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HIGH-SPEED RAIL LEARNING SYSTEM: EDUCATION AND TRAINING WEB PORTAL

SUMMARY

The United States has begun moving towards developing a High-Speed Rail (HSR) network. However, the necessary workforce and expertise for planning, design, construction, and operations of the nascent HSR system are currently underdeveloped. The project team from Michigan Technological University (Michigan Tech) and the Mineta Transportation Institute (MTI) evaluated system workforce needs and developed a proof-of-concept web portal as a means of providing education and training to the future HSR workforce. Although the project concentrated on HSR related topics, the portal can also be expanded in the future to serve other areas of rail transportation.

Building on an earlier study by MTI, this project assessed the current and future needs of the high-speed rail workforce from a national perspective. Based on the needs assessment, the team investigated current offerings for educating and training the HSR industry workforce, both in the United States and in Europe, and the potential for using online technologies as part of the solution. The team learned that:

- the upcoming generation of potential workers is accustomed to the online virtual learning environment;
- online learning enables participation by a spatially diverse audience; and
- while use of online learning has been limited in rail education, the freight rail industry has realized substantial efficiencies and financial savings from computer-based training.

In response to the identified needs, the team developed a proof-of-concept web portal to support online education and training of the future workforce. Figure 1 shows the home page for the Web portal, which is currently available at http://www.rail-learning.mtu.edu/. The portal offers introductory HSR materials developed as part of the project, as well as other materials such as recordings of HSR Workforce Symposium and American Association of State Highway and Transportation Officials (AASHTO) Rail Workforce Development Webinar presentations.

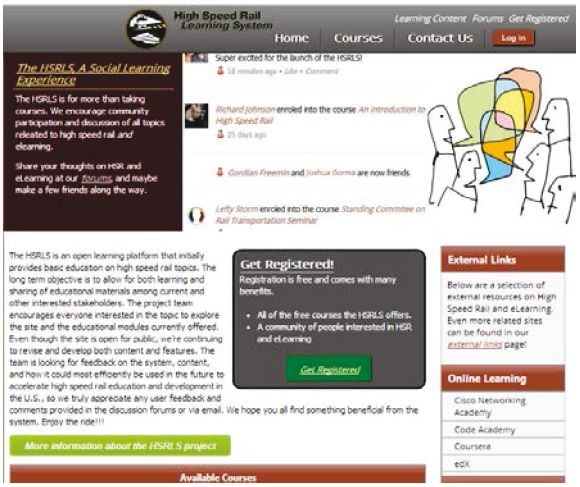

Figure 1. High Speed Rail Learning System Web Portal at http://www.rail-learning.mtu.edu/

With the proof-of-concept web portal in place, a new multi-year effort is planned to expand the learning system to address topics of interest proposed by various stakeholders such as State Departments of Transportation, universities, and K–12 schools.

BACKGROUND

This project was initiated in 2011 response to the Federal Railroad Administration's (FRA) Broad Agency Announcement (BAA 2010-1). Previous work by MTI had identified education and training shortfalls in the workforce available to support HSR in California. Accordingly, this project had a two-pronged focus: (1) expand the HSR workforce needs evaluation to a national scale and (2) set up a method to tackle some of the education and training shortfalls of current and future rail industry workers by developing an online Web portal capable of hosting and presenting materials related to relevant topics.

OBJECTIVES

The project had four objectives:

1. Assess HSR workforce education and training needs for future development. The project expanded on an earlier Mineta study in California to investigate high-speed rail workforce needs on a national level and to match those needs against existing infrastructure for training and educating workers.
2. Improve stakeholder engagement and collaboration in HSR workforce development.
3. Create and validate a proof-of-concept Web based HSR Learning System.
4. Enhance academic training and engineering materials and offerings to facilitate HSR skills development in the United States by developing and delivering a limited set of coursework and training materials through the HSR Learning System.

METHODS

The project was completed in three phases: Assessment, Conceptual Design, and Implementation/Demonstration.

To kick off the project, a steering committee was established to guide the project team efforts. A project information web site was also set up to disseminate results and solicit project input.

