Reprinted from The *IJET*, Vol. 6, No. 3, 2000. An AACE publication. http://www.aace.org/pubs/ijet

Going Online: Guidelines for Faculty in Higher Education

Marie de Verneil & Zane L. Berge

The need for life-long learning in a technologically driven, global economy, and the swift development in the past two decades of two-way, interactive communication systems have contributed to the creation of new distance learning programs. The World Wide Web (Web), along with mainstream-oriented Web tools, combined with telecommunication systems, is becoming a very significant delivery method in higher education. In an environment where state or district service areas no longer make sense, universities must compete on both the national and international arenas, establishing a presence in distance learning to meet the customers' needs (Nixon & Leftwich, 1998). In addition to the Web, if synchronous, video-based technology is included – the technology most often used to reproduce an in-person classroom environment at remote locations – teaching at a distance already exists within most colleges and universities. Still, many of today's new programs are turning to the Web to deliver instruction and provide content because it is easily accessible (Ethernet card or modem), very flexible (almost instant editing), and naturally can provide a very rich hypermedia learning environment.

It can also be cost effective. Web course development costs often consist of faculty time (e.g., usually paid by some type of temporary workload reduction) and technological support (e.g., often already on site). Faculty as developers tend to make use of existing hardware and software infrastructures. Thus, large, new capital budgets are not required. Online courses can generate larger enrollment, taping into new markets both on the national and international levels and do not require classroom space, therefore potentially increasing the return on investment (Owston, 1997). Along with these potential benefits, however, is the fact that few faculty have experience developing and teaching using online, computer-mediated courses. While growing, the supply of expert online faculty is not nearly adequate to meet the exponentially rising need.

Web-based instruction (WBI) is complex, and calls for a synergetic process, in which concurrent and dynamic elements must meet to create a successful hypermedia learning environment. This article offers guidelines to faculty and designers in higher education regarding transitioning from face-to-face classroom instruction to WBI. The framework used involves four dynamic and inter-related perspectives: managerial, pedagogical, technical, and social. This discussion focuses mostly on the managerial and pedagogical issues of WBI development, with a lesser emphasis on the technical and social aspects. Still, it should be noted that because all four areas are interrelated and overlapping in many cases, it is often impossible to categorize an issue in a single area, even though it is done so here for convenience of the discussion.

MANAGERIAL CONSIDERATIONS

Managerial considerations, also described by some authors as organizational, procedural, or administrative, include among other things, analyzing the fiscal and political environment in which online teaching and learning will take place. Also the strategic planning,and support services are analyzed.

Institutional Needs

Faculty members should find out how distance learning is viewed within the institution. Is distance learning explicitly part of the overall strategy to meet the institutional mission? This question addresses the university policies and operational questions concerning tenure-track expectations, reward systems and overall administrative support. Creating online courses is a very time-consuming process and all expectations and roles should be defined.

Departmental Needs

Does the new online course reflect an experimental interest from a single instructor or is it part of a program leading to

a certificate or diploma within the department? Identifying internal departmental needs that the course would fulfill in terms of curricular and other needs (e.g., necessity to broaden the audience base to justify the cost of running the existing course or to finance other non-cost-effective courses) is essential, as is identifying the needs the course will fulfill for a broadened audience.

Student Needs

This leads to performing both needs and audience analyses to clarify expected outcomes. How different will the audience be for an online course? Will the audience consist of adult learners for whom asynchronicity (time and space independent) is crucial? Questions such as these will help faculty focus on the relevancy of each project, relevancy which may quickly turn to issues involving supporting and budgeting for distance learning at both the departmental and university levels.

