BELLEVUE SMART TRAVELER: DESIGN, DEMONSTRATION, AND ASSESSMENT

WA-RD 376.1

Final Technical Report
August 1995

Washington State
Department of Transportation

Washington State Transportation Commission
Planning and Programming Service Center
in cooperation with the U.S. Department of Transportation
Federal Highway Administration

TECHNICAL REPORT STANDARD TITLE PAGE'

1. REPORT NO.	2. GOVERNMENT ACCESSION NO.	3. RECIPIENT'S CATALOG NO.
WA-RD 376.1		

4. TITLE AND SUBTITLE	5. REPORT DATE
Bellevue Smart Traveler: Design, Demonstration, and Assessment	August 1995
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
Mark Haselkorn, Jan Spryidakis, Cathy Blumenthal, Susan Michalak, Brain Goble, Margaret Garner	
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. WORK UNIT NO.
Washington State Transportation Center (TRAC) University of Washington University District Building; 1107 NE 45th Street, Suite 535 Box 354802 Seattle, Washington 98 105-463 1	11. CONTRACT OR GRANT NO, Agreement T9233, Task 32
12. SPONSORING AGENCY NAME AND ADDRESS	13. TYPE OF REPORT AND PERIOD COVERED
Washington State Department of Transportation Transportation Building, MS 47370 Olympia, Washington 98504-7370	Final Technical Report 11. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

This study was conducted in cooperation with the U.S. Department of Transportation, Federal Transit Administration and Federal Highway Administration.

16. ABSTRACT

New approaches must be taken to make high occupancy vehicle (HOV) commuting more attractive. One approach is to use innovative communication technology to provide commuters with the means to easily and flexibly arrange for HOV commuting to and from their downtown office buildings. The goal of the study was to design and test an information system that would help decrease single-occupancy vehicle (SOV) travel to a downtown employment center by making alternative commuting options more attractive and easier to access. The project team accomplished this goal by developing, implementing, demonstrating, and testing a traveler information center (TIC) prototype in downtown Bellevue, Washington. The main function of the Bellevue Smart Traveler (BST) TIC was to help commuters form dynamic rideshare groups, as well as to provide traffic congestion and transit information. The TIC integrated phone and paging technology to deliver three types of personal commuter information: (1) dynamic ride matching information, (2) current traffic congestion information, and (3) transit information. The usage patterns and various surveys that were conducted suggested that participants liked the idea of dynamic ridesharing, liked the presentation of the information, liked the technology, were willing to offer rides, and used BST to receive other forms of information. However, for various reasons they were either unable or unwilling to form ride matches.

17. KEY WORDS	18. DISTRIBUTION STATEMENT
traveler information center, ridesharing, ride matching, HOV, high occupancy vehicle.	No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22616

19. SECURITY CLASSIF. (of this report)	20. SECURITY CLASSIF. (of this page)	21. NO. OF PAGES	22. PRICE
None	None	256	

Final Technical Report
Research Project T9233, Task 32
Bellevue Smart Traveler-Downtown SOV Reduction

BELLEVUE SMART TRAVELER: DESIGN, DEMONSTRATION, AND ASSESSMENT

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and in cooperation with
U.S. Department of Transportation
Federal Transit Administration
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August 1995

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The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Washington State Transportation Commission, Department of Transportation, Federal Transit Administration, or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

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EXECUTIVESUMMARY

SUMMARY

The goal of this phase of the Bellevue Smart Traveler (BST) project was to design and test an information system that would help decrease single-occupancy vehicle (SOV) travel to a downtown employment center by making alternative commuting options more attractive and easier to access. The BST project team accomplished this goal by developing, implementing, demonstrating, and testing a traveler information center (TIC) prototype in downtown Bellevue, Washington, east of Seattle.

The main function of the BST TIC was to help commuters form dynamic rideshare groups, as well as provide traffic congestion and transit information. The TIC integrated phone and paging technology to deliver three types of personal commuter information: (1) dynamic ride matching information, (2) up-to-the-minute traffic congestion information, and (3) transit information.

The primary findings of the study were that study participants liked the idea of dynamic ridesharing, liked the presentation of the information, liked the technology, were willing to offer rides, and used BST to receive other forms of information, but, for various reasons, were either unable or unwilling to form ride matches.

Since dynamic ridesharing is a relatively new concept, we suspect that a longer time is needed to study and achieve the behavioral changes that would make it a viable transportation alternative. For now, we can confidently conclude that

(1) people prefer to offer rather than accept rides

(2) the factors that constitute a viable ride group need to be explored further.

In the end, it remains far too early to judge the viability of the Smart Traveler concept. This is because Smart Traveler is primarily a social experiment, and only secondarily a technical one. At this stage, the actual number of matches achieved is far less important than what we have learned, and need to learn, about rideshare groups,

people's willingness to get in another's vehicle, and people's willingness to have others get in their vehicle. We can be assured, however, that if these questions are answered, the communication technology will be available to implement the solution.

BACKGROUND

Traffic congestion is most severe in downtown areas, where the vast majority of workers travel in SOVs to densely clustered employment facilities. In the past, efforts to reduce traffic congestion in urban centers have focused on encouraging high-occupancy vehicle (HOV) commuting. However, these efforts have had mixed results, mainly because of the flexibility, convenience, and other attractions of SOV travel.

New approaches must be taken to make HOV commuting more attractive. One approach is to use innovative communication technology to provide commuters with the means to easily and flexibly arrange for HOV commuting to and from their downtown office buildings. BST is an intelligent transportation system (ITS) demonstration project developing such an approach. In an earlier, related project (HOV Mobile Telecommunications Project, 1991, funded by the Federal Transit Administration), we explored innovative ridesharing technology that combined cellular telecommunications, voice mail, and computerized, real-time traveler information. The current project built on these efforts in creating the BST TIC.

