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Beyond a Digital Status Quo: Re-conceptualizing Online Learning Opportunities

Ellen B. Meier

According to the popular press and many policy pundits, online learning represents the next educational leap forward. Extraordinary claims have been made in the name of e-learning, including the assurance of educational equity, personalized learning for all, and significant cost savings for students — to name just a few. At the same time however, few policymakers are asking substantive questions about the educational nature of online learning environments. How are the classes organized, and what learning theories shape the design of these digital environments? What skills are needed to teach online and how are instructors prepared to teach in these new environments?

Online approaches are increasingly criticized because they often simply replicate current class structures, without taking full advantage of the affordances of technology or of the emerging understandings of learning (Hemmi, Bayne, & Landt, 2009; Watters, 2014). Over the last twenty years, researchers have advanced our understanding of the learning sciences, motivating educators to move from simple “transmission” teaching approaches toward the creation of environments that encourage learner-centered, knowledge-centered classrooms (Bransford, Brown, & Cocking, 2000). This shift has significant implications for online learning.

In the design of online courses, there are three critical questions directly related to this shift:

1. Is the course based on learning theories that reflect developments in our understanding of learning?
2. Does the course design reflect these underlying theories to address the needs of a range of learners?
3. Are instructors adequately prepared for teaching and facilitating in new learning environments?

These questions are key to advancing the field of academic online learning. Online programs that miss the opportunity to re-imagine online environments run the risk of codifying past educational practice in a digital form — merely digitizing the status quo.

Background

The recent growth in online courses for higher education has been explosive. In 2014 the World Bank estimated that the global online higher education population was increasing annually at a 25% rate, from 200 to 250 million (Johnson, Adams Becker, Estrada, & Freeman, 2014). As undergraduate and

graduate students continue to enroll in online courses, it is increasingly important for educators to address the question of the educational nature of the online experience.

One of the great promises of online learning is that more students — a broader range of students — will have increased access to higher education. These students must also have access to engaging online learning opportunities, which requires creating learning environments that can address a range of student needs.

Typically, higher education online courses are offered through learning management systems (LMSs), which most often structure a course by breaking up subject “content” into small pieces and supplementing it with additional activities (e.g., discussion boards) as part of the student-teacher interaction (Watters, 2014). On the one hand, this makes perfect sense; educators are repackaging traditional “chalk and talk” educational courses in a recognizable form, accessible to students who are not able to travel to campus, or who want to take a course not offered in their college or university. Materials are available any time the student logs into the course. Making courses accessible is desirable because the learning is not limited by time and place, giving students more options and opportunities.

On the other hand, simply providing access does not represent an evolution in education.

[O]nline learning has been poorly defined and theorized, with little explication of which pedagogies, approaches, tools and environments should be used, under what conditions, for the best results. (Harasim, 2012, p. 87)

Putting traditionally organized classes online — classes that often follow a basic transmission approach to learning — fails to take advantage of what educators have learned about learning and the use of technology.

At the turn of the century, Scardamalia & Bereiter (1999; 2006) identified the importance of moving beyond a conceptualization of education as “knowledge transmission” to define education as “knowledge building.” They stress the importance of students working together to address issues and problems of substance. They delineate a three-stage progression: knowledge acquisition, knowledge-building, and knowledge refinement, using scaffolding approaches to learning (Scardamalia & Bereiter, 1994).

Sustained knowledge advancement is seen as essential for social progress of all kinds and for the solution of societal problems. From this standpoint the fundamental task of education is to enculturate youth into [a] knowledge-creating civilization and to help them find a place in it. (Scardamalia & Bereiter, 2006, p. 98)

Students who are expected to “build” knowledge need different learning environments, however, from students in the traditional, more passive online role of knowledge consumers. In Scardamalia

& Bereiter's framework, students are considered to be active participants in their own learning, using technology to create learning communities. With help, educators can shift the learning paradigm to empower students as active knowledge creators

Many claims have been made about the benefits of online learning, yet few studies address the fundamental elements crucial to achieving paradigm shifts in online classes. These shifts are fundamental to address our changing expectations for learning (Bransford et al., 2000; Darling-Hammond & Bransford, 2005). Educators will need support in order to move away from "business as usual" transmission teaching and learning — away from digitizing the status quo — to build creative online learning opportunities for all students. More investment is needed to explore innovative digital environments that can scaffold knowledge-building effectively.

