5. SME SURVEY RESULTS AND FINDINGS

5.1 Introduction

This section summarizes the results of the SME telephone surveys. Because the survey results are so closely tied to the research objectives and findings, the results will be reported with the findings as follows:

- WBT Objectives,

- WBT Promise,

- Value Creation,

- WBT Implementation Issues, and

- WBT Applications and Technology.

The 11 SMEs who participated in the WBT research are from different regions and have varying degrees of experience with the transit industry, transportation, other business sectors, and WBT. All SMEs had at least some familiarity with WBT. Surveys were conducted between November 2001 and February 2002. They lasted 45 to 90 minutes each and included 33 primary questions. Appendix B provides a background and contact information for the SMEs who were interviewed. Appendix C contains the telephone survey outline used by the interviewer. Appendix D provides a tally of scale questions. Appendix E summarizes the individual responses for selected survey questions.

Note that question responses were expressed as rankings on a scale from "1," indicating unimportant, to "5," indicating extremely important. This was done so that average rankings (e.g., 4.5) could be developed for each response. Although the responses are useful for the purposes of this analysis, the reader should note that the process used in the selection of the SMEs, the limited number of respondents, and the nature of the telephone survey eliminate any statistical significance and thus do not allow the results to be applied to a broader population.

5.2   WBT Objectives

Several survey questions asked which competencies and organizational levels WBT could address. The SMEs were asked to compare three areas of transit training that were identified in the preliminary research—"transit customer service techniques and procedures," "transit operations and planning," and "training in operating or maintaining equipment." They ranked "transit operations and planning" as the area most applicable to WBT (average ranking 4.5, Question 4). The SMEs were generally dubious about using WBT to teach customer service skills or operation and maintenance of equipment because these subjects often require hands-on experience.

SME perspectives were diverse concerning which subject areas and skill sets in the transit industry are most likely to benefit from the WBT approach (Q.3). Several items highlighted by multiple SMEs included computer and information technology (IT) skills and day-to-day technical or mechanical skills. Of the 11 SMEs, 6 said that IT and technical courses for systems and software are most appropriate for WBT because these subjects are precise, straightforward, and natural material to teach using computer and Internet technologies. Similarly, participants largely agreed that the most appropriate target audience for WBT is technical personnel (4.4, Q.5), a group that would likely use software applications.

Nonetheless, SMEs indicated in other responses that WBT could be applied to all organizational levels at transit agencies, including executive and managerial (e.g., high-level policy courses); supervisory (e.g., decisionmaking skills, employee performance measurement and monitoring); technical and professional (e.g., planning and scheduling techniques); and operating and line staff (e.g., safety training, maintenance, and operation). (See Appendix D, Q.3 for more detail.) As stated above, however, the technical and professional level received a substantially higher ranking for WBT applicability than did the other three organizational levels (4.5, Q.5). Note that several transit WBT courses have already been developed for technical and professional employees, including Transit Planning, Transit Scheduling, Employee Performance Measuring and Monitoring, Transit System Performance Measuring and Monitoring, and ITS Architecture. [31]

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[31]   From CUTA's list of WBT courses at http://www.cutaactu.ca/training.htm.

5.2.1 Summary

The responses described above suggest that the primary, near-term objective for applying WBT should be teaching computer and information technology skills and related knowledge sets to technical and professional employees. One might further assume that this application of WBT would also be readily adaptable to testing competencies. In fact, the SMEs said that WBT could effectively teach and test transit competencies (4.1, Q.16). In regard to which area is most applicable to WBT, the SMEs ranked transit operations and planning highest among the various skill areas.

5.3   WBT Promise

The SMEs felt that training is essential to the future success of the rapidly changing transit industry, a position that is supported by the literature findings discussed earlier. The SMEs agreed that WBT could meet the needs of transit training today (4.7, Q.2) and that training is also very important to the future of transit (4.8, Q.1).

When asked to cite the biggest differences between traditional (i.e., classroom) training and WBT, the majority of responses focused on the benefits of WBT, including the following:

- WBT eliminates many nonlearning barriers, such as travel and time away from the workplace;

- WBT offers "express" delivery to a greater number of people dispersed throughout more locations; and

- Designers are forced to identify core competencies early on, rather than to rely on instructors to communicate them (Q.7).

