Teaching the teachers: teaching and learning online

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Keywords

Academic libraries, Information services, Teaching methods, Learning styles

Abstract

As online learning opportunities increase in today's society, librarians need to consider additional ways to design online instruction effectively. Developing the strategies necessary to teach and learn online successfully requires an understanding of learning styles and how they may be best addressed in the online environment. As is the case in a face-to-face classroom, the use of a specific teaching style or set of styles must expand in order to address different learning styles when teaching online. Successful teaching and learning depend on all participants possessing the attitudes necessary to succeed in the online environment. This paper provides information about learning and teaching styles, and it addresses how teaching to various learning styles may be accomplished using the available online tools and resources.

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www.emeraldinsight.com/0090-7324.htm

Reference Services Review
Volume 32 · Number 4 · 2004 · pp. 404-412
 · ISSN 0090-7324
DOI 10.1108/00907320410569761

Online learning opportunities are now commonplace, both within the framework of formal post-secondary education and as part of continuing education offered through professional associations. The National Center for Education Statistics reports that:

> In 2001, about 3.1 million individuals were enrolled in distance education courses at either two- or four-year institutions, twice as many as in 1995 (Waits and Lewis, 2003, p. 1).

Furthermore, commenting on online courses and professional development, the Pew Internet & American Life Project states:

> Fully 41 percent of Internet users – a figure that represents more than 47 million people – have received additional online education or training for a career in the past two years (Kommers and Rainie, 2002, p. 5).

Given these trends, preparing to teach and learn online is increasingly important for academic librarians who teach online courses, as well as for those who participate in online continuing education sponsored by the Association of College and Research Libraries, Association of Research Libraries, and other organizations.

Distance education is broadly defined as any learning that takes place when the teacher and the student are separated by physical distance. Distance education is commonly divided into synchronous and asynchronous learning environments. In a synchronous environment, the teacher and student interact in real-time. Often students meet in a location, typically a classroom, at a designated time for either one-way or two-way videoconferencing, which is transmitted by the teacher from a different location. The advantage of synchronous learning is the opportunity for immediate feedback for both teacher and student. An asynchronous learning environment does not occur in real-time; students have the flexibility of working at their own pace in their homes or workplaces. Asynchronous learning is delivered via videotapes, audiotapes, or the web, often using course management systems, such as Blackboard or WebCT. Most course management systems also provide for synchronous learning via virtual chat.

Research suggests the most effective learning occurs when courses are designed to appeal to various learning styles. In a face-to-face classroom, this traditionally involves developing a pedagogy that may include lecture, active learning exercises, and experiential learning. In order to be successful online teachers and learners, librarians must understand and utilize learning styles to inform the way they approach online teaching and learning.

Submitted: 2 June 2004
Accepted: 5 August 2004

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This paper explores how knowledge of learning styles can transform learning and teaching in an online environment.

Overview of learning styles

The definition of "learning styles" varies widely depending on the perspective of the researcher. While early researchers, such as Kolb (1981), focused on learning styles as a reflection of how thought is processed, more contemporary researchers have expanded the field to include both psychological and affective dimensions that effect learning. Individual learning styles are developed as an outcome of heredity, experience, and current environment. James and Gardner (1995, p. 20) suggest that a core concept of learning styles is "how people react to their learning environment." Dunn (2000, p. 9) cites this commonly accepted definition:

> Learning style is a biologically and developmentally determined set of personal characteristics that make the identical instruction effective for some students and ineffective for others.

The following sections cover some of the important theories on learning styles.

Kolb's learning cycle

Drawing on experiential learning theory, Kolb (1981, p. 235) developed a model of the learning cycle to illustrate how "experience is translated into concepts, which, in turn, are used as guides in the choice of new experiences". According to Kolb, learning is a four-stage process beginning with CEs. These experiences form the basis for observations and reflections, which in turn lead to the formation of abstract concepts and generalization. Finally these abstract concepts or hypotheses guide in the creation of new experiences. Kolb further suggests that learners need to develop abilities that match the stages of the learning cycle. For learning to occur, the individual must undergo new experiences and reflect on those experiences. This reflection leads to the creation of theories or concepts that are then used to make knowledgeable decisions.

