

Implementing Kolb's Learning Styles into Online Distance Education

Aaron S. Richmond & Rhoda Cummings
University of Nevada-Reno

The purpose of this article is to investigate the application of Kolb's (1984) theory of Experiential Learning to online distance education. Specifically, there are three main objectives: (1) present Kolb's Learning Style research and Experiential Learning theory and justify its use in online education, (2) provide a critical evaluation of learning style research in online learning environments, and (3) demonstrate how to consider student learning styles in online distance education via a fictitious online distance education course in educational psychology.

Keywords: Learning Styles, Distance Education, Online Instruction.

Because of the increasingly heavy demand for online distance education courses, there is now an urgent need and responsibility to accurately assess the quality and effectiveness of online distance education course design and to conduct inquiries regarding the effect of online learning delivery on learner outcomes (Thiele, 2003). Maddux, Ewing-Taylor, and Johnson (2002) have suggested, for example, that one way to insure quality of online course design and positive student outcomes is through consideration of the relevance of student learning styles to design of instructional methods. One approach that holds promise for accomplishing this goal is Kolb's (1984) Experiential Learning Theory, which is based on the works of Kurt Lewin, John Dewey, Lev Vygotsky, and Jean Piaget.

KOLB'S EXPERIENTIAL LEARNING THEORY

Kolb has described four basic learning styles: accommodative, assimilative, divergent, and convergent. Incorporated within each learning style is a combination of two of the four learning modes: Concrete experiences, reflective observation, abstract conceptualization, and active experimentation. Kolb and Fry (1975) also have described four different learning environments that are most conducive for accommodating the different learning styles and learning modes. These include the affective learning

Aaron Richmond and Rhoda Cumming are at the University of Nevada-Reno in the Department of Counseling and Educational Psychology. Please contact Aaron Richmond at the University of Nevada-Reno, MS 281, Reno, NV 89557. E-mail: richmond@unr.edu

environment, the symbolic learning environment, the perceptual learning environment, and the behavioral learning environment.

In the following section, we describe the relationship among the learning styles, the learning modes incorporated within each, and the specific learning environment that is supportive of each learning style. Because certain learning modes are incorporated within more than one learning style, it is necessary to first define the four modes. We next describe the four learning styles and the four learning environments. Finally, we explain the relationship among the learning styles, the learning modes, and the learning environments.

THE LEARNING MODES

Concrete Experiences. The concrete experiences mode is characteristic of learners who desire plenty of opportunities for direct human interpersonal interactions. These individuals also prefer to feel and experience rather than think. Kolb describes them as intuitive decision makers, who value circumstances involving people in real world situations. This learning mode is "...concern[ed] with the uniqueness and complexity of present reality as opposed to theories and generalizations" (Kolb, 1984, p. 68). More often than not, people who prefer the concrete experiences learning mode take an artistic intuitive approach to problem solving rather than a scientific approach.

Reflective Observation. This mode focuses on the ability to understand the meaning of ideas. Individuals who are characterized by this mode value objective judgment, impartiality, and patience. They prefer abstract understanding over practical applications, and they prefer to reflect and observe rather than act on a situation.

Abstract Conceptualization. Individuals oriented toward abstract conceptualization typically attend to tasks that involve logical investigation of ideas and concepts. Unlike concrete experiences, this learning mode is characterized by a preference to depend on cognitive rather than emotional skills. Commonly, individuals who prefer this mode involve themselves with and tackle academic problems that require the ability to build general theories in order to come up with a solution. People in this mode also value rigorous idea analysis and well defined conceptual systems. Finally, this mode involves the use of "systematic planning, manipulation of abstract symbols, and quantitative analysis" (Kolb, 1984, p. 69).

Active Experimentation. "The active experimentation learning mode focuses on actively influencing people and changing situations" (Kolb, 1984, p. 69). In other words, individuals in this learning mode prefer to be involved in peer interactions that allow them to play an integral role in the decisions made in these interactions. This mode emphasizes practical applications or solutions rather than reflective understanding of a problem. People who use this mode are pragmatists and focus on doing rather than observing; they enjoy and are especially efficient at getting the "job done" (p. 69); and they truly value the ability to manipulate their environment to produce productive results.

