

## A Principled Approach to Facilitating Distance Education: The Internet, Higher Education and Higher Levels of Learning

*Heather Kanuka*

### Abstract

---

In an earlier study I investigated the essential principles that facilitate higher levels of learning in Internet-based distance learning university courses. In this study I explored how these teaching and learning principles could be applied in Internet-based distance learning environments. I used an open-ended questionnaire to determine how (or if) the teaching and learning principles identified in the earlier study could be applied. The outcomes of this study provide many suggestions for Internet-based distance activities that can support the facilitation of higher levels of learning.

### Résumé

---

Dans une recherche antérieure, j'ai examiné les principes essentiels qui facilitent des niveaux d'apprentissage élevés dans des cours universitaires à distance utilisant surtout l'Internet. Dans la présente recherche, j'ai exploré comment ces principes d'enseignement et d'apprentissage pouvaient être appliqués dans des environnements d'apprentissage à distance utilisant surtout l'Internet. J'ai utilisé un questionnaire ouvert pour déterminer comment (ou si) les principes d'enseignement et d'apprentissage identifiés dans la recherche antérieure pouvaient être appliqués. Les résultats de cette recherche fournissent plusieurs suggestions pour des activités à distance utilisant l'Internet qui peuvent faciliter des niveaux d'apprentissage élevés.

---

Although efforts have been made in the fields of distance and higher education to facilitate creative Internet-based learning activities that support higher levels of learning (see, e.g., Wilson & Lowry, 2001), the role of the Internet in distance education has remained by and large limited—where the Internet has been used as a platform for the course content and as a communication medium for on-line discussions. Moiduser, Nachmias, Lahav, and Oren (2000), for example, reviewed 436 Web sites and found that most are “still predominantly text-based and do not yet exhibit evidence of current pedagogical approaches (e.g., use of inquiry-based activities, application of constructivist learning principles, and use of alter-

native methods)” (p. 55). Although the reasons for this are unclear, it has been argued that our use of technology in the practice of distance education is shaped by our understandings of what is most familiar (Haughey, 1995). Specifically, established practices of teaching tend to be passed on to distance teaching. These are “partly the result of the transfer of traditional beliefs to distance education and partly the result of the ways in which distance educators have chosen to use particular technologies” (p. 8). Thus although the Internet has been used extensively in distance education as a communication medium for discussion, which, it has been argued, can support critical thinking skills and deep learning, this too replicates the traditional classroom model and misses opportunities for distance educators to benefit from the Internet’s unique attributes in the learning process. Moreover, research has revealed that on-line discussions do not necessarily support the development of higher levels of thinking and learning (Kanuka & Anderson, 1998). If higher levels of learning are to be achieved in Internet-based distance education, there is a need to expand our perspectives of teaching and learning beyond the dissemination and discussion paradigm.

### Background of the Study and Method

In this study I build on the results of earlier research that was designed to develop teaching and learning principles to guide the facilitation of higher levels of learning in Internet-based distance education environments (Kanuka, 2002). In that research I used Zetterberg’s (1962) model for change, followed by a validation process. From semistructured interviews with university instructors, a review of related literature, and my reflective journal I developed tentative principles and constructs. Then I conducted a two-step validation process, first with educational technologists who were experienced in facilitating Internet-based learning in postsecondary institutions, and then with experts and scholars in the field of technology-mediated distance education. The outcome was a set of guiding principles and corresponding constructs for facilitation of higher levels of learning in Internet-based distance education. The seven principles are divided along the two dimensions of teaching and learning, as Table 1 illustrates.

I then sought to identify how these teaching and learning principles could be applied to Internet-based distance education. Based on the seven principles and corresponding constructs, what can be used to facilitate higher levels of learning in Internet-based distance learning environments? Using an open-ended questionnaire I asked the question of the same population of experts and scholars identified above. Survey participants were asked to provide examples of an Internet-based activity (or activities) that facilitated the teaching and learning principles and constructs. Surveys were sent to 78 scholars in Canada and the United States

