

An Instructional Strategy Framework for Online Learning Environments

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The rapid growth of web-based instruction has raised many questions about the quality of online courses. It appears that many online courses are simply modeled after traditional forms of instruction instead of incorporating a design that takes advantage of the unique capabilities of web-based learning environments. The authors present a conceptual framework that can guide the development of online courses. Specific examples of instructional strategies that fit the framework are described in detail.

Keywords: Online Instruction, Web-Based Instruction, Instructional Strategies

Distance education is an instructional delivery system that allows students to participate in an educational opportunity without being physically present in the same location as the instructor. Although print-based correspondence study is the traditional method of distance education, more contemporary approaches rely heavily on various forms of instructional technology (Garrison, 1987). The reason for much of the growth in distance education programs in recent years is due to the development of the Internet and improvement of technologies that support online learning environments. For example, among higher education institutions offering distance education, use of two-way interactive video and one-way prerecorded video was essentially the same in 1997–98 as in 1995 while the use of asynchronous Internet-based technologies nearly tripled in that same time period (Lewis, Snow, Farris, Levin, & Greene, 1999). This change is not new to the distance education community, which has seen technology-based educational innovations come and go with much fanfare. The instructional films of the 1940's were expected to radically change the educational delivery system, as were instructional radio and television. While each of these technology innovations had some impact on educational programs, they did little to change the fundamental nature of education. The Internet and computer technology, as the next generation of technological innovation to impact distance education, appears to have the power to significantly alter the education landscape.

In spite of this rapid growth, there is considerable concern about the effectiveness of this educational innovation. Numerous studies comparing traditional classroom-based instruction with technology-supported instruction have found no significant differences on critical educational variables such as learning outcomes and student satisfaction (Clarke, 1999; Johnson, Aragon, Shaik, & Palma-Rivas, 2000; Navarro & Shoemaker, 1999; Smeaton & Keogh, 1999). A very popular web site (<http://teleeducation.nb.ca/nosignificantdifference>) contains a listing of over 300 research reports on technology for distance education (Russell, 1999). This comprehensive bibliography spans seven decades and highlights studies that found little or no significant impact of instructional technology on various educational variables.

The obvious conclusion is that the technology used to support instruction has little impact on students' attainment of educational outcomes. The primary factor in any instructional initiative, irregardless of format or venue, is the quality of the instructional design that is ultimately implemented. Based on the lack of evidence that technology significantly influences the learning process, scholars in the field of instructional technology now conclude that the technology used in an online program is not as important as other instructional factors, such as pedagogy and course design (Phipps & Merisotis, 1999). This is not a new idea however, as stated by Schramm in 1977, "learning seems to be affected more by what is delivered than by the delivery medium" (p. 273).

This paper describes a research and development effort that evolved during the creation of an HRD graduate program (*HRE Online*) that was taught entirely online. The learning environment that was created to support *HRE Online* was based on the assumption that learning is a complex event that cannot be explained with a single theory of learning. Instead, we hypothesized that quality learning environments should be based on instructional principles that are derived from multiple learning theories. Through an analysis of existing literature and experienced-based practices throughout the development of *HRE Online*, we sought to answer the following questions:

1. What instructional principles for online learning environments can be derived from a fusion of multiple theories of learning?
2. Based on those principles, what specific instructional strategies or techniques can be applied in an online learning environment?

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The purpose of this paper is to present a perspective of online teaching and learning that looks beyond the traditional paradigm of instruction. Once such a perspective is adopted, instructional designers can incorporate the key elements that are needed in quality online learning environments.

Instructional Challenges for Online Course Designers

Innovations in instructional technology are often implemented in very traditional ways. For example, while the television had the potential to significantly alter the way people were educated, its use as an instructional tool built on an existing instructional paradigm by providing a “talking head” that merely passed information to the student. Using this innovation in this way lacked creativity and ignored the power of the technology. The same problem now seems to be occurring in online instruction. Instructional designers are creating online courses that are simple conversions of their equivalent face-to-face counterparts. Online courses tend to build on traditional views of learning where the primary goal is to transfer information from the instructor to the student. This is accomplished by providing students with access to information and expecting them to demonstrate their learning on an exam. Examples of how face-to-face instruction has been converted for online delivery include recorded lectures, online readings, homework assignments, and online tests.

