

## Linking Theory, Educational Constructs, and Instructional Strategies in Web-based Course Development

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### Abstract

This chapter will present a description of links between educational constructs and corresponding principles of learning based on theory as they might be implemented in a Web-based course. Focusing on reflective, social and collegial, administrative and instructional aspects of Web-based courses, the chapter reviews literature related to the use of computer conferencing as a primary means of implementing sound instructional strategies based on learning theory. Connecting these concepts highlights specific instructional techniques and applicable ideas for implementation of Web courses using computer conferencing. We suggest an organizational scheme that depicts common constructs in the educational literature and aligns them with theoretical principles and instructional strategies irrespective of specific technology delivery format. We then link these theories and strategies to implementation ideas related to course components common to Web-based environments. It is hoped that this organizational framework may assist Web course developers and instructors in the design, development and implementation of theoretically-based constructs in teaching and learning activities afforded by these unique instructional environments.

### Introduction

In the last several years, terms such as Web-based instruction, computer conferencing, asynchronous learning networks and online threaded discussion groups have become familiar to many faculty and staff in higher education settings. Although most faculty believe that the use of computers in the college classroom can enhance learning, they also cite technology as a source of stress (Marklein, 1999). With the wide spread popularization of Internet and Web-based technologies, teaching online has increased significantly with one report showing almost a 40% increase in distance education courses [and use of corresponding technologies] from 1995 to 1998 (Henry, 2000). University faculty navigate a steep and continually changing learning curve to keep pace with the explosion of new online tools that are appearing almost daily. In the quest to incorporate innovative instructional solutions, many faculty in higher education are experimenting with online technologies long before they have been thoroughly tested in the classroom or in research studies.

Asynchronous learning tools that provide computer conferencing capabilities have been integrated into many current Web-based course development software applications (e.g. WebCT, CourseInfo, Web Course in a Box, etc.) permitting higher education faculty to easily integrate Web resources and online discussions into their courses. However, recently the focus in the literature related to Web course development has shifted to what is more difficult to grasp, the strategies and techniques to use these tools effectively for learning. Faculty are motivated to integrate these type of tools into their teaching by factors such as the opportunity to use technology, develop new ideas and improve their teaching (Schifter, 2000). Without specific guidance based on sound instructional principles however, faculty may indeed perceive the use of these tools as added stress and not a vehicle to improve their teaching.

Since much of the research related to the use of computer conferencing tools and Web-based course delivery has a very short history, a lack of specific guidance and firm foundation of principles on which to base instructional choices is prevalent. Prior to the emergence of the Web, early researchers recognized the valuable educational potential of online computer conferencing well before to the advent of more easily accessible Web-based development tools (Hiltz & Turoff, 1978; Hiltz, 1986; Harasim, 1987). However, related instructional strategies and techniques have not disseminated as quickly as the widespread use of the technology applications. Previous reviews of the research related to computer mediated conferencing found that the literature focused heavily on issues regarding specific applications, hardware and software requirements, and usage policy with a very small percentage of articles reporting empirical results or tested instructional strategies (Romiszowski & Mason, 1996). However, what has been learned from past research in distance education, computer-mediated communication and asynchronous learning environments has not been widely applied to Web-based course development. In addition strong ties between applicable theoretical grounding and applied instructional practice as guidance for those who are developing Web-based courses has also been lacking in the literature. Unfortunately, the true educational potential of these tools may never be realized until developers see links between established theoretical perspectives on learning and useful applied techniques in Web course design as well as find ways to improve the dissemination of research to provide more specific guidance for faculty.

To avoid this scenario, it may be useful for faculty who may be new to online teaching as well as those who are more experienced in the development of online courses, to create a connection between established, familiar educational constructs and implementation of techniques related to conducting online discussions and Web course delivery tools. Other researchers have begun to attempt to make a similar connections between principles of learning and implications for as Web course development (see for example, Bonk, Wisher & Lee's chapter). A direct link between established educational constructs and theoretical principles may prompt the consideration and inclusion of grounded instructional strategies in Web-based courses. As Mason (1994), has so aptly expressed, the technology is not the crux of the problem; identifying the most effective social and pedagogical strategies represents the core of a successful computer-mediated learning environment.