Definitions, Parameters, and Perspectives

Brown, Charlier, & Pierotti (2012) identified a total of 46 different, overlapping expressions used in descriptions of online learning. For the sake of this discussion, online learning is defined as an educational environment that uses technology to some degree to enhance learning. Online learning in this sense includes both "blended learning" (environments that use technology for some part of the teaching experience) and learning that takes place entirely online. Massive Open Online Communities (MOOCs) are not specifically addressed in this discussion because of the differences in scale. Although the general critique of online courses offered in this analysis may apply to MOOCs, the design implications may be different. Distinct design considerations may be necessary when building a learning environment for a class with thousands of students.

Assumptions about Learning

Learning theories are often implicit in the work of educators; this seems to be particularly true with online learning. Today's instructional designers, instructors, and even the learning management systems (LMSs) themselves incorporate a veritable potpourri of learning activities, typically without an explicit theoretical rationale.

In their seminal book on learning, Bransford, Brown, & Cocking (2000) trace the historical evolution of learning theories, from behaviorism, to cognitivist approaches, to constructivism. They explain that:

[T]he new science of learning is beginning to provide knowledge to improve significantly people's abilities to become active learners who seek to understand complex subject matter and are better prepared to transfer what they have learned to new problems and settings. (p. 13)

Various learning theories bring with them different ways of looking at the learning process and different approaches for using technology. Chris Dede (2008), drawing on the work of Dabbagh (2006), identifies these same three theoretical perspectives – behaviorist, cognitivist, and constructivist —

and describes the use of technology associated with each approach.

Behaviorist approaches assume a reality that is objective and external: learning is achieved through experience. Dede (2008) notes that, from a behaviorist perspective, the purpose of education is for students to learn to discriminate, generalize, associate, and automatically perform a specific procedure (p. 46), often through some sort of reinforcement. He identifies computer-assisted instruction (CAI), and learning management systems (LMSs) as closely associated with this behaviorist approach.

Cognitivist approaches, according to Dabbagh (2006) and Dede (2008), while also based on the assumption that there is an objective reality, assume that students acquire knowledge by building on “preexisting relationships among content and skills” (Dede, p. 48). Instructors present knowledge in ways that help students to retrieve and apply information, and to set their own learning goals and monitor their personal progress. Intelligent tutoring systems are an example of technology based on this cognitivist approach (Dede, 2008, p. 49).

Constructivist approaches assume that students themselves will create meaning as they actively work to integrate their experiences (Siemens, 2005). Students develop new knowledge based on their existing knowledge, including sociocultural perspectives (Dede, 2008, p. 50). They are motivated to learn because of curiosity, interest in the subject and the potential for exploration. Here, the learning activities are authentic, and the teacher serves as a guide. From this learning perspective, technology tools (e.g., science probes) often are used to do simple tasks to help students “focus on complex skills” (p. 52).

Scardamalia & Bereiter (2006) claim that they go beyond this constructivist approach, identifying students as active participants in the larger societal enterprise of building our understandings as a society.

Knowledge building... represents an attempt to refashion education in a fundamental way, so that it becomes a coherent effort to initiate students into a knowledge creating culture. Accordingly, it involves students not only developing knowledge-building competencies but also coming to see themselves and their work as part of the civilization-wide effort to advance knowledge frontiers. In this context, the Internet becomes more than a desktop library and a rapid mail-delivery system. It becomes the first realistic means for students to connect with civilization-wide knowledge building and to make their classroom work a part of it. (p. 98)

From this perspective, students occupy the center of a learning process that includes all of society. The teachers have the important responsibility of scaffolding the learning. They consider the Internet critical to linking the students to resources, including content experts and peers. Learning is structured through thoughtful exchanges with the students, as students are helped to pursue their investigations, identify important data sources, organize the data, and present their iterative understandings of a problem — thus building their knowledge within a community of learners.