According to Kolb, cognitive development takes place along two dimensions. The first places concrete experience (CE) at one end of the dimension and abstract conceptualization (AC) at the opposite end; the second places active experimentation (AE) and reflective observation (RO) at opposite ends of the dimension. This suggests four distinct learning styles: imaginative learners are opposite from common sense learners and analytic learners are opposite from dynamic learners. Imaginative learners rely on CE and RO. They seek meaning from experiences and are interested in people and culture. They perform best in situations that allow for "brainstorming." Common sense learners rely on AE and AC. They are pragmatic, seeking to integrate theory and practice. They perform best in situations where there is one correct way to accomplish a goal and prefer to learn one step at a time. Analytic learners rely on AC and RO. They perform best in a traditional classroom. Dynamic learners rely on CE and AE. They are willing to take risks and learn through experimentation. They perform best in an environment that allows for trial-and-error and will rely on information from others rather than analytical analysis to solve problems (Kolb, 1981; Lewis, 1991).

Gregorc's mindstyles

Similar to Kolb, Gregorc suggests that individuals learn through certain "mindstyles," which he names "concrete", "abstract", "sequential" and "random" to reflect the way that information is processed. Concrete learners respond well to a structured, practical, and predictable learning environment in which they can be physically involved. Abstract learners perform best in an environment that is logical and analytical. They specialize in synthesizing data to produce new concepts or theories. Random learners prefer sociable and imaginative learning experiences. They think holistically and can take disparate pieces of information and form them into a global concept. Sequential learners need specific details presented in a structured, step-at-a-time format (Sarasin, 1999; Lewis, 1991).

Multi-dimensional learning styles

While Kolb and Gregorc analyzed learning styles according to cognitive dimensions, other researchers recognize that learning styles also include perceptual and affective modalities. James and Gardner (1995, p. 19) suggest "the ways individual learners react to the overall learning environment make up the individual's learning style." And James and Blank (1993, p. 47) define learning styles as the "complex manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn." Thus, perceptual, cognitive, and affective factors all contribute to an individual's learning style. The perceptual mode identifies the ways in which individuals react to external stimuli and assimilate information. According to James and Gardner, French (1975a, b) proposes seven concepts that contribute to perceptual modality:

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(1) visual (pictures, diagrams, maps, charts);
(2) print (written words, text);
(3) aural (hearing or auditory);
(4) interactive (talking, discussion);
(5) haptic (touch);
(6) kinesthetic (movement, learning by doing); and
(7) olfactory (smell and taste).

The cognitive dimension of learning styles reflects how thought is processed and is represented by the Kolb and Gregorc models. Affective modes reflect the emotional component of learning and are seen in individual behaviors, such as preferring to learn independently or in a group. The affective modality is evident in the way in which individuals use their emotions to make sense of learning experiences.

Focusing on multidimensional factors, Dunn (2000) suggests that environmental, emotional, sociological, physiological, and psychological factors influence learning. Environmental factors include seating arrangement, temperature of room, and lighting, while emotional factors are represented by motivation, initiative, and responsibility. Sociological factors are preferences for learning alone versus group learning and working in various types of classroom settings. Physiological factors include perceptual dimensions, such as visual, verbal, and kinesthetic, as well as time of day and other stimuli that affect an individual's physiology. Psychological factors reflect the way that individuals process information (global versus analytic and impulsive versus reflective) and hemisphericity (right-brained or left-brained).