The BST project was led by researchers from the University of Washington in partnership with TransManage (formerly the Bellevue Transportation Management Association), with participation by PacTel (now Air Touch). The project began in July 1992; the test and demonstration ended in April 1994. The project was funded by the Washington State Department of Transportation and the Federal Transit Administration.

RESEARCH APPROACH

The first step in the project was a review of literature on all U.S. traveler information systems appropriate for potential application to the BST project. Relevant

projects were those that (1) provided information about either dynamic ride matching, up-to-the minute traffic congestion, and/or transit and (2) lent themselves to an information kiosk format.

The next step in designing the TIC was to gather information on potential TIC users' travel needs and preferences. Bellevue, Washington, was chosen as the demonstration city because it is an area in which a vast majority of people use SOVs to commute to concentrated employment facilities. We further chose Bellevue Place, a large office complex in downtown Bellevue, as the primary demonstration site. First, we conducted a user needs assessment that included a survey of employees at Bellevue Place, telephone interviews, and focus groups to determine employees' knowledge and use of high-occupancy vehicle modes, their information delivery preferences, their interest in different types of information, and how they might respond to a dynamic ridesharing program.

On the basis of the user needs assessment, we designed and developed a BST TIC prototype.

We then conducted a role playing usability test to determine whether the initial TIC design was effective and easy to use. Eight people participated in the usability study. For the first part of the study, participants offered rides and looked for rides offered by other members of the test group. For the second part of the test, participants explored the system, searching for problems. Participants recorded their interaction with the TIC in an activity log during both parts of the study. The recommendations for changes that resulted from this process were by and large implemented in the final version.

Next, we identified the target audience for participation in the TIC demonstration. This turned out to consist of two groups: (1) all TransManage (formerly Bellevue TMA) clients and (2) carpoolers and vanpoolers who were registered with TransManage. Once the audience had been identified, we recruited participants in two campaigns. In both

campaigns, the guiding factor was that the majority of the target audience have no knowledge of the TIC.

The TIC was tested and demonstrated over a five-month period. Usage information was gathered in two ways, from a log that the system automatically updated and from three telephone surveys conducted in the latter part of the demonstration that sought to determine users' reactions to the TIC.

Finally, just before the conclusion of the demonstration period, the study team sent questionnaires to all active participants in the BST program to help in its assessment. The questions investigated, among other topics, the ability of BST to achieve its goals, the usefulness of BST's information, the convenience of the locations in which BST's technology could be used, the helpfulness of BST's technologies, and the usability of BST's format.

USER NEEDS ASSESSMENT

From the results of a survey, telephone interviews, and focus groups, we determined the user requirements listed below. These requirements provided a basis for the development and design of the BST TIC prototype.

General Program Features

The assessment revealed a dichotomy between the desire to use the TIC information and willingness to use the TIC's likely technology. Lower income employees were significantly more likely to use the information offered by the TIC than were higher income employees; however, the lower income employees were also significantly less comfortable with various technologies. Therefore, system designers should not make assumptions about potential users' knowledge of technology and must make deliberate efforts to keep the system simple to use.

Ridesharing

If system limitations prevent a 24-hour-a-day system, then the system should allow ride matching at a minimum between the hours of 6 and 10 a.m. and 3 and 7 p.m., which would accommodate approximately 80 percent of the user audience.

Given users' relative lack of knowledge regarding ridesharing programs, instructional information must be provided on how to use a ridesharing system, how it works, guidelines for contacting potential ride partners, and so on.

A guaranteed ride home must be provided for ridesharing participants. Rides should be given on a point-to-point basis rather than a door-to-door basis unless participants agree to do otherwise.

Ride groups should be designed so that drivers/riders do not have to travel more than 6 kilometers (4 miles) to meet their ride match partner(s).

The system should allow people to make a ride match up to one hour before their departure. The system should also minimize the number of messages a rider would have to listen to.

For security purposes, the system should pre-screen participants, provide gender information, and record and monitor ridematches.

For many users, providing pagers and pager services would be a compelling incentive to use the system. Additionally, other tangible incentives should be provided to encourage carpooling/vanpooling.

Transit

Given users' relative lack of knowledge regarding bus use, the TIC should focus on providing users who are interested in commuting by bus with customized bus information.

TIC FEATURES AND FUNCTIONS

On the basis of the user needs assessment, we designed and developed a BST TIC prototype. Users accessed the TIC either by touch-tone telephone (interactive) or hand-

held alphanumeric pagers (non-interactive). The features available depended in part on the communication device being used. In addition to having telephone access, users with alphanumeric pagers could view a list of rides offered and current traffic reports. Users could elect to use a wrist-watch pager instead of an alphanumeric pager. However, while users who had wrist-watch pagers could alert each other when they were trying to arrange ride matches, they could not view a list of rides offered or current traffic reports.

The TIC automatically did the following:

- maintained a database of registered users, including contact information
- kept records of users who had called the system and the menus they had accessed
- tracked ride groups on the basis of geographical location
- prompted users to log rides
- deleted ride-offer messages when the date and time of the ride had expired.

USABILITY TESTING

After having designed the BST TIC, we conducted a role playing usability test to determine whether the initial TIC design was effective and easy to use.

Seven of eight participants were able to successfully make ride matches. Their responses to the system were generally positive. For these seven participants, no obstacles completely prevented them from using the system. Note that this group had been fairly comfortable with the TIC's technology before using the TIC.

As the commuter survey revealed, the people who would most need BST's services are the least comfortable with technology. The usability participant who was completely unsuccessful using the TIC was also the least comfortable with its technology. Importantly, her comfort with technology was probably closer to the characteristics of the

ideal BST TIC user population. The features/concepts that participants seemed to have the most difficulty with were getting contact information and confirming rides.

