other times, the group was seen as a strong impediment to learning. While there was no group in the COPLS model, the influence of the absence of a group was seen to impact teacher-learners' perceptions as strongly as the presence of a group in the Blackboard learning environment. Some of the teacher-learners saw the absence of a need to work collaboratively as a positive aspect of the CO-PLS model; others missed the opportunity to collaborate with peers. In many ways, the absence of the group allowed teacher-learners to take more control of their time and work flow while others felt the absence of a group left them without external pressure to adequately manage time and work. While this relates to the previous theme of self-regulation, it is less a function of self-regulation and more a function of the absence of a group inherent in the COPLS classroom of one design.

In the Blackboard learning environment, the group was perceived as a powerful source of varied perspectives, peer feedback, sharing of ideas, and structure for the learning process. Comments included, "having a sounding board was a positive aspect of group experience," "getting different perspectives," "a feeling of human interaction without face-to-face contact," and collaborating "led to better products overall." One student elaborated, "I feel like our group bonded. Not only did we go through an online class together, we watched each other get married, get engaged, and have children all the while encouraging each other. If someone was having a rough patch, the others picked up the slack." Another felt, "Learning in a group environment enabled me to learn from group members whose opinions, feedback, insight in discussions, in my lesson ideas, and in projects have affected me positively." Finally, one teacher-learner wrote, I learned so much from my peers' thoughts, ideas, and classroom experiences. I think so much more can be learned and accomplished when brainpower is combined and utilized."

The role of the group in Blackboard, however, was not always viewed as a positive aspect of the learning environment. Instead, it was frequently seen as source of frustration. Responses reflecting this frustration included dissatisfaction with the "uneven participation by different people in the group." Members found it "challenging and frustrating when group members vary in their levels of commitment." Teacher-learners found it a challenge to wait "on group mates to do their part" and to maintain "meaningful dialogue when postings are randomly performed." One teacher-learner was "hesitant to post information because others used it without contributing themselves." The attitude of many of the teacher-learners was captured by this response: "I acknowledge that people work at a different pace. However, at times, I felt that a few individuals in the group carried others. I felt this to be very unfair."

In the COPLS learning environment, the absence of the group was viewed as a positive feature by some of the teacher-learners. Its absence allowed them to "work at my own pace," and "make my own schedule." One wrote that a posi-

tive aspect of the COPLS model was that she had a "stronger sense of owner-ship of work done well since I am the only one doing it." Another wrote, "I'm a bit of a perfectionist so it is really hard to for me to entrust the final project to anyone other than myself." Finally, one teacher-learner wrote, "I like to be in control of my learning whenever possible and I struggled slightly with the group work…. I found the difficulty in working every day. When things got especially chaotic in my personal life, I sometimes found it difficult to work the [Blackboard] class into my schedule. Whereas, the [COPLS] coursework I could do a lot one day and a little the next day. I think the freedom of the [CO-PLS] course worked better for my schedule." Conversely, many teacher-learners missed the support and sharing of the group. They missed having classmates to "discuss and compare assignments" and "to share the workload." They felt the absence of the group put pressure on them to be more accountable. The response that best captures the feeling of the teacher-learners stated, "It seems more difficult to not have peers to compare how you are doing."

## CONCLUSIONS

At least two options exist for the design of online learning environments: an approach that uses the more traditional course management system design that includes multiple students, group discussion, and a shared timeframe for progressing through assignments and an approach that uses an individual-ized approach where the mentor-learner dyad structures the flow of work and conversation as well as the flexibility to negotiate timelines, assignments, and interactions (COPLS). Both options support high quality learning experiences for teacher-learners with neither emerging as better or more popular. Teacher-learners stated that the quality of learning in both learning environments was equal yet indicated clear distinctions between the two learning environments. The majority of teacher-learners were able to choose between the learning envi-ronments when given an opportunity. Study results suggest a slight preference for the COPLS model although no overwhelming preference in favor of one model over the other emerged. There was some evidence of a relationship be-tween content and learner characteristics as influences in their choice of learn-ing environment.

Despite the apparent equality of the two learning environments, aspects of the design of each emerged as influential in impacting the learning experience of teacher-learners. The ways in which each learning environment affected per-ceptions of self-regulation, the role of the instructor/facilitator/mentor, and the influence of the group emerged as dominating themes. The Blackboard learning environment was perceived as an external affordance for self-regulation while the COPLS learning environment was perceived as requiring internal self-regu-lation. This difference was seen by some as positive and others as presenting a challenge.

Regardless of the learning environment, the role of the instructor/facilitator/ mentor was essential. When the role was implemented with rigor and atten-tion, it was a significant factor in enhancing the learning experience. When the teacher-learners perceived a lack of attention and rigor in the implementation of

the instructor/facilitator/mentor's role, it was a significant factor in diminishing the learning experience.

Finally, the Blackboard learning environment was perceived as affording collaborative activities when group members participated while the lack of participation was perceived as a negative influence. Likewise, the COPLS learning environment's focus on the mentor-learner dyad was perceived as affording learner control while simultaneously lacking the input of peers and the sharing of work.

This reinforces the need to give careful attention to the relationship between the structure of the learning environment and the three factors of self-regulation, the role of the instructor/facilitator/mentor, and the role of the group regardless of learning design.