Table 1  
Principles of Teaching and Learning

<i>Principle</i>	<i>Constructs</i>
<i>Principles of Teaching</i>	
Active and purposeful <i>engagement with abstracted phenomena</i>	<ul style="list-style-type: none"> <li>• Complex problems</li> <li>• Interactive</li> <li>• Repertoire</li> </ul>
<i>Multiplicity of perspectives to be fully apprehended</i>	<ul style="list-style-type: none"> <li>• Multidisciplinary</li> <li>• Conflicting phenomena</li> <li>• Multiple sources</li> </ul>
<i>Relatedness for meaningful understanding</i>	<ul style="list-style-type: none"> <li>• Creditable source</li> <li>• Authentic event</li> <li>• Discursive</li> </ul>
<i>Diversity of instructional methods</i>	<ul style="list-style-type: none"> <li>• Inquiry based</li> <li>• Problem solving</li> <li>• Decision making</li> </ul>
<i>Principles of Learning</i>	
Assume greater <i>responsibility</i>	<ul style="list-style-type: none"> <li>• Setting standards of excellence</li> <li>• Learning/thinking strategies</li> <li>• Focus efforts</li> </ul>
<i>Meaning-making into abstracted phenomena</i>	<ul style="list-style-type: none"> <li>• Making sense</li> <li>• Generating relationships</li> <li>• Reflective deliberation</li> </ul>
<i>Reconstruction of meanings</i>	<ul style="list-style-type: none"> <li>• Empathy</li> <li>• Negotiable meanings</li> <li>• Diversity</li> </ul>

Adapted from Kanuka (2002).

(30 and 48 respectively). Twenty-six responded (8 Canadians and 18 Americans) for a response rate of 33%.

### Findings

All respondents had experience in facilitating learning activities on the Internet (average = 5.5 years), all taught courses where the Internet was used in some way to facilitate learning activities, and 77% taught courses where the Internet was the only communication tool used to interact with students. All respondents had published in the area of Internet-based teaching and learning, with 40% having published in books, 83% in refereed journals, 67% in nonrefereed journals, and 75% in other areas (e.g., conference proceedings, technology reports, newsletters, CDs, electronic journals). The responses provided many insights into applying the principles in Internet-based distance learning environments.

Although most of the participants provided examples of teaching and learning activities for facilitating the principles presented on the survey, some also expressed concern, the need for further clarification, and/or conditions under which the constructs could be applied. Each principle, first of teaching and then learning, is addressed in turn. The comments and examples from the respondents are followed by the literature on facilitating these activities in Internet-based distance learning environments. An overview is provided in Table 2.

### *Principles of Teaching*

#### *Engagement with Complex Abstracted Phenomena*

*Higher levels of learning typically involve active and purposeful engagement with complex abstracted phenomena.* This principle has the following three constructs.

- *Complex problems.* Problems that are enigmatic and/or ambiguous with no one or right solution should be presented to the learners.
- *Interactive participation.* Interactive participation requires the use of collaborative or cooperative learning strategies to facilitate active intellectual participation between the learners, the instructors, and the subject matter.
- *Strategic choices.* A variety of alternative teaching methods that engage learners in problem solving is essential in achieving the planned learning objectives.

An overwhelming majority of the respondents indicated that facilitating the understanding of complex problems or issues in an Internet-based environment can most effectively be supported through the use of case studies. Although the use of case studies appears to be the most effective method for presenting complex phenomena, the generation of possible solutions could be achieved on the Internet by using a variety of interactive teaching strategies. Participants also indicated that interaction could be effectively facilitated on the Internet through the use of cognitive tools such as Web-based threaded conferencing and group work. Furthermore, they noted that collaborative/cooperative group project work should be an extension of the case studies (or complex problem presented) where, in small group discussions, students generate solutions, share and critique each other's proposed resolutions, prioritize solutions, and make collaborative judgments.

Case studies have been effectively facilitated on the Internet in many ways (see, e.g., Collett, Kanuka, Blanchette, & Goodale, 1999; Paulsen, 1995). The most frequently described practice is to introduce the situation (case report or problem to be studied) in a textual format on a Web page followed by the use of asynchronous Internet-based conferencing for the analysis and discussion. Alternatively, as one survey respondent noted,

Table 2  
Principle-Based Strategies for Teaching and Learning

<i>Principle</i>	<i>Strategies</i>
<i>Principles of Teaching</i>	
Active and purposeful <i>engagement with</i> abstracted phenomena	<ul style="list-style-type: none"> <li>• Case study</li> <li>• Group work</li> <li>• CMC</li> </ul>
<i>Multiplicity of perspectives</i> to be fully apprehended	<ul style="list-style-type: none"> <li>• Online databases</li> <li>• Hypertext links with annotations</li> <li>• Sequenced content databates</li> </ul>
<i>Relatedness</i> for meaningful understanding	<ul style="list-style-type: none"> <li>• Application to personal context</li> <li>• Press conference/debate with expert</li> <li>• Guided discourse</li> </ul>
Diversity of <i>instructional methods</i>	<ul style="list-style-type: none"> <li>• Open-ended questions</li> <li>• Online links to related resources</li> <li>• WebQuests</li> <li>• Problem-based learning</li> <li>• Internet search and critique</li> <li>• Delphi technique</li> </ul>
<i>Principles of Learning</i>	
Assume greater <i>responsibility</i>	<ul style="list-style-type: none"> <li>• Self-assessment rubric</li> <li>• Prioritizing of activities</li> <li>• Collaborative projects</li> <li>• Presentations</li> <li>• Hypertext patterns</li> <li>• Learners' goals/objectives</li> </ul>
<i>Meaning making</i> into abstracted phenomena	<ul style="list-style-type: none"> <li>• Antithetical questions</li> <li>• Reflective activities</li> <li>• Interpreting database information</li> <li>• Constructing classification systems</li> <li>• Comparing experience with information</li> <li>• Scaffolded discussion</li> </ul>
<i>Reconstruction</i> of meanings	<ul style="list-style-type: none"> <li>• Online role playing</li> <li>• Peer support activities</li> <li>• Heterogeneous groupings</li> <li>• Online brainstorming</li> <li>• Synchronous CMC</li> </ul>

