A constructivist approach to online college learning

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Received 18 August 2003; accepted 31 October 2003

Abstract

The key elements of online course design and pedagogy suggested by research as promoting effective learning are discussed through the lens of constructivist epistemology. Presentation of content, instructor–student and student–student interactions, individual and group activities, and student assessment are each addressed, in turn. The focus is on learning and recognition that, from time-to-time, all students are teachers as they bring diverse expertise, experiences, and worldviews to the task of learning. Reflection on past experiences, interaction with other members of the learning community, immediate instructor behavior, authentic group activities, and diverse assessment tasks with timely and detailed feedback are underscored.

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Keywords: Learning; Constructivism; Higher education; Distance education; Course design; Pedagogy

1. Introduction

Distance education has become a familiar element of higher education and it continues to rapidly expand. The National Center for Educational Statistics reported that U.S. enrollments in postsecondary distance education classes nearly doubled between 1995 and 2000, with 56% of the nation’s 2- and 4-year institutions of higher education offering courses at a distance during the 2000–2001 academic year (Walts & Lewis, 2003). The report identified the Internet as the most popular delivery medium for both undergraduate and graduate courses.

Sikora and Carroll (2002), drawing from the results the National Postsecondary Student Aid Study, 1999–2000, which surveyed over 60,000 students, reported that a sizeable minority of students were less satisfied with their distance education courses than with traditional coursework. Study results were consistent when data were disaggregated by student age and by type of institution. However, students with higher SAT scores were more likely to be less satisfied with distance education than their peers with...
lower SAT scores. Approximately 40% of college students with a SAT score between 1201 and 1400 reported being the less satisfied with distance education courses than with traditional courses, whereas the dissatisfaction rate among students with SAT scores between 601 and 800 was approximately 19%.

The reasons why some students are less satisfied with distance education are not clear. Middleton (1997) suggested factors, such as feelings of isolation, time management problems, and limited accessibility to materials, to other students, and to instructors, can influence students’ perceptions of distance education in a negative way and result in student frustrations and anxiety. Hara and Kling (2001), conducting a study of online courses, found that feelings of isolation were a stress factor for online students, but not the primary factor as frequently mentioned in the professional literature. Rather, “[s]tudents reported confusion, anxiety, and frustration due to the perceived lack of prompt or clear feedback from the instructor, and from ambiguous instructions on the course Web site and in e-mail messages from the instructor” (p. 68). Such findings suggest computer-mediated communication (CMC), particularly from the instructor, may be one source of frustration for some online students. Examining distance education from the faculty perspective, a National Education Association study reported that nearly 50% of the distance education instructors surveyed believed that the overall quality of distance education courses was lower than traditional classroom courses (Inman & Kerwin, 1999). Moreover, not one instructor surveyed indicated that the distance education course was of higher quality.

At least part of the lower satisfaction of some students with distance education courses may be related to the online course design and pedagogy employed by some online faculty. Therefore, the purpose of this article is to summarize important research regarding the characteristics of quality distance education courses and to suggest effective practices to enable distance education faculty to reflect upon and perhaps hone their online course design and teaching skills. As a delimitation of this article, only research pertaining to asynchronous learning networks (ALNs—anytime, any place learning via the Internet) will be examined because the Internet is the most popular delivery method for postsecondary distance education. In addition, taking into account Koymen’s (1989) view that, “there is a need for a theoretical base for teaching effectively in distance education to help the educational developer and instructional designer” (p. 247), course design and pedagogy are examined from the constructivist perspective.

2. Constructivism defined

Constructivism is a philosophy of learning based on the premise that knowledge is constructed by the individual through his or her interactions with the environment. It has its roots in the constructivist movement of cognitive psychology, which holds that individuals gradually build their own understanding of the world through experience, maturation, and interaction with the environment, to include other individuals. Thus, from the constructivist viewpoint, the learner is an active processor of information. This is in sharp contrast to behaviorism, for example, in which the learner is viewed as a passive recipient of information.