Although most of the recommendations for changes that resulted from this process were implemented in the final version, some recommendations could not be implemented because of time constraints in the current project. These should be implemented in any future versions of the BST system.

SYSTEM USAGE

The TIC was tested and demonstrated over a five-month period. The majority of the target audience had no knowledge of the TIC. There were two types of TIC users: registered users and guest users. Registered users had access to all system features, as well as access to hand-held alphanumeric pagers or wrist-watch pagers. Guest users could use the system by touch-tone telephone, but they could not set up ride matches and had no pagers.

Usage Statistics

The figures below are taken from a log that the system automatically updated.

From late November 1993 to late April 1994, registered and guest users called the TIC 447 times. People seeking traffic information called 110 times, and people seeking transit information called 40 times.

At the program's peak, 53 users were registered. Of the registered users, 48 formed three ride groups: 23 from areas south of Bellevue, 10 from areas east of Bellevue, and 15 from areas north of Bellevue. Members from the ride groups offered 509 rides. By telephone, the 48 ride group members looked for 148 rides and accessed additional information on 33 specific rides. However, searching for rides by pager was more convenient than searching by telephone, and we had no way of tracking the number of times users looked at their pagers. Only six ride matches were logged. (Note that logging a ride was optional, so that ride matches could have occurred without being logged.)

Comments from ride-group members indicated that they liked the idea of dynamic ride sharing, but for various reasons they were either unable or unwilling to form ride matches. Some of these reasons included the limited ride-group sizes, which resulted in few ride choices; discomfort using the TIC's technology; and the inconvenience of ridesharing.

The low number of rides sought by telephone is deceiving, since looking for a ride was far easier with a pager. Even so, it appears that far more people were interested in inviting others into their car than they were in getting into someone else's car.

Results of Telephone Survey

Three telephone surveys were conducted in the latter part of the demonstration. These surveys sought to determine users' reactions to the TIC. Below are the most important findings from these surveys.

- Participants found it more convenient to offer rides than to accept rides.
- Participants who did attempt to form ride matches had difficulty finding people with compatible travel times to both work and home, which indicates that not enough rides were available to accommodate varied work schedules.
- Convenience and flexibility were the most mentioned obstacles to accepting rides,. The time necessary to enter data into the TIC to offer a ride and the time necessary to coordinate a ride match were other obstacles to using the ridesharing feature.
- The use of a pager, with its traffic, news and paging, was not enough of an incentive to motivate participants to change their driving habits. However, pagers as a method for sending information appeared to be successful, as indicated by the high number of users who said they frequently looked at their pagers.
- Participants who regularly commuted by carp001 or bus were no more likely to use the system for ride matching purposes than were people who drove alone.

- The traffic information feature served a useful purpose when sufficient data were available to inform travelers of road conditions.

CONCLUSIONS AND RECOMMENDATIONS

The usage patterns and various surveys that were conducted, particularly the final study questionnaire, suggested that participants liked the idea of dynamic ridesharing, liked the presentation of the information, liked the technology, were willing to offer rides, and used BST to receive other forms of information. However, for various reasons they were either unable or unwilling to form ride matches. Some of the likely reasons are as follows:

- The limited size of rideshare groups resulted in insufficient rideshare choices.
- Participants were uncomfortable getting into another's car.
- A lack of HOV lanes in the Bellevue area (they were under construction) limited time saving incentives.
- Participants were recruited by their interest in the technology, but the more people were attracted to the technology, the less likely they were to require BST services. Technology limitations, particularly the few number of rides that could be shown on the pager at one time, reduced the effectiveness of pager delivery.

Since dynamic ridesharing is a relatively new concept, we suspect that a longer time is needed to study and achieve the behavioral changes that would make it a viable transportation alternative. For now, we can confidently conclude that

(1) people prefer to offer rather than accept rides

(2) the factors that constitute a viable ride group need to be explored further.

These conclusions suggest that more work is needed to determine (1) how to encourage ride acceptance and (2) the dynamics of a viable ride group. The ride share group is a new social entity, and we know little as yet about what will make it successful.

Incentives.

Incentives could have played a stronger role in a number of areas.

- Predetermined meeting places for carpool pick-ups would add a time saving feature to potential ride matches. These pick-up points would be easy to establish in a small'urban center or office/industrial park.
- Working with large companies or office/industrial parks to establish an internal network for the TIC could increase participation by increasing access to the employee population. Employees would also be more likely to feel "safer" carpooling with a fellow employee.
- Implementing more financial incentives to rideshare may be necessary in future demonstrations of the TIC.
- Management support and encouragement may be an incentive to employees in companies that are attempting to meet the goals of Washington State's Commute Trip Reduction Law.

Technology

Other conclusions and recommendations relate to the technology used to implement BST. These include the following:

- The capacity for showing more ridesharing messages on the alphanumeric pager screen is necessary to provide an optimum number of ridesharing possibilities to users.
- Two-way paging, which is expected to be introduced in 1995, will allow a potential rideshare participant to page acceptance of a ride directly to the person offering the ride, expediting the matching process and reducing the time needed to form a ride match.
- Placing the BST TIC on the Internet would help people more easily obtain and respond to rideshare information.
- Receiving real-time traffic information on a computer screen would give users access to a more complete visual concept of traffic conditions. Thus hand-held computers would have significant advantages over pagers.

- BST should’be linked to other efforts to improve bus information, such as King County Metro’s RiderLink project.
- Participants would benefit from map printouts or other ways to provide users with the directions to meet a potential carp001 partner.

Imdementation

Finally, we present some recommendations for future implementations of the smart traveler ridesharing system.

