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# Virtual Learning Environments: An Information Technology Basic Skills Course on the Web

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## Abstract

*Calls for revolutionizing business education are being answered by a proliferation of virtual learning environments. Virtual universities are emerging and more and more universities are developing and offering virtual courses capitalizing on ever-growing and ubiquitous Internet-related technologies. This paper presents an implementation of a web-based virtual learning environment that was created to offer an IT introductory college level course for undergraduate business students at a large university in the U.S. The environment consists of several virtual areas to conduct the classroom activities and house the relevant resources and information. Theory predicts that higher level of "learner control" leads to more effective learning. Control and flexibility, among other advantages offered to the learner in virtual environments, are the intended benefits of this implementation.*

## Introduction

Calls for transforming learning industries and revolutionizing business education are being answered by a proliferation of virtual learning environments. Ives and Jarvenpaa (1996) warn that nothing will protect the business school from being swept into the current of technologically driven change, and they call upon business schools to seek an alternative vision built around virtual learning environments. These virtual environments are computer-based environments that are relatively open systems, allowing interactions with other participants and access to a wide range of resources (Wilson 1996). These new ways potentially have a wide range of advantages over traditional environments (e.g. convenience, flexibility, lower costs, currency of material, increased retention, and transcending geographical barriers).

Both the IS and the Education communities intuitively feel that the virtual learning environments will enhance learning and the students' ability to apply knowledge and skills. However, pedagogic practice has not yet fully integrated information technology into the curriculum and classroom activity (Alavi 1994). Computers and other related technologies remain greatly under-utilized in this context. In describing the frustrating gap between the education and business communities, Wellburn (1996) argues that the education system has not done an exemplary job of evaluating the impact of the technology it has implemented. It is fairly obvious that education has not turned to technology to the same degree, as has the business community.

Although it has become a common terminology, "virtual learning" might seem misleading. The learning is real, but the environment is what has changed (Schank 1997). Almost any metaphor of a learning environment includes at the outset the elements of "time," "place," and "space" where the learning actually occurs. The incorporation of technology in educational environments has mostly remained within the traditional boundaries of those elements until the recent explosion in Internet-related technologies. Today, technology allows the student and both the instructor and other students to be decoupled in any of the elements of time, place, and space.

Traditional classrooms seem unlikely to be the environments for the emerging paradigms about education such as Lifelong Learning and Just-in-Time Education. Lin et al. (1996) cited a number of theorists, who argued that the structure of typical classrooms discourages the kinds of learning necessary for the twenty-first century. Furthermore, it is becoming more evident that the "basics" required for success in our increasingly changing society are no longer simply reading, writing, and arithmetic, but the ability to think critically and reason about important content, plus the ability and the motivation to learn independently throughout one's life. Perhaps, it is time to consider new and innovative ways of creating effective and efficient environments that will adequately prepare us to face the challenges of the third millennium.

## Theoretical Framework

Wilson (1996) classified the emerging technology-enabled learning environments into three categories. First, the *Computer Microworlds*, where the students enter a self-contained computer-based environment to learn. Second, the *classroom-based* learning environments, where various technologies may function as tools in support of classroom activities. Third, the *Virtual learning environments*, which are defined as computer-based environments that are relatively open systems, allowing interaction with other participants and access to a wide range of resources. Such environments foster "Any time/ Any place" learning models that are not only a different way of delivering knowledge, but also a powerful means of creating knowledge. These new

environments potentially have a wide range of advantages over traditional environments (e.g. convenience, flexibility, lowering education costs, transcending geographical barriers, currency of material, increasing retention, etc.).

Theory predicts that rendering more control to the learner over the content and the pace of learning could enhance the learning effectiveness. "Learner Control" is a significant feature of the Component Display Theory of instruction design proposed by Merrill (1983). Some of the basic empowerment characteristics of virtual learning environments are the control and flexibility they offer to the learner. A learner in the virtual environment often can control what content to select, how much time to spend on what, and when to engage him or herself in the learning activity. Furthermore, physical presence in the learning environment is no longer a requirement. Fast-learners are no longer time constrained as with traditional environments, where the needs of slower and less experienced individuals often control the pace of everyone's learning. Technology has been shown to enable students to learn at their own pace (Barron and Orwig 1997).