As a philosophy, constructivism comes in many flavors and some constructivists take on extreme or radical views, such as the belief in the nonexistence of objective reality because each individual constructs his or her own meanings, and the need to eliminate grades and standardized testing, because the criterion for grading is the teacher’s reality and not the student’s reality. However, such radical views are unduly restrictive. A more pragmatic view of constructivism is to maintain that knowledge is the product of many learner-centered processes, to include the social process of communication and
negotiation (i.e., the social construction of reality). According to Heylighen (1997), the two criteria most often used by learners in choosing between different constructions to select the right one, are coherence, agreement between the different cognitive patterns within an individual’s brain, and consensus, agreement between the different cognitive patterns of different individuals.

The implications of constructivism for a learning environment include using curricula customized to the students’ prior knowledge, the tailoring of teaching strategies to student backgrounds and responses, and employing open-ended questions that promote extensive dialogue among learners. Questioning, therefore, becomes the major means by which students are helped to construct meaning. However, according to Brooks and Brooks (1995), the constructivist approach is more than just activities. In not treating students as passive learners, more respect is shown to students as learners and as human beings. It is very important for the instructor to be aware of initial student misunderstandings to provide the kinds of experiences that will allow the student to learn. It is this pragmatic view of constructivism that provides the philosophical basis for this article.

Jonassen (1994) suggested that constructivism should be applied to distance education and proposed a constructivist design model for online learning that included the following guidelines:

Focus on knowledge construction, not reproduction. Present authentic tasks that provide real world case-based learning environments. Foster reflective practice, and enable context and content dependent knowledge construction. Support collaborative construction of knowledge through social negotiation, not competition among learners for recognition (p. 35).

This constructivist approach to online learning is consistent with the paradigm shift that Barr and Tagg (1995) suggested is taking place in U.S. higher education. They reported that institutions of higher education are thinking less about providing instruction (i.e., the teaching paradigm) and more about producing learning (i.e., the learning paradigm).

Table 1
Elements of emphasis in higher education traditional and constructivist learning environments

<table>
<thead>
<tr>
<th>Traditional</th>
<th>Constructivist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional emphasis</td>
<td></td>
</tr>
<tr>
<td>Teaching, knowledge reproduction,</td>
<td>Learning, knowledge construction,</td>
</tr>
<tr>
<td>independent learning, competition.</td>
<td>collaboration, reflection.</td>
</tr>
<tr>
<td>Classroom activities</td>
<td></td>
</tr>
<tr>
<td>Teacher-centered, direct instruction,</td>
<td>Learner-centered, Socratic, authentic,</td>
</tr>
<tr>
<td>didactic, individual work.</td>
<td>individual and group work.</td>
</tr>
<tr>
<td>Instructor roles</td>
<td></td>
</tr>
<tr>
<td>Expert, source of understanding,</td>
<td>Collaborator, tutor, facilitator,</td>
</tr>
<tr>
<td>lecturer.</td>
<td>encourager, community builder.</td>
</tr>
<tr>
<td>Student roles</td>
<td></td>
</tr>
<tr>
<td>Passive, listener, consumer of</td>
<td>Active, collaborator, constructor of</td>
</tr>
<tr>
<td>knowledge, note taker.</td>
<td>knowledge, self-monitoring.</td>
</tr>
<tr>
<td>Assessments</td>
<td></td>
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<tr>
<td>Fact retention.</td>
<td>Authentic knowledge application,</td>
</tr>
<tr>
<td></td>
<td>portfolios, projects, performances.</td>
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</table>
Table 1 provides a summary of the differences in emphasis between traditional and constructivist higher education learning environments. The constructivist elements in Table 1 represent areas to be emphasized and together represent a philosophy of learning. There is room for traditional pedagogy, such as use of lectures with discussion, in a constructivist learning environment, provided these elements do not become dominant.

3. Preplanning the online course

Fink (2003) wrote that “faculty knowledge about course design is the most significant bottleneck to better teaching and learning in higher education” (pp. 23–24). Accordingly, it is important that online faculty have a solid understanding of the major principles of online course design before they attempt to put a course together. Extensive preplanning of online courses is essential.

If one follows the backward design model (Wiggins, 1998), course design should start with the instructor imagining what students will still retain 1 or 2 years after completing the course. This estimate forms the basis of the course’s learning goals. The instructor then refines these goals and develops instructional objectives after considering the expectations of external groups (Fink, 2003). In this analysis, the instructor should consider the expectations of society at large, state and other accrediting agencies, professional organizations, and school or department curricular requirements.