Some SMEs suggested that WBT is, therefore, ideal for repeated training of fundamental core competencies required of many transit employees; this could suggest that WBT is also applicable to other organizational levels at which such discrete core competencies are required, in addition to the technical and professional levels. As another potential advantage, some SMEs expressed that WBT offered more objective testing and fewer opportunities for subjective or interpretive grading because instructor presence takes a different form than traditional classroom training. Participants

attributed this to the format of some WBT models, which may require sharply defined questions with very specific right or wrong answers. In contrast, the SMEs also said that with transit staff studying independently—which is a potential component of each WBT mode—it could be difficult to implement and administer testing that provides effective skills assessment (Q.16). To allay these concerns, tests would need to be carefully designed or "proctored," and "how-to" testing for certification would require a human test administrator (although it was not evident whether proctoring would be via online controls or in person). The most negative factor mentioned about WBT in this regard was its lack of direct human interaction and its associated benefits, such as professional networking. However, the project team believes this potential downside could be minimized with the right WBT design, perhaps one that incorporated an online discussion group.

The SMEs disagreed about through which training subjects and at which organizational levels transit agencies could maximize benefits (to be discussed in Sections 5.4 and 6). (See summary of individual responses for Q.3, Q.4, and Q.5 in Appendix E; this is consistent with the project team's assessment that evaluating the applicability of WBT for a wide range of transit training subjects was beyond the scope of this study.) Nonetheless, the majority of SMEs agreed that the benefits of WBT outweigh those of classroom training (1) when it is difficult and costly to gather people in one place to provide training in the same material and (2) when the WBT incorporates a strong (virtual) human presence and interaction, as in W/VSC training (Q.12).

Overall, participants felt that WBT was a natural vehicle for integrating training and knowledge management into day-to-day transit functions—for example, with W/EPSS technology. If true, this should subsequently improve job performance. (This point is explored further in Section 5.5.) The SMEs said that solid content that addresses the actual needs and concerns specific to transit agencies (e.g., "our buses") should transfer easily from the WBT training session to the workplace, providing knowledge and a practical understanding of its application (Q.13). Driscoll concurs with this position in her article "Ten Things We Know about Teaching Online."[32]

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[32] View or download article at http://etraining.netspot.com.au/tenthings.html.

5.3.1 Summary

SME responses concerning the promise of WBT were often divergent and, at times, inconsistent when compared with other answers. Nevertheless, the SMEs noted that WBT could be most beneficial when used to train a large, dispersed, diverse body of people with different areas and levels of expertise who need a solid, common knowledge base. WBT could also be useful for repetitious training of core competencies. The SMEs generally agreed that such training is important for several reasons:

- Employee development,

- Organizational development,

- Keeping up with new technologies and trends, and

- Ensuring customer satisfaction.

Similarly, the SMEs tended to agree that WBT could be useful for certain well-defined skill and knowledge sets for the technical and professional and, to a lesser extent, for operating and line staff. Although professional networking might be lost, one might expect that this concern would only affect higher-level staff in a transit agency. Moreover, current Internet technologies could help mitigate this concern. In general, participants cited benefits to traditional classroom training and to WBT and said that WBT could be more beneficial in some situations, especially when an agency's training needs increase, but the training budget does not (Q.7).

Of course, content is just the jumping-off point for WBT learning (or any training, for that matter). Many SME responses suggest that a major promise for WBT is that it can address the needs not only of individual agencies, but also of larger sectors of the transit industry, such as multiple agencies. As one SME put it, training is crucial to the health of the transit industry because "we produce interactions between people, unlike factories that produce objects."

5.4 WBT Implementation Issues

To explore WBT implementation issues, the SMEs were asked pragmatic questions about the type of WBT to use, the subject matter and audience to teach with WBT, how and why transit should

use it, employee openness to WBT, and key factors to the overall success of implementation. The SMEs generally agreed that customer service training is the least likely to benefit from WBT. As noted earlier, customer service performance is based on human interactions; the SMEs said such training was better delivered face-to-face, incorporating role-playing and practice scenarios so that body language, eye contact, and observation of attitudes and mannerisms could be part of the students' experience (Q.5).

With regard to ensuring the success of a WBT program, the SMEs cited training content as the most important factor. As one SME put it, "You can market all you want, but if the program stinks, people will give WBT a black eye." Because a WBT tutorial is usually a fraction of the length of traditional training, it must incorporate the most crucial information in the most succinct way. To achieve this, several SMEs said it is important to use experienced WBT developers to define the scope of the project—audience, key content, and marketing to build employee incentive—and to incorporate sound adult learning principles in creating the program. Buy-in from upper management and IT support were also deemed crucial to successful WBT implementation and to ongoing management (Q.31).

