

Consortium for ITS Training & Education

A Collaborative, Cooperative Approach

By

Donna C. Nelson, Ph.D. Associate Director, Center for Advanced Transportation Technology,
University of Maryland, College Park, MD 20742. Phone: 1-301-405-4517. Fax: 301-405-2585.

DCNelson@eng.umd.edu

Kathleen M. Frankle, Manager, Consortium for ITS Training and Education, Center for Advanced
Transportation Technology, University of Maryland, College Park, MD 20742. Phone: 410-414-
2925. Kfrankle@chesapeake.net

SUMMARY

This paper describes an innovative strategy for developing and delivering ITS education and training. The Consortium for ITS Training and Education (CITE) is a unique consortium of universities, associations, and other organizations focused on providing comprehensive ITS training and education to mid-career professionals who wish to enhance their knowledge and skills in ITS and graduate level engineering students pursuing a focus in ITS. The principles underlying the organization and development of CITE are 1) a collaboratively-developed curriculum, 2) coordinated course development & delivery, and 3) an interactive web-based learning environment tailored to the needs of professionals and graduate students.

This effort is led by the University of Maryland with seed funding provided by the I-95 Corridor Coalition, which is itself, a consortium of transportation agencies along the northeast corridor of the United States. The Coalition's funding was initially intended to support a set of training and education courses to be offered in the spring of 2000. These initial plans are rapidly growing to include an expanded set of courses, a clearinghouse, and membership by universities throughout the world.

INTRODUCTION & BACKGROUND

A number of reports, including the US DOT Five Year Strategic Plan for Professional Capacity Building (1) conclude that "trained professionals do not currently exist, nor are they entering the workforce in sufficient numbers to effectively deliver the expected deployment of ITS." Education and training programs for ITS professionals have been initiated by a number of universities, agencies, associations, and companies (2). These efforts, while individually successful, are not sufficient to meet current or emerging needs.

Most existing ITS education and training efforts rely heavily (if not exclusively) on the traditional lecture format; e.g. instruction delivered on a fixed schedule, in a series of lectures. Learners are

expected to proceed at the same rate regardless of their interests or their preparation. Universities or other organizations develop instruction independently, often with very limited information about customer needs. The result is a fragmented program that is redundant and may or may not meet the needs of ITS professionals.

On July 21, 1998, representatives from ten universities, the I-95 Corridor Coalition, and the US DOT met at the University of Maryland to define and agree upon a strategy for effectively meeting current and emerging ITS education and training needs. The results of that meeting provided a foundation for the development of the Consortium for ITS Training and Education; (CITE).

All of CITE's courses will be delivered via distance learning. There are many types of distance learning available such as video conferencing, closed circuit television, interactive CD-ROM and cable television, but CITE has selected web-based instruction. The advantages of this type of course delivery include:

- Students work at their own pace
- Students set their own schedule
- Course material available anytime and from anywhere with Internet access
- Encourages independence
- More direct involvement by the student in the learning process

The following paper describes the concepts and principles that underlie the development of this unique collaborative and cooperative approach to ITS education and training.

DEFINING ITS EDUCATION AND TRAINING NEEDS

A number of recent publications provide a fairly clear picture of the desirable characteristics of education and training programs for ITS (3)(4)(5)(6). These challenges are similar to those faced in other emerging fields (7). These programs must:

- Address the critical barriers to professional training, such as heavy workloads, inconvenient training times and locations, travel restrictions, and cost (8).
- Accommodate audiences from a variety of fields new to ITS.
- Extend the knowledge and skills of practitioners in the transportation fields, and in addition, must provide them with an understanding of the fundamentals in new, unfamiliar fields.
- Incorporate effective learning experiences that improve the learner's ability to retain and apply the lessons learned.

Institutions of higher education in a wide range of fields are actively seeking ways to meet the needs of a changing workforce for improved accessibility and convenience, lower costs, and greater relevance to work. It is apparent that innovative, alternate approaches to the design and delivery of higher education are essential (1).

Presently, all too many graduate students are arriving on the job with little or no background in ITS. The development of ITS courses for a select handful of students interested in specifically in ITS is too costly for one university. CITE offers universities a way to incorporate ITS courses into their curriculum with little or no expense.