After identifying goals and objectives, the instructor identifies how the students could demonstrate that they achieved these goals. This step will result in development of the course’s assessment tasks. Finally, the instructor determines what the students need to do during the course to perform well on these assessment tasks. To fully address this step, the instructor needs to carefully consider a number of situational factors, particularly student characteristics, the characteristics and capabilities of the e-learning system, and the mix of online and face-to-face learning.

3.1. Student characteristics

An analysis of distance education student characteristics and past experiences will help the instructor determine how best to promote learning through various learning activities. Hanson et al. (1997), in their review of the distance education literature, found that successful distant learners tend to be abstract learners who are intrinsically motivated and possess an internal locus of control. They also tend to be older than traditional students. Knowles, Holton, and Swanson (1998) theorized that adult learners are motivated to learn to the extent that they perceive the learning will help them better perform tasks that they will confront in life. They also need to be responsible for their own decisions and to be treated as capable of self-direction. Their diverse life experiences represent a rich resource for collaborative learning. These experiences, however, may be permeated with partiality and bias.

3.2. E-learning system

E-learning is a combination of content and instructional methods delivered via a computer and designed to build knowledge and skills. According to Jonassen (2000), such technologies are cognitive tools that assist learners to elaborate on what they are thinking and to engage in meaningful learning. Within the context of constructivism, he suggested that learners use such technologies as intellectual
partners to (a) articulate what they know; (b) reflect on what they have learned; (c) support the internal negotiation of meaning making; (d) construct personal representations of meaning; and (e) support intentional, mindful thinking.

A variety of Internet-based e-learning systems, such as Blackboard, eCollege, Embanet, HorizonLive, Lotus LearningSpace, and WebCT, are presently used in higher education. Knowledge of the capabilities and limitations of the e-learning system used by one’s school is therefore an important prerequisite to designing an online course. These systems typically consist of an integrated set of learner and support tools that faculty and students can access. However, the nature and variety of these tools and characteristics vary widely among e-learning systems. A designated university-wide faculty development center with a learner-centered philosophy can offer valuable planning assistance to the online instructor in course design and pedagogy.

3.3. Mix of online and face-to-face learning

According to Colis and Moonen (2001), blended learning is a hybrid of traditional face-to-face and online learning so that instruction occurs both in the classroom and online and where the online component becomes a natural extension of traditional classroom learning. Many variations of the blended model exist. Martyn (2003) described a successful blended model used at a small liberal arts college as consisting of an initial face-to-face meeting, weekly online assessments and synchronous chat, asynchronous threaded discussions, e-mail, and a final face-to-face meeting with a proctored final exam. Dziuban and Moskal (2001) reported that blended courses at the University of Central Florida replaced face-to-face class time with online learning so that a 3-h course occupied only 1 h of actual face-to-face classroom time. Such courses allowed the weekly operation of multiple classes in a classroom previously occupied by only one course, thus making more efficient use of existing university infrastructure. Moreover, blended courses, when compared to traditional courses, had equivalent or reduced student withdrawal rates as well as equivalent or superior student success rates.

Blended learning is thus a flexible approach to course design that supports the blending of different times and places for learning, offering some of the conveniences of fully online courses without the complete loss of face-to-face contact. The course designer must therefore determine whether the course will be fully online or a hybrid blend of online and traditional learning. If a blended model is selected, the instructor must determine the amount and form of face-to-face learning. School and departmental policy will most likely inform this decision.

4. Online course design

Some postsecondary schools add distance education courses “to existing academic programs with faculty being told to teach as they have always taught” (Cyrs, 1997, p. 53). This practice ignores fundamental differences between traditional classroom instruction and distance education. Distance education calls for special instructional design methods and interactions (e.g., Merrill, 1994). Collis (1996) refers to such changes in the instructional composition of a course to make it suitable for online delivery as pedagogical reengineering.