The growth of online instructional programs raises an interesting question for online course developers. Should we model our online course designs after formal models of instruction or should we incorporate innovative approaches into our online programs? If we hope to develop powerful learning environments via the web, the answer should be clear. Instructional designers need to look for innovative ways to support quality teaching and learning without succumbing to the temptation to have online instruction become direct instantiations of traditional forms of instruction. The challenge for instructional designers is to devise ways to create pedagogically sound content for delivery over the Internet. Online courses need to address variability in student learning styles and provide external forms of motivation for the isolated student. The challenge is also to facilitate active learning in online courses while avoiding the tendency to provide too much information. The most difficult challenge may be to devise ways to promote high levels of interactivity among students and instructors. Such interactivity can result in community building, collaboration among learners, and enhanced communication.

Instructional Principles for Online Learning Environments

In order to confront these challenges, instructional designers must examine their traditional perspectives and adopt a new philosophy of teaching and learning that is appropriate for online instruction. This does not imply that traditional theories such as behaviorism should be tossed aside in favor of the more contemporary social-constructionist theories. Instructional designers need to match their desired learning goals and instructional methods to the appropriate learning theories. We argue that this new philosophy should build on a combination of learning theories rather than being confined to one preferred perspective (Johnson, 1997). For example, quality online learning environments should be comprised of elements of behavioral learning theory (e.g., positive reinforcement and repetition), cognitive learning theory (e.g., address multiple senses, present new information in motivating ways, limit the amount of information presented, and connect new information to prior knowledge), and social learning theory (e.g., encourage group interaction, peer assessment, and personal feedback). Adopting a synthesized theory of learning can have a synergistic result by integrating the most positive and powerful aspects of each individual learning theory into an online learning environment.

The pedagogical model used to develop the *HRE Online* master’s degree program was created by building on specific aspects of adult learning theory (Bandura, 1971; Skinner, 1968; Thorndike, Bregman, Tilton, & Woodyard, 1928; Vygotsky, 1978). Two conceptual models that were developed from an extensive study of the literature were reviewed. These two models were then synthesized into seven general principles that appear to be critical for quality learning environments (Johnson & Thomas, 1992; Johnson, 1997). We contend that powerful online learning environments need to contain a combination of these principles: (1) address individual differences, (2) motivate the student, (3) avoid information overload, (4) create a real-life context, (5) encourage social interaction, (6) provide hands-on activities, and (7) encourage student reflection (see Figure 1). This pedagogical model for online instruction was used to create the design template that is followed for each course in the *HRE Online* program. The following section provides specific examples of instructional strategies that have been used in the *HRE Online* program. Each of these strategies highlights the importance and practical application of the seven principles of quality online learning environments.

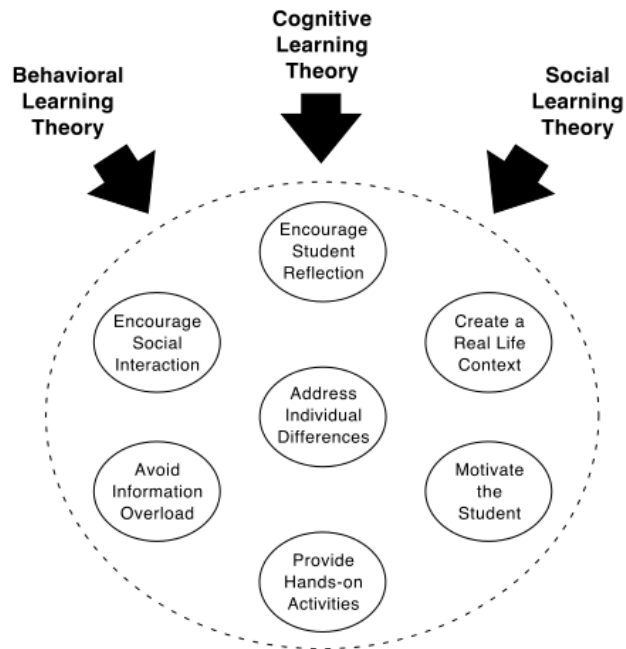


Figure 1. An Instructional Strategy Framework for Online Learning Environments

Using the Framework to Create Instructional Strategies for Online Courses

Individual Differences

Within a learning context, differences can be found in the areas of general skills, aptitudes, information processing, and application of information to new situations. In addition, all learners differ in their ability to perform various education-based and real-world learning tasks. Consequently, the general abilities or preferences of the learner will affect his or her ability to accomplish different learning outcomes. Individual differences specific to learning and instruction can be found within intelligence, cognitive controls, cognitive styles, learning styles, personality types, and prior knowledge (Jonassen & Grabowski, 1993). Each dimension helps us understand 1) patterns of thinking and reasoning about information, 2) how individuals process information to make sense of the world, 3) preferences for information processing, and 4) how past knowledge, skills, or ability influence the learning process. Each of these dimensions, collectively, helps to describe one's personality.