The HSR workforce needs assessment was supplemented by the results of a research trip during which team members visited European rail providers and discussed current HSR education and training methodologies in Europe. An HSR Workforce Symposium was conducted in September of 2012 to further discuss workforce needs and available resources as well as to initiate collaboration between rail entities related to HSR workforce development.

Additional research focused on exploring available technologies for hosting a Web portal using open source and easily deployable resources. The team investigated available Learning Management (LMS) and Content Management Systems (CMS) in the search for an integrated approach.

Figure 2 illustrates the conceptual design which integrates content with classroom and site administration through the portal.

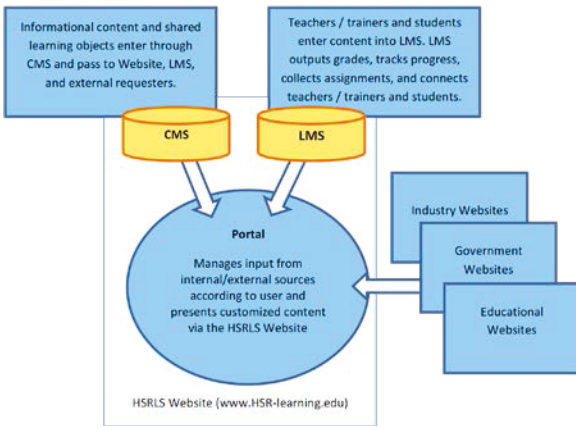

Figure 2. Interaction and Key Components of HSRLS

Open source software Moodle, Joomla, and Joomdle were selected as the key components for system implementation.

Subject matter experts from both the project team and external sources provided expertise to develop synchronous and asynchronous materials used in testing the system.

RESULTS

The needs assessments showed that although there are some university programs and professional seminars that touch on HSR topics, the options are limited. Online education for rail topics is even more limited, although large freight railroads have invested significantly in computer-based training and have realized great efficiencies and cost savings along the way.

The project team successfully released 2012 the proof-of-concept web portal, available at http://rail-learning.mtu.edu/. The final product supports the materials, communications, and grading requirements for both synchronous and asynchronous education and training, including capabilities for interactive content.

To demonstrate the system, three HSR educational modules and one additional module with complementing material were developed and deployed through the portal:

- *An Introduction to High Speed Rail* is an asynchronous course that uses an interactive delivery method to provide basic introduction in HSR.
- *High-Speed Rail Management* was presented as a three-session synchronous lecture/discussion course with students scattered around the country. Students used an online meeting tool to participate in a live interactive session with the instructor. Homework, reading assignments, and discussion forums were managed through the course portal.
- *High-Speed Rail Technologies* is a three-module asynchronous course that uses recorded lectures, supplemental readings, an online forum, and graded quizzes.
- *Additional materials* offered through the portal include presentation recordings of the HSR Workforce Symposium, AASHTO Rail Workforce Development Webinar, and the 2013 Michigan Rail Conference.

Nearly, 400 individuals from around the world have registered for the three HSR courses in the portal. The portal received more than 4,000 visits, from more than 2,600 unique visitors, during its first 6 months of operation (July 2013–December 2013). The statistics in Table 1 demonstrate that the site and its HSR materials appeal to an extensive variety of rail backgrounds and a wide range of ages.

Table 1. Enrollment Statistics, HSRLS Courses

Enrollment Numbers by Profession		Enrollment Age by percent	
Student	112	<21	7%
Rail Professional	112	21–30	31%
Other Professional	73	31–40	18%
Academic	39	41–50	18%
Retired	12	51–60	17%
Other	22	>60	9%

CONCLUSIONS

The project successfully demonstrated the need for education and training opportunities in the HSR industry. It used open source software to develop a functioning proof-of-concept system for distributing educational and training

materials online. The web portal's 2,600 unique visitors and nearly 400 course enrollments are indicative of the potential high interest in HSR education. Based on the feedback solicited on the site, the user experience with the portal was mainly positive. The HSR Workforce Symposium initiated valuable stakeholder discussions and the HSR educational modules developed as part of the project provided a good introduction to key HSR topics. To meet the long-term vision of the project strategy, a more extensive library will need to be developed for this system to serve as the centerpiece of HSR education and training.

ACKNOWLEDGEMENTS

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