Research that compared distance education to traditional face-to-face instruction has provided substantial evidence that distance education can be as effective as traditional education, when the
method and technologies used are appropriate to the instructional tasks, there is student-to-student interaction, and when there is timely teacher-to-student feedback (e.g., Moore & Thompson, 1990). Faculty who design a fully online or blended course should approach this task in terms of maximizing the potential of the medium and e-learning system that will be used for course delivery. It would be a serious mistake to take a course delivered in a traditional classroom setting and use it, without change, in an online program. In designing a fully online or blended course, the instructor should carefully consider the following course design elements in terms of the competencies that students are to master and the situational factors identified above: (a) presentation of content, (b) instructor–student and student–student interactions, (c) individual and group activities, and (d) assessment of student performance. The following sections will examine a few ways in which each of these elements can be implemented in an online learning environment. The descriptions are meant to provide some key ideas and are by no means a comprehensive treatment of these topics.

4.1. Presentation of content

Presentation of course content consists of developing and organizing course materials in an integrated, intuitive manner that students can access at any time. An online course that consists of only textbook reading assignments, a syllabus with course schedule, online discussions, and assessments is tantamount to taking a traditional course and pedagogically reengineering it by removing all instructor classroom presentations and offering no replacement. Students need to make connections to the instructor and to course content by means of supplemental course materials that are organized by logical modules, such as weeks, textbook chapters, topics, and so forth. Such materials can include notes from the instructor, Microsoft Power Point presentations, examples, illustrations, advance organizers (before the reading assignment), consolidators (after the reading assignment), supplemental readings, demonstrations, video or audio clips, and other online learning resources. Additionally, several textbook publishers include CD-ROMs and associated Web sites for their textbooks that provide multimedia resources for instructors and students who use the textbook. These resources often include chapter summaries, multiple-choice self-tests, multimedia tutorials, flashcards, interactive exercises, and Web links. Incorporating selected multimedia resources, such as these, into the design of an online course can add a level of richness and diversity that would be difficult to otherwise achieve.

It is also a good idea for the instructor to introduce and orient students to the course by means of an overview or welcome Web page at the course entry point. This page should include, as a minimum, the course purpose or goals, a personal note from the instructor to the students to include words of encouragement and the need to be self-directed, descriptions of how the course is organized and how to get technical assistance (an 800 number as well as an e-mail address), the instructor’s office hours, how to contact the instructor both telephonically and by e-mail, and a step-by-step description of the course routine. A hyperlink to a short audio or video file in which the instructor personally welcomes students is an excellent touch that helps promote a strong sense of community.

4.2. Instructor–student and student–student interactions

Threaded discussion boards used in e-learning systems support the construction of knowledge as learners formulate their ideas into words and build on these ideas through responses from others. A
variety of discussion board activities can be used to facilitate a constructivist learning environment, such as topic-based discussions, peer critiques, and role-playing. Such CMC conferencing activities can create and support an interactive and cooperative learning environment and a strong sense of community that are valued by constructivists. The opportunity for reflective interaction can be encouraged and supported, which is an aspect of discussions seldom demanded of students in traditional classroom settings where discussions are often spontaneous and lack the reflection that is a characteristic of ALN dialogue (Harasim, 1989).

McGiven (1994) reported that the most important component of a successful distance education course is required and consistent interaction. Berge (1999) supported the view that interaction should be an element of online course design when he wrote that “interaction does not simply occur but must be intentionally designed into the instructional program” (p. 5). Accordingly, the online instructor should not present course content and simply await students’ questions regarding the content. If so, the interaction process is likely to be inconsistent, content driven, and labor intensive for the instructor as dialogue will be dominated by instructor–student interactions. Interaction should be design driven and carefully planned before the start of the class to promote a balance between instructor–student and student–student interactions and to ensure the instructor implements an effective communication strategy.

One of the most consistent findings related to excellent instructor communication is a set of immediate communicative behaviors (Andersen & Andersen, 1982). Instructor immediacy can be verbal and nonverbal. Verbal immediacy includes the instructor’s use of spontaneous humor, praise of students’ comments, following up on student initiated topics, and demonstrations of willingness to have conversations with students (Gorham, 1988). Nonverbal immediacy behaviors are nonlinguistic actions, which are approach behaviors, signals of availability for communication, and communication of interpersonal closeness and warmth (Andersen & Andersen, 1982).

The role of the instructor in a constructivist learning environment varies from time to time depending upon student needs and circumstances within each class. At times, the instructor is the expert and source of knowledge and understanding, and in this role, provides answers to student questions. This role is particularly strong in discussion forums in which students are responding to discussion topics and ask questions.

