Distance learning is by no means a new phenomenon. However, new technologies provide a twist to distance learning that is making it grow and expand at an overwhelming rate. The National Center for Educational Statistics reported that in 1995, a third of U.S. post-secondary schools offered distance education courses with another quarter of these schools planning to do so in the next three years. During the summer of 1999, the UCLA Extension Service will offer more than 100 Web–based courses in continuing higher education to anyone and anywhere (Business Wire, 1999). When the rapid proliferation of Web-based courses as a distance learning option is considered, and then couple that proliferation with the fact that the World Wide Web (WWW) has only been “popular” for the past five years, this expansion is indeed overwhelming.

While the numbers alone are enough to amaze and dazzle, what is more interesting, and should be of greater concern, are the instructional design and pedagogical issues that should form the foundation of Web-based courses (Ritchie & Hoffman, 1997). The technical proficiencies necessary to build a course Web site and all of its technological accompaniments are merely psychomotor skills that range from the simple to the highly complex. However, one of the reasons for the rapid proliferation of Web-based courses is the development of courseware packages (Web Course-In-A-Box, WebCT, ILN CourseInfo, etc.) that remedy the needs for instructors to worry about acquiring these technical skills (Hansen & Frick, 1997). Unfortunately, while these courseware packages, and the many Web editors available, may facilitate the development of Web-based courses, these tools don’t address the myriad of instructional design and pedagogical issues that must be considered before and during development. Hill (1997) lists some of these key issues, which include pedagogical, technological, organizational, institutional, and ethical questions. Many of these issues must be resolved prior to the development of the first Web page.
In this chapter, we explore some of the research that has been done on Web-based courses, but our intent is to largely delve into the practical realities of designing pedagogically effective and accessible Web-based instruction (WBI). Specifically, we explore the importance of a needs assessment of learner characteristics in the design process to determine and therefore design for the technological abilities and capacities of target students. Additionally, potential solutions and recommendations on how to design a virtual classroom environment that fosters and facilitates active student learning are discussed. Finally, the authors examine the very real issue of course accessibility for all students and how various design elements can enhance the accessibility.

BACKGROUND

As described above, the educational community is turning to the Web in ever increasing numbers to deliver and receive instruction. What is the appeal of the Web for teaching and learning? The Web has experienced phenomenal growth, with currently well over four million Web servers worldwide. That figure doesn’t even begin to indicate the number of users, which remains a difficult number to determine (Zakon, 1999). This growth makes WBI an accessible medium for distance education for many users. It is also affordable from the delivery standpoint; colleges and universities already have the Internet infrastructure in place. At most, the institution might choose to license one of the aforementioned courseware packages to facilitate WBI delivery; however, faculty may also opt for the development of their own original Web sites. Either way, the university does not need to invest in new classrooms or technologies, and expenses may ultimately be offset by attracting new students to courses.

Although WBI may be growing because it is convenient for the student and for the institution, it also has some inherent advantages as an effective instructional tool. The world’s job market is constantly changing; there are jobs that will exist in the future that do not exist at this moment. In many ways, we are preparing students for what is a moving target. Therefore, what we are really preparing students for is the process of lifelong learning whereby they control their own learning needs (Romiszowski, 1997). The power of WBI is that to varying degrees, students have control over when and where they gain their new knowledge. Research has shown that students can be effective learners over the Web, and learn as much if not more than in traditional courses (Mory, Gambill, & Browning, 1998; Business Wire, 1999b). However, are there factors that must go into the design of these courses to ensure that students are developing this self-directed learning style and can gain the skills needed to be successful in the long-term?

To design an effective course, whether it is Web-based, traditional, or presented in other formats, a student-centered needs assessment should form the central core of the instructional design. Witkin (1984) defines a needs assessment as the process of using information to make decisions, set priorities, and allocate resources for course design. Burton and Merrill (1991) suggest that a need is present when “there is a discrepancy or gap between the way things ‘ought to be’ and the way they ‘are’” (p.21). As an instructor, and as an instructional designer, part of a needs assessment is determining if these “gaps” can be resolved through instruction, or if the possible resolution lies outside those bounds (Mager & Pipe, 1970). These views of needs assessment largely deal with determining discrepancies. By highlighting discrepancies in knowledge and information, for example,
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