Some have credited Scardamalia & Bereiter with essentially defining a fourth, emerging learning theory for the twenty-first century. Harasim (2012), for instance, describes “Online Collaborative Learning” as a direct outgrowth of Scardamalia & Bereiter’s work, which uses collaborative community tools in online environments. Others have named some of these same ideas “Connectivism” (Downes, 2004; Siemens, 2004). Kop & Hill (2008) note that Connectivism wants to be understood as “a learning theory for the digital age” replacing older theories that are no longer adequate to explain developments in learning (p. 1). The heart of Connectivism is the belief that knowledge is fluid and distributed among the online learning community, where individuals can work together on learning issues. Siemens (2004) argues that with the introduction of digital technology a new learning theory is needed:

Over the last twenty years, technology has reorganized how we live, how we communicate, and how we learn. Learning needs and theories that describe learning principles and processes should be reflective of underlying social environments. (para. 1)

However, there is ongoing debate as to whether the time is right for such a paradigm shift. Although the work of Siemens (2004) and Downes (2004), for example, reflects an attempt to use this emerging theoretical paradigm to better explain design considerations in online learning environments, others claim that further work is needed (Kop & Hill, 2008). Still others note that, “[Connectivism] is a tool to be used in the learning process for instruction or curriculum rather than a stand-alone learning theory” (Duke, Harper, & Johnston, 2013, p. 10).

In summary, different learning approaches lead to different uses of technology. An awareness of one’s underlying instructional beliefs is critical for instructors and others identifying appropriate use of technology, particularly in learning environments where students are sometimes left with only the technology to guide them. What are the instructor’s assumptions about learning, and how are these assumptions supported through the design of the overall experience? Beliefs about learning theory will guide the conceptualization of the learning process, shape the design process, and inform decisions made about the role of the instructor.

Centrality of Design

The design process is a second critical element in online learning. The overall goal is to identify and apply design approaches that allow students with various backgrounds to interact and build knowledge in ways that are equitable and personalized. Design choices are built on learning theories, so before designing, the theory must be considered (Bednar, Cunningham, Duffy, & Perry, 1992): “Instructional design and development must be based upon some theory of learning and/or cognition; effective design is possible only if the developer has developed reflexive awareness of the theoretical basis underlying the design” (p. 19).

Bell & Federmann (2014), in their review of three meta-analyses of e-learning studies, note that the “characteristics of the instructional design, such as the instructional methods used, the feedback pro-

vided, and the degree of learning engagement, create the conditions within which learning occurs” (emphasis added, p. 175). Wallace (2004) notes that technology all by itself does not “provide a map for its use... teachers in effect become curriculum makers” (p. 451).

If educators want to help students move from being merely passive consumers of information to being active learners, it is important to create environments where students can construct knowledge (Johnson et al., 2014). Based in part on Vygotsky’s (1978) perspectives on the importance of scaffolding knowledge-building in social situations, Scardamalia & Bereiter (1999; 2006) emphasize the social nature of learning and introduce the idea of building knowledge in both face-to-face and online social situations.

Bransford et al. (2000) present an overall schema for a balanced “learning environment” which involves overlapping circles to capture learner-centered, knowledge-centered, and assessment-centered perspectives, all within a community circle. Although the authors note that the literature on learning does not provide “recipes for designing effective learning environments,” they underscore the value of ensuring that these four perspectives are explicitly addressed in the design of any learning environment (p. 153).

Wiggins & McTighe (2005) provide more concrete design advice and establish “student understanding” as a learning goal. They define “understanding” as the ability to transfer knowledge to new situations and as “the ability to marshal skills and facts wisely and appropriately, through effective application, analysis, synthesis, and evaluation” (Wiggins & McTighe, 2005, p. 39). They contrast “understanding” with “knowledge” in a useful chart (see Table 1).

Table 1: Understanding vs. Knowing

Knowledge	Understanding
<i>The facts</i>	<i>The meaning of the facts</i>
<i>A body of coherent facts</i>	<i>The “theory” that provides coherence and meaning to those facts</i>
<i>Verifiable claims</i>	<i>Fallible, in-process theories</i>
<i>Right or wrong</i>	<i>A matter of degree or sophistication</i>
<i>I know something to be true</i>	<i>I understand why it is, what makes it knowledge</i>
<i>I respond on cue with what I know</i>	<i>I judge when and when not to use what I know</i>

Source: Wiggins & McTighe, 2005, p. 38

This explicit contrast of knowledge and understanding clearly establishes the importance of understanding and helps to define the need for developing deep content proficiency and insight, an appropriate knowledge-building goal for course design work.