At other times, the online instructor assumes the role of a tutor, particularly in collaborative activity forums in which small groups of students are engaged in problem-based learning. Barrows (1992) wrote that the interactions of a tutor with students in such situations should be at a metacognitive level, except for housekeeping tasks, and that the tutor should avoid expressing an opinion or giving information to the students. In other words, the tutor does not provide the students with a solution to the problem. Instead, he or she will ask questions, such as: Do you know what that means? What are the implications of that? Is there anything else? Barrows also suggested that the tutor must convey to members of the learning community the notion that saying nothing about another member’s facts or opinions was the same as agreeing. Barrows summarized the role of a tutor as follows:

The ability of the tutor to use facilitatory teaching skills during the small group learning process is the major determinant of the quality and the success of any educational method aimed at (1) developing students’ thinking or reasoning skills (problem solving, metacognition, critical thinking) as they learn, and (2) helping them to become independent, self-directed learners (learning to learn, learning management). Tutoring is a teaching skill central to problem-based, self-directed learning (p. 12).
Rovai (2003) conducted an ex post facto study of 18 graduate-level ALN courses and found evidence that grading strategies significantly influenced online discussions and discussions were related to students’ sense of community. In particular, he wrote that there were significantly more discussions per student per week and higher levels of sense of community in courses where discussions were a graded course component. Moreover, students with stronger feelings of being connected to others in their online courses felt more satisfied with their distance education program. Study results also suggested that the weight given to a course discussion grade need not be great to generate the critical mass of timely and quality discussions that strengthens sense of classroom community. A significant increase in the number of student messages per week and student satisfaction were noted between courses in which discussions were not graded and those in which discussions accounted for 10–20% of the course grade. No additional benefits were noted when this weight was increased to 25–35% of the course grade.

Instructors who grade online discussions should provide students with a course participation rubric so that students know what is expected regarding their role in online discussions. The sample participation rubric at Table 2 is one that instructors might want to use or adapt for their own online courses.

Compared to traditional classroom discussions, individuals engaged in online discussions tend to be more argumentative and outspoken (Sproull & Kiesler, 1991). Students can also take offense to written public comments when none was intended. Such behavior can have a negative impact on sense of community and can diminish participation in online discussions by some students. Moreover, problems left unchecked can result in personalization of perceived attacks and alienation. Consequently it is important for the course participation rubric to set the standards for discussions at the beginning of the course.

A good technique to help maintain a spirit of community is for instructor comments in discussion forums to be nonevaluative and consist of largely objective comments to enable learners to evaluate their

Table 2
Course participation rubric

<table>
<thead>
<tr>
<th>Superior</th>
<th>Good</th>
<th>Below average</th>
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<tbody>
<tr>
<td>Accesses discussion forums several times per week. Posts three or more constructive messages each calendar week. Postings tend to be spread throughout the week.</td>
<td>Accesses discussion forums at least once per week. Posts at least two constructive messages each calendar week.</td>
<td>A lurker, tends to read messages in the discussion forums on a weekly basis but contributions are sporadic.</td>
</tr>
<tr>
<td>Messages are characterized by conciseness, clarity of argument, depth of insight into theoretical issues, originality of treatment, and relevancy. Arguments are well supported.</td>
<td>Messages tend to provide good general answers but may not always directly address discussion topics.</td>
<td>Messages tend to address peripheral issues. Content is generally accurate, but with some omissions. Tendency to recite fact or provide opinions rather than address issues.</td>
</tr>
<tr>
<td>Collaborative learning is evidenced by comments directed primarily student–student rather than student–instructor. Evidence of support and encouragement is exchanged between students, as well as willingness to critically evaluate the work of others with constructive comments. Often includes good questions that stimulate discussion. Frequently responds to questions from others.</td>
<td>Shows little evidence of collaborative learning. Most comments are directed student–instructor. Rarely critically evaluates the work of others. Rarely includes questions that stimulate discussion. Seldom responds to questions. Some messages may contain numerous errors in spelling and grammar.</td>
<td></td>
</tr>
<tr>
<td>Messages contain few if any errors in spelling and/or grammar (indicating proofreading). Messages are well-formatted and are easy to read.</td>
<td></td>
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</tbody>
</table>
own work. Instructor critiques are better left to private feedback between the instructor and the student. Constructive criticism, when deemed appropriate in a public forum, should always be accompanied by positive comments. Any problems that may arise during the course should be handled by the instructor privately and offline, preferably by a face-to-face or telephone conversation.

