

## **6. LESSONS LEARNED AND NEXT STEPS**

Given the broad scope of this WBT study, as many questions were raised as lessons learned. Best practices, as discussed in the preceding sections, are conceptual rather than physical. The Multisystems project team has translated some of the key findings, persistent questions, and best practice concepts into lessons learned and next research steps.

### **6.1 Lessons Learned**

The project team's WBT research, and the sources from which it was derived, strongly suggests that the transit industry is ready for the expansion of WBT and that organizations and experts expect it to provide significant benefits. Although there will be management, financial, and technological hurdles along this road, WBT in its various forms portends to address training for skill and knowledge sets throughout transit organizations and the industry as a whole. However, as the project team discovered, the profusion of approaches, content, and especially resources can be overwhelming. For every information source, technology, resource, or WBT model mentioned in this report, another 10 could have been cited. The situation is similar to the one faced by transit agencies that are trying to develop e-business, Internet information services, or ITS deployments.

The project team strongly agrees with SME suggestions to take steps toward centralizing and standardizing transit WBT development, customization, and distribution through transit trade organizations. This would help make WBT a widespread reality throughout the transit industry—from small to large or rural to urban transit agencies, similar to what CUTA and other organizations have started. A transit WBT portal,<sup>34</sup> similar to the TTR webpage developed by the project team, would be an important step in that direction.

---

<sup>34</sup> Quoted from [whatis?com](http://whatis.techtarget.com/), <http://whatis.techtarget.com/>: "'Portal' is a term, generally synonymous with gateway, for a World Wide Web site that is or proposes to be a major starting site for users when they get connected to the Web or that users tend to visit as an anchor site. There are general portals and specialized or niche portals. Some major general portals include Yahoo, Excite, Netscape, Lycos, CNET, Microsoft Network, and America Online's AOL.com. Examples of niche portals include Garden.com (for gardeners), Fool.com (for investors), and SearchNetworking.com (for network administrators)."

A transit WBT portal would address another lesson learned. While centralization and standardization of WBT would be a major benefit, WBT would also address the dichotomy between development for the transit industry as a whole and for inclusion of individual agencies. This finding is supported by the APTA strategic plan report cited in Section 4.2., which discusses the need for joint efforts in technology development and deployment.

## **6.2 Next Steps**

TRB and other organizations could take numerous paths to capitalize on WBT's potential. One could start by reviewing theories and methodologies that provide the foundation for WBT, including adult learning theory, instructional design, component display theory, and concept-performance matrix design. However, because experts and developers engaged in WBT should already be fluent in these topics, the Multisystems project team recommends moving forward with concrete activities and targeted research that specifically address exploiting WBT for the transit industry. Where new thinking in these foundation topics emerges, it should be included in WBT development.

### **6.2.1 Create a Transit WBT Portal**

As the e-transit project has evolved, several SMEs have suggested augmenting the TTR website. One SME suggested the addition of an introductory page and a mission statement. Another recommended adding chat rooms and a discussion forum to create a virtual community for transit staff interested in WBT. Indeed, when the SMEs were asked what resources could be added to the TTR, they had many responses, including the following:

- The Decisionmaking Website<sup>35</sup>;
- Training organizations and publications such as the American Society for Training and Development (ASTD),<sup>36</sup> *Learning Circuits*,<sup>37</sup> *On-line Learning Magazine*,<sup>38</sup> *e-Learning Magazine*,<sup>39</sup> and so forth; and

---

<sup>35</sup> See at <http://www.decisionmaking.com/> (the home page for Klein Associates).

- Community colleges offering online courses for transit employees

Since the TTR was created, the Multisystems project team has identified a multitude of additional resources that should also be added to the website. The project team suggests, therefore, that the TTR be redesigned as a WBT portal specifically designed for the needs of the transit industry as a whole and of individual transit agencies. The portal would provide a common link among various transit industry efforts to promote WBT courses. It would be similar in concept to APTA's TransportMAX web portal for transit e-business.<sup>40</sup>

Similar to the demonstration courses cited above—CUTA's "IntraLearn Self-Guided Demo Course" and "Designing Effective Electronic Courses" developed by William Horton Consulting—an important component of a transit WBT portal would be links to other "free" WBT courses that would give transit agencies hands-on experience with different types of WBT methods and technologies. The portal creator would be charged with establishing ties with organizations to gain access to a representative array of WBT courses, in transit or from other industries. A WBT portal would serve as an excellent resource for the next recommendation.

### **6.2.2 Centralize and Coordinate Transit WBT Efforts**

Given the plethora of commercial WBT service providers and the apparent fragmentation of transit industry efforts to create, promote, and distribute WBT courses, centralizing and

---

<sup>36</sup> See ASTD at <http://www.astd.org/>. Founded in 1944, ASTD is a "professional association and leading resource on workplace learning and performance issues. ASTD provides information, research, analysis and practical information derived from its own research, the knowledge and experience of its members, its conferences, expositions, seminars, publications and the coalitions and partnerships it has built through research and policy work."

<sup>37</sup> See <http://www.learningcircuits.org/astd.html>.

<sup>38</sup> See <http://www.onlinelearningmag.com/onlinelearning/index.jsp>. Also see the magazine's first annual state-of-the-industry report from October 2001 for statistics about *eLearning* at [http://www.onlinelearningmag.com/onlinelearning/images/pdf/2001state\\_of\\_industry.pdf](http://www.onlinelearningmag.com/onlinelearning/images/pdf/2001state_of_industry.pdf).

<sup>39</sup> See <http://www.elearningmag.com/elearning/>. Self-described as "content, technology, and services for corporate, government, and higher education" clients.