Other researchers also focus on learning styles as preferences for certain behaviors or conditions under which learning occurs as well as how information is processed. According to Sarasin (1999), Sims and Sims group learning styles into cognitive, perceptual, behavioral, or affective domains. Persons with cognitive learning preferences learn best when information is presented in a logical, sequential manner. They need to understand parts of a concept before applying understanding to the whole concept. Perceptual learners view concepts holistically. Understanding the whole leads to understanding of how the parts influence the whole. Perceptual learners learn best when presented with information graphically. Behavioral learners favor experiential learning and "learning by doing." Affective learners depend on their emotions to bring sense into the learning process.

Harb, Durrant, and Terry suggest that learners are reflective/abstract, concrete, or active (see Sarasin, 1999). Reflective/abstract learners need time to think about information while concrete learners visualize information. They need to see how each of the parts contributes to the whole concept. Active learners need involvement in the learning process. Sarasin groups learning preferences into auditory, visual, and tactile/kinesthetic categories. Auditory learners perform best when information is spoken. They learn sequentially and process information in a structured, logical way, moving from understanding of parts to comprehension of the larger concept. Visual learners rely on pictures, images, and graphs to comprehend information. They do well in an environment that introduces a global concept and then integrates the parts into the whole. Tactile/kinesthetic learners need to "do" in order to learn. They perform best in an active learning environment where they can be involved in the learning process.

Grasha (2000) groups individuals into six categories: competitive students need to learn material better than their counterparts in order to receive attention and recognition; collaborative learners share ideas and work with others; avoidant learners are not very interested in learning and will not participate in class discussions; participant learners are active in class and tend to be good class "citizens"; dependent learners rely on authority and show little intellectual curiosity; and, independent learners work alone and determine the extent of their own learning.

Felder and Solomon (1993) combine modalities to include active and reflective, sensing and intuitive, visual and verbal, or sequential and global. Active learners perform best in environments where they can experiment and "learn by doing". Reflective learners need to think about the information they receive so need time to process information. Sensors need to experience ideas in logical, structured sequences, while intuitive learners think in abstract concepts. Visual learners learn best through graphs, pictures, and images, since they need to "see" new ideas or concepts. Verbal learners do best in an environment focused on both written and spoken words. Sequential learners respond well to information presented in a logical, structured order, while global learners think in abstract terms, often grasping whole concepts before seeing how each idea contributes to the whole.

Research suggests that individuals are usually strong in one learning style, but will exhibit multiple learning styles or a combination of learning styles depending on age, gender, personality, culture, and environment[1]. The following sections discuss some strategies that can be used to adapt instructional design in an online environment to appeal to the learning styles of various types of learners.

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Planning for online education

Before considering whether to teach or participate in online instruction, individuals need to consider whether they have the technical tools, personality, and resources to achieve success. Online learning is most successful when individuals are enthusiastic about teaching and learning in this medium and willing to take risks to learn to communicate effectively employing the available technology. Teaching and learning online requires preparation in the following prerequisites.

Teacher and student prerequisites for online learning

Prerequisite to online education is the availability of technical resources. Both teachers and students must have easy access to computers and a good internet connection. It is impractical for students to believe that they can complete most coursework during work hours, even when the course is mandated or supported by employers. If either teachers or students need to rely on dial-up connections, they must make sure that the connection is fast enough to allow for virtual chat and reliable download of large files. Students may need to check with system administrators to make sure that firewalls or other security systems will not interfere with access. Teachers may also need to troubleshoot technical problems or have access to others who will supply fast technical support. Both teachers and students need basic technology fluencies, such as file management, uploading and downloading files, and communication etiquette.

Before enrolling in an online course, students need to assess the practical considerations that will affect their success. Online students should be motivated and self-directed. Successful online students prioritize their home, work, and study responsibilities. While online learning often allows for great flexibility in scheduling, students must be able to manage their responsibilities to allow sufficient time for course participation and study. The physical environment should be conducive to interaction via computer and reflection on course material. Students need to work independently, often with less direction from the instructor than is available in traditional classrooms. Distance education students should be comfortable communicating in an online environment and willing to take the initiative in communicating with teachers and other students. They should be open to experimenting with new technologies.
Buchanan *et al.* (2004) suggest the following steps for success in online learning:

(1) reading suggested background materials before the course start date;
(2) glancing through all content as soon as the course is available in order to become familiar with the layout;
(3) noting the scheduled chat times and making necessary arrangements to be present;
(4) going online at least once a day to see what other participants have posted;
(5) making every attempt to meet the due date for each day's activities, which build on each other and lead toward completion of the final project; and
(6) using the calendar within WebCt (or other course management systems) to keep abreast of important dates and events.