Wiggins & McTighe (2005) propose a specific design process with understanding as the overarching

goal. This process, which was developed for instructors, has three steps:

1. the definition of an overall learning goal (framed with an essential question);
2. the definition of an assessment process (innovatively defined in six facets); and
3. a design of a learning environment that provides learners multiple entry points to address the learning goal.

The overall process aims to empower the student, as well as the instructor, to define the learning goal in this “backward” design process.

Even though this design process was developed for teachers teaching face-to-face, and not for online learning per se, it is a good example of a design framework for elementary- through university-level teachers and instructors. The authors claim that it represents “a way of thinking more purposefully and carefully about the nature of any design that has understanding as the goal” (Wiggins & McTighe, 2005, p. 7).

For designing online environments, Morgan & Adams (2009) contrast “first” and “second” generation design approaches, comparing the more common, didactic learning procedures (“start here, end there” in linear learning paths) to a “self-organizing” model that features an open-ended “ecology of content” (p. 136). The self-organizing approach encourages students to pursue non-linear learning. It can begin where the student decides (perhaps based on some assessed need), and proceed on the basis of student choice, allowing the learner to determine a non-linear learning progression (p. 137). The authors claim that their design provides a means of individualizing learning and puts more of the learning trajectory in the hands of the student (see Figure 1). Although from this perspective, the instructor is crafting the learning ecology for the student, subsequent design models might better reflect Scardamalia and Bereiter’s more open-ended use of the Internet to provide even more student independence.

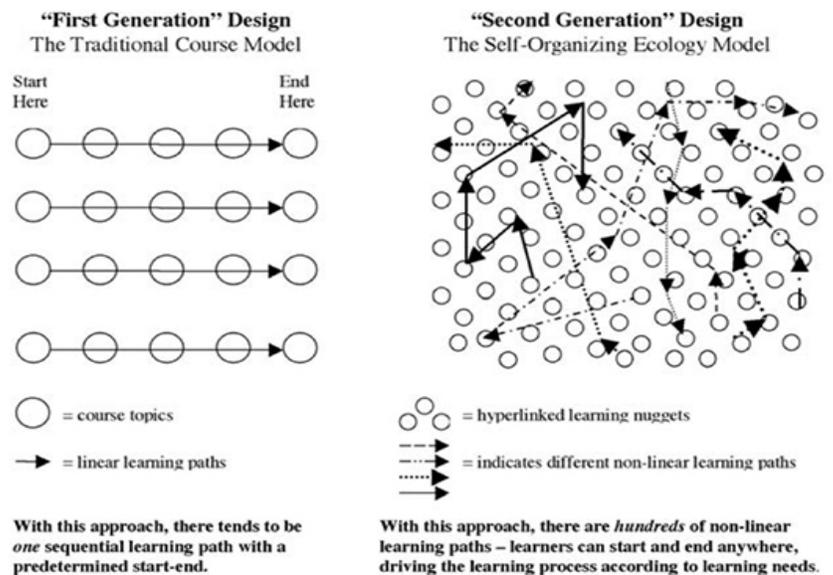


Figure 1. First and Second Generation Design (Morgan & Adams, 2009, p. 136)

Media Plays a Role

Media is a central aspect of online learning design. While an exploration of the contribution of multi-modal learning is beyond the scope of this discussion, it should be noted that pictures, graphics, and visual and auditory learning of all sorts can play an important role in the learning process, and could, from a design perspective, create more equitable opportunities for learning by providing different pathways, different mediums for learning. Malamed's (2011) recent work on visual language notes the importance of this "hidden language" and the importance of understanding how individuals process visual information. Assumptions about the learning process should come first, however, and guide the appropriate use of graphics, pictures, and auditory data.

Dede (2008), in his paper on theoretical perspectives that influence the use of technology, presents one other "instructional opportunity," a so-called "Next Generation Pedagogical Media" involving the use of media in new immersive technologies such as simulations and augmented realities. As technology continues to evolve, these new immersive learning interfaces provide exciting prospects for learning. However, the design of immersive technologies and their use will require the same thoughtful consideration of learning perspectives, lest these media be used in support of status quo approaches to learning.