An important aspect of community building is for learners to have the means and opportunities to become engaged in both educational and social experiences. Socializing can take on many characteristics, from exchanging empathetic messages to self-disclosure (Cutler, 1996). According to Cutler, “the more one discloses personal information, the more others will reciprocate, and the more individuals know about each other, the more likely they are to establish trust, seek support, and thus find satisfaction” (p. 326). Online instructors can promote socializing by creating a discussion forum devoted to this purpose. Use of the name Water Cooler Forum seems appropriate as the water cooler in the workplace is an area where workers often engage in socializing. The online instructor can post the initial message in this forum that describes his or her background and interests and suggest that students do the same.

4.3. Individual and group activities

An important goal of adult education is to promote independent, self-directed attitudes and social interaction while discouraging excessive dependency on the instructor (Knowles et al., 1998). This goal can be achieved in online courses by creating a balance between individual work, class discussions, and group work and by skillful facilitation of course discussions by the instructor in ways that trigger self-directed learning and collaboration among students.

Individual work should appeal to students whose personality relates to the inner world of ideas and is helpful in assessing individual student strengths and weaknesses. Group work is likely to appeal more to students who are energized by the external world of people and events. ALNs are valuable in facilitating collaborative group activities because students can access and participate in the activities at any time. Small groups of two or more learners can be assembled for discussions, assignments, projects, case studies, and so forth. Johnson and Johnson (1994) identified five essential components of small-group collaborative learning: (a) clear, positive interdependence among students; (b) regular group self-evaluation; (c) interpersonal behaviors that promote each member’s learning and success; (d) individual accountability and personal responsibility; and (e) frequent use of appropriate interpersonal and small group social skills. Collaborative learning is achieved when the group agrees on a product that represents a synthesis of each learner’s contribution.

In group work, the learner is “involved in constructing knowledge through a process of discussion and interaction with learning peers and experts” (Harasim, 1989, p. 51). Each member of the group is responsible for learning what is taught and for helping others in the group to learn. Group work can contribute to the development of a collaborative, participative learning environment that is valued in constructivist learning environments. Small group activities can also foster the development of trust and positive peer relationships among learners. Kwon (1998) reported that online groups who made decisions and solved problems made fewer social and off-task comments during their discussions when compared to face-to-face groups. However, Lea and Spears (1991) reported that online group work produced more polarized decisions than did face-to-face decisions and Siegel, Dubrovsky, Kiesler, and McGuire (1986) reported that online small-group decision making takes longer and may result in the use of stronger, more inflammatory communication. Muirhead (2001) reported that some online students expressed concern that group work can place unfair demands upon a few individuals who do most the
group work. Instructors can help prevent negative group experiences by closely monitoring group work, intervening as appropriate, and awarding grades to students based on their actual contributions.

4.4. Assessment of student performance

Anderson, Ball, and Murphy (1975) wrote a classical description of assessment. According to their view, “[a]ssessment, as opposed to simple one-dimensional measurement, is frequently described as multitrait–multimethod; that is, it focuses upon a number of variables judged to be important and utilizes a number of techniques to assay them... Its techniques may also be multisource. ... and/or multijudge” (p. 27). According to this description, sound assessment strategy is not limited to a single measurement, such as a traditional selected-response test, but consists of a system of multiple measurements that include diverse assessment tasks. Assessments need to tap and build upon the strengths that learners, in all their diversity, bring to the learning situation. Regarding online learning, Carnevale (2001) reported:

All of higher education is moving toward outcomes-based assessments, with online education leading the way, says Peter Ewell, senior associate at the National Center for Higher Education Management Systems. The push for new assessment models in online education comes largely from competition with its older brother, traditional education, says Mr. Ewell. Because distance education is comparatively new, he says, critics often hold it to a higher standard than traditional education when judging quality. It has more to prove, and is trying to use assessments that show its effectiveness as the proof (p. A43).