To move in this direction, we have attempted in this chapter to provide direct associations between known educational constructs, applicable theoretical principles, instructional strategies and implementation ideas as they relate to development of Web-based courses. We have organized these elements into a table representing three major pedagogical aspects related to the use of computer-conferencing and associated Web technologies when used for teaching and learning: reflective components, social components and content components. While by no means exhaustive and merely presenting an overview of theoretical perspectives and application in Web courses, we hope that this approach will assist instructors in higher education with the complex decisions involved in designing a course incorporating Web-based attributes. At the very least, perhaps it will help faculty to push past the novelty of the technology delivery formats and encourage them to apply what they know about teaching and learning to the creation of these environments basing their decisions on sound pedagogical constructs relevant to their own domains.

### **Previous Research Related to Distance Education, Anynchronous Learning and Computer Conferencing**

Much of the literature on distance education has informed current design and development of Web-based courses. However, the term distance education has been used to describe an incredibly broad range of courses, delivery formats and audiences. Simonson, Smaldino, Albright & Zvacek, (2000) cite Coldeway's work in establishing a framework of four combinations of time and place that are possible for education to be delivered including same-time, same place education, different-time, same place education, same-time different place and different time, different place education. Traditional views of distance education usually encompassed only the different time, different place combination. However, the distinctions have blurred as various Web-based course technologies have permitted the ease of use of these systems for course management and asynchronous discussions in all types of course settings. Despite the struggle for definitions, the distance education movement has a 150 year history and provides a foundation of research available for current Internet and Web-based course development tools (Keegan, 1986). In the voluminous literature related to distance education, several educationally viable factors have emerged which are applicable to current online instructional delivery mechanisms. It is important to consider this previous research as it may indicate some of the general factors that may facilitate success in Web-based learning environments and inform the effective implementation of current online teaching and learning tools. Some principles based on previous research in the area of distance education are the following:

- § Independence of the student is an important factor in learning (Wedemeyer, 1981).
- § The learner needs to have control, and to take responsibility for the pace of own progress (Keegan, 1986).
- § The environment must be "learner-determined," allowing for self-directed learning (Moore, 1988, 1994).
- § High levels of interaction (e.g., discussion, feedback) may promote learning (Perraton, 1988).

Interaction and learner centered activities in an online or Web-based environment are often facilitated through various computer mediated communications or asynchronous learning tools. Computer mediated communication (CMC) tools include email, listserv, computer conferencing, whiteboard and other technology environments that promote collaboration and communication. A similar construct, asynchronous learning networks (ALNs) are defined as "...a distributed community of learners who, by having access to a computer network could communicate with each other and access learning materials at any time and from any place" (Oakley, 2000, p. 1). Computer conferencing is a significant feature of computer-mediated communications or asynchronous learning network environments that provides a focus for previous and current research on teaching and learning with online technologies. As a primary attribute of current Web course development tools, computer conferencing discussion tools provide the capabilities for creating online learning communities, where participants are engaged in dialogue with each other to learn, collaborate, reflect, debate, critique, expound, share, give feedback, question, answer, and various other communicative behaviors. The virtue of computer conferencing as an effective educational tool is in its proficient ability to support human interaction over distance and time. Interaction between participants is electronically mediated, and thus, whether they are in the same building or across the continent, learners are a part of an asynchronous learning environment.