Recognition of individual differences has, for the most part, been taken into account and promoted through the instructional design template used in *HRE Online*. The following techniques and strategies have been used in our online courses to address individual differences.

1. *Provide content in multiple formats.* This is done through the use of various communication technologies. Lectures are audio streamed and synchronized with the applicable PowerPoint presentation. These lectures are additionally transcribed and posted in the course website. This is quite beneficial for students who travel and want to take the transcribed lecture with them to read. Content is also presented through WebBoard discussion groups where students are required to share and discuss information with each other. Each course also has links to outside web sites that provide supplemental material on the current topic.
2. *Allow for individual locus of control.* All courses provide various means of navigation within the online course. Content can be accessed through links or a graphical organizer. An individual can be as systematic or random in his or her access of course material as they desire. Although the course is built and presented in a hierarchical sequence, it does not have to be accessed in the same way. While it is not necessarily encouraged, students are also not discouraged from moving through the course in a random order.
3. *Encourage active and collaborative interaction.* Recognizing that "the whole is greater than the sum of the parts," each course is designed with activities that are both individual and group based. Working within "virtual teams," students work together to solve problems, analyze cases, and develop group deliverables. These assignments allow individual ideas, perspectives, and experiences to be heard and collectively considered. The idea of "agreeing to disagree" is taught through these experiences.

Motivation

At its most basic level, human motivation is controlled by the drive to satisfy a range of human needs (Maslow, 1970). According to Maslow's hierarchy of needs, if people lack basic needs or security, those needs must be addressed before higher level needs such as social status and self-worth can be attended to. While this model is certainly an influencing factor in human behavior, it may be more appropriate to examine motivation in terms of its complex interaction with cognitive, emotional, and behavioral factors.

The ARCS Model of Motivation is a practical way for instructors to address the issue of student motivation (Kellar & Suzuki, 1988). This model is based on a review of psychological literature on motivation and breaks motivation into four major concepts; (1) Attention, (2), Relevance, (3), Confidence, and (4) Satisfaction. Instructors must be able to gain and maintain students' attention by providing an environment that is interactive and participative. While keeping the students' attention is critical, it cannot be maintained unless the students feel that the course material is relevant. In other words, the course content, activities, and assignments must be related to their personal and professional goals. Students must also feel confident that they can achieve the expected outcomes of the course; therefore instruction should be flexible to compensate for individual student needs. The final component of the ARCS Model is satisfaction, which corresponds to whether or not students derive satisfaction from the instruction. For example, students will not perform as well if they feel dissatisfied with the instruction because it does not present enough of a challenge.

Strategies for enhancing student motivation in a web-based environment can best be characterized as either novel and entertaining approaches or attempts to personalize the instruction. We have successfully used the following techniques to enhance the motivation of our online students.

1. *Incorporate games into the online environment.* An example of a successful game for an online course is the popular television show called "Who Wants To Be A Millionaire." We have used this game during live synchronous sessions to summarize course content covered previously and to provide a sense of community among the students. The instructor plays the role of Regis Philbin, the game show host, and reads a question that requires the students to put a sequence of answers in the correct order. The students then type the correct order (e.g., B, C, D, A) as quickly as they can into a WebBoard chat window. The student who first answers correctly becomes the contestant who calls a toll free number so their voice can be patched through to the class. This provides live dialogue when the instructor asks a student the first of several multiple-choice questions. The student has the option of answering the question directly or, if they are not sure of the answer, they can use one of two "lifelines." The lifeline "Ask the Audience" involves asking all students to post what they think is the correct answer in the chat space. The contestant can then use their colleagues' responses to select the correct answer. The contestant can also "Phone a Friend" by asking one particular student for help, to which they respond by typing their answers in the chat space. The game continues until the student answers a predetermined number of questions correctly or responds with an incorrect answer. When this happens another sequencing question is asked so another contestant can be selected.
2. *Simulate a radio talk show with multiple DJs and "call-in" guests.* In many online courses the students spend much of the "class time" listening to the instructor through streaming audio or video technologies or during a live "web cast" during a synchronous class session. As we all know, it can be both boring and difficult to listen to one voice for any length of time, especially when there are few visual cues to accompany the audio. To provide variety and a livelier online atmosphere, we have been successful having multiple speakers interact during these broadcasts to liven up the synchronous sessions.
3. *Use multimedia when appropriate.* Online courses tend to be primarily textual-based forms of instruction. While this may be preferable to some students, we must recognize that the students of today are different from those of the past. The MTV generation seems to desire visual over verbal stimulation and there is no excuse for not incorporating multimedia into technology-based learning systems. We have found that graphic images, photographs, and videos enhance student motivation. For example, in several of our courses we have created short QuickTime clips from popular movies and television shows that can be streamed over the web. These clips provide entertaining examples that support the concepts and procedures being discussed in class and provide a nice break from the textual format that dominates current online environments.