- Select participants who require the service and adjust the technology accordingly.
- Make the traffic congestion information provided on the pager more specific and timely.
- Provide hands-on training. Respondents’ comments indicated that some of them found the phone system intimidating.
- Re-vamp the menu structure and add additional features.

CHAPTER 1. INTRODUCTION

The goal of this phase of the Bellevue Smart Traveler (BST) project was to design and test an information system that would help decrease single-occupancy vehicle (SOV) travel to a downtown employment center by making alternative commuting options more attractive and easier to access. The BST project team accomplished this goal by developing, implementing, demonstrating, and testing a prototype traveler information center (TIC) in downtown Bellevue, Washington. (Bellevue is located east of Seattle, Washington.)

The main function of the BST TIC was to help commuters form dynamic rideshare groups, as well as to provide traffic congestion and transit information. The TIC integrated phone and paging technology to deliver three types of personal commuter information: (1) dynamic ride matching information, (2) up-to-the-minute traffic congestion information, and (3) transit information.

The BST project was led by researchers from the University of Washington in partnership with TransManage (formerly the Bellevue Transportation Management Association), with participation by PacTel (now Air Touch). The project began in July 1992; the test and demonstration ended in April 1994. The project was funded by the Washington State Department of Transportation and the Federal Transit Administration.

The remainder of this introduction provides a brief background of the project and an overview of the report.

BACKGROUND

Traffic congestion is most severe in downtown areas, where the vast majority of workers travel in SOVs to densely clustered employment facilities. In the past, efforts to reduce traffic congestion in urban centers have focused on encouraging high-occupancy vehicle (HOV) commuting. However, these efforts have had mixed results, mainly because of the flexibility, convenience, and other attractions of SOV travel.

New approaches must be taken to make HOV commuting more attractive. One approach is to use innovative communication technology to provide commuters with the means to easily and flexibly arrange for HOV commuting to and from their downtown office buildings. SST is a national ITS demonstration project developing such an approach. In an earlier, related project (funded by the Federal Transit Administration), we explored innovative ridesharing technology that combined cellular telecommunications, voice mail, and computerized real-time traveler information (Pieratti et al.). The current project built on these efforts in creating the BST TIC.

Bellevue, Washington, was chosen as the test and demonstration site because it is a prime example of an area in which a vast majority of people use SOVs to commute to concentrated employment facilities.

RESEARCH APPROACH

The first step in the project was a review of all literature on all U.S. traveler information systems appropriate for potential application to the BST project. Relevant projects were those that (1) provided information about either dynamic ride matching, up-to-the minute traffic congestion, and/or transit and (2) lent themselves to an information kiosk format,

. The next step in designing the TIC was to gather information on potential TIC users' travel needs and preferences. We chose Bellevue Place, a large office complex in downtown Bellevue, Washington, as the primary site for the demonstration. First, we conducted a survey of employees at Bellevue Place to determine the employees' commuting habits and needs. After results of the survey had been analyzed, telephone interviews were conducted to elicit feedback regarding potential system features. Pocus groups were then conducted with employees who did not participate in the survey to determine how well they would respond to a dynamic ridesharing program.

On the basis of the user needs assessment, we designed and developed a BST TIC prototype.

We then conducted a role playing usability test to determine whether the initial TIC design was effective and easy to use. For the first part of the study, participants offered rides and looked for rides offered by other members of the test group. For the second part of the test, participants explored the system to see whether they could find any problems. The recommendations for changes that resulted from this process were by and large implemented in the final version.

Next, we identified the target audience for participation in the TIC demonstration. This turned out to consist of two groups: (1) all TransManage (formerly Bellevue TMA) clients and (2) existing carpoolers and vanpoolers who were registered with TransManage. Once the audience had been identified, we recruited participants in two campaigns.

The TIC was tested and demonstrated over a five-month period. There were two types of TIC users. Registered users had access to all system features, as well as access to hand-held alphanumeric pagers or wrist-watch pagers. Guest users could use the system by touch-tone telephone, but could not set up ride matches and had no pagers. Usage information was gathered in two ways, from a log that the system automatically updated and from three telephone surveys conducted in the latter part of the demonstration.

Finally, just before the conclusion of the demonstration period, the study team sent questionnaires to all active participants in the BST program to help in its assessment. This questionnaire contained five sections. The initial questions were directed at the ability of BST to achieve its goals. The remaining questions investigated the usefulness of BST's information, the convenience of the locations in which BST's technology could be used, the helpfulness of BST's technologies, and the usability of BST's format.

OVERVIEW OF THIS REPORT

This report is divided into nine chapters. The first step was a literature review, and chapter 2 is a review of relevant projects. Relevant projects were those that (1) provided either dynamic ride matching, up-to-the minute traffic congestion information, and/or transit information and (2) lent themselves to an information kiosk format.

The next step in designing the TIC was to gather information on potential TIC users' travel needs and preferences. Chapter 3 describes the three assessment methods used to gather this information and presents the findings from these assessments.

Chapter 4 describes the features of the TIC and how users accessed and used it.

Chapter 5 presents results of a usability test that was conducted to determine whether the initial TIC design was effective and easy to use.

Chapter 6 describes the marketing strategy used to promote BST and identifies the target audience that was invited to participate in the demonstration.

The TIC was tested and demonstrated over a five-month period. Chapter 7 describes this test and demonstration, along with results of three interviews of participants that were conducted to identify difficulties with the system, inform participants about technical improvements, and obtain information about the use of the system not available otherwise. This chapter also includes statistics on the usage of the TIC.

Chapter 8 presents results of the completion survey that the BST participants **filled** out when the demonstration was completed.

Chapter 9 summarizes conclusions reached in the BST project and makes recommendations for future efforts to implement a dynamic ridesharing TIC.