A sampling of previous literature and research related to the use of computer conferencing as a form of CMC and ALN environments include the following findings:

- § Learning through the dialogic exchange of questions, answers, arguments, comments and feedback can be facilitated through mediated communication (see Holmberg's theory of "guided didactic conversation", 1986);
- § Discussion, the "currency" of computer conferencing, is one of the more efficient and effective methods by which adults learn (Brookfield, 1986);
- § Computer conferencing is appropriate for subject matter that involves discussion, brainstorming, problem solving, collaboration and reflection (Wells, 1992);
- § Computer conferencing affords learning activities such as making choices, self-expression, group interaction and learner organization of information as well as more common learning-to-learn strategies such as time scheduling, working with others, setting goals, establishing positive attitudes, seeing the task and structure of course information and demonstrating competence (Burge, 1993).

While these strategies inform the use of online computer conferencing tools, many issues remain to improve the design of these learning environments. Romiszowski and Change (1992) suggest that better strategies are needed achieve transparency of the tools and focus the learner on the instructional content. While progress has been made in this regard, problems particular to this medium remain include separating relevant information from the irrelevant, and the difficulty of permitting student free expression, and then bringing them back to the original topic when they stray too far off course (Romiszowski et. al., 1992). More current integration of computer conferencing capabilities into Web-based course delivery tools provides opportunities to integrate the vast resources found on the Internet into directed learning activities involving communication and discussion. Harasim and her colleagues (1995) describe this as knowledge networking or facilitating the acquisition of information and knowledge building. Discussion, interaction and knowledge building activities afforded by current online instructional tools create opportunities for numerous types of instructional strategies in Web-based instruction (Bannan & Milheim, 1997).

### **An Instructional Framework by Course Component**

Discussion among participants, reflection on individual and group contributions, and engagement with course content frame the fundamental aspects of the online learning community. Research has attempted to categorize the different types of communication events that occur in computer conferencing interaction (e.g., Henri, 1992). Providing further links to educational constructs, theoretical principles, teaching and learning strategies and implementation ideas can extend this line of thought to provide additional grounding for teaching and learning using conferencing and other attributes of current Web course delivery tools in sound educational practice. Categorizing various constructs, principles and strategies according to course components (e.g. reflective activities, social interaction, and content) can provide a natural scheme for organizing these ideas.

In this chapter, we present reflective, social, and content components that occur in many Web-based courses (see Table 1). The organization of these ideas in this format is a deliberate attempt to align

theoretical and research-based principles with related instructional strategies and corresponding ideas for implementation in a Web-based course environment. From left to right, educational constructs are presented progressing from the theoretical perspective to the more applied. Similar to Henri's (1992) analytical framework that attempts to classify various types of conferencing exchanges, this framework uses similar educational constructs but views them from a design rather than an analytical perspective.

Topics tend to overlap, therefore, the order of course components first present the reflective and social aspects and then administrative and content-based strategies. These elements may be present throughout an instructional context but they also offer specific strategies that can be applied to Web-based course environments. From a spatial perspective, these distinctions of course components might be thought of as course "areas" or "spaces" within Web-based courses representing the following purposes:

1) Reflective Course Component or Area:

Purpose: To facilitate individual and group reflection, metacognition, and self-evaluation

2) Social & Collegial Components or Areas:

Purpose: To organize a space for social and collegial interaction

3) Content Course Components or Areas:

Purpose: To provide administrative information and instructional content through various instructional methods.

With careful planning, a course that includes computer conferencing and knowledge networking capabilities can provide a fulfilling, well-rounded learning experience in terms of organization, instruction, and motivation. Our framework is an overview of organizing the instructional aspects of online interaction to align educational constructs, theory, and instructional activities. We hope that this organizational scheme may prompt the development of additional theory to application links among the educational constructs applicable to Web-based courses.