Leidner and Jarvenpaa (1995) proposed a taxonomy for technology fit with learning models. They argue that incorporating technology with the objectivist model is a matter of automation only; however, incorporating technology within constructivist model would create the potential for long-term effect on the self-variables (e.g. performance, self-efficacy, etc.) since the control has been shifted to the learner. Thus, it appears that virtual learning environments are conducive for successful implementation of the assumptions of the effective learning theories. The facilities offered by this implementation could serve as a platform to conduct research on the effectiveness of different learning models in a virtual environment.

### Course Design and Features

The course is an introduction to Information Systems for freshman students in the College of Business. It is mainly a skill course where students are introduced to the Microsoft Office 97 suite (i.e. Word, Excel, Power Point, Access). The course is designed for college students but we believe that it could be targeted to employees in any organization. These are necessary business tools for almost everyone in the business communities in this day and age.

This web-based course was developed in a Lotus Learning Space environment, which offers four "virtual" areas to conduct the classroom activities:

- **The Schedule:** where student can access the course materials and assignments organized by date.
- **The Media Center:** where students can access general information, multimedia material, grades, etc.
- **The Course Room:** where students can interact with each other and with the instructor in a threaded discussion.
- **The Profiles:** where students can post information about themselves and check out information about each other.

The online material was developed as modules grouped in tutorials. The modules utilize JavaScript routines to present the material in a form that allows students to apply concepts and practice skills without ever leaving the virtual environment. Practicing basic skills, as they are learned, increases the retention rate. There is a reasonable body of research (though it is beyond the scope of this article) supporting that learning-by-doing enhances the learning effectiveness.

The web-based course accommodates students that prefer to study during the day as well as learners who are more proficient in the evening or even at night, because there is no need for the students to convene in one place at one time. Two separate navigation schemes are provided for the students: sequential and random. The sequential pattern allows the students to follow the path that was prepared by the instructor. Such scheme is targeted to learners that prefer to have guidance during the learning process. More independent students, who prefer to learn through individual discovery, can take advantage of the random navigation scheme. A number of links connect related modules and allow the students to follow paths that best fit their interest and learning style.

The virtual environment suits the needs of students with prior knowledge as well. Each tutorial includes a descriptive index of all the modules that it contains. Such modules can be accessed directly from the index page releasing students with prior knowledge from having to "sit through" prolonged periods of time just to hear what they already know as it is the case in traditional classrooms. Also, by interacting with each other in the discussion area (i.e. the Course-Room), students with prior knowledge can contribute by enhancing the discussion and stimulating others in a productive fashion. Learners who prefer visual aids in the learning process could also take advantage of animations provided by the course. Each module is linked to animations that visually show how to accomplish a particular task.

### Course Organization

Students in the virtual environment are presented with a detailed schedule of weekly lessons. Each lesson is composed of one *practice assignment*, one *graded assignment* and two tutorials. Each lesson begins with a practice assignment that presents the students with the objectives of the lesson. The students print out the practice assignment and complete it as they read the on-line tutorials. The tasks to be completed in each practice assignment are synchronized with the teaching modules contained in the lesson's tutorials. The students were instructed to resize the application window (i.e. Microsoft Word 97) to fit on the screen along with the teaching modules. Accessing the material and the application simultaneously allows the students to practice each skill as they learn it. Once the practice session is complete, the students can complete the assignment and turn it in to the instructor for feedback and grading. The graded assignments are structured so that the students can not passively follow the tutorials but they have to actively apply the skills and concepts that they learned. Nevertheless, if they do not remember how to perform a specific task, they can access the on-line help in a just-in-time fashion. Interactions between students and the

instructor and between the students take place through the Course-Room facility. While students are completing the lesson, they can easily post questions and comments to the discussion area. They could receive answers from the instructor or other students, through the same medium, in a timely fashion. The discussion area is a great tool that allows the instructor to implement different teaching techniques enhancing the student-teacher and student-student interactions.

### Conclusions

This paper presented an example of virtual learning environments for IT basic skills. Because of the great potential of these virtual learning environments for academia and business communities, researchers are increasingly investigating the effectiveness and fit of such environments. Analysts estimate that the Web-based training market could hit \$1 billion by the year 2000 (Ouellette 1998). Although some might think that the use of the web is inevitable, so there is no need to justify it; we believe that investments in its deployment for education must be justified through vigorous research under a wide range of learning situations. Implementations such as the one presented in this paper could serve as a platform for researchers to investigate the effectiveness and efficiency of virtual environments. As we prepare to enter the third millennium, web-based virtual learning environments- if proved effective- provide great opportunities for both academia and business communities.

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