Learning Platforms

In 1983, Richard Clark famously declared that, "consistent evidence is found for the generalization that there are no learning benefits to be gained from employing any specific medium to deliver instruction" (p. 445). Further, he claimed that media was simply a "neutral delivery system" that did not influence learning, at least as reflected in the research on outcomes. Students can learn with various media, such as iPads, Nooks, and Kindles, according to Bell & Federman (2013), however "Ultimately, research needs to move beyond the 'does it work' question toward a better understanding of exactly what does influence the effectiveness of e-learning and thus of the conditions under which e-learning is likely to be most effective" (p. 175).

Learning management systems encompass and define today's learning experience for most students taking formalized online courses in higher education (Means, Bakia, & Murphy, 2014). The LMSs effectively shape what is and is not possible to do online. Educators need a better understanding of the function of these LMS platforms — including their implicit assumptions about learning theories and design.

Audrey Watters (2014) is critical of the role of LMSs. Comparing them to "technological silos," she noted:

The LMS... has profoundly shaped how schools interact with the Internet. The LMS is a piece of administrative software... software that purports to address questions about teaching and learning but that

really works to “manage” and administer, in turn often circumscribing pedagogical possibilities. (p. 19)

For the most part, LMSs reflect traditional behaviorist transmission models of learning, as Dede (2008) notes, essentially recreating conditions in many face-to-face classrooms. The appeal of the LMSs to schools and universities is undoubtedly related to their replication of so many traditional classroom activities (Watters, 2014).

Going forward, it will be important to continue to investigate key design aspects of the online learning process. Anderson (2003), for instance, explored the issue of “interaction” and attempted to develop an “Equivalency Theorem” for online learning, putting interaction at the center of meaningful learning. According to Anderson (2003), getting the right mix of independent study and interactive learning activities can simply be seen as creating the highest possible interaction between student-teacher, student-student, or student-content work (p. 4).

Similarly, Deanna Kuhn, known for her work on inquiry and argument, recently wrote on the issue of collaboration, and the conditions under which collaboration can be judged as truly collaborative (Kuhn, 2015). Focused on a K-12 audience, her article “Thinking Together and Alone” ends with a critical research-based conclusion, with implications for older learners:

[I]ntellectual collaboration does not come naturally. A sociocultural perspective regards all individual cognition as social in origin (Vygotsky, 1978; Wertsch, 1979). Nonetheless, it is not enough simply to put individuals in a context that allows for collaboration and expect them to engage in it effectively. Intellectual collaboration is a skill, learned through engagement and practice and much trial and error (Ladd et al., 2013). p. 51

Thus, many pieces of the overall design process and LMSs in particular bear closer scrutiny. LMSs continue to evolve and the assumptions about learning seem to be diversifying (Means et al., 2014). Even though a standard group of activities are still at the heart of the design process for most LMSs (e.g., video lectures or written presentations, discussions, quizzes, group work), there is discussion regarding the importance of building course materials *without* using an LMS, per se (Kroner, 2014).

Alternatives to Learning Management Systems

Not all educators working online assume that LMSs should be the organizing vehicle for their online class. A growing number have been involved in rethinking the online instructional process. For instance, Siemens imagines a more fluid structure:

In the learning process we need different cycles of scaffolding – there are times when you come across a new idea completely and you can’t really create and socialize around it effectively because you just

don't know anything. So, there may be a cycle by which the learner follows a traditional structure or pathway but as soon as they become more confident they move into social and more emerging formats. (Siemens, 2014, para. 12)

Some pioneers, such as a group of researchers at the University of Alberta, Canada (Garrison, Cleveland-Innes, & Vaughan, 2015), are building new online spaces. They studied computer-mediated communication and created a model for developing a “Community of Inquiry” (COI) made up of three elements: cognitive presence, social presence, and teaching presence (<https://coi.athabasca.ca/>). The more complete model that has subsequently evolved is represented in Figure 2.