Structural Analysis: Define the Online/Offline Support System

There should be a correlation between the previously identified needs and the support the program receives from the sponsoring organization(s). Support should be secured in terms of technical assistance, release time for subject matter expertise, instructional and graphic design, computer programming and authoring, and time reduction for online management and assessment. Support should also be budgeted for course development expenditures. Some of the tasks are:

- Identifying university instructional technology resources (design center). How available are these resources and how available will they be to faculty when needed? Are there any open or hidden costs involved?
- Identifying key players and all stakeholders to analyze the existing support infrastructure.
- Identifying distance learning programs and events already taking place within the university system. Interviewing involved faculty and administrators. Asking questions about technical help.
- Finding any web-based instructional packages used in the university and listing advantages and disadvantages for each. Identifying faculty training that is available and what is needed. Although faculty members should not be expected to become technical wizards all at once, one must be aware of software and hardware capabilities. This will constitute the environment in which instruction is designed.
- Participating in existing distance learning discussion groups. Meet faculty involved with distance learning frequently. Distance learning is a synergic environment and team support and different expertise are essential.

PEDAGOGICAL CONSIDERATIONS

Define the Learning

Is the learning you are designing ill-defined, therefore calling for higher cognitive processes? Will the delivery be more efficient in a computer-based training (CBT) landscape? Is it well-suited for a hypertext environment that can bring together multiple perspectives on a variety of themes (concepts that are key to the domain)? Or, to the contrary, is this a sequential, procedural part in a program? In any case, which delivery platform would best fit your purpose? Demonstrations (e.g., how to repair an engine) are often best illustrated by video, which could be contained in a CD-ROM with online CBT for simulation. Should you try to duplicate a face-to-face environment or should you take advantage of the Web hypertext environment to develop new learning strategies? The traditional lecture could be replaced by a short presentation (text-based or audio/video streamed) which will contextualize thematically organized Websites listed for the student. A class conferencing system can allow students and instructors to discuss or collectively resolve perceived problems.

Define the Environment

The nature of the learning should determine the design of the learning environment. By that is meant that there are different types of interaction: between student and instructor, between student and content, and among students (Berge, 1999). Although e-mail, mailing lists, and presentation packages can be easily used, we support exploring the feasibility of using web-based instructional software such as WebCT, which provides a computer-mediated communication platform. Included are synchronous and asynchronous conferencing assessment tools and class management tools. Consider how secure the environment should be. Many web-based learning software packages have a password screening feature which ensures privacy and may help students and instructor develop a sense of community.

Traditional versus Innovative Instruction

When speaking of web-based instruction, it is easy to equate a new delivery medium (the Web) with "a new pedagogy" and, consequently, define face-to-face, in-person, classroom instruction as being a traditional, old, "bad," approach to instruction This is misleading. It is not the delivery medium that defines the instruction. Granted, the delivery medium is very instrumental in the learning approach and its capabilities should be integrated in the instructional design. When an instructional event such as a lecture, for instance, is replaced by a talking head on streamed video, the delivery mode is more "high tech," but the strategy has not changed.

Today, in part due to rapidly improving streaming technology, all common teaching paradigms encountered in an in-person instructional program can be transposed into a Web environment. Bourne, McMaster, Rieger, and Campbell (1997) have analyzed how well the common teaching paradigms fare in an asynchronous learning network (ALN) course. Learning by listening, (e.g., lectures), can be implemented by on-screen video played on-demand or downloaded. Its likely success is fair to poor. This model suffers from lack of presence of the lecturer but permits replay and indexing of lecture. Discovery learning such as library and literature searches in the instructional program can be implemented by web searches which often yield much bet-

ter results than traditional library searches. Still, there is a lot of garbage online and novice researchers may not know how to perform quality control. Learning by doing (e.g., laboratory, writing, and creating things), can be implemented by learning modules, simulations online, writing online, and critiquing. Asynchronous systems are an excellent medium for writing and critiquing but online lab materials are not widespread. Learning modules can be very good. The last paradigm, learning through discussion and debates, does not fare well in large classrooms but can be excellent in small classes with the right instructor. Discussion and debates can be implemented through network conferencing and fare very well in an asynchronous environment.

DESIGNING WEB-BASED INSTRUCTION

Within an instructional system design (ISD), there are many models available which emphasize various theories. The two major frameworks are the *objectivists* and the *constructivists* (McManus, 1996; Berge, 1998). The objectivist models most often describe interaction between the teacher and the student and between the student and the content but there is little consideration given to peer interaction.