case studies can be presented through video and/or audioclips on the Web. However, this format requires that the course developer and/or

instructor have access to the necessary equipment and skills. Course participants also must have access to the necessary software.

These responses are also in agreement with Klemm and Snell (1996) who maintain that one of the most effective means to facilitate higher levels of learning is through on-line collaborative group processes where learners are required to think critically, creatively, and integratively. However, Klemm and Snell also observe that "collaborative learning is seldom applied in a computer conferencing software environment because the threaded discussion systems do not expedite team building and effective group processes." The result is a trivialized group discussion. To avoid this scenario and raise the intellectual level of the group, instructors should consider requiring learners to produce tangible work products (not just opinion postings) where learners must participate in the active sharing of information and the intellectual resources to complete a group project. This is effectively achieved through interdependent learner teams where each learner is assigned a well-defined role (e.g., leader, concept list editor, concept map editor, insight paper editor, researcher, and quizzier), and each role is necessary for successful completion of group projects.

Finally, the literature supports the view that using a repertoire of Internet-based teaching activities can encourage higher levels of learning such as creative, critical, and cooperative thinking skills (Bonk & Reynolds, 1997). In addition, Paulsen (1995) provided an overview of many of these activities and maintained that most can be effectively facilitated in on-line forums.

#### *Multiplicity of Perspectives*

*Higher levels of learning typically include diverse and/or multiple perspectives about the issue(s) or problem(s) presented.* This principle has the following three constructs.

- *Multidisciplinary approaches.* A multidisciplinary approach to teaching involves the relating to, or making use of, several disciplines (or branches of knowledge) at once.
- *Conflicting phenomena.* Presenting conflicting phenomena requires the presentation of two or more occurrences, circumstances, or observable events that are contradictory.
- *Multiple information sources.* Presenting multiple sources of information requires information sets with diverse perspectives and positions on an issue(s).

Participants indicated that the Internet can be effective in supporting multidisciplinary approaches through its ability to provide links that access information from different disciplines. Furthermore, according to one participant, this is necessary to "offset some of the inherent drawbacks of the medium." Respondents also indicated that on-line debates can be an

effective way to present conflicting phenomena that promote thinking and reflection, especially if learners are expected to take a position that may be contrary to their own.

Finally, a number of respondents indicated that it is possible to present multiple information sources on the Internet through hypertext links (including videoclips, audioclips, documents, and other scanned artifacts). However, some cautioned that hypertext links should be used with care and purposeful intent. Specifically, a number of respondents stated that although providing access to multiple information resources on the Internet effectively facilitates multiple perspectives, care must be taken to avoid a tendency to provide too many links. As one respondent stated, "it can be tricky to present conflicting phenomena as confusion is a looming peril in on-line learning." Another suggested that sequencing of the content, as well as careful and purposeful linking, would guard against random traveling, and a third mentioned that simply providing links to Web sites is not the most effective way to include multiple perspectives about the problems or issues presented. Rather, sequencing and quality linked information should be accompanied by clear, concise, and comprehensive annotations.

Support for the comments that the Internet is effective at providing multidisciplinary approaches is in keeping with the literature by Spiro and Feltovitch (1997). They maintain that hypertext platforms such as the Internet are effective for using a multidisciplinary approach precisely because of its vast resource base and ability to access these resources easily through links. However, some researchers (again, in agreement with the survey data) have found that simply providing access to hypertext links to present a variety of disciplines does not necessarily support a multidisciplinary approach. In particular, it has been argued that hypertext links can result in learners traveling randomly through the Internet, resulting in cognitive overload and conceptual disorientation (Roselli, 1991), although Jacobson, Maouri, Mishra, and Kolar (1996) observed that learners, when provided with guided and thematic hypertext learning activities, performed at a significantly higher level on a knowledge synthesis task than freely exploring learners.