Information Overload

Providing too much information in a short period of time contributes to memory overload, which makes learning difficult and leads to confusion and poor retention. Psychological studies show that most people can manage about seven "pieces" of information at one time without too much difficulty (Miller, 1956). Providing more than that

amount of information at one time overloads short-term memory. Instructional designers need to follow the *Rule of Seven*, which suggests that the amount of information presented at one time should be limited to no more than seven pieces of content (Clement, 1985). The Rule of Seven suggests that instructional designers “chunk” instructional content into small groups and give students the opportunity to learn each “chunk” thoroughly before being presented with new information. Using this strategy will result in better understanding. The following strategies have been used successfully in our online program.

1. *Limit the amount of content and activities.* By following the Rule of Seven, we help avoid memory overload by purposely limiting the amount of information and activities we provide in a course. For example, we ask instructors to break their lectures into 10-12 minute “chunks” or segments. These short lectures are recorded and converted into streaming media for delivery to students. These short lectures make it easier for students to complete in one sitting and it forces the instructor to concentrate on only a few main concepts in each “mini” lecture. This approach also fits ideally with the concept of a learning cycle.
2. *Organize instruction around learning cycles.* The instructional design model used in the *HRE Online* program utilizes learning cycles at the core of its modular approach. Each course has a hierarchical structure containing sections, modules, and learning cycles. This approach allows for easy updating of courses over time and the development of custom courses to meet different client group needs. More importantly, this instructional design approach builds on theories of adult learning. Each learning cycle is comprised of three components. The first component provides the student with access to new content through a streamed audio or video file or by reading an online article. The last component of the learning cycle involves evaluating the learning outcomes through an activity involving self-assessment, peer-assessment, or formal instructor assessment and feedback. Once the learning cycle is completed, a new cycle begins with the presentation of a new “chunk” of content, followed by new application and assessment activities.
3. *Provide a graphic organizer for the course.* It is very easy for students to get lost in any hypertext environment as they navigate through online courses that contain extensive layers of content distributed over multiple locations. To avoid the frustration and memory overload that can occur in a web-based environment, we provide a visual representation of the course structure. This graphic organizer serves as a map for students as they navigate through various portions of the course. The graphic is also hyperlinked so students can quickly move to a desired location in the course by clicking directly on the image.

Contextual Learning

Context is an essential central element in learning because knowledge is a product of the activity, context, and culture in which it is developed and used (Brown, Collins, & Duguid, 1989). Wilson (1993) identifies three major premises of context and how these affect knowing and learning. The first is the idea that learning and thinking are social activities that are structured by constant interpersonal interaction. Second, the available tools within the particular situation significantly structure an individual’s ability to think and learn. Finally, “human thinking is profoundly structured by interaction with the setting” (p. 72). We offer the following recommendations to online instructors to promote contextual learning in the virtual classroom.

1. *Create virtual learning teams.* At the start of each new course, students are placed in a virtual learning team consisting of three to four other classmates. This allows the instructor to replicate the group experience found in face-to-face settings. Students work together on weekly assignments and projects via conferencing systems, conference calls, e-mail, and Instant Messenger. This initiative provides a group context that is similar to what would be experienced in the face-to-face classroom.
2. *Simulate reality using appropriate case studies.* Regardless of the delivery format, the more “real-life” examples that can be utilized, the better students will learn. Case studies are an excellent way to provide the context through which new learning can be developed. As with any situation where a case study is used, it is critical to choose cases that relate to the content of the course. In our online evaluation course, students are provided with a case describing a program within an organization that needs to be evaluated for effectiveness. Throughout the duration of the course, students are asked to design an evaluation around this case using the concepts, ideas, and procedures taken from the course materials. Students are provided with feedback through WebBoard discussions and weekly synchronous chat sessions.
3. *Require collaborative projects with schools, businesses, or other organizations.* Students are encouraged, where possible and appropriate, to develop course projects within the context of their work environment. This provides a real-life context in which to imbed application of the material. For example, in the online instructional design course, students develop a training package that represents 6-8 hours of training time. The majority of the students choose to develop a training package that addresses a performance issue within their organization.