CHAPTER 2. SUMMARY OF LITERATURE REVIEW

We began this project by reviewing the literature on all U.S. traveler information systems appropriate for potential application to the BST project. The options described in this review were only a few possible approaches that were considered, but they served as points of departure for further discussion.

To enhance the use of high-occupancy vehicle (HOV) alternatives, we determined that BST would be composed of three information components-(1) ridesharing information, (2) traffic information, and (3) transit information-and that these three components would be integrated into a single interface. This chapter summarizes the literature review; the complete report can be found in Appendix A. This chapter is divided into three parts, each part relating to one of the information components.

RIDESHARING INFORMATION COMPONENT

Ridesharing can take various forms. The most common form is regular ridesharing, which means that the commuter rideshares for the Monday through Friday home-work-home commute trip, and the commuter typically works an 8-hour day shift. A more recent alternative to regular ridesharing is dynamic ridesharing. Dynamic ridesharing refers to ridesharing that takes place on an occasional, on-demand, unscheduled basis. Previous efforts found that the successful coordination of a ridesharing program-whether regular or dynamic-requires attention to the following factors:

- Geocoding, which places employees in ridesharing zones
- Alternatives to the ridesharing mode in the event a ride falls through
- Screening methods to ensure safety of the participants
- Database accuracy to ensure trustworthy information
- Matchlist delivery, preferably the night before

- Follow-up contact by the ride match service, which usually ensures higher success rate
- Driver incentive or compensation because people needing a ride tend to use a ridesharing system more aggressively than people who are able to offer rides (In BST, we found quite the opposite to be true.)
- Marketing to attract and maintain interest in the program
- Attention to liability issues
- System accessibility from both office and home.

We included the following rideshare systems in this review because of the insight they provided into one or more of the above factors.

Ridesharing Information and Mapping System (Seattle) is an employer-based system developed to help transportation coordinators make ride matches quickly and accurately. The program provides detailed maps showing clusters of potential matches and possible routes for regular ridesharing trips.

Metro Regional Ride match Program (Seattle) provides regular ride matching from a database of over 18,000 people interested in ridesharing. An 'individual who wishes to rideshare contacts Metro by either calling them or mailing in an application. Within three to five days, the participant receives a list of names and phone numbers of people who have similar commute characteristics.

Metro VanPool Program (Seattle) provides a van to groups of seven to 15 people who commute together. The driver of the van rides free, and the other participants pay a monthly fee based on the commute's round-trip mileage and the number of participants in the vanpool.

RideShare Link (Newport Beach, California) accommodates both regular and dynamic ride matching using voice processing technology. This system consists of an interactive voice response software system that answers telephone calls and performs ride matching 24 hours a day, seven days a week.

Loseff Voicemail Model is a system plan developed by Donald Loseff, then a transportation consultant in Seattle. This plan would provide a subscriber with a voicemail box and a list of the voicemail boxes of all the participants within'a particular ridesharing zone. Participants would create their own ride matches.

California Smart Traveler (San Francisco, California) is based on videotex and audiotex systems. This system focuses on single-trip carpools that are not work related.

Commuter Connection (Marin County, California), referred to as "institutionalized hitchhiking," provides participants who need a ride with a Commuter Connection card. These people stand at a designated spot and hold out their card until a participating driver picks them up.

TRAFFIC INFORMATION COMPONENT

We decided that to help commuters make the best travel mode choices, the traffic information component of the BST kiosk should provide real-time traffic information in an interactive format. The information system used should be able to respond to specific requests for route information and should be able to provide estimated driving times based on the user's travel origin and desired destination. Furthermore, to emphasize the advantages of using HOV modes, the system should ideally provide information regarding travel time savings if HOV modes are used.

A number of driver information systems provide real-time traffic information via television and radio, but we did not consider these types of systems. Radio does not apply to a kiosk format, and television technology would not at this time allow us to create an interactive interface that could respond to specific requests for information. We focused on the following real-time traveler information systems.

Infobanq (Houston, Texas) is a non-interactive system that displays real-time traffic information, on computers located in various parking levels of a large office-building

complex. The display terminals provide real-time traffic information, as well as information about freeway construction and incidents.

INFORM (Rhode Island, New York) provides real-time traffic information via variable message signs that reflect real-time conditions. The system combines electronic surveillance, communications, and signing. Subscribers can also access the system by modem and receive a computer-generated map that is color-coded according to speeds.

Houston Smart Commuter (Houston, Texas) is a system similar to BST that was undergoing testing at the time of this review. This, system seeks to encourage more efficient use of Houston's highways by providing real-time traffic information to commuters at home and at work via television and telephone technologies.

Traffic Reporter (Seattle) is a PC-based, graphical, interactive 'advanced traveler information system that converts traffic data from freeway detectors into up-to-the-minute traffic information. Traffic Reporter displays a map of major freeway corridors in the Seattle area on which speeds are color coded according to a range of average speeds of traffic. A user can access specific trip information, such as the best route available for an individual trip, estimates of driving time and speeds for each alternative route, as well as an estimated travel time savings if HOV lanes are used.

TRANSIT INFORMATION COMPONENT

The transit information component of the BST kiosk should offer schedule, route, and arrival and departure times for bus routes serving the kiosk site. Ideally, the kiosk should give information that reflects real-time transit operations. The system used should also be interactive or "menu-driven" (i.e., respond to specific information requests) so that users can access desired information quickly and easily. Furthermore, the ideal system should be accessible from home. Most current transit information systems are geared toward providing transit information over the telephone, which gives users access from home; however,

relatively few systems have been devised that support a kiosk format. We reviewed the following transit information systems.

ESDS (Berkeley, California) is an electronic schedule display system located at eight transit stations around the city. ESDS provides departure times of buses, which are based on predetermined schedules. The display, which looks similar to an arrival/departure information screen used at an airport, provides the next two departure times for each bus leaving the station.