Alternatively, debates can present conflicting phenomena in on-line learning environments. Paulsen (1995), for example, contends that on-line debates provide learners with opportunities to improve analytical communication skills through formulating arguments, defending positions and critiquing counter positions, and encouraging learners to actively challenge their understandings by searching out new information and experiences of which they have little working knowledge. This in turn results in acquiring multiple perspectives.

### *Relatedness*

*Higher levels of learning typically involve phenomena that have relevance to the learners.* This principle has the following three constructs.

- *Credible authority.* Phenomena that are presented by a credible authority in the field can support relevance, making the issue(s) and problem(s) worthy of study.
- *Actual event.* The phenomena presented should be related to or derived from an actual event.
- *Guided discourse.* Meaningful understandings created in the learning process should proceed through a guided reasoned discourse, rather than relying on intuition.

Respondents indicated that there are points in the learning process when inviting an outside expert to contribute timely information and valuable experience can facilitate relevance. One respondent added that this activity seems most effective when learners are asked to apply the ideas presented by the authority in contexts that are personally meaningful. Survey participants also noted that computer-mediated conferencing can provide access to experts who might not otherwise be accessible. However, some respondents suggested that it is not always necessary to have a credible authority in order to facilitate relevance for the learners. One participant commented, "a credible authority does not ensure personal relevance for all students." The reasons why invited experts do not always contribute to relevance were not revealed in the survey data. However, Renner (1994) has noted that just bringing the expert is not enough. For an invited guest to provide an effective learning activity, proactive instructors should organize an on-line debate or press conference type of forum. This kind of conferencing forum, with learners asking prepared questions, reduces the pressure on invited guests to generate dynamic on-line discussions in what is typically an unfamiliar environment, while at the same time involving the whole group.

For a number of respondents the Internet was an excellent medium to facilitate the presentation of actual events because of its vast repository of information, which includes case histories with raw data. According to one survey respondent, "The presentation of case histories can be made even more effective when learners evaluate the event from a personal perspective according to previously agreed upon criteria that include interpretations and conclusions."

Finally, respondents indicated overwhelmingly that an instructor with moderating skills can provide opportunities to support reasoned discourse and sustain critical dialogue using computer-mediated conferencing. Many survey respondents noted that guided discourse is most effec-

tive when used in combination with certain instructional methods such as case studies.

Supporting the data from the study, literature on the effectiveness of these activities (i.e., case histories and invited guests) suggests they are effective at facilitating relevance and higher levels of thinking and learning (see, e.g., Jonassen et al., 1997). Moreover, research related to guided discourse has shown that the effectiveness of on-line discourse rests on whether instructors have the necessary skill sets. Studies by Phillips, Santoro, and Kuehn (1988) and Kanuka and Anderson (1998), for example, found that on-line discourse is often ineffective because of the instructor's inability to moderate or challenge learners on line. This reinforces the need for instructors to acquire the necessary skill sets to facilitate on-line guided discourse effectively.

#### *Instructional Methods*

*Higher levels of learning typically include diverse ways of knowing.* This principle has the following three constructs.

- *Inquiry-based learning.* Inquiry-based learning involves a close examination, investigation, or probe in a quest for knowledge, data, or truths.
- *Decision-building learning.* Decision-building learning requires a position, conclusion, or passing of judgment on an issue reached after generating the alternatives, evaluating the choices, and assessing the consequences.
- *Problem-based learning.* Problem-based learning requires learners to explain, decipher, or resolve something that is enigmatic, ambiguous, obscure, and/or cryptic.

Survey participants indicated that inquiry-based learning could be effective in helping students to find external resources to justify their position, and also initiated students into the actual practice of scholarship. There were a number of suggestions on how inquiry-based learning could be facilitated using the Internet including, for example, asking open-ended questions and providing on-line links to related resources. However, the most frequently mentioned example was the use of WebQuests. Originally inspired by Dodge in 1995, WebQuests are unique Web-based activities where information that the learners use comes from the resources on the Internet.

Respondents also indicated that problem-based learning can provide a focus and context that encourages students to surpass theoretical understanding of new concepts. The most frequent example provided to facilitate this construct was the use of the problem-based method. Watson (2001) has written on Internet-based approaches for problem-based learning and maintains that the use of the Internet can facilitate conversations

and problem-solving among learners. Further, when facilitated on line, it is also possible to integrate on-line resources. Because aggressive problem-based learning implementation requires access to ample information, the Internet's vast resource base can be useful, and "is a valuable and fun way to model for students how to search effectively and evaluate critically" (Watson, p. 114). However, it is also possible that the challenges encountered implementing this method in face-to-face settings may become even more intense in on-line settings. A drawback of the problem-based method is that both learners and instructors may experience discomfort with it. Specifically, instructors often have a fear of "letting go of the helm," and learners often resist assuming greater responsibility. These kinds of problems tend to be magnified in on-line learning environments due to the transactional distance between and among learners and instructors.