The assessment principles that guide student assessments in a traditional learning environment remain unchanged in an online course. What is different in an online environment is how these principles are implemented. One important difference between traditional classroom assessment and online assessments is that in online programs, particularly graduate programs, most of the students are already in the workforce as full-time professionals. Consequently, students can demonstrate content mastery by doing what they learned and demonstrate competency through the use of work-related portfolios and projects. This assessment model is consistent with the strategies identified by Vrasidas and Glass (2002) to reduce plagiarism in online courses by creating assignments that are more difficult to plagiarize by requiring students to (a) use their own experiences, (b) apply ideas to their own or at least to real-world contexts, (c) work collaboratively with their peers, and (d) negotiate the assessment process with the instructor.

In constructivist learning environments, where the emphasis is on collaboration, relationships, inquiry, and invention, overreliance on traditional tests that emphasize factual recall is not consistent with the nature of the learning that takes place in these environments (Salomon & Perkins, 1998). Constructivists view traditional selected-response assessments as shackling student responses to problems. Their view is that the more open-ended the assessment, the better.

Honebein, Duffy, and Fishman (1993) characterized a constructivist learning community as one in which the cognitive demands should be authentic to the tasks for which the student is being trained. For example, it would be a stretch to describe a multiple-choice test as an authentic task for a research course, whereas evaluating a published research article would be authentic. The use of authentic assessment can also assist the learner in understanding the relevance of the task and persuade the student to assume ownership of the task. This approach is highly consistent with the views of Knowles et al. (1998) regarding the characteristics of adult learning.
Students should be assessed by a combination of participation in online discussions, submitted tests, portfolios, and individual and group projects and performances, most of which will be submitted directly to the instructor by e-mail attachment. Additionally, Henderson, Rada, and Chen (1997) reported research results that suggest peer evaluation to be an effective technique for online assessments. Students must know the due dates for each assessment task at the start of the course so that they can manage their time. Instructors should acknowledge receipt of each assignment as soon as possible. The timing and content of the instructor’s feedback to students takes on added importance in an online environment where members of the learning community are separated from each other. Feedback should be timely and comprehensive. Because assessment tasks are particularly useful to help students identify their weaknesses and strengths, instructors should consider providing feedback for both incorrect and correct responses. Such feedback should also direct students to relevant sections in textbooks and course materials, as appropriate.

In addition to designing and using assessments for student accountability purposes, online instructors should frequently monitor student progress and course effectiveness through a series of informal assessments known as classroom assessment techniques. This strategy is particularly relevant in an online environment where there is no face-to-face contact and problems may not surface soon enough for the instructor to take effective action. Cross and Steadman (1996) define classroom assessment techniques as “small-scale assessments conducted continually in college classrooms by discipline-based teachers to determine what students are learning in that class” (p. 8). Classroom assessment techniques provide in-process feedback and allow instructors to implement continuous quality improvement to their course (Soetaert, 1998). Moreover, some researchers have found that in online learning, it is better to present material in small steps with immediate feedback (Henderson et al., 1997). Such findings support the frequent use of classroom assessment techniques in online courses.

5. Evaluation

To evaluate the learning effectiveness of the online course design and pedagogy described above, students in an online graduate course that implemented the principles described in this article were asked to respond to the following perceived learning item via an online survey at the end of the course: On a scale of 0 to 9, how much did you learn in this course, with 0 meaning you learned nothing and 9 meaning you learned more than in any other course you’ve had? This survey item was first used by Richmond, Gorham, and McCroskey (1987) and has since been used in many studies related to learning. Pace (1990) supported the validity of such student self-reports of learning based on research evidence that suggested the consistency of results over time and across different populations. He also found that patterns of outcomes vary for self-reports of learning across majors and length of study in the same manner as was established through direct achievement testing. McCroskey, Sallinen, Fayer, Richmond, and Baraclough (1996) reported that test–retest reliability over a 5-day period was .85. They also reported that a sample of 365 university students at West Virginia University enrolled in various traditional face-to-face courses responded to this perceived learning item with $M = 6.0$ and S.D. = 2.0.

Three separate sections of a fully online graduate course in educational research design taught by the author of this article were sampled in the present study. The course was one semester (i.e., 16 weeks) in duration and was presented via the Internet using the Blackboard e-learning system. Participants consisted of 72 volunteers enrolled in the same online course. The volunteer rate was 96%. Participants were predominately female (87.5%). The ethnic breakdown was as follows: 42 (58.3%) Caucasian, 27...
African-American, and 3 (4.2%) who classified their ethnicity as other. The goals of this course were for students to develop (a) an appreciation for the usefulness of research in studying social phenomena; (b) a sophisticated understanding of quantitative and qualitative research; and (c) the skills necessary to plan, conduct, and critique educational research.