Metro Vision (Syracuse, New York) uses color television monitors to display transit information as well as news, weather, sports, and advertising. Each monitor displays 40 pages of information. It displays a page for 15 seconds and repeats all 40 pages every 10 minutes, 24 hours a day.

CRIS (Salt Lake City, Utah) provides arrival times of buses to riders who call telephone numbers assigned to specific bus stops or groups of stops. In addition to hearing arrival times, callers get messages concerning delays, detours, or service unavailability. A computer generated voice provides the arrival times of the next two or three buses serving that stop. When delays or detours occur, bus dispatchers can select messages that indicate the amount or delay, the reason for the delay, and/or a telephone number to call for additional information.

BusTime (Seattle) is similar to CRIS except that at the time of this review, the information provided by BusTime was static. When potential riders call a bus stop-specific number, an automated voice tells them when the next two or three buses will arrive at that stop.

TranStar (Los Angeles, California) provides transit riders with information that takes special rider needs into account. The rider calls in and provides his or her origin, destination, arrival or departure time, date of trip, customer fare category, wheelchair need, and customer preferences. A human operator gives the caller the pertinent information for that trip on route and destination, boarding location, fare, scheduled time of departure, and transfer

information. In addition, the caller can request that a printed itinerary of the route information be mailed to his or her home.

Travlink (Minneapolis, Minnesota) aids fleet management by providing real-time location information, as well as helping to ensure that connections are made between feeder buses and express buses. Using videotex and audiotex technology, this system also provides transit riders and ridesharers with real-time traffic and transit information at home, offices, park-and-ride lots, and transit terminals.

Houston Smart Traveler (Houston, Texas) at the time of this literature review was a demonstration project with many goals similar to BST's. The bus component of the project delivered real-time traffic information and bus schedules to homes and offices. The car-pooling component was an employer-based, real-time carp001 matching service.

Gateway (Overlake, Washington), at the time of this literature review, planned as a videotex information system in three different environments: an office park, a suburban city, and a residential area. This system provides bus and ferry schedules, paratransit information, ride matching information, and traffic congestion information.

CHAPTER 3. USER NEEDS ASSESSMENT

One of the main objectives of the BST project was to design a prototype TIC. The first step towards accomplishing this objective was to assess the travel needs of potential participants in the demonstration and test. We chose Bellevue Place, a large office complex in downtown Bellevue, Washington, as the primary site for the demonstration. We used three methods for gathering assessment data from employees at Bellevue Place: commuter surveys, telephone interviews, and focus groups. (See Appendix B for a copy of the commuter survey.)

First, we conducted a survey of employees at Bellevue Place to determine the employees' commuting habits and needs. The survey sought to determine Bellevue Place employees'current knowledge and use of high-occupancy vehicle (HOV) modes, their information delivery preferences, and their general interest in the types of information that would be offered through the TIC. After results of the survey has been analyzed, telephone interviews were conducted to elicit feedback regarding potential system features. Focus groups were then conducted with employees who did not participate in the survey to determine how well they would respond to a dynamic ridesharing program. This chapter presents the findings from each data collection method and, on the basis of those findings, provides recommendations for the TIC's system features and general program characteristics.

COMMUTER SURVEY

The commuter survey sought to determine how knowledgeable the employees at a downtown office complex were about various HOV travel modes. If the employees were already highly knowledgeable about HOV travel modes but were not using them, our task would then be to motivate them to do so (with less emphasis on providing information).

To help us design BST's ridesharing program, we asked Bellevue Place employees how important various ridesharing features would be in making their decision to join a ridesharing program. We were specifically interested in determining the importance of safety issues to our

participants. The survey also asked participants how they would prefer to sign up for a ridesharing program and how they would like to receive ride match information.

About 1,200 surveys were distributed to 54 companies at Bellevue Place, and 420 people from 45 companies responded. The data were analyzed using Statview 4.0 for the Macintosh. Frequencies were calculated for all variables for the total sample. Because a large group of Hyatt employees responded to the survey, we ran tests of significance to determine whether there were any statistically significant differences between Hyatt vs. non-Hyatt respondents. Gender and income differences were assessed with t-tests for interval data, Mann-Whitney tests for ordinal data, and x^2 tests for nominal data. Because of the large number of variables analyzed, only variables that are relevant to user requirements and system features are reported here.

Employees' Current Commuting Schedules

Seventy-eight percent of the survey respondents reported arriving at Bellevue Place between 6 and 10 a.m., with nearly 60 percent arriving between 7 and 9 a.m. Approximately 77 percent reported usually leaving Bellevue Place between 3 and 7 p.m., with 53 percent leaving between 4 and 6 p.m. Respondents could vary the time they started work by an average of 21.2 1 minutes (SD= 32.82, SE= 1.7, median= 10.0) and the time they left work by an average of 27.39 minutes (SD= 35.85, SE= 1.9, median= 15.0).

Prior Knowledge of HOV Modes

Respondents indicated whether they were familiar with and/or used the items listed in Table 1. Over half of the respondents were unfamiliar with the route number of the most convenient bus to work, and over two-thirds were unfamiliar with the departure and arrival times of the most convenient bus to or from work or home. Nearly two-thirds were also unfamiliar with the amount of fare needed to ride a bus.

Over two-thirds of the respondents stated they were unfamiliar with available carpooling/vanpooling programs. However, a later question cast some doubt on respondents' initial claim of unfamiliarity with ridesharing programs. Although only 26 percent of the respondents said they were familiar with available carpooling programs, 47.33 percent indicated

in a later question that they would know how to sign up for a carpooling/vanpooling program if they wanted to join one.