> Constructivists view the mind as a processor, rather than a container. A constructivist's approach most often contextualizes and is associative in nature. That is, new ideas are internalized or processed according to that which is already existing or is known within the individual's thinking. Al Mekhlafi (1997) describes constructivism as follows:
>
> Constructivists believe that our personal world is constructed in our minds and that these personal constructions define our personal realities. According to this belief, the mind is the instrument of thinking which interprets events, objects, and perspectives rather than seeking to remember and comprehend an objective knowledge. Constructivists engage the learners so that the knowledge they construct is not inert, but rather usable in new and different situations Constructivist environments engage learners in knowledge construction through collaborative activities that embed learning in a meaningful context and through reflection on what has been learned through conversations with other learners (p.1).

It is easy to see how the web environment can be used as an ideal learning platform for persons holding this frame of mind. It brings together in an authentic setting, multiple global perspectives on very diverse subjects, and provides professional expertise that learners can use to develop their own learning structures. However, access to information is but one part of the equation. As with any learning, the learner must engage with the environment in meaningful ways.

The Objectivists

The objectivists describe learning outcomes in terms of exhibited behaviors. As a result of an instructional analysis, the designer sets the performance objectives. This model of instruction is a systematic approach, which proceeds in several steps. McManus (1996) believes that this approach "may well be appropriate if the knowledge is procedural and can be exhibited. But if the instruction deals with declarative knowledge, or more importantly with higher levels of thinking and learning, these models and the instruction produced by them can prove ineffective" (p.5).

Ritchie and Hoffman (1996) have proposed an objectivist WBI implementation model which is based on seven instructional sequences: (a) motivating the learner, (b) specifying what is to be learned, (c) prompting the learner to recall, and apply previous knowledge, (d) providing new information, (e) offering guidance and feedback, (f) testing comprehension, and (g) supplying enrichment or remediation.

Motivating the learner. This can be accomplished by : (a) external stimuli such as designing a multimedia webpage with graphics, sound, animation, etc., (b) inquiry arousal: problem, mystery to be solved, (c) establishing relevance to users, or (d) building self-confidence on completing the learning tasks: propose models or easy practice activities.

Identify what is to be learned. (a) list outcomes or expectations as students access an instructional page, and (b) help students focus on the task at hand, limit external links to what is very important.

Reminding Students of past knowledge. (a) identify your learner profile, and (b) provide links that will help the learner contextualize the new knowledge to be learned.

Require active involvement. Require the learners to do a project.

Provide guidance and feedback. During exploration of web materials. (a) label your links: (e.g., "example," "shortest path"), (b) require learners to make a choice among alternatives and provide feedback pages with the answers, and (c) use CGI scripts to create interactivity.

Testing. (a) Use CGI for online testing, and (b) provide students with Web editing tools, so that they can create a project.

Providing enrichment and remediation. (a) Use linked pages and CGI, and (b) provide alternative methods of information and presentation.

The Constructivists

Constructivist epistemology has proposed many instructional models but the most appropriate for a web-based environment may be cognitive flexibility theory (CFT). Jonassen, Dyer, Peters, Robinson, Harvey, King and Loughner (1997, p.120-121) quote Spiro's CFT description:

> Cognitive flexibility theory is a conceptual model for designing learning environments that is based upon cognitive learning theory. Its intention is to facilitate the acquisition of advanced knowledge to serve as a basis for expertise in complex and ill-structured knowledge domains. Cognitive flexibility theory uses hypertext to rearrange "instructional sequences,

> for multiple dimensions of knowledge representation, for multiple interconnections across knowledge components, and so on. Features like these correspond nicely to well known properties of hypertext systems, which facilitate…multiple linkages among content elements" (Spiro et al., 1991. p.67).

CFT was developed to overcome oversimplification and prearranged knowledge structures, which do not prepare the learner to face real life complexity. Content is presented from multiple and often irreconcilable perspectives. Web-based instruction designed from CFT is most often authentic, with varied cases presented from a multiple points of view to provide the learner a variety of applied contexts from which he/she will construct personal knowledge structures (Berge, 1997).