As stated above, some combination of these learning modes are incorporated within one of four Learning Styles (assimilative, accommodative, convergent, divergent), which are described below. Table 1 depicts the relationship of learning modes to learning styles.

THE LEARNING STYLES

Assimilative Style. The assimilative learning style is characterized by the ability to reason inductively. Kolb (1984) has suggested that one of the assimilator's greatest abilities is to "create theoretical models in assimilating disparate observations into an integrated explanation" (p.78). Assimilators concern themselves with ideas and abstract

concepts rather than with people and social interactions and are concerned with abstract, logical rather than practical aspects of theories. Individuals who use the assimilative style incorporate the learning modes of reflective observation and abstract conceptualization.

Table 1. *Conceptual Schematic of Kolb's Learning Styles and Learning Modes.*

Learning Styles	Learning Modes
<p><i>Assimilative</i> <i>Strengths:</i> Building Theoretical Models <i>Emphasis:</i> Less on People & More on Ideas & Concepts</p>	<p><i>Abstract Conceptualization</i> <i>Focus:</i> Logic, Ideas, & Concepts <i>Values:</i> Conceptual Systems & Rigorous Idea Analysis</p> <p><i>Reflective Observation</i> <i>Focus:</i> Understand Meaning of Ideas <i>Values:</i> Patience, Impartiality, & Thoughtful Judgment</p>
<p><i>Accommodative</i> <i>Strengths:</i> Doing & Risk-Taking <i>Emphasis:</i> Adapting Oneself to New Situations</p>	<p><i>Concrete Experiences</i> <i>Focus:</i> Involved Interpersonal Experiences <i>Values:</i> Real World Situations</p> <p><i>Active Experimentation</i> <i>Focus:</i> Influencing People & Changing Situations <i>Values:</i> Ability to Manipulate Environments</p>
<p><i>Convergent</i> <i>Strengths:</i> Intelligence Tests <i>Emphasis:</i> Problem-Solving & Decision-Making</p>	<p><i>Abstract Conceptualization</i> & <i>Active Experimentation</i></p>
<p><i>Divergent</i> <i>Strengths:</i> Creativity & Brain-Storming <i>Emphasis:</i> Social Interaction & Perspective Taking</p>	<p><i>Reflective Observation</i> & <i>Concrete Experiences</i></p>

Note. Information provided in this table is adapted from Kolb (1984).

Accommodative Style. As opposed to the assimilative style, accommodative learners excel at accomplishing tasks by following directions, meticulously planning, and ultimately seeking new experiences (Kolb, 1984). They are characterized as being opportunistic, action driven, and risk takers. The accommodative label comes from their ability to adapt themselves to changing circumstances. Unlike assimilative learners, those who are accommodative solve problems in an intuitive trial-and-error manner rather than through careful examination of facts, and they rely heavily on other people for information rather than on their own analytic ability (Grochow, 1973; Stabell, 1973). The learning modes associated with accommodative learners include concrete experience and active experimentation.

Convergent Style. Kolb suggests that the convergent learner's greatest strength is the ability to efficiently solve problems, make decisions and apply practical ideas to solve problems. Generally, these people do well on standard conventional intelligence tests because they can organize knowledge by hypothetical deductive reasoning and thus are able to converge to one given answer (Kolb, 1976; Torrealba, 1972). Hudson (1966) suggests that people with this learning style are well adept at controlling their emotions, and prefer dealing with technical tasks and problems rather than with issues that involve

interpersonal and social interactions. Convergent learners draw from the learning modes of abstract conceptualization and active experimentation.