The top obstacles to successful implementation cited by the SMEs were largely user-related (i.e., students). Although, on average, participants believed that both transit employee and manager acceptance to WBT is good (Q.28, 3.6 and Q.29, 3.5, respectively), many said that the biggest possible obstacles to successful implementation are related to the reactions of end-users—the employees being trained. The SMEs said that a WBT program could fail if students are not engaged in the material; not open to a more independent, interactive learning style; or too distracted or frustrated by the technology to absorb the content (Q.31). One SME talked about the "old school mindset" of many transit workers, which dictates that training automatically entails a classroom and a one-way flow of information from instructor to passive student.

Successful WBT implementation also requires tracking student progress and promptly updating material as needed (and budgeting for the associated costs) so that WBT can evolve to best address changing staffing and agency needs (Q.32). A number of survey participants also warned against confusing impressive technology with good training. As one SME put it, transit agencies should avoid getting sidetracked by "vendor glitz." Rather than getting distracted by the bells and

whistles of a WBT program—appealing graphics, animation, music—participants said that transit officials should concentrate on how well the content addresses the organization's training needs. One SME warned against thinking of WBT as a "one size fits all" solution. Finally, one SME stressed the importance of maintaining and updating WBT courses as an element of success.

5.4.1   Summary

The SMEs acknowledged that certain obstacles must be overcome for successful WBT implementation. They agreed that transit officials must carefully consider how and where to use WBT, must financially support course development efforts and subsequent maintenance over time, and must employ WBT professionals for course development, especially to select appropriate technology without paying for needless bells and whistles. Finally, management must be committed to tracking student involvement and progress enabled by WBT technologies to ensure staff and agency commitment.

5.5   WBT Applications

Closely related to assessing the objectives and promise of WBT is consideration of the different approaches to employing WBT. As shown earlier in Table 2, the SMEs were presented with a defined set of WBT methods, based on a four-category model, to prepare them for discussing potential WBT advantages, disadvantages, and applications.

Every participant said that W/EPSS could be useful to the transit industry (Q.6). W/EPSS was considered a good reference tool for specific, basic, on-the-job information that staff could look up quickly, such as systems knowledge (e.g., bus door locks) or standard background information (e.g., transit planning measures). W/EPSS was also cited as having outstanding versatility because it is an effective way to catalogue and access staff knowledge. One SME said that because W/EPSS integrates training into the workday, it leads to direct job performance improvement. The SMEs praised the ability to look up "what you need, when you need it." In an ideal training solution, however, many participants said that W/EPSS could not stand alone as an employee's only training experience (Q.6).

At the other end of the spectrum, the majority of the SMEs said that W/VSC classes are the most effective form of WBT in terms of learning. This is because W/VSC most closely follows the traditional classroom model, with real-time, student-instructor interactions and immediate feedback. One SME said that the real-time involvement of a virtual instructor could help reduce the intimidation associated with W/VSC technology.

Other less enthusiastic SMEs praised W/VSC classes as long as the classes were small or for workers whose supervisors control their schedules. However, the SMEs also noted that the drawbacks of W/VSC classes are similar to those cited for traditional classroom training. Two elements the SMEs mentioned were the costs to employ an instructor and the difficulty of coordinating instructor and student schedules.

SME perspectives on W/CBT and W/VAC were not as clear-cut. W/CBT was praised for its scheduling flexibility and its effectiveness in reaching large groups dispersed by time, space, or both. Nevertheless, most SMEs agreed that the success of these self-paced tutorials is largely dependent on the motivation of the learner—a risk that transit agencies may be hesitant to take. This concern could be offset, however, if W/CBT included technology to track students' course progress and grades.

The SMEs asserted that W/CBT is far better than CBT (which is defined as training with a design and format similar to W/CBT, but delivered on a CD-ROM) because CBT can be expensive, difficult, and slow to update and redistribute—factors that are reduced with W/CBT. Trainers using W/CBT can also quickly add or change links to other relevant webpages to provide additional information useful to the online training process.

On the other hand, CBT or W/CBT is inferior to W/VAC or W/VSC, which facilitate interaction between instructors and students through the Internet connection. One SME felt that the one-way information flow of learning from a CD-ROM is simply ineffective and went so far as to call CBT a "dead instructional tool, an experiment that failed."