McManus (1996) has proposed a CFT instructional model (p.7). It is composed of 7 elements: "define your learning domain," "identify cases within the domain," "identify themes and perspectives" concurrent to "provide the learner with controlled navigation through the cases." "Themes and perspectives" leads to "Map Multiple Paths linking cases," which, with "provide learner controlled navigation," leads to "focus learner self-reflection."

Define the learning domain. McManus believes that in an ill-structured environment, the designer needs to set the boundaries of what one wishes to present the learner. One may also consider if the domain supports CFT, that is to say, if the issue is complex, does not have a logical structure, and involves identifiable themes (Jonassen, et al., 1997, p.127).

Identify cases within the domain. Identify the various elements or cases to be studied: bits of declarative and procedural knowledge, text, graphics, sounds, and videos which will represent the domain.

Identify themes/perspectives (guided path). At that point, the learner is presented with two alternatives: the guided path or the learner controlled path. The guided path will identify designer goals and select learning elements that the designer believes are important. They differ from traditional ISD learning objectives in that they are suggestions and not what the learner will necessarily get out of the environment.

Learner control path. If learners create their own objectives, they need to be provided with the tools they will need to explore the learning domain on their own. For example, some tools are keyword search engines and concept maps, which can be restructured by the learner.

Map multiple paths through cases to show themes. Create links between the instructional elements which represent the cases for your suggested path(s). These should reflect multiple perspectives.

Encourage learner self-reflection. There is no standard objective evaluation. The designer can provide guidance and questions to promote the learner's self-evaluation. McManus states that the design should include tools to help the learner decide on what to do next.

SOCIAL ASPECT OF WEB-BASED LEARNING

Often, both objectivist and the constructivist models have one thing in common: they do not address the instructional process as a social phenomenon. While most models do not exclude the possibility of peer learning, it is important in most web-based instruction that a designer explicitly includes learning in social context. Learning is a seamless process – it is contextual in nature. It is also social, since the learning process takes place within a social framework. Learning is a "transactional process, a process that is characterized by the exchange of ideas, thoughts, and feelings between and among people, resulting in new ways of viewing the world or in new ways of acting" (Lauzon, 1992, p. 33). In this framework, advanced cognitive learning is most effectively attained using discussion as a learning strategy (ibid. p.35). This point of view is shared by Harasim (1989):

> Conferencing exchanges in the courses are student-centered, involving dynamic and extensive sharing of information, ideas, and opinions among learners. Knowledge building occurs as students explore issues, examine one another's arguments, agree, disagree, and question positions. Collaboration contributes to higher order learning through cognitive restructuring or conflict resolution, in which new ways of understanding the material emerge as a result of contact with new or different perspectives (p5).

Conferencing is part of computer-mediated communication (CMC). It can be classified under three categories: (a) *conferencing* such as e-mail, and group conferencing (e.g. listserv), (b) *informatics* (online access catalogs, databases), and (c) *computer-assisted instruction* (CAI) (Santoro, 1995). Using these CMC communicative and collaborative capabilities, the designer can plan for the various types of interaction called for in the instructional goals for the course.

When thinking about learning as a social function, the use of discussion comes directly to mind. However, the social dimension may go further. Lave and Wenger state that:

> …the key factors in supporting learning are those, which makes a community, open to its newcomers, allowing them to participate in its practices and move from peripheral to central status as rapidly and smoothly as possible. (Lave & Wenger, 1991 in Wenegif, p.2).

In WBI, this should translate into a design that will deliberately focus on developing a virtual community in which all members will feel at a central status. This can be achieved, but it takes work on the parts of the students and the instructor. Ideas to help accomplish this include:

- Ask students to post a biography (with picture if possible).
- Request active participation from all students. Silent students should be privately contacted and moderating skills should be put to use to make sure that that student's contributions have been acknowledged and appreciated.

- Provide a virtual café designated for socializing purposes.
- Include chat rooms in the CMC environment designed to provide an area for synchronous, social interaction if desired.