Finally, the most frequently suggested activity for supporting the decision-building process was the Delphi technique. Hiltz and Turoff (1978) have argued that this instructional method is effective in an on-line environment. In the initial stage of the technique, for example, computer-mediated conferencing removes "the uneasiness that sometimes accompanies sitting around a table and looking at one another without talking" (p. 294). It also reduces the elapsed time between consensus rounds and increases the possibility for the process to flow steadily and incrementally. Perhaps the most important benefit, however, is that computer-mediated conferencing can provide anonymity, which is one of the best techniques to prevent conformity to group pressures. Empirical research conducted by Sheffield and McQueen (1990) has shown that this technique is as effective on line as in face-to-face settings with respect to expressed satisfaction on the technical and socioemotional aspects and also supports Hiltz and Turoff's belief that the process is less time-consuming when using computer-mediated conferencing.

### *Principles of Learning*

#### *Responsibility*

*Higher levels of learning require learners to assume greater responsibility in the learning process.* This principle has the following three constructs.

- *Set standards of excellence.* Learners should take charge in setting standards of excellence, defining benchmarks, and selecting learning activities in ways that are meaningful, authentic, challenging, and multidisciplinary to address the phenomena presented.
- *Thinking/learning strategies.* A repertoire of thinking/learning strategies is essential to apprehend fully the multiplicity of complex problems.

- *Focus efforts.* Learners need to evaluate their strengths and weaknesses accurately and determine where to focus their efforts to make the learning process personally meaningful.

Survey participants suggested a variety of ways to help learners in setting standards of excellence, the most frequent suggestion being to provide a rubric or set of guidelines for self-assessment. Some respondents expressed concerns about the learners setting standards of excellence. One respondent, for example, asked, “Why would I have my students do something that is my job?” These kinds of concerns are reflected in the literature on self-directed assessment. To resolve these issues Crowe (2000) suggests finding a middle ground that combines traditional assessment techniques with self-directed assessment techniques such as triangulated assessment.

Survey participants also suggested that learners should be both able and required to draw on a variety of learning strategies to accomplish the learning objectives although, as one respondent noted, “the challenge tends to be in not presenting information using a variety of ways for learners to learn and think—rather, the challenge is to get them to use a variety of learning and thinking strategies.” A number of ways to facilitate thinking and learning strategies were also provided. For example, suggestions were made as to how the Internet can provide learners with a repertoire of learning and thinking strategies given its ability to present issues and problems through various media (e.g., text, audioclips, videoclips, Java simulations) and a variety of teaching methods (e.g., debates, role-plays, case studies, brainstorming, simulation, etc.).

Finally, some participants suggested that, when appropriate, establishing where to focus efforts could be effectively facilitated through on-line collaborative projects where learners are forced to prioritize activities. One respondent suggested that learners develop an on-line group project and present the project to the larger community where their feedback guides them in their assessment of where their efforts should be focused.

Related literature on the use of the Internet has supported these responses. For example, it has been argued that hypertext environments can provide visual displays that document relationships between the learners’ mental models and new information in ways that reflect how they think and so can accurately represent the learners’ meaning-making patterns that result in the construction of new mental models (Jonassen, Peck, & Wilson, 1999; King, 1996). Mental models are in turn necessary for higher levels of thinking.

The literature on on-line group learning is also in agreement with this suggestion. Jonassen et al. (1999), for example, observed that the easily accessible and vast resource base of the Internet offers self-regulated learners an unparalleled source of information and “the intentionality is

enhanced when a group of learners is committed to the same goals ... there are a number of projects that have maintained students' focus by supporting collaborative meaning making among groups of learners" (p. 37).

In contrast, however, other writers on collaborative learning have criticized the use of the Internet for providing a platform that is too vast and nonstructured, which results in unfocused learning because of the inability of many learners to stay on task when using the Internet. This supports the need for instructors to ensure that learners have clearly articulated goals and objectives, as well as the means to facilitate these aims. Ultimately, however, as was stated by a survey participant, "the key to being effective is related to the ability of the group to regulate each other's performance."

#### *Meaning-Making*

*Higher levels of learning typically require learners to build meaning into the issues and problems presented.* This principle has the following three constructs.

- *Making sense.* The learning process should require learners to compare, classify, induce, deduce, analyze, abstract, and evaluate to make sense of the data or information presented.
- *Generate relationships.* Learners should be encouraged to be generative, which includes the ability to originate, transform, reshape or reinterpret new information through a different scheme or structure resulting in new understandings.
- *Reflective deliberation.* Learning should be characterized by thoughtful mediation or contemplation that uses the powers of the mind to conceive ideas and/or draw inferences resulting in the expression of carefully considered thought expressed through critical dialogue.