Several SMEs agreed that W/VAC offers a good solution because it combines the flexibility of anywhere, anytime online access with some instructor involvement through e-mail, chat-room

correspondence, and deadlines. However, several SMEs predicted high costs and other difficulties in retaining an instructor to correspond with several students on different schedules.

The SMEs said that, if applied correctly, the various types of WBT could help with human resource functions such as employee advancement and retention (Q.9). By offering employees the opportunity to enhance their skills using cutting-edge technology, transit agencies not only would enable employees to increase job confidence and advance in their careers, but also would demonstrate that the agencies are committed to investing in individuals' growth. Some SMEs said that offering employees the choice to log in to WBT from home or at work would emphasize this commitment; others suggested that a specially designated learning lab is the ideal location for WBT.

With Driscoll's model as a reference, participants were also asked more general questions about when a human presence is required and when self-paced or scheduled WBT is most appropriate. According to the SMEs, a human presence for any kind of training is advantageous (Q.10). Training that involves complex or rapidly changing subject matter or material that (1) requires critical analysis (e.g., "what if" situations), (2) entails human interactions, or (3) benefits from the rapid exchange of ideas is best taught by a live instructor who can facilitate discussion and answer questions immediately. The SMEs generally agreed that WBT is best when it involves a human presence and can simulate the atmosphere of a group learning experience.

The SMEs generally felt that self-paced training is sufficient for highly motivated audiences; for teaching skills that do not require hands-on practice; or for use as a high-end help system to follow-up classroom training, such as W/EPSS (Q.11). The SMEs said that WBT with a set schedule of activities and exercises is more effective to teach long and intensive courses, discrete skill sets, or material that builds sequentially lesson to lesson (e.g., you must learn A in order to learn B). One SME said that, in his experience, only 50% of trainees completed online courses that did not have periodic deadlines. Another said that making students and supervisors responsible for setting and meeting deadlines increases motivation.

5.5.1 Summary

Based on the SME responses, the ideal application of WBT appears to be W/VSC. However, W/EPSS, W/CBT, and W/VAC all have potential uses in the transit industry, depending on the particular subject matter, the needs and capabilities of the students, and the resources available for WBT. The SMEs seemed to indicate that W/EPSS, in particular, might play a greater role in training and job support not only for technical and professional staff but also for operating and line staff.

To some extent, the distinction among WBT applications and technology is irrelevant. If learning content and job performance outcomes are the primary focus, transit agencies should consider Internet training as a hybrid of the four WBT modes (at least as defined for the purposes of this research) to produce the most effective and efficient online training programs.

5.6 WBT Technology

The question of WBT technology takes two forms. The first technology issue is the personal-computing equipment and Internet connections available at transit agencies or at staff homes. The second issue is the Internet technologies available to deploy successful WBT courses.

Most SMEs could only roughly estimate what personal-computing equipment and Internet connections were available across the transit industry. Speaking from their own experiences, the SMEs said that this "access" technology is generally up to date in the administrative and executive offices (an estimated 80% probably have Internet access [Q.25]); however, the access is very limited among supervisors and line staff who do not work in fixed locations, particularly mechanics, bus operators, and supervisors who work in garages, vehicles, or location-to-location (Q.25) (especially regarding the availability and quality of Internet connections). Moreover, on average, about one-third of transit employees would need basic computer training before receiving WBT, according to SME responses (Q.30).

Therefore, the personal computer technology and Internet connections for accessing WBT were cited as possible obstacles for some transit workers. Slow or bad Internet connections were cited as deterrents to effective WBT in the sense that poor connections could limit the features of WBT design. The majority of SMEs said that a high-speed Internet connection is important for a good WBT experience if the course includes video, audio, or intensive graphics. However, the SMEs agreed that dial-up connections are better than no connection at all. Nevertheless, good WBT courses could and *should* be designed for 56k or slower connections because that will remain a common means of accessing the Internet in the near future.

The WBT technologies used to create and present training are developing rapidly; what is available today will be supplanted by an improvement tomorrow. The transit industry should focus on adopting tools that make creating and managing WBT courses straightforward for human-resources and training staff within agencies. These rapidly developing technologies currently include the following:

- Step-by-step course creation software;

- Interactive exams taking and exam results scoring;

- Online note taking and storage for students;

- Communications tools such as discussion groups, class e-mail, instructor mailboxes, chat rooms, and online collaboration tools; and

- Reporting tools for managing, tracking, and administering courses.[33]

Although more discussion of these tools would be a useful resource for readers, it is beyond the scope of this project to thoroughly identify, investigate, and explain WBT software.