TECHNICAL ASPECTS OF WEB-BASED INSTRUCTION

General Guidelines:

- You must secure ongoing technical assistance from your computer services. They will help set up your course site (for a web-based instructional package) and password privileges, create a listserv. etc. Ask your students to meet a minimal hardware and software configuration. [1]
- Provide online tutoring if you are using a sophisticated web-based instructional package.
- Allow one to two weeks to work out problems and bugs.
- Enrolled students should receive a mailed packet with instructions and be provided with diverse means of contacting the instructor: e-mail, phone and fax.
- Summative evaluations should also be mailed.

Understanding the Nature of the Environment

According to Eklund (1996), a strength of learning environments such as the Web is that it is a non-linear method of organizing and displaying multimedia information (text, graphics, sound, and video). Eklund proposes the following guidelines to maximize learning in hypertext:

- Use an expert's construction of the domain to form the basis for the creation of the nodes (declarative elements of knowledge) and links (procedural and structural understanding). Draw a semantic net (or concept map) of the subject matter.
- Incorporate advanced navigational devices (e.g., maps) to inform the user of where they are and where they have been (e.g., fading or changing the color of visited links).
- Provide adaptive advice, based on several stereotypical users, and model the user's acquisition of knowledge through their use of the environment perhaps suggesting a preferred path through the knowledge base if one exists.

Segment and Label Paths Properly

To take advantage of the web-based environment, the homepage and web site should direct the users to alternative paths reflecting the different stages of declarative knowledge and procedural and structural understanding. Learners' non-linear use of the material is a function of their level of expertise in the subject matter (Ohlsson, 1992, in Eklund, 1996) and knowledge of hypermedia environments (Stephenson, 1992 in Eklund, 1996). Suggestions are:

- Labels such as " Tell me more," "more examples like this one," and "what do the experts say," will help users choose the path that fits them best.
- Provide different navigational tools. Punctual tools will help the user move to another location. Structural tools should provide an overview map and indexes. Historical tools will help the user see where he/she has been (La Passardiere and Dufresne, 1992 in Eklund, 1996).
- Stay within existing web standards as much as possible to help learners with the proper recognition and navigation in the environment being design.

The Homepage

Pedagogical considerations:

- Even if your course is contained in a webtool software such as WebCT, design a homepage for the course from which learners can access the proprietary software.
- Use the page as an advance organizer, providing students important links and access to major databases. Your web page should give students a feel of the learning environment and engage them into further exploration.
- Provide a course description even if you intend to post this information within your CMC platform, which cannot be accessed by visitors.
- Consider including the syllabus and course management, keeping in mind intellectual property rights issues (i.e., what are you willing to give away to casual visitors to your webpage).
- Give an e-mail address to send inquiries.

Graphic considerations:

- If using graphics or animated gifs, remember that speed is a key factor. Do not use big pictures and consider slicing the picture for faster download, especially if modems are involved in the users' systems.
- Avoid patterned backgrounds that are hard to read and distract from content.
- Avoid hard to read colors and complementary clashing colors (e.g., red with black).
- Check how your work will look on different platforms. Colors do not always transfer properly from one operating system to another.

[1] An example provided from the University of Maryland Baltimore County Emergency Health Services Distance Learning Program is:
Power Mac or PC (Pentium or similar 32 bit operating system)
24 Meg of RAM
Printer/Color VGA monitor
28.8 k. Modem
PPP/SLIP/AOL: access to graphical Web browsing
Netscape 3.0 or better or Explorer browser (latest possible version)
Set your browser. Make sure your browser is Java and Javascript enabled. In the Netscape Navigator menu, go to Options/ Network Preferences/ Languages and check both boxes.
e-mail address
Word processor

- Check how different browsers will handle your pages.
- Design for the middle ground (speed of the modem and browser).
- Provide text versions of your images when possible and when appropriate (i.e., when the instructional goals are not compromised by so doing).
- Think of printing. Some colors will not show well on a printer. Try to print before uploading to the server.