Successful online students are active learners, who are willing to take responsibility for their own learning and able to communicate effectively in both a synchronous and asynchronous environment using a variety of technologies.

Applying teaching styles to online learning

Just as students possess different learning styles, teachers tend to exhibit specific teaching styles that reflect their belief in how individuals learn[2]. Grasha (2000) proposes five teaching styles:

(1) *Expert*. Possesses knowledge and expertise that is communicated effectively to students to insure they are challenged and well prepared for future experiences.
(2) *Formal authority*. Relies on position and power to engage students in a structured, acceptable program of learning.
(3) *Personal model*. Will model behavior that students should emulate in order for learning to occur.
(4) *Facilitator*. Encourages student-teacher interactions and develops independent learning activities in a consultative fashion.
(5) *Delegator*. Acts as a consultant and resource person as students develop into self-directed, independent learners.

Grasha further suggests that individuals exhibit these teaching styles in four teaching style clusters, two of which are teacher-centered and two, student-centered: expert/formal authority; personal model/expert/formal authority, facilitator/personal model/expert; and delegator/facilitator/expert. Both the expert/formal authority and the personal model/expert/formal authority styles focus on the teacher as authority, employing lecture as the primary mode of instruction. The personal model/expert/formal authority style also employs role modeling. The facilitator/personal model/expert teacher provides goals and objectives, while including active learning to facilitate student involvement in learning. The delegator/facilitator/expert teacher provides a student-centered

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environment in which the students are responsible for their own learning. The delegator/facilitator/expert teacher works on developing good relationships with students to allow for maximum student learning to occur (Grasha 1996). Grasha likens the process of learning to a dance that involves both teacher and student as one responds to the other. Using various teaching styles provokes a certain response from students, just as accommodation to various learning styles can effect change in the teaching styles of instructors.

When designing an online course, teachers should employ a variety of techniques and active learning experiences for students. Typically online courses are developed using Blackboard or WebCT course management software. These systems offer opportunities to incorporate various activities that appeal to different learning styles. By its very nature, online learning requires a student-centered approach. Teachers whose mode is primarily expert and formal authority may have difficulty adapting their styles to an online environment. On the other hand, online courses provide an opportunity for teachers to expand their teaching repertoire. Courses built on instructional design that recognizes differences in learning styles are often more effective and satisfying to students than courses that primarily rely on written content or lecture format. Verduin and Clark (1991, pp. 157-62) propose five factors to be considered when designing instruction for distance education:

(1) entering behavior;
(2) instructional objectives;
(3) designing the learning unit;
(4) presenting and performing; and
(5) assessing performance.

To design an effective online course the teacher must understand the motivation, goals, and level of understanding of entering students. He or she must develop clearly defined goals and objectives built on knowledge of entering behavior. Objectives should be both instrumental, designed to produce behavioral change, and conceptual, planned to generate application of knowledge. Presenting involves the way content is delivered and the communication process utilized by teacher and students. Assessment of performance should be formative and summative. Formative assessment occurs during the learning experience and includes feedback to both instructor and student. Summative assessment happens at the end of the course to ascertain the achievement of the learning objectives. An important step in this model is utilizing technology to meet behavioral objectives. By appealing to various learning styles, teachers can use technology to design instruction that creates a variety of learning experiences for effective teaching. The most successful teachers spend time carefully designing their courses for the online environment. Even when adapting a fully developed traditional course which has already been used in the classroom, they incorporate learning activities specific to distance learning. They enjoy working with technology and are willing to help students with technology issues (Gilbert, 2001).