THE CONSORTIUM FOR ITS TRAINING & EDUCATION (CITE)

CITE is a consortium of universities and other organizations that have an interest in developing, offering, or obtaining education and training to support ITS deployment. The mission is to encourage and facilitate the creation of an effective education and training program for ITS. CITE, itself, acts as a broker and facilitator. It engages in activities that support a cohesive, integrated program including curriculum and course development, networking and information sharing, quality control, assessment, promotion, and planning.

CITE's programs will focus on the needs existing transportation professionals and trained professionals from other fields whose expertise supports ITS. Instruction offered through CITE will also be designed to complement and support educational programs, which also benefits future transportation professionals and leaders enrolled at universities, colleges, and technical/vocational schools. Instruction will include the technical and non-technical subjects needed to support ITS deployment, including incident management and emergency management, telecommunications, information technology, ITS project management, and strategic planning and implementation. The curriculum will include education, as well as skills-based training.

The vision for CITE is of an organization based on a consortium of partners who hold a common goal of creating a comprehensive, cohesive education and training program for intelligent transportation systems.

The principles underlying its organization and development are 1) a collaboratively developed curriculum, 2) coordinated course development & delivery, 3) learning environment tailored to the needs of professionals and graduate students.

Collaboratively-developed Curriculum

A growing number of universities are establishing consortia among universities and private and public sector organizations to jointly develop programs tailored to meet their specific industry needs (9). These consortia-based efforts are often custom-designed for a specific market, and focus on targeted groups of students, usually employed adults (7). CITE is following this model.

The CITE curriculum is being developed collaboratively by its members. The curriculum development process provides a mechanism for creating a program based on input from a variety of stakeholders. The I-95 Corridor Coalition plays a central role in assuring that instruction is relevant to the needs of ITS professionals and graduate students and the organizations that employ them.

Curriculum "tracks," currently being developed, will describe the graduate-level education and/or skills-based training courses appropriate for professionals with diverse backgrounds, professional needs, and educational goals. CITE, itself, does not plan to offer degrees. Instead, CITE courses will be designed to complement degree programs offered by other universities. For example, completion of a CITE course might fulfill requirements for an ITS Certificate; or might represent a

subset of the requirements for a graduate degree offered by a partner university, or it may simply be recognized by an employer as evidence of preparation for a specific job.

This curriculum will serve a variety of purposes for course providers, potential students, and for deploying organizations. A comprehensive curriculum provides a means for course developers to identify unmet education and training needs; and it can guide the decisions of professionals seeking continuing education, and the organizations that employ them. This curriculum will continually evolve and expand to keep pace with, and whenever possible, anticipate ITS education and training needs.

Coordinated course development and delivery

A recent study of Intelligent Transportation Systems Education and Training Efforts at U.S. Universities illustrates the potential benefits of a coordinated approach (2). More than fifteen universities currently offer or are developing courses that provide an Introduction to ITS. In addition, a larger number of universities are updating existing courses to include ITS related information, with much apparent duplication of effort. A growing number of universities recognize that coordinated course development and shared delivery of courses is an effective way to support the needs of industry and government, particularly in new, rapidly changing fields (7).

This cooperative approach will facilitate the development of instruction needed to support ITS deployment in several important ways:

- It creates a large-enough pool of potential students to justify developing and offering specialized courses. Even large graduate programs may have only a few students interested in many of the specialized courses needed to support ITS.
- It will free faculty to develop courses in their specific areas of expertise, which in turn, should increase the variety of courses available
- It will allow better use of "intellectual capital." Direct access to the experts in specific topics will enrich all of the programs.
- It can lead to a common understanding of the subjects covered by particular courses through a peer-review and evaluation process.
- It will provide valuable information for training course developers by highlighting un-met training needs, and helping them tailor their courses to the needs of their target audience

The role of CITE is to serve as a broker, facilitating coordinated course development, shared course delivery, and an active resource-sharing network among universities. These activities include development of comprehensive peer-review and quality control processes, program promotion and marking, and other activities that promote CITE programs.

The Learning Environment.