Each week, all students, regardless of section, were presented with either two or three instructional tasks. The first task always consisted of reading assignments in the course textbook and Web-based professor’s notes. Next, the professor posted a problem-oriented discussion topic to group discussion boards. These boards were established by the professor and consisted of 10–15 students per group. Discussions were graded and were guided by the discussion rubric shown in Table 2. Finally, an authentic assessment task requiring the evaluation of a short research-based case study was assigned during most weeks. These assignments required both individual and collaborative group work.

Course letter grades were distributed as follows: F, 3 students; C, 3 students; C+, 0 students; B−, 7 students; B, 23 students; B+, 15 students; A−, 18 students; and A, 3 students. The mean and standard deviation for perceived learning among this group of participants were 7.17 and 1.23, respectively. The relationship between course letter grade and perceived learning using Eta, the asymmetric nominal by interval correlation coefficient, was .54 with course grade as the dependent variable, and .48, with perceived learning as the dependent variable. A one-sample t test was also conducted to evaluate whether the perceived learning mean was significantly different from 6.0, the mean reported by McCroskey et al. (1996) for a sample of 365 university students at West Virginia University enrolled in various traditional face-to-face courses. The sample mean was significantly higher than 6.0, \( t(47) = 6.59, P < .001 \). Moreover, the effect size, as measured by Cohen’s measure of effect size \( d \), was .95, suggesting a large effect.

6. Conclusion

The initial, working title of this article was A Constructivist Approach to Online College Teaching. However, soon into the writing, it became evident that a more appropriate title was A Constructivist Approach to Online College Learning to better reflect the constructivist philosophy. This change does not imply that teaching does not take place in a constructivist classroom, for indeed it does. What the change implies is that the focus of course design and pedagogy is on learning, not teaching, and that from time to time, all members of the learning community are teachers as they bring diverse expertise, experiences, and worldviews to the task of learning.

An online course structured as a sequence of online lectures or textbook-based reading assignments followed by traditional assessments represents a passive form of learning that is teacher-centered and better aligned with the more traditional form of higher education. A constructivist learning environment, on the other hand, is one that is learner-centered, where the focus is on learning rather than teaching, and where active learning and cooperation through discussion take place. This view is consistent with that of Barr and Tagg (1995) who described a shift of emphasis in higher education from one of providing instruction (the teaching paradigm) to one of producing learning (the learning paradigm). Table 3 lists the essential characteristics of online courses designed in the tradition of constructivism and can be used as a checklist for instructors designing online courses. Teaching at a distance is not just about using technology, it is also about perfecting a pedagogical art for effective online learning.

The results of the one-sample t test reported in the previous section support the conclusion that an online course designed and delivered based on a constructivist epistemology can be highly effective and result in a
satisfying distance learning experience. If the group had been homogeneous regarding prior research knowledge and skills, one would expect a high relationship between course letter grade and perceived learning. However, the moderate relationship between these two variables suggests a heterogeneous group of students were sampled regarding prior knowledge and skills in research design, as confirmed by the course instructor. For example, a student who earned a grade of A in the course may have learned less than a student who earned a B because the B student may have come into the course with little prior knowledge of research while the A student may have started the course with a substantial background.

Additional research regarding the use of constructivist activities in an online learning environment is needed. In particular, research is required to identify the types of online constructivist activities that have the greatest impact on learning. What are the effects of different activities on higher order thinking skills? If some constructivist activities are more effective than others, what are the most effective activities and why? Are there groups or clusters of activities that need to be combined to achieve the best results? Are instructor-defined or learner-defined activities more appropriate? Why are some students less satisfied with their online learning experiences than with their traditional coursework? What are the most effective assessment models for use in online education? What is the best way to promote learner autonomy in an online constructivist learning environment? These questions and others need to be addressed if online education is to achieve its promises of providing education for individuals at times and places of their choosing without diminishing the quality of learning they would experience in a more traditional classroom setting.

References