In *Implementing the Seven Principles: Technology as Lever,* Chickering and Ehrmann (1996, pp. 3-6) suggest using technology to support online instruction through the following "good practices":

- encourage contact between students and faculty;
- develop reciprocity and cooperation among students;
- use active learning techniques;
- give prompt feedback;
- emphasize time on task;
- communicate high expectations; and
- respect diverse talents and ways of learning.

Implementing these good practices using course management systems to recognize the strengths of various learning styles is covered in the next section.

Teaching to learning styles

> The four types of interactions critical for DE learner success includes (1) learner-to-content, (2) learner-to-instructor, (3) learner-to-learner, and (4) learner-to-interface (Schutt, 2000, p. 1).

Online course communication must be intentional and planned. Learner-to-instructor defines the communication structures enabling interaction between student and teacher, whereas learner-to-learner reflects media used for student communications. According to Schutt (2000), learner-to-interface includes the process whereby the student gains mastery of the technology used in the course management system, while learner-to-content describes the cognitive processes as the student learns the course material. The course management system is the interface with which students interact, and it contains the tools that teachers need to carefully consider in addressing the various types of learning interactions that are available.

Using the syllabus to create community

When planning online courses using course management software, the development of the syllabus requires careful consideration. In an online course, the syllabus provides more than the course outline often typical of the syllabus used in a

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traditional classroom. The syllabus provides information about the course instructors, including links to e-mail, telephone numbers, and times of availability. A personal message from instructors personalizes the course and begins to develop a sense of community. Besides the goals and objectives for the entire course, the goals and objectives for each lesson or module need to be explicitly expressed in the syllabus. The syllabus should also provide an overview of course content. All activities, which should be student-centered and include discussion boards and chats, need to be described in detail with due dates highlighted. Expectations for posting to the discussion board have to be clearly defined and should include some group interaction. Virtual chat should occur at various times in order to include as many students as possible. Due dates should be linked to the calendar, which needs to be kept current to remind students of important dates. The syllabus needs to explain methods of communication, as well as guidelines for submission of materials and when feedback can be expected. When appropriate, grading criteria and other class expectations should be included in the syllabus. Links to content support those learners who prefer a global or abstract approach to learning, thereby allowing students to approach the course sequentially or randomly.

It is important for the teacher to establish a sense of community by including initial activities that encourage students to get to know one another. The teacher can post a biography and ask for students to post introductory biographies or provide other information about themselves. If possible, an "ice-breaking" activity can be designed as the first discussion thread. A discussion board can be set up for community interactions outside formal discussions. Social learners appreciate the ability to chat virtually with classmates in informal venues.

Teachers can effectively make use of the announcement page to encourage students and reinforce learning. The announcement page can provide feedback, pose questions that further critical thinking, and point students to useful resources. It can also be a forum to encourage and support community through use of personal anecdotes that are relevant to the course material.

Overall, the syllabus conveys the teacher's expectations, as well as addressing student concerns. Together with the announcement page and introductions, it builds online community and introduces the process that students will use to engage in course content.

Developing student-centered content

Developing course content requires comprehensive planning to create an active learning, student-centered environment. Content ought to be presented using various technologies and formats. Online lectures should be concise with lots of white space between bodies of text. Using headings and sub-headings helps to break up heavy textual content and provides an opportunity for linking that will appeal to the global learner. Written course material will appeal to the visual and verbal learner, while audio files can be used to appeal to the auditory learner. The written content should include charts, graphs, and images, thus, facilitating learning for the non-textual visual learner. Both visual and auditory learners relate to material presented in a logical and sequential format. Links to definitions provide quick explanations of unfamiliar terms. Linking to related concepts allows the global learner access to materials that support random multi-directional learning. Students may be asked to develop links to additional lists of resources that are relevant to the topic, thus supporting the active learning environment. Providing optional as well as required course readings that are relevant and challenging appeal to both sequential and global learners.