Survey participants suggested a number of ways to facilitate meaning making using the Internet. One was to have learners access related Web sites with a focused perspective and then have the instructor play the devil's advocate (which is the presentation of an alternative perspective in a confrontational manner, also known as antithetical question posting) in Internet-based discussions. The aim of this activity is to force students to analyze arguments presented on the linked Web sites carefully and to make sense of them from alternate views.

Survey participants provided somewhat more diverse suggestions on how to facilitate the process of generating relationships when using the Internet. One suggestion was to have learners access related Web sites on a regular basis and write reflective papers. In these papers, learners must demonstrate that they are generating relationships from the linked infor-

mation and thinking critically about what they are learning. Another suggestion was to have learners interpret information in Internet-based databases. According to this survey participant, "linking to Web-based databases followed by activities where learners interpret the data can help generate relevance and make information meaningful." Another respondent, who made a similar suggestion for using Internet-based databases, noted further that when presenting links to Internet-based databases, instructors should have the learners construct rules or a classification system based on their observed patterns, and resulting in generalization and transference to generate relationships. Another survey suggestion was to have learners compare and contrast various Internet-based databases and infer the effects of a variable (or variables).

Suggestions directed to reflective deliberation indicate that requesting learners to reflect on course content using Web-based conferencing often forces them to express their views and opinions carefully. This process in turn facilitates reflective deliberation. In the words of one respondent, "threaded conferencing results in reflective deliberation due, precisely, to a posting's permanency and availability for others to view, refer to, critique and quote." Another similar suggestion was to allow students to reflect on their field or practice experience and compare it with the current literature or information presented by the instructor. This process can be facilitated through computer-mediated conferencing combined with the use of scaffolded discussion and personal reflections on experienced concepts in practice. According to this survey participant, "such activities help learners understand the diverse, as well as common, ways in which the issues and problems presented are applied in the real world."

It has been argued in the literature that a hypertext environment is effective at facilitating higher levels of learning because it forces learners to generate meaning from the vast amount of accessible information (King, 1996; Marchionini, 1988). Specifically, in order to make meaning from large amounts of information, learners are forced to search for patterns (sequencing, prioritizing, categorizing, summarizing, and analyzing) and make meaningful relationships (synthesizing and evaluating). It would seem reasonable that the use of Internet-based databases, as suggested by many survey participants, would be a means to achieve this end.

The participants' suggestions also concur in the literature by Laurillard (2002), who asserts that if the process of knowledge construction is to be facilitated effectively through academic knowledge (complex and abstracted phenomena), it must be meaningful to the learners; information is made meaningful through reflecting on its relevance to one's world. Further, the use of discursive media (such as computer-mediated conferencing) can support discussions such that the learners have time to compose carefully and articulate clearly their position, arguments, and

interpretation—or reflectively deliberate—on the phenomena presented. Further, presenting phenomena using language that is effective and persuasive facilitates relevance, thereby creating the conditions for learners to make meaning from information presented.

#### *Reconstruction*

*Higher levels of learning typically require learners to understand that their own world view is not the only one (or necessarily the correct one).* This principle has the following three constructs.

- *Empathy.* Learners need not only to know and understand their own worlds, they need to know and understand others; this requires learners to develop the ability to reconstruct meanings.
- *Negotiable meanings.* Learning at a higher level is frequently not about discovering more, but about reshaping or transforming new and existing knowledge through negotiation of meanings with others.
- *Diversity.* To achieve shared understandings, learners must be encouraged to value diversity.

For survey participants, being empathetic of others' world views may be easier in on-line environments than in face-to-face environments. As one participant stated, "there may be a broader span of cultures represented through the medium." However, although there was consensus with this construct, they offered few examples for related Internet-based activities; one suggested that encouraging learners to become empathetic of others' world views could be achieved through on-line role-playing.

Some survey participants suggested that whatever the activity, Web-based conferencing was an excellent medium for sharing views—essential for negotiating meaning. However, it was also noted that shared understandings require an equitable environment so that learners can deliberate through discussion with another, or others, in order to negotiate meanings with an equal voice. A few respondents indicated that Web-based conferencing is a particularly effective medium for this process, because the Web does not show the students' skin color, age, height, sex, culture, socioeconomic status, and so forth. According to one respondent, "the result is a leveling of the environment that can support more equitable contexts for sharing views." One example given on how to facilitate the sharing of views and negotiation of meanings was the use of peer support activities. These kinds of activities require students to share their projects with their peers on line; in turn their peers respond with critiques, suggestions, and support.

