Intercity Bus Accessibility for Sensory-impaired Travelers

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INTRODUCTION

The needs of persons with sensory and communications limitations are now being addressed with greater urgency. In recent years, the Transportation Development Centre of Transport Canada has funded a number of studies aimed at this group of travelers (1, 2, 3, 4) and other TDC reports. In light of the great numbers of riders with disabilities who are in the 3 000 towns served by intercity buses in Canada, it was deemed appropriate to enlarge accessibility for bus riders.

This project reported here began by examining the barriers which persons with sensory and communication impairments experience when traveling on intercity buses and concludes with an outline of features which appear to be quite practical to enlarge accessibility.

After extensive consultations with riders, bus operators, bus associations, voluntary organizations, travel trainers, and other authorities, a list of 14 features of potential benefit to riders was evolved.

Some of these features are available as ready to buy products, for example, hand-held Internet access devices, and can be displayed in normal operating form. Some are self-evident and can be satisfactorily represented in bare mock-up form, for example, a safety instruction card. And some features, while not presently in existence, can be mocked-up in sufficient fidelity to convey a satisfactory impression of their utility, for example, the highly praised "dog seat."

Whether fully functional or mocked-up, all 14 features were presented to a sample of testees.

CONDUCT OF THE MOCK-UP TEST

This section describes the test. After outfitting, the bus was parked at the Toronto bus terminal at a bay for two days of evaluation in February, 1999.

Vehicle

It was determined that a charter-type bus was best. That is because such buses have CRTs for presenting visual images and tend to be of higher amenity and, it seemed to the contractor, represented trends for the future of scheduled service. Moreover, it seemed appropriate to secure an accessible vehicle since that would already incorporate features for the future.

Sample of users

It was important to include travelers with a range of conditions, for example, those using guide dogs and those using canes. Guests with hearing impairments were recruited by the Canadian Hearing Society but were not specifically identified to the project team until they arrived, and as a group. They needed to be interviewed as a group because a signing interpreter was used and this group needed the stimulation and discussion of a group process to arrive at conclusions about the features. A total of 12 targeted users evaluated the features.

Sample of specialists and project-related individuals

It was determined that some individuals with interests in communication impairments and members of the Transport Canada's Ministers Advisory Committee on Accessible Transportation (ACAT), as well as professionals in the field would take part. Four experienced travel trainers and mobility specialists and seven individuals with bus industry affiliations served as evaluators.

Features used in the mock-up

1. audible sign (blind, poor sight, cognitive compromise)
    1. at end of loading area and at bus door

2. driver station paper and pencil (deaf and hard of hearing)

3. Personal Digital Assistant for driver (all)
    1. digital and micro-cassette units

4. descriptive audio tapes (blind, poor sight, hard of hearing, cognitive compromise)
    1. a cassette holder and three cassettes with titles printed and in Braille, sitting in an overhead baggage area

5. printed service/safety cards mock (deaf, hard of hearing, blind, poor sight, cognitive compromise)
    1. mock-ups, only title is produced, including Braille title, two versions

6. TTY - Cantel RIM Inter@ctive Pager (deaf and hard of hearing)

7. seat numbers Brailled or raised mock 6-7-8-9 (blind and poor vision)

8. text displays of audio messages (deaf and hard of hearing)
    1. video of messages on long tape

9. dog pad (blind with guide dog)

10. hard of hearing compatible telephone (hard of hearing)
    1. cell-phone-like device

11. Infra-red transmissions (hard of hearing with T-setting)
    1. FM and Infra-red transmission with teleLoop from Phonic Ear (if available)

12. communications pod (all)
    1. portable unit provided just to passengers with special needs. It could be mounted under the overhead bins, on the back of the seat ahead, or be held in the lap. The pod can have a screen to present messages in a visual medium, an induction loop for some hearing aid users, headphone connection, enhanced audio capability such as a volume control and better speakers. A payphone might also be included. For a person with a cognitive impairment, it can enable the traveler to signal the driver or for the driver to signal the traveler when their stop is approaching
13. pre-preparation and caregiver kit (all and especially cognitive compromise)

14. signs Brailled or raised (blind and poor vision)
    1. bus number and for washroom, etc.

RESULTS OF THE TEST

INTRODUCTION AND METHOD

This section summarizes the reactions of 25 individuals, to all features or to features of greatest relevance to their activities. There were four types of reviewers. Where it makes sense to separate their views in this report, they are identified and discussed individually. The guest/evaluators are identified at the end of this report.

The types of reviewers were:

1. users - those who might benefit from a given feature
2. mobility training specialists - those who are mobility teachers or other experts in assisting individuals with impairments
3. bus industry specialists - those who work for a bus company or transportation association and with responsibilities related to accessibility
4. project staff - those working on this project.

A survey interview instrument addressing each feature with the same questions was prepared. However, it was administered in its original form or in full length to only a few of the observers. A survey module for one feature is shown below.