### **Reflective Course Components**

The process of reflection is crucial to learning, regardless of the form content delivery takes. Students need to make interpretive sense of their learning process and to integrate their past experiences with new information. However, the opportunity for reflection is often overlooked by instructors (Brookfield, 1990). The asynchronous attributes of Web-based course delivery tools may promote reflective activity because these features allow more time for students to form responses than in face-to-face or other synchronous, real-time environments. However, reflection is a broadly encompassing term and is included within dialogical, metacognitive, and evaluative processes. It is applicable to both group and individual instructional situations. In the instructional framework presented (see Table 1), these aspects of reflection are arbitrarily separated in order to examine the various types of reflective activities. It is assumed, however, many of these processes overlap within these activities.

### **Discussion and Interaction**

Through interaction with others in social situations involving dialogue and the higher order thinking processes of reflection, students construct their self-image, self-esteem, and systems of self-regulation

(Ridley, 1991). Reflection, as demonstrated in interactive dialogue, is closely integrated into metacognitive and evaluative processes. The combination of reflective, metacognitive and evaluative processes assist students in their awareness, control and benefit from learning experiences.

The reflective process is embedded in the activity of writing. On-line instructors can facilitate the creation of reflective opportunities and highlight the importance of reflection on topic discussions in order to prompt quality responses and initiate the ongoing dialogue relevant to students' knowledge and experiences. Taking additional time to think before responding to conference messages can promote more constructive (rather than non-constructive) criticism of their own or other's work allowing learners to receive valuable feedback on their contribution to the class.

### Individual Reflection

Through the act of individual reflection, learners build perceptions of themselves, their experiences and relationships, and a greater self-understanding (Mills, 1991). Not usually embedded in each course, it behooves instructors to deliberately integrate opportunities for individual reflection into assignments. The use of learning journals and logs may prompt students to examine their own learning processes and to capitalize on the inherent features of Web-based course delivery tools. Features such as access to transcripts of past discussions provide the opportunity to review and reflect on individual contributions over the semester and consider how these contributions contribute to previous and current learning related to the subject matter.

### Small Group Reflection

Donald Schon's (1987) construct of the "reflective practitioner" relates to both individual and group reflection. This theory is appropriate for application to Web-based course delivery environments in promoting a learning community of professionals using discussion (as a group reflection activity) and individual reflective processes to grow, learn, and mature. Directing students to use computer conferencing and knowledge networking features of Web-based courses, promotes a mechanism for communicative and reflective small group activities. Students can engage in communication and reflection while participating in a directed task or problem scenario. This experience can elicit fundamental elements necessary for learning such as feedback, review and evaluation of the project.

### Metacognition

Metacognition is defined as the awareness and regulation of one's own thinking processes, and is considered to be critical for effective learning (McCoombs, 1991). Clearly, the teaching-learning process includes a need for self-awareness and self-regulation associated with learning and knowing. This self-monitoring and self-control of the learning process is well researched (e.g., Candy, 1991; Flavell, 1976; Hiemstra & Brockett, 1994). It is necessary to consider metacognitive elements while designing and moderating instructional environments. Overall, presenting metacognitive opportunities within educational settings can help students self-regulate their own learning behaviors and become active agents in their own learning process.

A student who can effectively direct his or her own thinking processes is one who develops a metacognitive awareness about his or her own participation within an educational experiences (Ridley,

Schutz, Glanz, & Weinstein, 1992). Because of the asynchronous and distributed nature of online learning environments, students need to regulate and direct their learning. A practiced metacognitive awareness can not only assist them in making their knowledge explicit but also permit them to share their learning and their learning processes or strategies. Instructors can help students to generate metacognitive responses through initiating “metacomments” (Berge, 1995) about the course, methods and approaches. If the faculty member stimulates metacognitive contributions about the course, learners will more comfortably reveal their understanding of on their own learning processes.

#### Self-Evaluation

Self-evaluation obviously involves reflective activity on the part of the learner. This type of evaluation stands apart from instructor evaluation because it involves the student in a critical examination of his or her own work as a detached observer. The process of self-evaluation has an integral and mediating role in the student’s goal-setting, self-motivation and perception of self-efficacy in relation to instructional tasks (Bandura & Schunk, 1981)

Requiring self-evaluative activities in Web-based courses, in addition to peer and instructor evaluations, can provide a more thorough perspective on the attainment of instructional goals. To have students submit periodic self-evaluations (perhaps through a structured Web-based form) can substantially improve both the learning process and the resulting instruction (Jonassen, 1992).