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[33] Adapted from CUTA's online course demo at http://www.transittraining.com/frame_demo.html developed by WBT service provider Embanet at http://www.embanet.com/indexflash.htm. Embanet has developed "an advanced course management system where individuals can register, obtain training, submit tests, communicate with others, and receive certification over the Internet."

5.6.1 Summary

Transit agencies should be aware that WBT courses could involve content and technologies that would make it difficult for students to take advantage of them, either at work or at home, because of personal-computing limitations. At this time, the SMEs agree that it would be wise to design WBT courses for dial-up connections (unless transit managers can ensure a high-speed Internet connection). Transit agencies should carefully search for the most appropriate technologies or service providers to achieve the desired training outcomes. Although online collaboration tools are not usually considered stand-alone WBT tools, more research is needed to evaluate the role these tools might play.

5.7   Value Creation of WBT

As discussed above under Sections 5.2 and 5.3, the SMEs were asked if WBT could provide value to the transit industry, either through a good return on investment, cost savings, or intangible benefit. The SMEs said that using WBT could provide value, not because it necessarily means spending less on training, but because the return on investment is better since it can be used to train more people more efficiently. Participants contrasted the high development costs of WBT to the high delivery costs of classroom training. Several SMEs said that transit agencies would get better value by spending more of their training budgets on content and design, rather than on airplane tickets and other travel-related costs associated with traditional training (Q.20).

Travel costs and lost productivity (e.g., employee and instructor time away from their jobs) were cited as the two biggest and most expensive barriers to effective training (Q. 17). By enabling employees to take training in their workspaces and to schedule it around other tasks, WBT mitigates these barriers, the SMEs said. Developing a WBT course also takes less time to complete than traditional classroom training and can be presented many more people in many more locations. One example is including small and rural agencies that would not normally have access to such resources. One participant said that in smaller agencies, training only happens when there is a group of trainees big enough to justify the expense, which is often hard to accomplish.

The SMEs said that the "anytime, anyplace" nature of WBT offered enormous potential value to the transit industry (Q.19). In addition to eliminating the training barriers cited above, WBT could

diminish the hassle of planning a classroom training session and could provide simultaneous access to training at varying levels for employees with different needs and in different time zones. One SME said that the flexibility of WBT could enable employees to become certified more quickly by fulfilling other requirements, such as road tests, without waiting to sign up and get authorization to attend a training session months away.

The SMEs said that a significant up-front investment in WBT is worthwhile if the investment produces high-quality material that can be used by many people dispersed throughout several locations, repeatedly, and at different times (Q.20). Some SMEs said that a one-time expenditure is easier to budget than many of the hidden costs of classroom training (e.g., hiring temps to do the jobs of people who are away at training sessions). Other SMEs noted that the cost of developing and deploying a new training approach such as WBT would motivate transit officials to monitor the development process and to ensure delivery of a quality product (Q.14). One SME said that employing good WBT tools and courses will enable agencies to implement transit technologies more smoothly, thus increasing efficiency, improving job performance, and leading to cost savings in the long run.

5.7.1   Summary

The SMEs said that it was important to have knowledgeable people developing the right material in the most effective manner. They said that the knowledge base should be developed by transit SMEs and the assessment tools by instructional systems design experts. Several SMEs expressed caution about using WBT technology and consulting vendors. In contrast, one SME said that once a transit agency identifies a good, reliable partner to work with to develop WBT, it is best to have faith in the development process and skills of the vendor. The project team notes that like any effective procurement, transit agencies must write appropriate specifications, scopes of work, and then properly oversee WBT development projects.

In order to maximize the value of WBT to the transit industry, the SMEs emphasized using WBT as the foundation for communication within and among agencies (Q.20). Several SMEs said that WBT should be used as a vehicle for collaboration and knowledge exchange among organizations

and individuals across the industry. Others said that knowledge management improves community communication, enables the pooling of intellectual capital, and should be used to communicate and subsequently teach transit best practices.

The project team concurs with those SMEs who suggested a more advanced vision for creating value and minimizing financial investment in WBT. This would entail centralizing WBT development in transit trade or training organizations such as APTA, NTI, TRB, or CUTA. Such a strategy could include having these organizations sell access to WBT courses or resources or provide them as member benefit. The ultimate objective was to make WBT resources available to a wide spectrum of transit agencies at the best value possible.