The need for flexible, affordable, relevant training is not unique to ITS. A growing demand for instruction that meets the needs of professionals is radically changing the higher education (7)(10).

In addition to an innovative learning environment, industry is calling an increased emphasis on "competence," and certification of proficiency (11)(12).

Traditional lecture-based courses provide a "linear" learning environment (10). Courses are presented as a sequence of topics covered in a series of lectures, held in classrooms at pre-set intervals. Everyone proceeds at the same pace regardless of his or her interests, prior experience, talents, or other demands on their time (11). Similarly, short courses cover a series of topics in a condensed period of time, usually with little opportunity for hands-on experience to reinforce the lessons learned. These "linear" models do not adequately meet the needs of a diverse group of learners.

The pedagogical model for CITE is currently under development. The objectives of CITE make it clear that it will draw upon models that combine a variety of educational experiences to create an effective learning environment. These concepts incorporate innovative approaches to instructional design, course delivery, and student assessment. While these models are primarily distance learning based, the learning experience may be supplemented by traditional lectures and other face-to-face learning experiences.

CITE will function as what might be called a "virtual" university. Most virtual university programs strive to create "learning networks," or "learning communities." The learner is at the center of the learning network and is connected by both real-time (synchronous) and non-real-time (asynchronous) links to learning resources. Students interact with the instructor, other learners and academic resources using a variety of communication and information technologies, including video, audio, and web-based conferencing, email, internet chat-rooms and forums and satellite TV. They have access to remote resources including print resources, for example, books, journal articles, or online resources including materials created by the instructor, CD-ROM, video or audio materials, or simulations and multimedia presentations. These technologies present an excellent opportunity to re-think and to restructure the way material is presented to increase both understanding and retention.

CURRENT STATUS: CITE - AN OPERATIONAL TEST

The I-95 Corridor Coalition has provided seed funding for a two-year project to implement and evaluate the feasibility of CITE. This funding will be supplemented by in-kind contributions from the participating universities for course development, course delivery and student and faculty support. CITE members adopted a Statement of Principles at their November, 1998 meeting. This document states CITE's purpose, mission and objectives. It also outlines what CITE and its members will provide to the partnership. These principles are embodied in a business model that has been developed to serve as a framework for guiding all of CITE's future activities. The objectives of the Business model are to enable CITE to be financially self-supporting, serve the best interests of all CITE's "stakeholders", allow CITE to expand and change as circumstances dictate and enable CITE to "partner" with other organizations when appropriate.

A series of "critical path" activities have been initiated in order to begin offering courses in spring of 2000. These include:

- Identification of training and education courses.

- Selection of professors to develop course modules in their area of expertise.
- Selection of a course instructional designer to put the text from the developers into a web-based interactive learning environment.
- Creation of the initial web-based course in prototype form by Fall of 1999 for evaluation purposes.
- Expansion of university partners to expand the region of graduate level course offerings.
- Marketing of CITE to current state departments of transportation and ITS private sector firms as the source for ITS distance learning training.

CITE's initial courses will be "Fundamentals of ITS and Traffic Management" and "ITS Applications and Management." The Fundamentals course will be available beginning in spring of 2000. It will be offered through participating universities as a graduate level education course and directly through CITE as a continuing education course. The Applications course will be available either in the summer or fall of 2000. The syllabus for each course is available on CITE's web site at www.citeconsortium.org. Both courses are being developed by a team of faculty members from nine different participating universities. Authors for each module were selected based on their expertise in the subject area of the module they are developing.

CLOSING

This type of approach to higher education is gaining support from educators and from industry as an effective, efficient alternative to traditional programs. Cooperation among universities, combined with the active participation of industry are essential to the development of a cohesive, comprehensive education and training program to support the long-term deployment of ITS.

CITE was formed in recognition of the breadth of ITS and the importance of providing effective training and education at times and places that are convenient for both existing practitioners and graduate students. A well-established information-sharing and promotional network will assist training providers in reaching their market, and will, likewise, provide a source of information on available instruction to the private and public sectors. Universities and training course developers may also benefit from pooled expertise in distance-learning will be valuable to training providers new to this media.

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