Transit and Ridesharing Interest

In response to the four types of transit information listed in Table 2, over one-fourth of the respondents said they would be likely to commute by bus if various types of transit information were readily available to them at home and at work. For each of the information types listed in Table 2, individuals who made less than $20,000 annually were significantly more likely to commute by bus if they had transit information than were individuals who made more than $40,000.

Ridesharing Interest and Preferences

Respondents were asked to rate how likely they would be to use the ridesharing types listed in Table 3 if these types of ridesharing were readily available at Bellevue Place. Nearly 24 percent said they would be moderately to very likely to carpool/vanpool on a regular, scheduled basis. Respondents who made less than $20,000 annually were significantly more interested in this type of carpooling than were respondents who made over $40,000 per year. About 21 percent of all respondents said they would be moderately to very likely to carpool/vanpool for special trips on an on-demand basis. Of the three types of ridesharing described, carpooling/vanpooling to or from work on an on-demand basis was the most popular: nearly 35 percent of all respondents said they would be moderately to very likely to use such a form of ridesharing if it were available in Bellevue Place.

Importance of Ridesharing: Features

Respondents were asked to rate how important the ridesharing features in Table 4 would be in making their decision to join a carpool or vanpool. If respondents already carpooled or vanpooled, they were asked to rate how important these features were to them currently.

Having a guaranteed ride home was by far the most important ridesharing feature to respondents, with approximately 62 percent rating it very important. The second most important

TABLE 1. Familiarity with HOV modes

Item	Percent		
	Familiar with	Use	Unfamiliar with
Route number of most convenient bus to work	31.66	11.31	57.03
Departure time(s) of most convenient bus from work	29.15	—*	70.85
Departure time(s) of most convenient bus from home	28.39	—	71.61
Arrival time(s) of most convenient bus at work	**28.89**	—	71.11
Arrival time(s) of most convenient bus at home	28.14	—	71.86
Amount of fare needed to ride bus	36.27	---	63.73
Available carpooling/vanpooling programs	25.88	4.77	**69.35**
Park and ride lot closest to home	66.58	6.53	**26.89**
Location of nearest bus **stop** to work	51.00	11.31	**37.69**
Location of nearest bus stop to home	49.50	10.80	39.70

* Data not applicable.

TABLE 2. Likelihood of commuting by bus

Likelihood of commuting by bus if the following bus information were provided:	Rating (in percent)			
	Very likely	Moderately Likely	Slightly likely	Not at all likely
Scheduled bus departure time from your stop near home/work				
All	11.71	15.32	21.32	51.65
Under $20,000 income	22.58	17.74	**29.03**	30.65
Over $40,000 income	7.15	10.7 1	10.71	71.43
Exact current location of your bus				
All	12.20	15.85	19.50	52.44
Under $20,000 income	21.67	21.67	25.00	31.67
Over $40,000 income	8.93	12.50	8.93	69.64
Actual bus arrival time at your stop near home/work				
All	11.78	16.01	21.15	51.06
Under $20,000 income	22.58	17.74	30.65	**29.03**
Over $40,000 income	5.36	14.29	10.71	69.64
Detailed route and transfer information between your origin and destination				
All	10.19	15.43	20.37	54.01
Under $20,000 income	17.24	20.69	29.3 1	32.76
Over $40,000 income	7.27	12.73	7.27	72.73

TABLE 3. Likelihood of carpooling

Likelihood of car-pooling if Carpooling/vanpooling were available:	Rating (in percent) Very likely	Moderately likely	Slightly likely	Not at all likely
To or from work on a regular, scheduled basis				
All	10.65	13.12	17.21	59.02
Under $20,000 income	14.67	24.00	21.33	40.00
Over $40,000 income	3.28	4.92	19.67	72.13
For special trips on an on-demand basis	8.22	13.03	16.43	62.32
To or from work on an on-demand, flexible basis	12.50	22.01	17.66	47.83

TABLE 4. Importance of ridesharing features*

Ridesharing feature	Rating (in percent) Very important	Moderately important	Slightly important	Not at all important
Having a guaranteed ride home in an emergency	62.08	23.70	9.48	4.74
Saving time over current transportation mode	48.33	27.75	15.31	8.61
Reducing pollution	43.26	35.10	17.79	3.85
Having preferences met (e.g., riding/ driving in a non-smoking environment)	39.43	25.48	26.44	8.65
Saving money over current transportation mode				
All	37.14	38.10	16.67	8 . 0 9
Under $20,000	52.00	38.00	4.00	6.00
Over $40,000	20.69	44.83	17.24	17.24
Participants being pre-screened				
All	22.22	31.32	27.27	19.19
Under $20,000	31.82	34.09	20.45	13.64
Over $40,000	17.86	17.86	42.85	21.43 .
Meeting other participants before forming a carpool/vanpoo1				
All	17.88	25.60	36.23	**20.29**
Under $20,000	26.53	30.61	28.57	14.29
Over $40,000	10.35	20.69	37.93	31.03
Knowing other participants				
All	13.40	30.62	30.62	25.36
Under $20,000	22.45	28.57	34.69	14.29
Over $40,000	3.33	26.67	23.33	46.67
Participants being co-workers				
All	12.08	24.64	25.60	37.68
Under $20,000	18.75	39.58	18.75	22.92
Over $40,000	10.00	20.00	20.00	50.00

*For variables that resulted in significant differences between lower income (<$20,000 individual annual income) and higher income (>$40,000 individual annual income) respondents, percentages for all respondents, 'lower income respondents, and higher income respondents are provided.

feature was saving time over their current transportation mode, with 48 percent rating it as very important. Reducing pollution and having their preferences met were the third and fourth most important features, respectively.