Course content needs to incorporate experiential learning with time to reflect on new learning experiences. Activities should be integrated throughout the course. When possible, simulations or case studies can be used effectively to involve students in the learning process. Encouraging debate and discussion is necessary for effective learning. Using the discussion board for both threaded and unthreaded discussions based on course content aids in learning and integration of new concepts.

The reflective student requires time to think about new concepts. Students have to be given opportunity to reflect on the course content through discussion or reflection essays that include their own observations on the content and also how they can incorporate the experiences or observations of others into their own knowledge base. Teachers should be prepared to facilitate discussion as students may guide their own learning through experience or reflection. Both active and reflective students benefit from an instructional design that provides feedback and the ability to talk about concepts and experiences.

Using discussion boards effectively

Discussion boards often become the primary means of communication. Benfield (2002) offers useful suggestions for managing effective online discussions. When setting up discussion threads, the teacher needs to be clear about expectations, setting up guidelines and protocols for discussion. Time limits for postings need to be clearly

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articulated with defined beginnings and endings. Discussions should be task-oriented and provide a useful advantage to students. Students need to know when they can expect teacher feedback and the criteria that will be used if discussion is assessed. In an online discussion, the teacher acts as facilitator and model. The best discussion is student-centered with the teacher intervening to provide structure. Feedback should be timely. Teachers need to encourage students through praise and reassurance. A useful technique is to set up group debates requiring students to work together and collaborate on postings. Discussion boards can be used effectively as building blocks to a final research report, annotated bibliography, multimedia project, or portfolio. Reflective learners may be reticent about posting initially, whereas active learners may engage in discussion more easily. To be effective, teachers need to communicate with non-participants privately to encourage discussion. Most importantly, the teachers in online courses need to model the behaviors they expect from students.

Suggestions for virtual chat

Virtual, or synchronous, chat provides an additional medium for communication that appeals to active, social learners and global, abstract learners. Before the chat session, students should make sure they can connect to the Internet and should become familiar with the chat interface. For virtual chat to be effective, group size should be limited to no more than 12 participants. Time for social interaction is appropriate at the beginning of the chat session, but the session should have a specific agenda that is posted to students beforehand. Students should be encouraged to prepare carefully for the chat session by reading assigned materials and considering agenda items.

The teacher facilitates discussion by directing comments to certain individuals or to the group in general and by encouraging participation from all (Varvel, 2001). This is also an opportunity for the teacher to be supportive and encouraging. After the session, the teacher should follow-up on any unanswered questions. An archive of the chat should be made available as soon as possible after the chat session. This provides additional access to material for the visual learner and allows for reflection on the content and dynamics of the chat session. For auditory learners, the teacher may use audio format or perhaps conferencing to facilitate group discussion.

Developing experiential activities

Activities should provide learners with the opportunity to apply concepts to their real-life situations. Ip and Naidu (2001) provide useful suggestions for experience-based pedagogical designs that work well for e-learning. Using goal-based scenarios, the instructor develops general goals for the course while students complete projects that give them the opportunity to learn by doing. This gives students the freedom to decide what content and skills are most important for them to learn in order to complete their project, which is often based on a real-life need. In goal-based scenarios, the teacher acts as delegator/facilitator/expert by providing consultation and direction while students work independently. This scenario works well with independent and active learners.

In web-based role-play, students are organized into teams to come up with a constructive solution to a problem or crisis that is rooted in experience. Each student is responsible for conducting his/her own research and contributing insight into the solution of the problem through role-play. The teacher acts as delegator/facilitator/expert by providing a supportive environment and guidance, but does not actively participate in the learning experience. Independent and active learners perform well in this environment, as do random and global learners who will see the problem in its entirety and work towards a solution.

Rule-based simulations allow the learner to try out various schemas by adjusting input variables in a system to observe changes in output variables. Rule-based systems can focus on conceptual or operational models. Sequential or cognitive learners will enjoy the structured and analytical approach to rule-based simulations while the teacher acts as facilitator/expert by providing consultation and expert reasoning to the solution of problems.