Course material considerations. Apart from assigned textbooks that the learner may be requested to buy (check with your bookstore about their policy for sending textbooks if you have to ensure distribution), provide all assigned reading materials online. If the materials you want your students to read are not already available online, you should arrange to put them there. Remember, copyright issues apply. The protection of intellectual property is a legal issue and should not be overlooked. Your library services should provide the information you need as well as request forms, and so forth. This can be a relatively lengthy process and should be limited to crucial documents.

Troubleshooting and Evaluation

Troubleshooting:

- Provide online help, even if simply an email address for problems and a FAQs list.
- Technical problems could be addressed and indexed on a special Trouble Shooting Forum where all could share insights.
- "Dead" URLs should also be identified as soon as possible and deleted.
- Request feedback for all major activities. Students should provide written comments and be engaged in the design process. Be flexible and react positively to student feedback (e.g., too many readings).

Formative evaluation. Course subject matter assessment will be totally determined by the subject matter, teaching style, and the educational philosophy (objectivist vs. constructivist). Traditional evaluation tools such as quizzes (multiple choice, etc.) are available in most web-based instructional software and CGI or Java scripts can be used to develop your own (check shareware CGI).

Summative Evaluation. Although it is not usually done, a summative evaluation of the course can be used to report to appropriate stakeholders and decision makers.

CONCLUSION

Developing online courses is a team-based, synergetic process that must address managerial, pedagogical, social, and technical considerations. Although managerial and technical considerations do provide the necessary infrastructure for the online course, they are subordinate to pedagogical considerations. The designer must also reflect the fact that learning takes place in a social context and account for the characteristics of the web-based environment to create an environment that may maximize learning. ■

References

Aprendio, Inc. (1997). Developing instructor led web-based courses. [Online.] http://www.aprendio.com/check1.html

Berge, Z.L. (1999). Interaction in post-secondary, web-based learning and teaching. *Educational Technology, 29*(1): 5-11.

Berge, Z.L. (1998). Conceptual frameworks in distance training and education. In D.A. Schreiber & Z.L. Berge (Eds.) *Distance training: How innovative organizations are using technology to maximize learning and meet business objectives.* San Francisco: Jossey-Bass. 19-36.

Berge, Z.L. (1997). Characteristics of online teaching in post-secondary, formal education. *Educational Technology, 37*(3), 35-47.

<Not in Text>Berge, Z.L., & Dougherty, K. (1998). How to convert face-to-face instruction to web-based instruction. To appear in P. Philips, (Ed.).*1999 McGraw-Hill Sourcebook.*

Bourne, J.R., McMaster, E., Rieger, J., & Campbell, J.O. (1997). Paradigms for on-line learning. JALN, 1(2) [Online.] http://www.aln.org/alnweb/journal/jaln_Vol1issue2.htm

Eklund, J. (1996). *Cognitive models for structuring hypermedia and implications for learning from the world-wide web.* [Online.] http://www.scu.edu.au/sponsored/ausweb95/papers/hypertext/eklund/index.html

<Not in Text>Gillani, B.B., & Relan A. (1997) Incorporating interactivity and multimedia into Web-based Instruction. In B.H. Khan, (Ed.), *Web-based Instruction*. Englewood Cliffs, N.J: Educational Technology Publications.

Harasim, L. (1989). On-line education: A new domain. [Online.] http://www-icdl.ope.ac.uk/mindweave/chap4.html

Jonassen, D.H., Dyer, D., Peters, K., Robinson, T., Harvey, D., King, M., & Loughner, P. (1997) Cognitive Flexibility Hypertexts on the Web. In B.H. Khan, (Ed.), *Web-based Instruction*. Englewood Cliffs, N.J: Educational Technology.

Lauzon, A.C. (1992). Integrating computer-based instruction with computer conferencing: An evaluation of a model for designing online education. *The American Journal of Distance Education. 6*(2).