Text displays of audio messages

1. Does this feature have any special value to you? yes ☐ no ☐

2. Importance of including this type of feature

   ☐ very important ☐ just slightly important
   ☐ somewhat important ☐ unimportant

3. How well designed in the mock-up today

   ☐ very well designed ☐ just slightly well designed
   ☐ somewhat well designed ☐ not well designed

4. How would you modify it to make it better?

   _____
   _____
   _____

GLOBAL PERCEPTIONS

Overall, evaluations were highly favourable with observers in the advocates group and the bus industry group both addressing the implementation of features with highly positive attitudes. One bus industry observer tended to emphasize the obstacle of cost somewhat more than others but overall, the value of proceeding to develop additional communications access features was shared.

RESULTS FOR EACH FEATURE

1. **Audible sign with target (blind, poor sight, cognitive compromise)**
   ----------at end of loading area and at bus door

   1. As a concept and at a basic functional level, audible signs which support directional wayfinding were very well liked by blind users. They address a material difficulty for blind travelers, namely, identifying and locating destination locations such as bus bays.

   2. Users found the device reasonably easy to master and it served to provide gross directional guidance.

   3. Considerable refinement is required in terms of establishing conventions of use, effectiveness in settings congested with vehicular and pedestrian traffic and congested with other electronic signals, sharpness of the directional beam, meaningfulness of the signal to the user, and the portability of devices and their security.

2. **Driver station paper and pencil (deaf and hard of hearing)**

    1. Having a writing pad available provided a worthwhile benefit. For cognitively impaired (or multiply impaired) travelers, it would be necessary to have large, well-mounted writing tools, which may not be feasible.

    2. However, industry observers noted how hard is would be to keep the materials from "walking off" by accident.

3. **Personal Digital Assistant for driver (all)**
   ----------digital and micro-cassette units

    1. Providing some means for drivers to record information about passenger requirements, both for impaired and unimpaired riders, was considered a good feature. Information could include medication reminders, giving the clock time to passengers from time to time, and generally being better prepared to announce stops earlier.

    2. Industry guests did not feel additional machinery was needed beyond the ordinary tools of drivers in order to keep track of information.

4. **Descriptive audio tapes (blind, poor sight, hard of hearing, cognitive compromise)**
   ----------a cassette holder and three cassettes with titles printed and in Braille, sitting in an overhead baggage area

    1. Having descriptive tapes was highly regarded by most observers.

    2. The enthusiasm noted needs to be tempered by the fact that observers were given only appealing titles on the mock-ups (operational and safety, scenery, and information on Trentway-Wagar). Therefore, there remains the question of reactions had observers been able to listen to the contents of such cassettes.

    3. The cassette players need to be supplied either by the traveler or the operator.

    4. Blind travelers are moving more towards CD formats.

5. **Printed service/safety cards mock (deaf, hard of hearing, blind, poor sight, cognitive compromise)**
   ----------mock-ups, only title is produced, including Braille title, two versions

1. Having service cards was considered a good feature by most observers.

2. As with cassettes, the enthusiasm noted needs to be tempered by the fact that observers were exposed on to the title or concept. Therefore, there remains the question of reactions had observers been able to see the completed cards.

3. Industry observers were comfortable with the idea of providing information in this form. However, some operators may not have heard much customer demand for cards or safety information to this point in time.

6. TTY - Cantel RIM Inter@ctive Pager (deaf and hard of hearing)

1. Nearly all guests (and project staff) shared an enthusiasm for the Cantel-RIM device.

2. If such a device were available on a bus, it would fulfill quite a substantial number of communication requirements by itself.

3. No discussion took place as to whether the bus line or the user would provide the device. Nor was any attention devoted to the time-frame of learning to use it. The device is quite well-designed and user-friendly. But there are a large number of features and there is a substantial amount of pre-set-up (which, in turn, leads to ease of use, once the channel has been pre-set-up). Therefore, it may be formidable to use for any but those who own and/or frequently use that sort of device.

4. In current practice, bus operators provide TDD/TTY services at stationary facilities but would not be optimistic about providing the Cantel Rim service from their own resources.

7. Seat and aisle numbers, Brailled or raised letters (blind and poor vision)

1. No feature seemed more beneficial yet clearly inexpensive than simply putting seat and row identification on the top edges of aisle seats.

2. A few of the blind users did detect the existing seat and aisle tags. The existing tags are mounted within the grab rail which is integrated into the bottom edge of the overhead luggage bin. In turn, many riders, sighted and vision impaired, do not know there is a grab rail nor ever find and use the grab rail. Thus in terms of spontaneous rider experience, the seat-back tags are much better. But if riders were given any introduction to features of the bus, the tags mounted on the grab

rail would be satisfactory.

3. Bus industry observers were doubtful if the seat back tags would be practical given the need to change upholstery and the difficulty mounting items to the soft parts of chairs. Arm-rest mounting was suggested.

8. Text displays of audio messages (deaf and hard of hearing)

1. The presentation of verbal messages in a visual format was strongly appreciated by all. For persons who having hearing impairments, the presence of an abbreviated visual message can be a cue to ask a neighbour to help them with any fuller spoken message than may have been made.