Finally, participants suggested that when heterogeneous groupings are used, learners tend to gain a wider perspective on the issues and problems presented, which results from the diverse opinions of the group par-

ticipants. Some participants also indicated that this process can be facilitated when learners work with others of distinct and different characteristics, abilities, cultures, and backgrounds. However, the comments also indicated that this is easier said than done for two reasons. The textual nature of the Internet as a communication medium makes it difficult to ascertain each student's unique characteristics, and students who participate in higher education tend to have similar characteristics and values. Given these two factors, it is often difficult to facilitate heterogeneously grouped learning activities in Internet-based distance learning.

Nonetheless, survey participants provided examples. One suggestion was to have learners complete an on-line learning-styles inventory and have the computer automatically select students with different learning styles for group work. However, this suggestion would require instructors to have access to an on-line learning-styles inventory program or to have the necessary skills and time to develop such a program. A more practical suggestion had learners working in heterogeneous groups. One participant, while acknowledging that this kind of grouping may be difficult in on-line environments, suggested that requesting learners to post biographies as introductions at the onset of the course could be used to obtain the necessary information for heterogeneous groupings.

There is sufficient literature to support the view that these activities are effective in facilitating empathy (Collett et al., 1999; Renner, 1994). For example, according to Hiltz and Turoff (1987) role-playing is one of the most promising instructional methods for computer-mediated conferencing and could probably be done more authentically using computer-mediated conferencing than in some of the face-to-face activities, "especially if the students were not able to tell which of the other players were student, faculty, or real-life jobholders playing at their convenience from their own terminals" (p. 309). The ability to provide temporary anonymity (or e-mail aliases) in Internet conferencing software not only helps students to play their roles more convincingly, but also helps them through role-playing to acquire an understanding of others' world views.

Researchers have also suggested that on-line brainstorming is an effective medium to create the equitable environments necessary for the negotiation of meaning (Collett et al., 1999; Jones, Valdez, Nowakowski, & Rasmussen, 1996). Collett et al. note that one of the characteristics of brainstorming is a spontaneous and rapid pooling of ideas. The time lag inherent in asynchronous text-based interaction can interfere with this process. There is also a tendency in asynchronous interactions to skip over the generative portion of the activity and move into the discussion phase too soon. They suggest that in order to create a sense of synergy in the on-line environment, synchronous text-based interaction should be used,

as synchronous discussions can foster much of the excitement and dynamic synergy that is necessary for brainstorming to be effective.

### Conclusions

The purpose of this study was to extend the understanding of learning activities beyond the dissemination and discussion paradigm that currently dominates the design of Internet-based distance learning activities. Despite the limitation of its response rate (33%), the results of this study indicate that from the perspective of the participants, when creatively designed, Internet-based learning can be a powerful instructional medium. In particular, the participants identified many strategies involving the Internet that can be used to support higher levels of learning. These emphasized its ability to convey information, arguments, concepts, and ideas in ways that can introduce abstract ideas and provide perspectives through the use of strategic and creative linking structures, as well as a flexible format and a variety of learning activities. Thus it seems reasonable to conclude that if the desired learning outcomes are to facilitate higher levels of learning, it is important to consider designing instruction so as to incorporate many of the activities suggested by survey participants using the teaching and learning principles as a heuristic for Internet-based distance learning.

### References

- Bonk, C.J., & Reynolds, T.H. (1997). Learner-centered Web instruction for higher-order thinking, teamwork, and apprenticeship. In B. Khan (Ed.), *Web-based Instruction* (pp. 167-178). Englewood Cliffs, NJ: Educational Technology Publications.
- Collett, D., Kanuka, H., Blanchette, J., & Goodale, C. (1999). *Learning technologies in adult distance education*. Edmonton, AB: University of Alberta Press.
- Crowe, J.L. (2000). Evaluation of adult learners: Ethical issues. *New Horizons in Adult Education*, 14(3), 4-10. Retrieved August 28, 2002, from <http://www.nova.edu/~aed/horizons/vol14n3.pdf>
- Dodge, B. (1995, 1997). *Some thoughts about Webquests*. Retrieved July 1, 2002, from [http://edWeb.sdsu.edu/courses/edtec596/about\\_Webquests.html](http://edWeb.sdsu.edu/courses/edtec596/about_Webquests.html)
- Haughey, M. (1995). Distinctions in distance: Is distance education an obsolete term? In E. Keough & J. Roberts (Eds.), *Why the information highway? Lessons from open and distance learning* (pp. 2-14). Toronto, ON: Trifolium Books.
- Hiltz, S.R., & Turoff, M. (1987). *The network nation: Human communication via computer*. London: Addison-Wesley.
- Jacobson, M.J., Maouri, C., Mishra, P., & Kolar, C. (1996). Learning with hypertext learning environments: Theory, design, and research. *Journal of Educational Multimedia and Hypermedia*, 5(3/4), 239-281.
- Jonassen, D.H., Dyer, D., Peters, K., Robinson, D.H., King, M., & Loughner, P. (1997). In B. Khan (Ed.), *Web-based instruction* (pp. 119-138). Englewood Cliffs, NJ: Educational Technology Publications.
- Jonassen, D.H., Peck, K.L., & Wilson, B.G. (1999). *Learning with technology*. Upper Saddle River, NJ: Prentice Hall.

