Blended Learning:
The Key to Successful Web-Based Training and Education

Kathleen M. Frankle
Program Manager, Consortium for ITS Training and Education,
Center for Advanced Transportation Technology, University of Maryland,
Building #806, Room 3103, College Park, MD 20742-6601.
Phone: 410-414-2925. Fax: 301-403-4591. E-mail: Kfrankle@umd.edu

United States of America

ABSTRACT

Courses taken over the internet (referred to as web-based courses or e-learning) have become the fastest-growing segment of the education and training community. E-learning has many advantages but there are also disadvantages as well. The Consortium for ITS Training and Education (CITE) has addressed many of the disadvantages of web-based training by developing a "blended" course format that combines the best features of both web-based instruction and more traditional instruction methods. These courses have been extremely successful as evidenced by both quantitative and qualitative measures. CITE's experience and success with blended courses is not unique. Other universities and organizations throughout the country have experienced similar successes with the blended learning format.

INTRODUCTION

Courses taken over the internet (referred to as web-based courses or e-learning) have become the fastest-growing segment of the education and training community. For example, the University of Phoenix Online, which delivers only e-learning courses, is the largest private university in the country, and it has only been in existence since 1976. The combination of busy schedules and exploding technology, is forcing more and more people to use e-learning to satisfy their education and training needs. E-learning offers many benefits including flexibility, reduced travel and interactivity of course material.

THE CONSORTIUM FOR ITS TRAINING AND EDUCATION

The Consortium for ITS Training and Education (CITE) was formed in late 1998 to provide transportation engineering students and professionals with an integrated curriculum covering the technologies and management subjects associated with ITS. This curriculum includes a broad range of material related to transportation engineering, computer science, systems engineering, and project management. CITE is a unique organization of more than 100 universities and industry associations focused on providing comprehensive advanced transportation training and

education throughout the world. CITE courses are all delivered in an interactive web-based format and are available 24 hours a day, seven days a week.

CITE's audience includes both graduate students and industry professionals. Graduate level for-credit courses developed by CITE are offered through CITE university partners. Training courses for continuing education units are available directly through CITE for an enrollment fee.

In June 2000, CITE was the first organization to provide the transportation community with web-based ITS courses. CITE completed and piloted its first semester-long course, "Fundamentals of ITS and Traffic Management" in Spring 2000. This course consisted of 11 modules, each focused on a different aspect of ITS. The course was designed to provide a working-level understanding ITS. During the pilot of the course, one of the conclusions reached was that a full semester course proved too demanding for many current professionals because of their additional work commitments. As a result, stand-alone versions of the individual modules of the Fundamental course were transformed into individual short-courses. Thus in June 2000, CITE introduced twelve web-based ITS courses.

CITE's curriculum has grown tremendously over the last five years. As of June 2005, CITE's program has grown to now include two full semester courses, 28 individual short courses, five blended courses, five courses in Spanish and three certificate programs made up of six courses each. A "Careers in ITS" course is also offered to inform freshman and sophomore college students of the opportunities in the advanced transportation field.

The number of courses taken by students has also grown over the last five years. If you look at Figure 1 below, you can see that in the first year CITE provided 81 courses to students. In the fifth year, the number of courses taken grew to 571 courses. There is a huge spike in courses taken in the third year due to the release of two certificates in June 2002 and the pilot offering of CITE's first blended course (see below) in November 2002. There is also another large spike in the firth year that is due to the increased number of blended courses CITE offered to students.
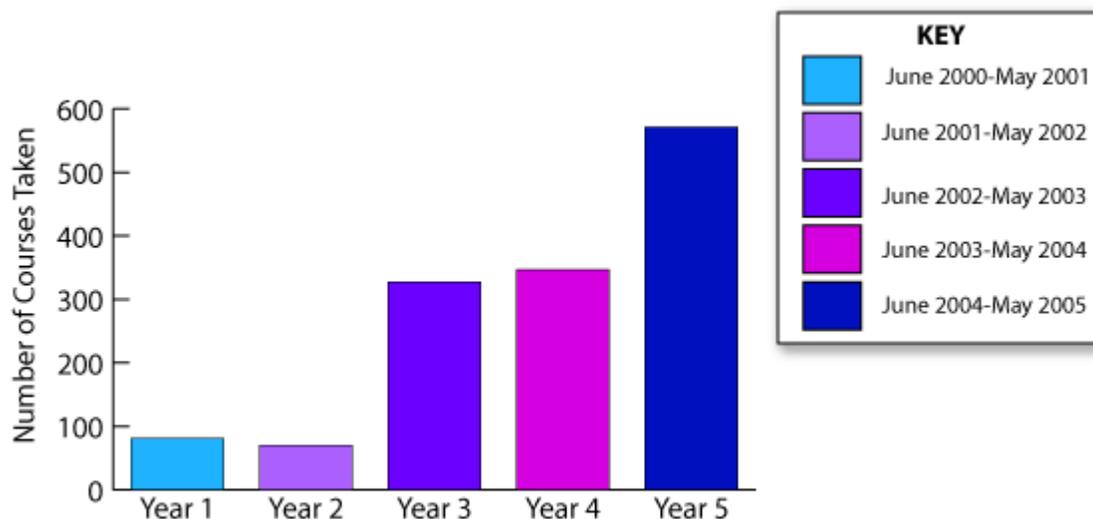

Figure 1- Courses Taken Each Year by CITE Students

THE CONCEPT OF "BLENDED" LEARNING

All of CITE's courses have been developed in an interactive web-based format. Wed-based courses have many benefits including:

- Flexibility. Students can take the courses at any time of the day or night, from home, the office or even while away on travel. A computer and internet access are the only requirements.
- Just-in-time delivery. New assignment at work? There is no need to wait for the next course offering; the course is there when they need it.
- Interactivity. The courses provide student interactivity through a stimulating mix of participatory activities, such as self-study quizzes, exercises or problems, and drag-and-drop pages. These activities help support and reinforce the text-based information and keep students engaged and active in the learning process.