In case-based learning, students discuss and debate a real world problem or topic in order to develop critical reasoning. In case studies, learning proceeds from the specific case to understanding of concepts or theories that can be applied to similar life situations. Thus, case studies appeal to abstract and random learners. Because case studies can be analyzed either independently or by individuals working in groups, they can apply to independent or social, collaborative learners. In case studies, the teacher acts as delegator/facilitator/expert by offering consultative support while encouraging participants to work out their own understanding.

Project-based or problem-based learning activities appeal to those students who "learn by doing." In this scenario, students are presented with a problem and asked to develop a solution through use of discussion boards, independent research, and reflection. Building on activities to

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complete final projects students can potentially use in their work or personal lives increases retention and integration of concepts. Projects can take the form of written presentations, spoken presentations using audio or video format, or multi-media presentations, offering students the opportunity to incorporate various media into their final projects. It is often beneficial for projects to be shared via a virtual "dropbox" that can be accessed by both students and instructor. Students can be asked to comment on the projects of others and to find ways that they may use their colleagues' ideas in their own presentations. Project-based or problem-based activities will generally appeal to many types of learners, as they accommodate active learning with RO. Problems or projects can be assigned independently or collaboratively, appealing to independent or social learners. Critical thinking is developed as individuals reflect on their own problems and comment on the projects of others. The teacher acts as delegator/facilitator/expert by providing resources while encouraging students to engage in online discussion, debate, and reflection on both the completion of the project and the method of learning.

Critical incident-based collaborative learning engages participants in reflection of real-life work situations. Ip and Naidu (2001) suggest the use of learning logs to record experiences, how the individual dealt with the incident, and successes and failures. The learning log provides a medium for reflective thinking as it focuses on the process of problem solving. Learning logs are shared with other students so that all can learn from each others' experiences as concepts or theories are applied to experience. Critical incident-based collaborative learning appeals to imaginative or abstract learners, as well as random learners, who will enjoy the social process of integrating experiences into holistic concepts. In this scenario, the teacher supports the collaborative learning environment by facilitating and guiding discussion. Whenever possible, students should be encouraged to use local resources, such as libraries, museums, etc. to complete the research component involved in experiential learning.

Conclusion

Online learning provides both teachers and students with a fresh opportunity to engage in the learning process. Referring to the dance metaphor, Grasha (2000, pp. 4-5) states:

> The classroom is like a dance in which one partner leads, and the other follows. As in a dance, the person leading is not completely in control; how a dance partner responds affects the next move of the person leading. Good dancing partners make needed adjustments to accommodate each other, and the exchange of signals allow a creative and artistic expression of movement and form to occur.

Taking time to understand learning styles better has the potential to improve teaching and learning. When students are aware of their learning styles, they can choose the instructional format that will appeal to them and compensate for formats that are not conducive to their learning style. They learn to adapt to other learning styles in order to become more balanced learners who adjust to various situations, thus, providing experiences that reflect real-life. Teachers can develop courses using a variety of formats and techniques to appeal to various learning styles. This addresses both dominant preferences and provides learners with additional opportunities to develop other learning styles. In online education, the role of the teacher changes from one of authority or sage to facilitator or guide. Online learning promotes student-centered, active learning in which the individual becomes largely responsible for his or her own learning while the teacher is responsible for presenting multiple opportunities for processing information and assisting students in the creation of new knowledge. By applying these principles to instructional design with deliberate planning, online education becomes a wonderful, fulfilling experience for both teachers and students.

Notes

1 Various learning styles questionnaires are included in the Appendix.
2 Grasha-Riechmann's Teaching Style Survey is available at http://longleaf.net/teachingstyle.html. Also, see " Teaching styles: teaching styles and instructional uses of the world wide web" (Indiana State University Center for Teaching and Learning, 2004) for a discussion of teaching styles and their impact on online instruction.

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