Divergent Style. The divergent learner is best at tasks that require “imaginative ability and awareness of meaning and value” (Kolb, 1984, p. 77). Individuals with this learning style have the ability to identify concrete examples of a concept and to generate numerous qualities about this concept from many perspectives. They are then able to organize these qualities by how each quality interrelates to one another, which then provides a meaningful “gestalt” whole of the concept. They are considered “brainstormers” (p. 77), prefer to observe rather than act, are emotionally-oriented and tend to be very creative. Divergent learners prefer the learning modes of concrete experiences and reflective observation.

THE LEARNING ENVIRONMENTS

According to Kolb (1984), there are four learning environments that support the various learning styles and their associated modes. These include the *affective*, *symbolic*, *perceptual*, and *behavioral learning environments*. It should be noted that Kolb (1984) did not make a direct correlation or causal relationship between learning environments and learning styles.

The *affective learning environment* emphasizes concrete experiences so that students actually experience what it might be like to be a professional in a given field of study. Affective learning tasks include activities such as practical exercises, simulations, or field experiences. Information is usually peer oriented and delivered informally. The instructor is considered as a role model and an exemplar for the particular field of study. Activities are noncompetitive, and feedback should not be comparative but personalized to the individual student’s goals and needs (Kolb, 1984).

The *symbolic learning environment* is one in which learners are involved in trying to solve problems for which there is usually a right answer or a best solution. Information is abstract and usually presented in readings, data, pictures, and lecture formats. Characteristic activities may include lecture, homework, and theory readings. The instructor is acknowledged as the expert, enforcer of rules, regulator of time, and taskmaster. This instructional format is typically didactic with a top-down, hierarchical class structure (Kolb, 1984).

According to Kolb and Fry (1975), the *perceptual learning environment* is one in which the main goal is to identify and understand relationships among concepts. Unlike activities in the symbolic environment, the perceptual environment emphasizes the process of problem solving rather than coming up with the best solution. Learners are required to collect relevant information for researching questions and are expected to attack a problem situation through different perspectives (own opinion, expert opinion and literature) by listening, observing, writing, discussing and personal pondering. In this environment, the teacher’s role is to act as a facilitator of the learning process, to be nonevaluative, and to act as mirror by reflecting back student observations and comments. Learning processes may include reflective exercises such as keeping journals, writing reflective essays, or engaging in dialogue with other students. Such practices are incorporated into each class session, which emphasizes the importance of reflection on learning.

Finally, the *behavioral learning environment* emphasizes actively applying knowledge or skills to a practical problem. Although correct answers for activities are not necessary for success in this environment, activities should be structured so that learners gain intrinsic rewards and values. The teacher acts as a coach or guide but only when the student initiates or solicits help. Small group work, interactive projects that apply theory

to real-world settings, and peer feedback are prime examples of student activities in this environment. Measurement is in the form of “how well something worked, feasibility, sellability, client acceptance, cost, testing results, [and] aesthetic quality” (Kolb, 1984. p. 199).

Summarily, to accommodate all types of learning styles, the online course designer should consider how to incorporate each learning environment suggested by Kolb and Fry (1975). Figure 1 depicts a conceptual framework of the four learning styles, learning modes, and learning environments.