In spite of the many benefits of web-based courses, many students are dissatisfied with its lack of personal interaction with the instructor and other students. The schedule flexibility provided also results in low completion rates, since there are no mandatory dates for students to finish their work. The concept of blended learning has been introduced to overcome these problems.

The blended learning concept combines web-based courses with other types of more traditional instruction. Although the idea of combining multiple presentation formats is not new, it has proved extremely effective when applied to e-learning. Blended learning is an exciting concept because it recognizes the variety of learning strategies used by students, and the need to utilize more than one type of teaching method. In essence, it permits educators to match the delivery technique with students' learning styles and requirements. Blended learning clearly provides more participation, more enthusiasm, and ultimately, greater learning success. CITE has found that this approach overcomes most, if not all of the drawbacks of e-learning.

CITE's First Blended Course

In November 2002, CITE offered its first blended learning course jointly with the World Bank's Global Development Learning Network (GDLN), when it delivered its introductory ITS course to more than 160 students in five countries. Instruction consisted of on-line interaction with the CITE material, interspersed with video-conferences at which students were asked to present information on ITS applications in their own countries, and discuss the course material. The course included three two-hour video-conferences set over a period of a week and a half. As a part of the course assignments, students participated in group discussions on questions posed by the instructors. The answers to these questions were debated within each group at the local level and subsequently shared with the other participating sites during the video-conferences. In this way, a high level of interaction was achieved among the students and with the instructor.

The Success of CITE's Blended Courses

The success of the first pilot course led to the refinement and subsequent development of other blended offerings in which teleconferencing was substituted for the video-conference. The teleconference format was selected for reasons of cost and accessibility. CITE's blended courses combine what we believe are the best features of both instructor-led and web-based instruction. The features of these courses include:

- Live discussions with the instructor through the use of conference calls,
- Convenient, flexible web-based learning,
- Workshop problems designed to reinforce the concepts being taught and promote interaction with other students,
- A specific time schedule in which to complete the course, and
- Networking and interaction with both students and instructors through the use of class problems posted on a discussion board.

Since September of 2003, CITE has offered five different blended courses and an additional five will be available by December 2005.

Blended courses have been a huge success for CITE, as shown by quantitative performance measures. For the period June 1, 2003, through May 31, 2004, blended course students accounted for 56% of all students taking CITE courses. During that same time period, CITE increased the number of students taking courses by 298% from the previous year's twelve-month student total. The completion rate for students enrolled in blended courses is 91% compared to a 54% completion rate for regular web-based courses.

In the final survey given to all students taking CITE's blended courses, the students were asked the following question:

> *"In a regular web-based course, you take it at your own pace (no specific deadlines) and there is no live interaction with the instructor, only access via e-mail. In this course, we blended three features of instructor-led courses with a regular web-based course... If both of these formats (regular web-based and a blended version) were available to you for a future course, which would be your preferred delivery mode?"*

Only 11% of the students selected the traditional web-based formats while 89% preferred the blended format.

The effectiveness of the blended training is further demonstrated by the nature of the discussions taking place during the teleconferences. In a conventional classroom course, most students are from the same agency or same geographical area. Students in blended courses, however, offer a variety of geographic and organizational backgrounds. As a result, a rich combination of differing approaches and experiences are offered, which provides an educational experience superior to either classroom or traditional distance learning alternatives.

To ensure the pedagogical quality of the courses, CITE requests that students complete an on-line survey after taking their final exam. This gives students an opportunity to comment on all aspects of the course and provides CITE with valuable feedback on the various course

components and their effectiveness. These surveys are completed and submitted anonymously. Some of the survey comments received from students taking the blended courses are listed below.

- "The learning aids and the conference call concept is definitely a winner. I look forward to other 'blended' courses from CITE."
- "Definitely a worthwhile learning experience."
- "I am a former university professor. I can say that it was an excellent course—well designed, presented, and conducted. I would rate the course as excellent and would recommend it to others."
- "Excellent, informative, beneficial."
- "Great course, great value, really enjoyed it."
- "Great course, will recommend strongly to other ITS Engineers."

Below is a sampling of answers to the question, "*What did you like most about the course?*"

- "The teleconferences and the response postings were the best features."
- "Flexibility to do the course when I had time while also being able to share experiences of instructor and other students."
- "The review of other students' ideas and resolutions to problems. This gave me a broader view of problems."
- "That it was an online course with an instructor."
- "Real-world experience discussions during the conference calls."
- "The course content, structure, conference call, discussion forum, and learning aids."
- "The interactivity of the course learning process."

CONCLUSION

CITE's experience with blended courses is not unique. The Rochester Institute of Technology (RIT) Online Learning Department produced a final report for a blended learning pilot project for the academic year 2003-2004 that showed similar results. RIT reported that nearly 75% of all students in the pilot indicated they like the blended learning format, and course completion was excellent with less than 5% withdrawing or failing. This example, combined with other similar reports, demonstrates that the blended learning approach is definitely superior. As a result, CITE, in cooperation with the Federal Highway Administration, has embarked on a series of new projects in which additional blended offerings will be developed, and new teaching strategies explored.

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