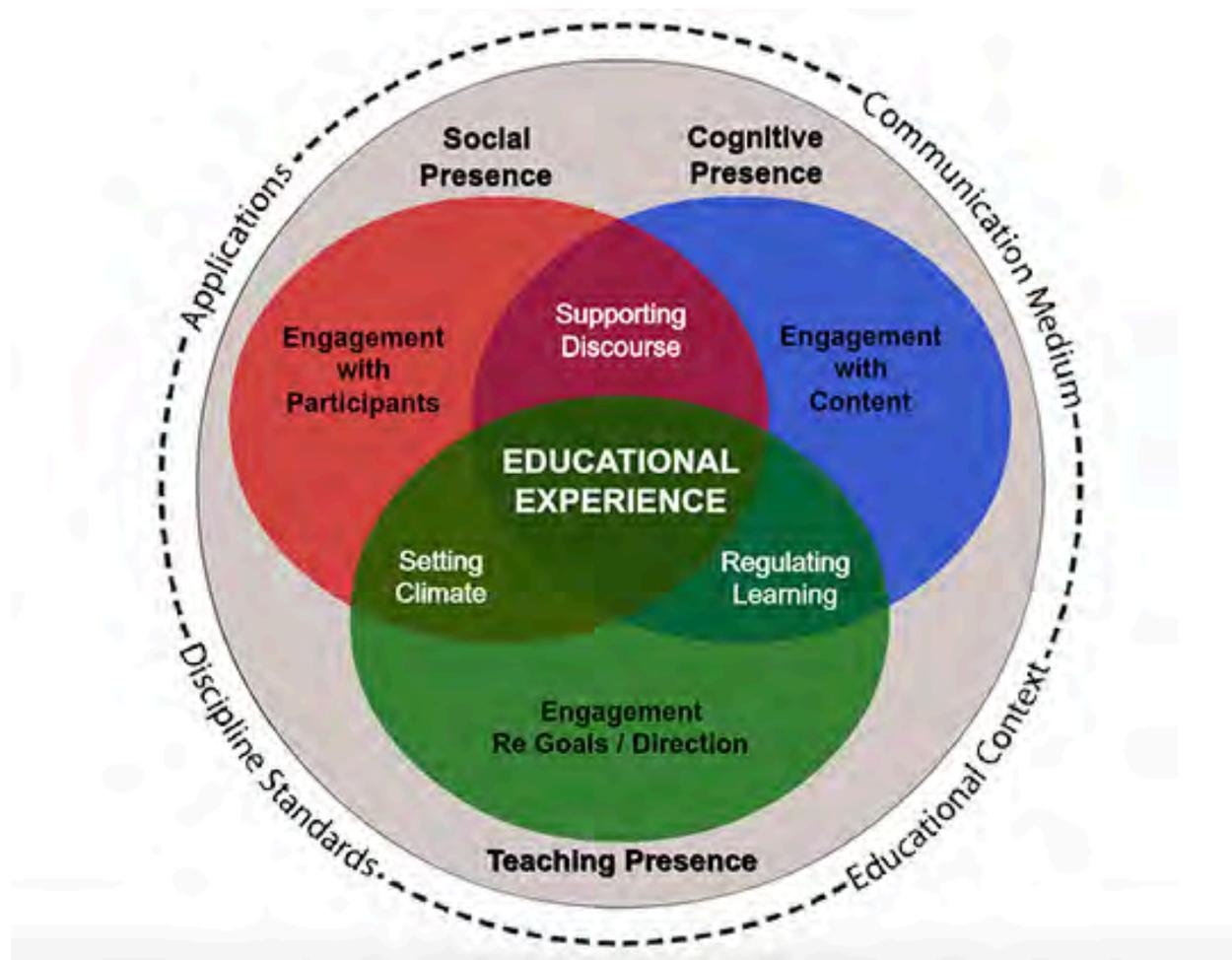


Figure 2. Community of Inquiry: <https://coi.athabasca.ca/>

Instructor Preparation

Online instructors play a central role in the effectiveness of online instruction. They provide the substance of the interaction, the course coherence, and the personal support for students that research has shown to be so important (Rose & Adams, 2014). Because of the many differences between face-

to-face classroom exchanges and asynchronous online interactions, important questions arise: What is the role of the online instructor? How does one organize the learning for the course, for the assessment? What is required to create a caring environment at a distance? How should instructors facilitate meaningful interactions between and among students?