2. The mock-up used text (and speech) presented on the six CRTs in the bus. CRT presentation as compared to LED signs was discussed with some guests and the CRTs seemed much better for a number of reasons — including, perhaps, that a CRT signified a higher-amenity bus service. CRTs were distributed around the bus and located in positions which were comfortable for viewers to use. They integrated sight and sound. CRTs are nicer, more colourful, and more flexible displays than LEDs and can present information with grades of emphasis.

   One major operator said they have no CRTs on line-haul service and another major operator said they have lots of them and are planning for more.

3. However, within a context of general approval for CRT-borne communications, deaf users saw the need for certain enhancements.

    1. More units so as to be in more intimate relation to communications from the driver.

    2. Presentation of messages by sign interpreters. In turn, this would require much higher practical visual resolution because subtleties of gesture and an image showing the interpreter's body down to their thigh and up to the top of their heads, as it required for some signs. Practical visual resolution would be achievable through larger screens or sitting closer to the same sized screen.

4. Bus industry people recognized the value of this feature and thought it could be incorporated for messages which are constant across many routes. But messages which may be individual to a single route might prove too expensive to implement — at least in the technology demonstrated in the mock-up.

9. Dog pad (blind with guide dog)

1. The general configuration of the dog pad created for the mock-up was widely and enthusiastically endorsed. It proved comfortable for all the dogs which tried it. Perhaps an additional rail could be added to keep the dog from falling sideways, towards the aisle.

2. However, inherent in the concept is the need for the dog to climb on to "furniture" in the form of the bus seats. Guide dogs are trained to never climb on furniture and this presents a conflict to them.

3. Some discussion took place of the difficulty of finding a covering fabric which would be easy to keep clean but provide a good purchase for dogs' feet. Also, the matter of ownership is up in the air.

4. For the bus operator, the dog seat takes up the space of a passenger. Further, if supplied by the operator, the pad would need to be secured in the under-coach baggage compartment, with good packaging to keep it clean and with a cleanable covering.

10. hard of hearing compatible telephone (hard of hearing)
----------cell-phone-like device

1. Presence of some means of communication by telephone for persons who use a hearing aid, and for all riders, was taken as a worthwhile feature by most observers.

2. The proliferation of cell phones and the increasing presence of payphones on common carriers may make this feature redundant.

3. It may be a simpler course of action to wait commercial development of payphones. When payphones are installed on buses as they are now found in trains, they could have the phone compatible with T-settings and with a volume control.

11. Infra-red or FM transmissions (hard of hearing with T-setting)
----------FM and Infra-red transmission, of use of conventional broadcast-FM band devices, possibly working with TeleLoop

1. Endorsement of the importance of this feature was only moderate.

2. With the proliferation of in-the-ear and in-the-canal devices, the incidence of T-setting hearing aids will be declining, Likewise, if a good quality distributed sound system were used, there would be fewer problems with acoustic pick-up.

3. Bus industry guests were not favourable to such systems. Unless a driver is especially poor in his/her communication skills, travelers should not be especially inconvenienced if they must ask for the assistance of other travelers.

   Some suggestions of using an embedded induction loop were made. Bus authorities thought this would be acceptable and inexpensive. it was thought that a manufacturer such as MCI would find no obstacle to installing loop systems.

4. Also, use of a communication pod, see below, would substitute for broadcast messages.

12. Communications pod (all)

----------portable unit provided, possibly just to passengers with special needs. It could be mounted under the overhead bins, on the back of the seat ahead, or be held in the lap. The pod can have a screen to present messages in a visual medium, an induction loop for some hearing aid users, headphone connection, enhanced audio capability such as a volume control and better speakers. A payphone might also be included. For a person with a cognitive impairment, it can enable the traveler to signal the driver or for the driver to signal the traveler when their stop is approaching

1. There was widespread appreciation of the value of a communications pod and admiring comments on the concept.

2. On the other hand, the communications pod was the mock-up feature with the largest element of "wish list" compared to reality or economic feasibility.

3. Bus industry representatives could envision the inclusion of wiring in the bus to support a communications pod. But providing such pods might better be an expense for the user, not the system. Indeed, some aspects of the pod could be personalized and unique to the user.

13. Pre-prep and caregiver kit (all and especially cognitive compromise)

1. Most observers felt there were aspects of bus travel which could beneficially be included in a booklet for travelers and care-givers.

2. There is a question about the best route of distribution, whether that be through bus companies or voluntary organizations.

14. Signs Brailled or raised (blind and poor vision)
----------bus number, for washroom, etc.

1. The addition of Braille signs — particularly to substitute for the bus number which presently is located out of reach on the "brow" of the bus — was considered a good thing.

2. The bus used in the mock-up had a number of raised and Brailled signs because it is an enhanced accessibility vehicle. But guests welcomed having more signs.

CONCLUSIONS

In light of the favourable reactions to the mock-up features, ongoing research has been facilitated by the Transportation Development Centre. Currently underway is an operational test using inter-city buses on routine scheduled service.

Results for the operational test should be available by September, 2000. This test will permit examination of the features functioning under representative conditions and with targeted users and non-users present.

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