Social Learning

Social learning theory combines elements from both behaviorist and cognitive theories and posits that we learn best by interacting with others in social settings (Merriam & Caffarella, 1999). Behavioral learning theory contributes to social learning because people do not learn from observation alone but through imitation and reinforcement of what they observed. Cognitive theory focuses on the cognitive processes involved in the observation over the resulting behavior with the idea that individuals can regulate their own behavior by recognizing consequences. Social learning is manifested through socialization, social roles, mentoring, and locus of learning.

For the social learning theorist, the purpose of education is for the learners to have new roles and behaviors modeled for them. Instructors and peers serve as a model for new roles and behaviors within an educational context. The following strategies have been successfully used by online faculty to promote this perspective.

1. *Create a personal connection with students.* The goal is for instructors to be perceived as a real person in mediated communication. This is promoted several ways. Each course has an audio-streamed welcome message from the faculty member. This helps the student to put a face with the voice. Additionally, actions such as humor, vocal variety, personalizing examples, addressing students by name, questioning, praising, initiating discussion, and encouraging feedback all help make this connection. Personal connection can also be made through the use of “relational icons” or “emoticons” made by combinations of punctuation marks.
2. *Peer review and feedback.* Feedback from fellow students is as important as instructor feedback. Therefore, students in many online classes are asked to provide a meta-evaluation of another student’s work. The purpose of the activity is to help their peers by providing comments that help the person understand the areas that are clear and well done and the parts that need further development. This activity also models appropriate format for the particular assignment being developed.
3. *Require and facilitate interaction.* This may not seem like a new approach, however, in the online environment, it is much easier for students to be passive both in weekly assignments involving the group as well as during synchronous chat sessions. In addition to basing a percentage of the course grade on participation, other initiatives can be taken as well. One is to post an agenda of the upcoming week’s synchronous session. This serves as an advanced organizer and allows students to come to class better prepared for interaction. Another technique is to post discussion questions prior to a synchronous session so students can think about the topic and be ready for a discussion. Throughout the week, students are required to review comments and ideas that have been posted by other students and respond to them in a virtual class discussion. Two things that are important to keep in mind. First, while the quantity of interaction is important (measured by hits on the WebBoard), the quality of interaction is what should be stressed. If not, it becomes too easy for students to fall into the trap of providing comments that add little or no value to the discussion. Second, it is important that the instructor model the expected type of interaction by providing quality comments to the discussion as well.

Active Learning

There seems to be an assumed separation between knowing and doing in education (Brown et al., 1989) where knowing is valued over doing and mental activity is valued over physical activity. However, cognitive theorists have challenged this perspective because the activities through which learning occurs are inseparable from cognition. In order for formal online instruction to be successful, some form of learner activity must be included.

Active learning can occur in many forms in an online environment. Discovery learning, project-based learning, and cooperative learning are common techniques for engaging students in activities that involve considerable amounts of creativity, decision-making, and problem solving. Each of these instructional approaches emphasizes the importance of learning from experience that is goal driven and activity-based. Since these activities usually take more time to complete, they provide for sustained thinking about specific problems over long periods of time. The following are specific examples of how active learning can be applied in an online environment.

1. *Organize online courses around projects.* Since HRD is a constantly evolving applied field of study, it is reasonable to design an online HRD course with a heavy emphasis on the application of the skills and procedures needed by the HRD professional. The best way to accomplish this in an online environment this is through a project-based approach. Application-rich courses can be designed around major projects and specific activities to be completed in order to create a final product. For example, in the instructional design course where students are expected to create a complete training module, they need to complete many specific tasks such as conducting a needs assessment, developing training plans, and creating instructional media. By adopting a project-based approach, the online instructor can easily incorporate the concept of active learning into a virtual environment instead of providing the typical “read and write” online course.