#### **Social and Collegial Course Components**

In a higher education setting, the social and collegial components possible in a Web-based instructional environment play a crucial role in learning and overall course effectiveness. Social and collegial activities are included in the course design to provide opportunities for participants to interact outside the more directed academic objectives related to the course. In this way, students are encouraged to interact on an informal basis, emphasizing the natural social aspects of human communication and their contribution to the concepts of trust, community building, collegiality, and socializing for fun and recreation. These elements are necessary components of any successful learning experience and are even more important when a course is delivered primarily on-line.

#### Social Interaction

In on-line learning environments, social activities help build a sense of community, a place for informal discussions and interaction that may be tangential to academic content. Reil and Levin (1990) suggest that the social design of the experience has a significant impact on course outcomes. For students to initiate learning processes through collaboration, sharing, open discussion and reflection, a social context must be established that allows feelings of comfort, safety, camaraderie, collegiality, and fun, to flourish. Social interaction promotes social cohesion and a feeling of belonging (Henri, 1992). These type of activities may be used to facilitate a positive attitude toward learning and reduce a sense of isolation (Phillips, 1990).

As suggested above, to build an effective online learning experience, social processes must be fostered to create a sense of community. In addition to the basic human need for people to be sociable in a group, Friedman *et al.* (1995) suggests that social chat may give rise to useful insights, leading to beneficial

learning results. Designating social areas within Web-based courses through metaphors such as lounges, cafes and “hall talk” may help to create free-flowing social interchange. Students need to be prompted to interact in these separate areas or they do not perceive this activity as an effective use of their time. Other strategies include the creation of a more informal conversational tone in the course by permitting and encouraging social exchange to be interwoven through the more “academic” discussions. Operationalized, social interaction is an integral part of effective online educational environments, as well as successful academic experiences for participants (Harasim et al., 1995; Hiltz, 1994).

### Situated Learning and Creation of a Community of Practitioners

From a constructivist perspective, the use of interaction within groups provides an emphasis on learning as situated in activity (Lave and Wenger, 1991; Jonassen *et al.*, 1995). The interactivity of groups depends on several social elements integral to effective and sustained communication (e.g., a critical mass of active participants who are collaborating and cooperating, debating and deliberating). Lave and Wenger (1991) discuss the concept of learning as not just internalizing information and knowledge, but as a personal transformation defined by participation in a social community. They argue for the use of discussion and dialogue as a constructivist approach to learning within a community of practitioners. This de-emphasizes a traditional didactic, teaching-centered approach, and shifts the focus to a context of socially-bound communication based on seeking, sharing, analyzing, organizing, and investigating knowledge. This learning-centered approach requires the group to function as social actors, participants connected through discourse; thus, demanding the group be socially well-integrated and functional.

In an online constructivist context, learning can be an inherently social-dialogical process where the processes involved with the interaction among group members facilitate the development not only of a community of learners and a community of practitioners, but a dynamic social system where collegiality and professional development is fostered. Successfully implemented, there is not only a feeling of belonging and trust among group members, but also a sense of a shared purpose.

### **Content Course Components**

#### Administrative Content

Many of the considerations necessary to plan and conduct a traditional course are also necessary when designing a Web-based instructional experience. Administrative matters must be addressed, content must be delivered, additional content resources must be available, interaction must be planned, interim assessments of understanding to check on-going learning must be implemented, and a final assessment to determine if course objectives have been met must be in used.