- It is essential that aspects of the learning environment facilitate self-regulating activities for learners. The design of the learning environment must include features that scaffold time management, pacing of work, timely completion of tasks, the use of appropriate learning strategies, and a learner's sense of ability to succeed.
- It is essential that those who choose or are asked to serve as instructor, facilitator, and/or mentor are well prepared to carry out the role of a skilled online guide. Those who serve in this role must understand the online learning process, the structure of the learning environment, the need to build relationships with learners, strategies for supporting and promoting learner self-regulation, and methods for summarizing and evoking student learning by asking thoughtful questions, building connections with prior learning and with future practice, eliciting reflective thinking, and promoting problem-solving.
- It is essential that designers carefully consider the implications of structuring learning with or without a group. If the learning environment creates a classroom of many, strategies must be included that support the work of the group to encourage robust and productive participation, cope with groups or group members who do not experience successes, and help group members develop questioning, collaborating, and reflecting practices. If the learning environment creates a classroom of one, strategies must be included that insure frequent and meaningful interactions between mentor and learner, focus attention on the relationship of the mentor and the learner, provide sufficient examples and perspectives, promote prompt and in depth feedback and exchange of ideas, and maximize the potentials inherent in a flexible learning environment.

This design-based research supports one central theoretical tenet of design and challenges a second. The research supported the generalizable notion that any design for learning must center on the interactions of at least three design features: scaffolding the self-regulatory behaviors of students, careful crafting of the actions, dispositions, and role of the teacher/mentor/facilitator, and structuring the role of peer interactions. This is a reaffirmation of long standing notions about the essential attributes of any learning context.

The second consideration is more novel. That is, there may not be a theory of design ubiquitous to all design models. While it is important to consider the attributes of self-regulation, the role of the teacher, and peer interactions, the function and impact of those attributes are not uniform across designs. Rather, different design features influence self-regulation, teacher role, and group interaction differentially. This suggests that the essence of design theory(s) may lie most centrally in the clear and insightful articulation of goals and outcomes prior to the selection of secondary design features, reiterating the claim made by Cobb et al. (2003) that although design-based research is conducted to develop theories "these theories are relatively humble in that they target domain-specific learning process" (p. 9).

The current study represents one design event in the cyclical and iterative nature of design-based research. By introducing a second design model (the COPLS model) as a not commonly practiced or not well understood design alternative, the researchers were able to compare and contrast through the perceptions of the learner the impacts of two design models—the more conventional classroom of many model and the alternative classroom of one model—on the learning experience.

There are a number of limitations to this study. Researchers did not control for mentor nor investigate how different mentors impacted teacher-learner experiences. The content of the two courses was different and thus, the relationship between design and content were not explored.  In addition, the study did not address individual learner characteristics such as learning style, approach to learning, motivation, and learning strategies as they might have influenced teacher-learner perceptions of the two designs. Finally, the study did not examine the actual e-mails from the COPLS design model or the discussion threads related to the course management system design. These limitations are discussed below in the context of recommendations for future research.

While the results of this study suggest an equality in the two designs' power to deliver quality learning experiences and the importance of self-regulation, instructor/facilitator/mentor role, and the impact of the presence and absence of group interactions as central design considerations, results also raise several questions. A number of teacher-learners identified the nature of course content as a variable influencing their assessment of the two design models.  The relationship and interaction of content and design model represents an unexplored venue for design-based research. What if the content of the two courses and their respective design model were switched? Would teacher-learners view their learning experiences differently?  Are some domains of knowledge best mastered in one model or the other?

As one research project within the larger domain of online learning design research, this study focused on the perceptions of learners, asking them to reflect on their learning experience.  The study did not, however, address learner characteristics such as learning style, approach to learning, motivation, and learning strategies. Thus, conclusions that might offer learners the ability to choose a design model as the most appropriate learning model for them are not possible.

Future research that identified learner characteristics prior to the learner's online experiences would enable researchers to assess the relationship between design model and learner characteristics.

The comparison of the two design models in this study pointed to the influence of the instructor/facilitator/mentor. If the learner perceived this role within each design model as well implemented, they reported a positive learning experience. If the learner perceived this role within each design model as poorly implemented, they reported a less positive learning experience. Given this connection, there is much to be learned about the relationship between online learner and online teacher. The design model structures the nature of the relationship. In the conventional course management design model, the relationship is of one to many while in the COPLS design model the relationship is one-on-one. The attributes of the teacher and their skill set are different. Similarly, the interactions of learners with the teacher require different skill sets. What learner skill sets are necessary for interacting with the teacher in each design model? What effective teacher attributes and instructional strategies are necessary for interacting with learners in each design model? What might be features of a design model or models that scaffolds these interactions in ways that best support robust learning outcomes?

The course management design model was structured to emphasize public, peer discussion, and product development; the COPLS design model was structured to facilitate private, one-on-one interactions and discussions. Results of the study suggest that teacher-learners both appreciated features of both and struggled with both. If there was an emphasis on public discourse as the central design feature, teacher-learners appreciated the sharing of ideas and products while expressing frustrations with lack of learner control and reliance on peers. If there was an emphasis on private discourse as the central design feature, teacher-learners appreciated the ability to control their learning but expressed a sense of loss at the lack of shared examples and ideas from peers. Is it possible to develop an online design model that captures the features of both—that scaffolds both public and private discourse?

Results of this study point to several design innovations that might represent direction in the design-based research process related to the development of robust online learning experiences. All indication is that online learning will continue and likely expand as an avenue for offering learning opportunities to today's learners. Design-based research as an emerging research paradigm offers educators and researchers a powerful means of addressing the complexities that are the hallmark of educational settings. Viewing each design opportunity as a design event in the iterative and continuous research process supports the creation of robust online learning opportunities while simultaneously extending knowledge that leads to the development of generalizable learning theories. It arms researchers with insights that promote thinking deeply about the design of online learning environments. Perhaps more important, it offers a research approach that avoids seeking final answers and opens avenues, guidelines, and theories to promote continuous innovation.

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