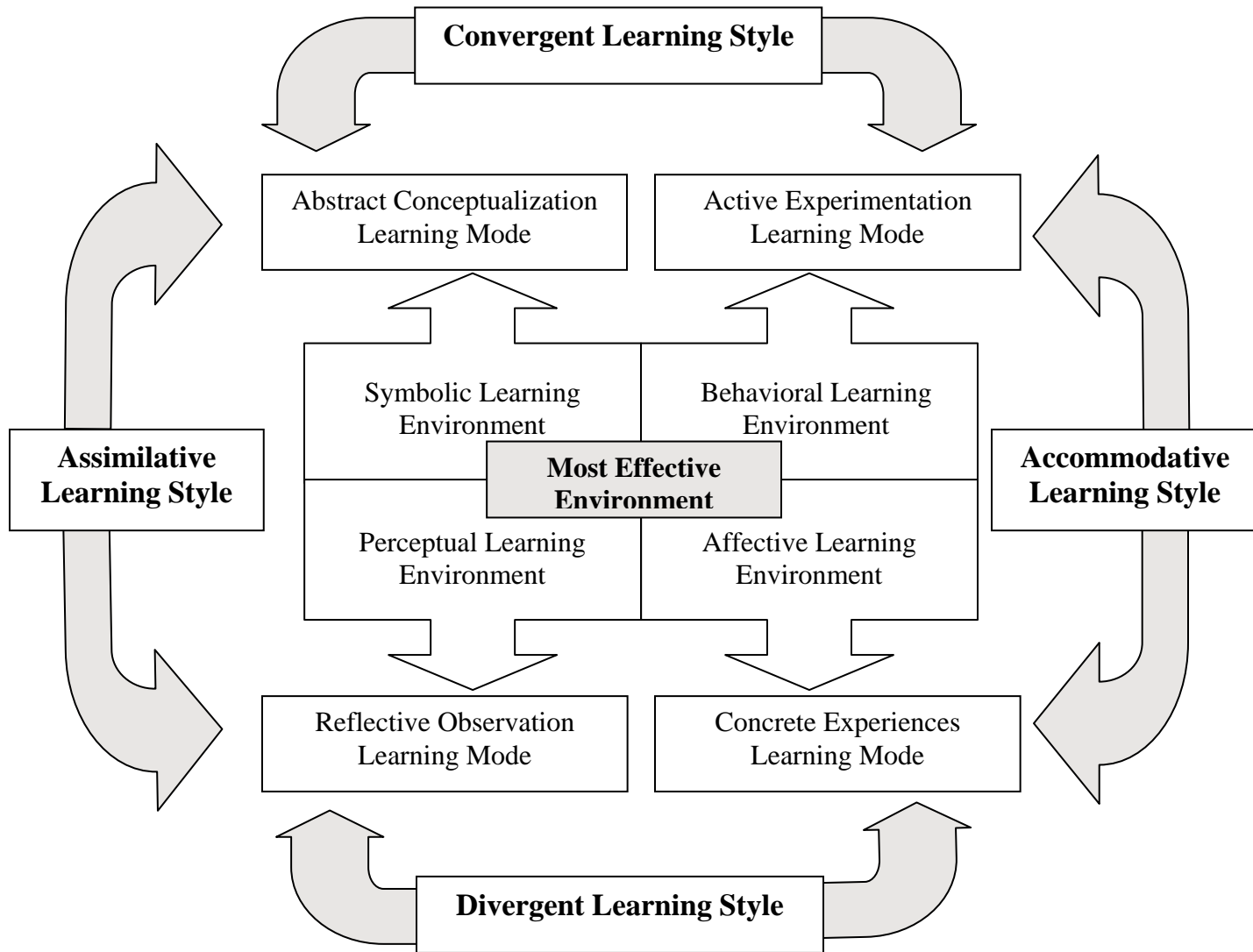


Figure 1. Conceptual Schematic of Kolb’s Learning Styles, Modes, and respective Learning Environments. Note for each Learning Style there is two corresponding Learning Modes and for each Learning Mode, there is a corresponding Learning Environment.

**RELATIONSHIP AMONG LEARNING STYLES,
LEARNING MODES, AND LEARNING ENVIRONMENTS**

As Kolb and Fry (1975) have suggested, each of the four learning environments is supportive of a particular learning mode with its accompanying learning styles as

depicted in Figure 1. Specifically, the *Symbolic Learning Environment* best supports the *Abstract Conceptualization* learning mode, which is part of both the *Convergent* learning style and the *Assimilative* learning style. The *Perceptual Learning Environment* is the most effective environment for the *Reflective Observation* learning mode that is part of the *Divergent* and *Assimilative* learning styles. The *Behavioral Learning Environment* best supports the *Active Experimentation* learning mode, which is part of the *Convergent* and *Accommodative* learning styles. Finally, the *Affective Learning Environment* is the most effective learning environment for the *Concrete Experiences* learning mode, which is part of the *Divergent* and *Accommodative* learning styles.