#### Administration: Basic Course Information

A syllabus is the most common way to communicate administrative information about the course, (e.g., to describe course objectives, assignments and instructional activities). Syllabi have the fundamental purpose of reducing anxiety and initiating learning by informing the learner of the instruction’s goals. Gagne, Briggs & Wager (1992) describe these type of activities as “external” events of instruction necessary to

elicit “internal” events of learning that prompt the student’s executive control processes to select particular internal strategies appropriate to the task and the expected outcomes. It also avoids demoralizing students when they are unsure of what is expected from them (Brookfield, 1990).

Course administrative information should always be presented in a clear and direct format. This is particularly important in a primarily on-line course format. The potential for confusion and misconception is increased for both a totally on-line course and for courses using computer-mediated tools in a supplementary fashion. Often in these situations, the syllabus is the primary communicative mechanism and must provide additional descriptive detail beyond a traditional face to face class. Clear organization of information is crucial to allow students to easily comprehend the structure of the course, the study and assignment timeline and to access related information. The on-line syllabus is often the primary organizing structure for the majority of information. It may include direct links to specific on-line resources or papers, to help constrain the content of the course and allow for easy access to necessary on-line and off-line resources.

#### Administration: Learner Participation

Adult learning theory speaks to the necessity of providing a learner-centered instructional experience that capitalizes on adults’ rich base of experience and prior learning ( Merriam and Caffarella, 1991) . Knowles (1980) describes the ideal adult learning situation as a democratic environment where the student is included in decision making and defining goals, activities and evaluation. Permitting various levels of student input on course activities and assignments is a technique that attempts to engage students in learning. Instructors that use Web-based course delivery tools can provide learner centered opportunities such as structured assignment alternatives for students to select or students can be permitted to openly discuss options and choose the form and method of fulfilling the objectives. Since adults come to the instructional environment with their own individual experiences, involving them in identifying and contributing relevant course resources often yields richer and more varied content examples and references than the instructor alone may have been able to gather. Capitalizing on adult learning principles in online learning environments can promote better engagement in the content and the course.

#### Methods: Congruency of Objectives, Strategies and Assessment

The process of instructional design advocates creating congruency across course objectives, instructional strategies, and form of assessment (Smith & Ragan, 1993). This principle ensures that the nature of the interaction and assignments correspond well with the expected outcomes and original objectives. Just as a classroom instructor would not merely teach the facts of the civil war by reviewing a timeline and then on a test expect students to provide reasons why the war occurred on a test, the same principle should be applied to delivering instruction on the Web.

A simple violation of this principle can cause frustration on the part of the learner when placed in a performance or testing situation that does not resemble the methods used to learn the content. Ensuring a match between objectives, strategies and assessment can avoid this scenario. Web-based course environments can provide resources and approaches generated by the students as well as the instructor to provide models for specific course assignments and meeting course objectives. If the outcome is some type of development project, the content of the course should contain all the necessary resources and suggested strategies to assist students in making informed decisions about the project. In this manner, the objectives

(e.g., completion of a Web site on the civil war), the instructional strategies (e.g., suggested processes to assist students with planning and development such as reviewing other example sites, narrowing down content, suggested forms of writing for the Web, links to Web tools and discussions to facilitate problems) and form of assessment (e.g., the developed site presented to class for feedback and critique) are in alignment. The principle of congruency helps to avoid student frustration and ensure appropriate methods and materials to meet the required assignments of the course.

#### Methods: Project-based Learning

The unique affordances of Web-based instructional tools that integrate the use of Web resources with collaborative aspects of conferencing create powerful instructional possibilities in facilitating project-based learning. Through a process of pursuing solutions to problems, designing plans, gathering information, drawing conclusions and communicating findings to others, students are engaged in an authentic process requiring a variety of skills (Krakcik, Blumenfeld, Marx & Soloway, 1994). The use of conferencing and the Web as the media for student investigation, discussion, planning as well as production and posting of projects offers rich resources for students to synthesize and create content using higher level learning processes.