2. *Think-Pair-Share in a virtual environment.* Having online students work in groups of two or three within a virtual environment is a great way to keep students active and focused on their learning. Think-pair-share is an active learning technique used in many face-to-face classes but is rarely used in a virtual environment. The goal is to help students organize prior knowledge, brainstorm questions, or summarize, integrate, and apply new information. This strategy can be used in both synchronous and asynchronous situations.
3. *Use small group discussions during synchronous sessions.* Although few online programs seem to rely on synchronous class sessions, they can provide powerful opportunities for student interaction. We conduct weekly synchronous sessions in our program where the instructor performs a live audio broadcast to the students over the web while the students interact with the instructor and other students in a group chat space. While this in itself encourages active learning, incorporating small group interactions into the large group discussions further enhances it. This is accomplished by having the instructor describe a discussion activity to the class and then asking them to enter their private “virtual team” chat space to discuss and complete the assignment. A specific time is given when the students are expected to return to the class chat space and share the major points of their discussion with the rest of the class. Although this technique is commonly used in many face-to-face classes, it is a unique, yet underutilized, strategy in an online learning environment.

Reflective Learning

Mezirow defines learning as “the process of making a new or revised interpretation of the meaning of an experience, which guides subsequent understanding, appreciation, and action” (1990, p. 1). Reflection allows individuals to correct distortions in their beliefs and critique “the presuppositions on which our beliefs have been built” (Mezirow, 1990, p. 1). Argyris and Schon refer to critical reflection as double-loop learning “that results in a change in the values of theory-in-use, as well as in its strategies and assumptions” (1996, p. 21). The process of reflection enables the ideas, understandings, and experiences of individuals and groups to be reviewed (Preskill & Torres, 1999). Values, beliefs and assumptions of team members are explored through reflection. Through better understanding of individuals’ mental models, we can better understand how two or more people can view the same event so differently. Watkins and Marsick (1993) see reflection as a key to continuous learning. The following three strategies can be used to promote reflective learning.

1. *Provide extensive and timely feedback.* While this is something most instructors already know, it is important to remember that the online environment removes some of the human “checks and balances” that face-to-face students have with the instructor. While the opportunity to ask questions and have interaction with the instructor is relatively equal, feedback received through physical distance, eye contact, facial expressions and personal topics of conversation is not present for these individuals. Therefore, it becomes even more important that the instructor take time to provide feedback that is detailed enough to paint a complete evaluative picture. This includes addressing not only the areas that were weak or need improvement, but providing praise for the areas that were done well. Instructors are encouraged to get this feedback to the students no later than a week after the assignment is turned in.
2. *Incorporate “One Minute Papers” and “Muddiest Point” into class.* “One Minute Papers” are short writing exercises in which students are asked to reflect on a particular topic as a form of knowledge assessment activity. Students are asked to post a quick list of the new knowledge they gained through a particular session. The “Muddiest Point” activity allows students to identify the areas of confusion or uncertainty and/or to raise additional questions around the content of the session. Both of these activities benefit the students and instructor by providing feedback on what was clear and what may need further attention through the use of reflection.
3. *Online diaries or reflective journals.* Diaries and journals promote continuous reflection throughout the course. Entries can be self-directed or promoted by an issue, question, or experience posed by the instructor. Journals allow students to reflectively interact with various course topics and experiences and, as noted earlier, critically examine how their values, beliefs and attitudes fit with the material. This is a way that promotes growth beyond what regular instructor and student interactions provide.

Concluding Thoughts

The instructional strategy framework discussed in this paper is clearly a work in progress. Although the framework is based on well-recognized theories of learning and represents a synthesis of ideas from multiple perspectives, it is not fully developed, nor is it all-inclusive. Additional principles will be added as the online program continues to develop and evolve. The specific techniques for applying the instructional principles highlighted in this paper are currently in use in the *HRE Online* courses and continue to be enhanced each time they are implemented. The

possibilities for application of the instructional strategy framework are only limited by the creativity and energy of the instructional designers and course instructors.

Formalized research efforts need to be conducted to validate and improve the strategy framework and the instructional techniques that evolve from it. Studies that examine the effectiveness of instructional strategies in online courses are lacking in the educational technology literature. Most literature provides anecdotal comments on experiences with online courses and empirical research that compares face-to-face and online delivery methods. Instead of comparing two dissimilar learning environments, future studies should empirically test the effectiveness of different instructional techniques in maximizing learning opportunities and achievement in online environments.

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