In summary, Kolb (1984) has described four learning styles and their associated learning modes, which are incorporated within each of four learning environments. In the following section, we describe a number of research studies that have investigated the impact of learning styles on student learning.

RESEARCH ON THE IMPACT OF LEARNING STYLES ON COURSE CONTENT

Numerous studies have investigated the impact of learning styles in community college courses (Jones, Reichard, & Mokhtari, 2003; Terry, 2001), for educators in public schools (Lemire, 2002), and pre-service student teachers (Raschick, Maypole, & Day, 1998). Very little research, however, has focused on the relevance of learning styles to internet-based courses in higher education. Simpson and Du (2004) recently investigated the relationship of learning styles to self-reported enjoyment in students enrolled in online classes. The researchers found that learning style was correlated with students' perceptions of class enjoyment. Students with the converging style reported the greatest amount of enjoyment followed by those with diverging, accommodating, and assimilating styles. Although the authors did not analyze the distribution of learning styles, they did report the number of participants who were considered divergent, convergent, assimilative, or accommodative. Evaluating this distribution, most students were characterized by either the convergent or assimilative style. In their conclusions, the authors suggest the relevance of Kolb's (1984) learning styles theory for designing online distance education courses.

To investigate this possibility, Richmond and Liu (2005) examined the distribution of Kolb's Learning Styles in a small sample (n=49) of pre-service education majors in both traditional and online courses but did not find a disproportionate amount of type of learning style in either class format. However, these results were suspect based on the small sample size. In addition, Terrell and Dringus (2000) stressed the need to develop online course design around sound theoretical research. They used Kolb's Learning Styles theory as the basis of an investigation of whether the learning styles of assimilator or accommodator were most likely to predict success in online learning environments. They found no evidence that style predicted success in online learning.

In summary, although the research on learning styles and distance education is sparse, the few findings of a relationship between learning style and course enjoyment (Simpson & Du, 2004) provide some support for consideration of learning styles in online course design. In the following section, we describe the application of Kolb's Learning Styles to online distance education course design in an undergraduate course in educational psychology.

APPLICATION OF LEARNING STYLES TO ONLINE DISTANCE EDUCATION

Effective online distance education courses should be based on instructional design decisions that will have the most impact on student learning. These may include decisions related to structure of course delivery, teacher-student communication, appropriate assignments and activities that are conducive to online learning, and effective use of online resources. Consistent with Maddux et al., (2002) and Thiele, (2003), we suggest that it is important to design courses, which accommodate student learning styles. Accordingly, we suggest that Kolb's learning styles theory holds promise for providing a solid framework for accomplishing this goal.

As an example of how to adapt Kolb's theory to online instruction, we will use an undergraduate course in educational psychology in our university to illustrate how to adapt online course design to student learning styles. Typically, students enrolled in the course are education majors, and the primary objective of the course is to relate psychology of learning to the educational setting. The course is completely online and there is no physical interaction either between the instructor and the students or among other students enrolled in the course. All communication occurs through email, and asynchronous and synchronous formats such as chat rooms and discussion boards.

ONLINE COURSE DESIGN

The instructor who wishes to consider how best to structure effective learning environments supportive of diverse student learning styles and learning modes may first want to identify the distribution of the four learning styles of students enrolled in the educational psychology course. Fortunately, Kolb (1976) has developed the *Learning Style Inventory* (LSI), which can be used to assess the class distribution of learning styles. This instrument takes very little time to complete and is self-scoring. For commentary and reliability of the LSI, see Kolb (1981). The LSI should be administered at the beginning of the course so that course design and structure may be designed and implemented accordingly. For example, if the majority of students demonstrate assimilative and convergent styles, the instructor will want to implement a learning environment that is supportive of these styles.

The following section describes specific course activities, methods of delivering course content, student evaluation, and instructor style that are appropriate for use within the context of each of the four learning environments (see Table 2).