#### Methods: Cooperative Groups

The literature on the use of cooperative or collaborative groups as an instructional strategy has natural links to computer conferencing techniques that promote a mutual learning process. Cooperative learning can positively impact achievement and student relationships, however, the benefits of this instructional strategy are not automatic and are greatly dependent on the design and structure of the course as well as instructor mediation (Johnson, Johnson & Smith, 1991; Eastmond, 1992). Emphasis has been placed on the goals of cooperative learning (e.g., addressing complex problems, consensus building, individual responsibility, group self-management and cohesiveness) as determining factors in the effectiveness of this method (Slavin, 1990). Similarly, collaborative group processes in computer conferencing have highlighted several key dimensions such as: the degree of openness of the problem presented and related project activities; individual and group responsibilities related to the project; instructor involvement and support as well as the tools available to the group and the final form of the project (Collis, 1994; Hereen, 1996).

Collis, Andernach & Van Diepen (1997) have addressed many of the critical aspects of cooperative learning in a Web-based course. Students assume clearly defined roles in complex group projects sharing and submitting work on-line. These participants use Web-based instructional environments for supporting group process, posting projects, and providing varied forms of evaluation including self, peer and instructor-based. All of these activities are managed through an integrated Web-based system that permits computer conferencing and shared work space. This course structure fully integrates product, process, and conceptual issues while supporting both individual responsibility and an engaging collaborative experience for students.

#### Methods: Cognitive Apprenticeship

Cognitive apprenticeship involves a view of learning that promotes student development through the use of tools and skills that reflect authentic activity in a particular community of practice. The student is supported in the learning process through modeling and scaffolding relevant tasks, participation in

collaborative efforts, and articulation and socialization inherent in the particular culture. Similar in concept to situated learning, cognitive apprenticeship delineates specific strategies to support the student in a situated context. Through supported generation of solutions to authentic problems, students begin to use the tools, vocabulary, and procedures evident in their particular field of study and therefore become an “enculturated” participant in the community of practice (Brown, Collins & Duguid, 1989),

Collins (1991) identifies specific strategies related to cognitive apprenticeship and instructional technology (e.g., modeling expert performance; directed coaching at critical points in the problem solving process to accomplish tasks; reflection to make abstractions about the learning process; articulation to make knowledge explicit and use it flexibly; and exploration for students to try out different hypotheses, methods and strategies). These strategies can be easily adapted a Web-based course environment. One approach is to engage students in authentic projects that reflect problems and issues unique to their particular field using computer conferencing and knowledge networking features for communication and exploration of project content and purpose. Permitting students to generate their own creative ways to solve and apply their knowledge to the problem gives them practice in the dealing with the issues and problems associated with their particular field of study.

Other instructional strategies that may facilitate cognitive apprenticeship using Web-course delivery tools involve the “enculturation” of students into the field. The particular terminology, issues, and processes that emerge from discussions with those currently practicing in the targeted profession of the student give him or her valuable exposure to the culture of the field. Online tools make it convenient and fairly easy to bring experts and practitioners into the online classroom from the local area as well as those at a distance. Their involvement in course on-line discussions can connect the conceptual and theoretical issues in the course with applied practice. These strategies can be facilitated in several ways from involving practitioners in a few class discussions to the practitioner providing input on specific projects to a long term mentoring relationship established throughout the student’s course or program. In any form, the instructional strategies that use cognitive apprenticeship can only improve the interaction in a Web-based course.

### Conclusion

In this chapter, we have reviewed previous research related to distance education, asynchronous learning and computer mediated communication that has not been widely applied to current online learning tools. We also presented an organizational scheme that links established theoretical principles, instructional strategies, and ideas for implementation applicable to the use of Web-based course delivery tools in higher education. We hope this framework may help to promote other connections from theory to application expanding instructional design possibilities in online learning. Integration of theoretical perspectives into the practice of designing and developing Web-based courses can only enhance the educational potential of these exciting instructional environments.

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