- Jones, B.F., Valdez, G., Nowakowski, J., & Rasmussen, C. (1996). *Plugging in: Choosing and using educational technology*. Washington, DC: Council for Educational Development and Research North Central Regional Educational Laboratory. Retrieved July 1, 2002, from <http://www.ncrel.org/sdrs/edtalk/toc.htm>
- Kanuka, H. (2002). Guiding principles for facilitating higher levels of Web-based distance learning in post-secondary settings. *Distance Education. An International Journal*, 23(1), 163-182.
- Kanuka, H., & Anderson, T. (1998). On-line social interchange, discord, and knowledge construction. *Journal of Distance Education*, 13(1), 57-74.
- King, K.L. (1996). *Usability of hypertext: Factors affecting the construction of meaning*. Unpublished master's thesis, New Jersey Institute of Technology.
- Klemm, W.R., & Snell, J.R. (1996). Enriching computer-mediated group learning by coupling constructivism with collaborative learning. *Journal of Instructional Science and Technology*, 1(2). Retrieved July 1, 2002, from <http://www.usq.edu.au/electpub/e-jist/docs/old/vol1no2/article1.htm>
- Laurillard, D. (2002). *Rethinking university teaching: A conversational framework for the effective use of learning technologies* (2nd ed.). New York: Routledge/Falmer.
- Marchionini, G. (1988). Hypermedia and learning: Freedom and chaos. *Educational Technology*, 28(11), 8-12.
- Moiduser, D., Nachmias, R., Lahav, O., & Oren, A. (2000). Web-based learning environments: Current pedagogical and technological state. *Journal of Research on Computing in Education*, 33(1), 55-76.
- Paulsen, M.F. (1995). *Online report on pedagogical techniques for computer-mediated communication*. Retrieved July 1, 2002, from <http://www.nettskolen.com/forskning/19/cmcped.html>
- Renner, P. (1994). *The art of teaching adults: How to become an exceptional instructor and facilitator*. Vancouver, BC: Training Associates.
- Roselli, T. (1991). Control of user disorientation in hypertext systems. *Educational Technology*, 31(12), 42-46.
- Spiro, R.J., & Feltovitch, P.J. (1997). *Cognitive flexibility, constructivism, and hypertext: Random access instruction for advanced knowledge acquisition in ill-structured domains*. Retrieved July 1, 2002, from [http://phoenix.sce.fct.unl.pt/simposio/Rand\\_Spiro.htm](http://phoenix.sce.fct.unl.pt/simposio/Rand_Spiro.htm)
- Phillips, G.M., Santoro, G.M., & Kuehn, S.A. (1988). The use of computer-mediated communication in training students in group problem-solving and decision-making techniques. *American Journal of Distance Education*, 2(1), 38-51.
- Sheffield, J., & McQueen, R.J. (1990). Groupware and management education: Matching communication medium to task requirements. *Proceedings of the Third Guelph Symposium on Computer Mediated Communication* (pp. 181-192). Guelph, ON: University of Guelph.
- Watson, G.H. (2001). Problem-based learning and the three Cs of technology. In B.J. Duch, S.E. Groh, & D.E. Allen (Eds.), *The power of problem-based learning* (pp. 109-117). Sterling, VA: Stylus.
- Wilson, B., & Lowry, M. (2001). Constructivist learning on the Web. In L. Burge (Ed.), *Learning technologies: Reflective and strategic thinking*. San Francisco, CA: Jossey Bass, New Directions for Adult and Continuing Education. Retrieved August 29, 2002, from [http://ceo.cudenver.edu/~brent\\_Wilson/WebLearning.html](http://ceo.cudenver.edu/~brent_Wilson/WebLearning.html)
- Zetterberg, H.L. (1962). *Social theory and social practice*. New York: Bedminster Press.

---

Heather Kanuka is the Associate Director of the Learning Commons at the University of Calgary and also holds an assistant professorship in the Faculty of Education. Her research interests have focused on online learning, distance education, and higher levels of learning.