The Affective Learning Environment. In this environment, the primary online course structure would include interactive online tutorials that demonstrate course concepts. For example, if the instructor intends to teach the concept of behavioral learning, he or she could construct, borrow, or purchase an interactive tutorial that enables the students to experience and witness the basic principles of behaviorism, such as operant conditioning, reinforcement schedules, rewards and punishments. Through observation and practice experienced in such tutorials, students who prefer this learning environment could use the knowledge gained from the tutorials and apply it to their personal values and future experiences. In addition to interactive tutorials, students might keep an online journal that includes personal reflections on assigned readings. Another online course design for this environment would be synchronous chat sessions that allow students to interact with one another in live time and bounce ideas off each other. Finally, course activities should include personalized peer and instructor feedback. For example, journal reflections might be selected to share online with other students and the instructor via a chat room or bulletin board. Because the instructor in this environment is a "coach" or helper, it is

important for him or her to make suggestions or otherwise stimulate student thinking through judicious comments and questions.

Table 2. *Learning Environments & Application to Online Courses.*

Environment	Activities	Content Delivery	Evaluation	Instructor Style
<i>Affective</i>	Interactive Tutorials that Require Autonomy	Synchronous Chat Discussions with Both Peer & Instructor Involvement	Peer & Instructor Feedback which is Personalized	Coach or Helper
<i>Symbolic</i>	Multiple-Choice Quizzes & Tests, Case Study Analysis	Lectures that Focus on Theories or Broad Concepts	Instructor Derived Based on Objective Criteria	Top-Down, Didactic, Guide, & Task Master
<i>Perceptual</i>	Online Reading Journal & Lecture Summaries	Lectures that Focus on Interpretation & Asynchronous Chat Discussions	Instructor Evaluates Work Compared to others in the field	Expert Opinion & Deemphasizes Critical Evaluation
<i>Behavioral</i>	Structured Group Projects & Homework that Applies to Theories	Peer Asynchronous Chat Discussions & Lectures are not Helpful	Peer Feedback Ownership & Justification of Grading Policies	Role Model and Exemplar of the Class Content

Note. Information in this table was adapted from Kolb (1984).

The Symbolic Learning Environment. In this environment, course activities include incorporation of traditional tests and lectures that focus on abstract theories and concepts. For example, quizzes, mid-terms, and final exams are constructed using multiple choice, true/false and essay questions. Students in this environment prefer a hierarchical, lecture style that generates a didactic structure between the professor (the expert) and the student (the novice). In addition to traditional quizzes and tests, activities also should include evaluation of research in the content area (for example, peer-reviewed educational psychology articles) and case studies that require students to apply theoretical concepts to the details of the case. Evaluation for course activities should be instructor derived and based on clear, concrete, and objective criteria

The Perceptual Learning Environment. Course activities specific to this learning environment include online reading journals, lecture summaries, and asynchronous chat discussions. Content delivery in this environment should be interactive lectures that include reflective questions, which ask students for personal interpretation of course content (via asynchronous chat sessions). In addition, for every major concept covered in the course, instructors should provide students with opportunities to recap and reflect on these concepts and related activities. Evaluation activities should measure student performance by comparing their work to that of others in the field of educational psychology. For example, if students are required to observe a child and then write a case summary based on their observations, the structure of the case summary should follow the example of case studies conducted and described by researchers or professionals in the field, such as teachers or school psychologists. Finally, in this learning environment, the instructor should provide expert opinions yet deemphasize making critical evaluations of students and course content.

The Behavioral Learning Environment. In this environment, course activities should include structured group projects and lessons that are designed to apply theoretical information to real-world settings. The group projects can be coordinated through use of discussion boards and/or chat rooms. Projects should be designed with clearly defined goals and objectives for each group member. For example, students could apply the Piagetian concepts of *assimilation*, *accommodation*, *disequilibrium*, and *equilibrium* to a case study in which each group member is required to identify one of these processes and explain how it can be applied to the particulars of the case study. Course content should be generated through peer interaction (asynchronous chat sessions) rather than traditional lectures. Specifically, the instructor should provide real world scenarios for each theoretical concept and then ask students to relate the concept to the example. The instructor also may ask students to apply theoretical concepts to their personal experiences. In terms of course evaluation, students in this environment appreciate peer feedback and prefer some ownership or justification of specific grading policies. For example, evaluation activities for the Piagetian case study described above might be peer evaluation of group work. In another activity, students may want to participate in a democratic selection of an evaluation method for that activity. Finally, the instructor in this learning environment acts as a role model and an exemplar of course content.