McManus, T.F. (1996). Delivering instruction on the World-Wide Web. [Online.] http://ccwf.cc.utexas.edu/%7Emcmanus/wbi.html

Mekhlafi, A. (1997). Constructivism. [Online] http://seamonkey.ed.asu.edu/~mcisaac/emc703old97/spring97/7/mekh7.htm

Nixon, M.A., & Leftwich, B.R.(1998) Leading the transition from the traditional classroom to a distance learning environment. [Online.] http://www.thejournal.com/magazine/98/aug/feature2.html

Owston, R. (1997). The Teaching Web: A Guide To The World Wide Web For All Teachers. [Online.] http://www.edu.yorku.ca/~rowston/chapter.html

Continued on page 32

We live in a technologically advanced and information rich world. We need to continue to grow. Using the World Wide Web as a way of providing instruction at Dowling College became a necessity after four years of trying to do it the traditional way

not value the creation of new learning modes.

Evaluation and Rewards do not encourage risk taking which can result in lower evaluations over the short term. Disincentives abound which discourage experimenting. Where are the classrooms fully equipped for innovative learning? Where is the support from information systems departments? Where is the celebration associated with a pioneer risk taker who tries a new method? Research, publishing and "chalk and talk" methods are prized.

Culture of Autonomy stresses the solitary activity of the classroom. Innovation requires collaboration, team teaching and building partnerships. It requires review by others.

Despite the obstacles, the establishment of a Web-based Virtual Learning Community can happen. It takes vision, planning, resources, and risks. Get Wired and Go Digital. ■

REFERENCES

Bishop, J. H. (1991, July). *A strategy for achieving excel lence in secondary education: The role of state universities and community colleges* (Cornell University Working paper #92) Paper presented at the Council of Chief State School Officers Institute, Okoboji, IA.

Bonk, C.J., & Reynolds, T.H., (1997, February). Learner centered web instruction for higher order thinking, teamwork and apprenticeship. *Educational Technology Publications, Inc.*, Englewood Cliffs, NJ.

Burk, D. L. (Fall 1997). *Ownership of electronic course materials in higher education.* CAUSE / EFFECT.

Distance education in higher education institutions: Incidence, audience, and plans to expand. (1998). Washington: National Center for Education Statistics.

Duderstadt, J.J. (Winter 1997-98). *Transforming the university to serve the digital age.* CAUSE / EFFECT.

Maehr, J.L, Midgley, C., & Urdan, T. (1992). School leader as motivator. E*ducational Administration Quarterly, 28*(3), 410-429.

Naisbitt, J. & Aburdene P. (1990). *Megatrends 2000: Ten new directions for the 1990's*. New York: Morrow.

The Public Policy Institute of New York State, Inc. (1991, March). *Technology in New York's Classrooms*, Albany: Author.

Toffler, A. (1990) *Powershift*. New York: Bantam.

Weiss, C.H., Carbone, J., & Wyeth, A. (1992). Trouble in paradise: Teacher conflicts in shared decision making. *Educational Administration Quarterly, 28*(3). 350-367.

Arlene O'Leary was the Director of Instructional Resources/ Professional Development and User Services for Dowling College when this article was written. Her interests are in distance learning and emerging technologies.
E-mail: drolear@ibm.net

Continued from page 18

Relan, A., & Gillani, B.B. (1997). Web-based Instruction and the traditional classroom: Similarities and differences. In B.H Khan, (Ed.), *Web-based Instruction.* Englewood Cliffs, N.J: Educational Technology.

Ritchie, D.C., & Hoffman, B. (1997). Incorporatin Instructional Design principles with the World Wide Web. In Khan, B. H. (Ed.), *Web-based Instruction*. Englewood Cliffs, N.J: Educational Technology.

Santoro, G.M. (1995) What is computer-mediated communication. In Z.L. Berge & M.P Collins (Eds.), *Computer mediated communication and the online classroom* (Vol1). Cresskill, NJ: Hampton.

Wegerif, R. (1998) The social dimension of asynchronous learning networks. JALN, 2(1). [Online.] http://www.aln.org.alnweb/journal/vol2_issue1/wegerif.htm

Marie de Verneil, Modern Languages and Linguistics, UMBC, 1000 Hilltop Circle, Baltimore, MD 21250 USA
devernei@umbc.edu

Zane L. Berge, Director, Training Systems Graduate Program, UMBC, 1000 Hilltop Circle, Baltimore, MD 21250, USA
berge@umbc.edu