<sup>40</sup> See <http://www.transportmax.com/>.

standardizing transit WBT development and distribution would help prevent “reinventing the bus” too many times. A transit trade or training organization such as APTA, NTI, TCRP, or CUTA could take the lead in this effort. Similar to the efforts in the transit industry to standardize ITS development and deployment, interoperability and reusability should be fundamental objectives for WBT.

The APTA technology report discussed earlier supports this approach in several of its recommendations for specific actions to effectively implement technology. These include the following:

Development of consensus standards where appropriate. This will insure commonality of technology applications throughout the transportation industry...Procedures, methods, and best practices to adopt and implement new technologies... [and] Technology sharing initiatives within the industry.<sup>41</sup>

An example of the potential benefits of standardization is found in a report by McRae et al. It states that a single company, Dow Chemical, expects to save \$29 to \$35 million in the first 3 years of its initial e-learning investment of \$1.6 million. A significant portion of the return on investment will come from eliminating duplicative training efforts.<sup>42</sup>

### ***6.2.3 Reusable Learning Objects***

Given the multifaceted diversity within and among transit agencies, the project team believes such a resource-sharing approach should involve processes and tools that would enable individual transit agencies or state and regional transit associations to customize WBT courses to their own needs—for example, course “templates” could be developed so that similar WBT programs would not have to be developed from scratch. There is an abundance of “content management” and

---

<sup>41</sup> “A Research and Technology Strategic Plan for the American Public Transportation Association: A Report and Recommendation to the APTA Executive Committee,” APTA, Washington, DC; p. 5.

<sup>42</sup> “Riding the Big Waves: A White Paper on the B2B *eLearning* Industry.” Thomas Weisal Partners. View or download the report at <http://www.masie.com/masie/researchreports/b2breport.pdf>.

“knowledge management” software tools that would readily promote and support such coordination. These tools could be configured to enable “remote” transit trainers to tailor courses to their organization’s particular needs by accessing templates from a web portal. To accomplish the integration and coordination of transit WBT efforts, research into RLOs should be undertaken. One description of RLOs suggests that a paradigm shift is occurring in learning content management:

The vision is to enable new and existing learning content to be created as small, independent “learning objects” which can then be tagged and managed in a learning object repository and “assembled” into learning modules or courses as needed.<sup>43</sup>

The research would look at how RLOs could lead to WBT flexibility, ease of updating curricula, WBT content management and customization, interoperability, facilitation of competency-based learning, and increased value of content.<sup>44</sup>

The research would investigate which transit organizations are already using this approach to maximize WBT investments and would involve assessing the potential of RLOs for other agencies, using an approach similar to one proposed by WBTIC for WBT course assessment. The steps could include potential client-needs analysis, tasks and user analysis, technical analysis, interface design, usability testing, standards definition and design document, template design, instructional design, media creation, and evaluation and updating.<sup>45,46</sup>

---

<sup>43</sup> Quote taken from Centre for Learning Technologies by the Advanced Distributed Learning Initiative webpage, a partnership of academic, government, and corporate entities. For more information on RLOs, see <http://www.adlnet.org/colab/LearningObjects.doc>.

<sup>44</sup> The list of potential RLO benefits was adapted from a tutorial on RLOs by Eduworks, a consulting company specializing in e-learning standards products at <http://www.eduworks.com/LOTT/tutorial/learningobjects.html>.

<sup>45</sup> See WBTIC’s webpage on WBT development for a complete description at <http://www.webbasedtraining.com/wbt/pages/process.htm>.

<sup>46</sup> More information on RLOs can be found at <http://www.learningcircuits.org/mar2000/primer.html>.

#### **6.2.4 Study Participants in an Existing Transit WBT Course**

Another step would be to survey participants who have already taken an existing WBT course for transit. This would require working with the course's sponsor. The participants could be either a panel of SMEs, similar to the one used on this project, or actual students who have enrolled and completed a course. The survey would be designed to measure overall satisfaction, the quality of the course and relevance to work demands, challenges and successes using the Internet and WBT technologies, how much is actually learned via a testing process, and what information is retained by students after the course. The survey could also assess the WBT mode or modes used in the course (e.g., W/EPSS, W/CBT, W/VAC, W/VSC, blended courses, or other WBT models).

#### **6.2.5 Evaluate Implementation Priorities and Procedures**

Further research could involve a study to evaluate implementation procedures and identify short-term steps to maximize the cost effectiveness of WBT for transit. This study could include several transit agencies of different sizes and types from across the country. It could begin by identifying the top training issues at each agency, including priorities of who and what is trained and what the anticipated outcomes would be.

After priorities are identified, the SMEs could evaluate how to address these key training issues with the smallest financial investment, such as using preexisting off-the-shelf courses and support systems where possible.

A WBT course—off-the-shelf or custom—could then be rolled out to all participating agencies, including a campaign to promote its use. The research team would monitor course use and satisfaction and study the factors related to the effectiveness of various types of WBT in addressing problems at different types of agencies. This work could be combined with the report resulting from TCRP Project F-05, *TCRP Report 29: Closing the Knowledge Gap for Transit Vehicle Maintenance Employees: A Systems Approach*, because the report focuses on a single aspect of transit training.

The results of this research effort could guide future WBT implementation programs and help maximize their effectiveness. Based on the findings, recommendations could be made regarding the WBT solutions that are likely to best serve the largest number and widest range of transit agencies.

### **6.2.6 Summary**

The project team concurs with the SMEs that it is likely the demand for and influence of WBT will continue to grow in the transit industry. As one SME put it, “People think that WBT is a fad, and it’s not. Transit must get on the bandwagon, because eventually it will be forced to, as it becomes more cost-conscious.” Another SME summed it up this way, “WBT is the wave of the future. The sooner we all do it, the better off we all are.”