Cheng (2015) explored the preparation of a group of world-language faculty members teaching online, and found that the training and instruction they were given for online teaching was limited. The instructors were not thoroughly prepared for teaching online. In the same way that technology is often introduced in K-12 schools by simply showing teachers where the “buttons” are, not how to teach with the technology (Meier, Mineo, & Cheng, 2013), online instructors are often introduced to the various parts and functions of the online platform with limited discussion of design or pedagogy.

Knowledge of design and pedagogy is an essential component of instructor preparation. Even if there was an expectation that instructors could design their courses within the framework of an LMS, few instructors have been exposed to different design approaches. Cheng (2015) found that the world-language teachers in his research sample had different understandings of what was meant by “instructional design,” but that many of them felt that following a specific design might be too rigid and limiting. Traditional understandings of “instructional design” may differ significantly from more recent, open-ended design approaches such as Wiggins & McTighe’s (2005) *Understanding by Design*.

Another key element of instructor preparation is the need to learn how to foster a dialogue between online students. Bolliger, Inan & Wasilik, (2014) note, “When designing an online course, one needs to keep in mind that the most important element is not the content but the interaction among course participants (Simmons, Jones & Silver, 2004)” (p. 184). The development of collaborative learning and dialogue is an emerging design aspect of effective online teaching. According to McAlister, Ravenscroft, & Scanlon (2004):

Structuring and guiding learners’ dialogue can lead to clear and significant educational benefits, and further, collaborative educational argumentation is often essential to support the sort of deep dialogue that in turn leads to conceptual development and improved reasoning in learners. (p. 195)

Educational dialogue can be designed in a way that fosters student development of reasoning and critical thinking, by following logical questioning sequences with open-ended questions (McAlister et al., 2004). However, instructors must be prepared to create and implement robust online discussions: asynchronous online conversations require different techniques than face-to-face classroom discussions.

A third component of instructor preparation is knowledge of appropriate tools and methodologies. Historically, teachers have not been prepared to use technology effectively (Meier et al., 2013). Although many instructors use technology fluently every day, fluent use is different from knowing how to use technology to engage students in building knowledge (Meier, 2011; Wallace, 2004). Instructors and faculty need support in learning to use technology, but unfortunately, “we know much more about

how to insert technology into the curriculum as a generic topic and about software that affects student learning than we do about the teacher’s role in using technology to mediate students’ learning” (Wallace, 2004, p. 449). Teachers need an understanding of discipline-appropriate technology-based tools and resources, and an understanding of when and how to use them, which in turn requires content and pedagogical content knowledge (Wallace, 2004).

Finally, instructors require appropriate support in learning about design approaches. Ideally, a community of online instructors would be organized to discuss learning theories and design approaches. They would also pursue more specialized knowledge, such as how to encourage meaningful dialogue between and among their students. On an ongoing basis they would also be exposed to specific technology applications, learn to teach with them, and learn about emerging technologies.

Conclusion

New learning opportunities, supported by digital advances, require the close attention of educators. We need to continue to explore the unique properties, opportunities, and limitations of online learning. Researchers can contribute to a timely dialogue in three key areas: learning theories; creative designs for digital learning; and the preparation of online instructors. These areas are critical for evolving online environments that go beyond the digital status quo.

Educational optimists see online learning as a source of new, more equitable learning opportunities for a growing number of students. The reality is that students are not equally prepared to take courses online. If the goal is to give students agency and scaffolded support to build their knowledge in collaboration with others, then instructors will need help in learning how to design learning environments to address the learning needs of their students. To take full advantage of the learning potential offered by digital tools, design approaches must accommodate a range of learners and provide “an ethic of online pedagogical care” (Rose & Adams, 2014) for all students

Educators have an unparalleled opportunity to serve our students better, by shifting into new ways of working and empowering students to become knowledge builders who can contribute meaningfully to our democracy. The poet Brenda Shaughnessy says that:

“Change” can mean substitution rather than transformation (same person into another outfit or same amount, just quarters now instead of bills) or “the more things change the more they stay the same.” But over time, right before my eyes, there are irreversible changes that have never occurred before — where it seems possible to grow, not just rearrange, to break patterns, not just replace. (Shaughnessy, 2015)

It is time now, in the words of this poet, not to rearrange or replace, but to break patterns — to define new learning environments that can provide meaningful educational opportunities for a growing number of students, opportunities that begin to redefine the educational landscape for a new generation of learners.

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