CONCLUSIONS

It is sometimes difficult for instructors of online education to recognize the importance of consideration of individual student needs. Since online instructors usually do not engage with students in face-to-face interactions, they may be more concerned with the mechanics of course delivery than with the individual concerns of students. Also, as some authors (Maddux et al., 2002; Thiele, 2003) have noted, it is increasingly important to identify student learning styles and adapt online course design to accommodate these styles. In response to this call for action, we have provided specific suggestions for using Kolb's theory of learning styles as a basis for designing online course instruction (Kolb, 1984). We hope that future researchers will use this information to investigate the validity of online course design that identifies students' learning styles and structure learning environments based on those styles. We believe that such thoughtful course design and implementation will not only improve the quality of online course delivery but also will enhance student learning.

REFERENCES

- Grochow, J. (1973). *Cognitive style as a factor in the design of interactive decision-support systems*. Unpublished master's thesis, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States.
- Hudson, L. (1966). *Contrary imaginations*. Middlesex, England: Penguin Books.
- Jones, C., Reichard, C., & Mokhtar, K. (2003). Are students' learning styles discipline specific? *Community College Journal of Research and Practice*, 27(5), 363-375.
- Kolb, D. A. (1976). *Learning-Style Inventory*, Boston, MA: McBer and Company.
- Kolb, D. A. (1981). Experiential learning theory and the learning style inventory: A reply to Freedman and Stumpf. *Academy of Management Review*, 6(2), 289-296.
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*, Upper Saddle River, New Jersey: Prentice Hall.
- Kolb, D. A., & Fry, R. E. (1975). Toward an applied theory of experiential learning, In C. Cooper, (Ed), *Theories of group processes*. London: Wiley Press.

- Lemire, D. (2002). Brief report: What developmental educators should know about learning styles and cognitive styles. *Journal of College Reading and Learning*, 32(2), 177-182.
- Maddux, C. D., Ewing-Taylor, J., & Johnson, D.L. (Eds.). (2002). *Distance education: Issues and concerns*. New York: The Haworth Press.
- Raschick, M., Maypole, D. E., & Day, P. A. (1998). Improving field education through Kolb's learning theory. *Journal of Social Work Education*, 34(1), 31-42.
- Richmond, A. S., & Liu, L. (2005). Student learning styles of traditional courses versus online distance courses. In C. Crawford, R. Carlsen, I. Gibson, K. McFerrin, J. Price, R. Weber & D. A. Willis (Eds.), *Technology & Teacher Education Annual* (pp. 576-578). Charlottesville, VA: AACE.
- Simpson, C., & Du, Y. (2004). Effects of learning styles and class participation on students' enjoyment level in distributed learning environments. *Journal of Education for Library and Information Science*, 45(2), 123-136.
- Stabell, C. (1973). *The impact of a conversational computer system on human problem solving behavior*. Unpublished master's thesis, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States.
- Terry, M. (2001). Translating learning style theory into university teaching practices: An article based on Kolb's experiential learning model. *Journal of College Reading and Learning*, 32(1), 68-85.
- Thiele, J. E. (2003). Learning patterns of online students. *Journal of Nursing Education*, 42(8), 364-367.
- Terrell, S. R., & Dringus, L. (2000). An investigation of the effect of learning style on student success in an online learning environment. *Journal of Educational Technology Systems*, 28(3), 231-238.
- Torrealba, D. (1972). *Convergent and divergent learning styles*. Unpublished master's thesis, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States.