Several ridesharing features related to safety issues: knowing other participants, meeting other participants before forming a carpool/vanpool, participants being co-workers, and participants being pre-screened. Of these safety features, participants being pre-screened appeared to be the most important issue to respondents, as 53.54 percent rated it moderately to very important. All of the safety features were significantly more important to lower income respondents than to higher income respondents.

Preferences for Sign-up Methods

Respondents were asked how they would prefer to sign up for a carpool/vanpoo1 program and receive ride match information. The three most preferred sign-up methods (in order) were in person, interactive computer in Bellevue Place's lobby, and interactive phone system. The most preferred methods for receiving ride match information were (in order) mail, in person, and interactive computer in the oft-ice complex.

Incentives to Rideshare

In previous ridesharing programs, people needing rides were expected to use the system more aggressively than people offering rides. Consequently, the research team wanted to determine how likely respondents would be to drive for a carpool/vanpool if offered various incentives, such as special parking privileges, expense sharing, and shopping discounts. As Table 5 reveals, all incentives received relatively similar, well distributed responses.

Commuter Information Delivery Preferences

Respondents were asked how likely they would be to change the following factors if up-to-the-minute traffic information were available to them at home and at work and if that information indicated that their usual commute route was congested: (1) departure time from home to work, (2) departure time from work to home, (3) route, and (4) transportation mode. Respondents who made less than $20,000 annually indicated a much greater likelihood than

those who made over $40,000 annually to change their transportation mode on the basis of up-to-the-minute traffic information. Additionally, 34.33 percent of the lower income respondents said they would be moderately to very likely to change commute mode, whereas only 12.7 percent of the higher income respondents said they would be moderately to very likely to do so (see Table 6). These results replicated the results of previous Seattle-area commuter surveys. (Haselkorn et al., 1990, 1992)

Respondents were then asked to rate how likely they would be to use commuter information if it were delivered in various ways (see Table 7). The most popular method for delivery of commuter information appeared to be by telephone (50.15 percent said they would be moderately to very likely to use it), followed by interactive computer in Bellevue Place's lobby. (44.29 percent said they would be moderately to very likely to use it).

Level of Comfort Using Various Technologies

Respondents were asked to rate how comfortable they were using various technologies (see Table 8). Overall, about 83 percent of survey respondents said they were very comfortable using a touch tone telephone to access information; 68 percent said they were very comfortable using a voice mail system; and about 58 percent said they were very comfortable using a computer.

For the last two technologies listed in Table 8 (voice mail and computer), there were significant differences in the comfort levels of lower income versus higher income respondents. Respondents who made over $40,000 annually were significantly more comfortable using voice mail systems (85 percent responded very comfortable) than were those who made less than $20,000 (4 1 percent responded very comfortable). As for using a computer, 76.19 percent of the respondents who made over $40,000 said they were very comfortable in comparison to about 35 percent of respondents who made less than $20,000 annually. This was a significant difference.

TABLE 5. Likelihood of riding/driving in carpool if provided incentives

Incentive	Rating (in percent)			
	Very likely	Moderately likely	Slightly likely	Not at all likely
Carpool/vanpool (drive or ride) if given:				
Special parking privileges	22.66	29.06	33.01	15.27
Drive for a carpool/vanpool if given:				
Full compensation for expenses	26.13	24.12	21.61	28.14
Full compensation for expenses and special discounts at downtown businesses	26.00	27.00	20.00	27.00

TABLE 6. Likelihood of changing commute features based on traffic information

Commute feature	Rating (in percent)			
	very likely	Moderately likely	Slightly likely	Not at all likely
Departure time from home to work	41.39	24.16	16.45	18.00
Departure time from work to home	34.64	24.22	18.75	22.39
Route	48.66	22.69	14.92	13.73
Transportation mode				
All	10.79	9.66	20.74	58.81
Under $20,000	22.39	11.94	22.39	43.28
Over $40,000	6.35	6.35	20.63	66.67

TABLE 7. Likelihood of using commuter information

Likelihood of using commuter information if delivered by:	Rating (in percent)			
	Very likely	Moderately likely	Slightly likely	Not at all likely
Telephone (24 hours per day)	22.93	27.21	26.93	22.93
Interactive computer in Bellevue Place's lobby	17.66	26.63	28.8 1	26.90
Computer at home or work (via modem)	13.32	19.57	25.27	41.85
Hand-held message receiver (similar to a pager)	10.47	14.60	23.69	51.24

TABLE 8. Rating of comfort level with various technologies

Technology	Rating (in percent)			
	Very comfortable	Moderately comfortable	Slightly comfortable	Not at all comfortable
Touch tone telephone to access information	82.90	12.96	2.07	2.07
Voice mail system				
All	68.17	18.83	8.75	4.24
Under $40,000	40.85	38.03	9.68	8.45
Over $20,000	85.48	3.23	12.67	1.61
Computer				
All	58.16	22.10	13.16	6.58
Under $40.000	76.19	6.35	20.83	1.59
Over $20,000	34.72	31.95	15.87	12.50

TELEPHONE INTERVIEW FINDINGS

After analyzing the results from the written commuter surveys, the research team conducted two sets of telephone interviews (see Appendixes C and D) to gather user input on specific system features. For the first set of interviews, survey respondents who said they would be very likely to use an on-demand carp001 system were contacted. In this group., nine randomly selected participants (seven women and two men) answered questions about how they would use the system as riders. For the second set of interviews, seven survey respondents (six women and one man) who said they would be very likely to drive for a carpool if they were fully compensated for their expenses were contacted about how they would use the system as drivers.

Interviewees in both groups were asked questions regarding how much in advance they would be likely to call the system if they were offering or checking for a ride, whether the free use of a pager was an incentive to offering or checking for rides, how much drivers/riders would be willing to wait beyond their desired departure time to make a ride match, how far they were willing to drive/walk to meet a ride match, and so on.

The results of the telephone interviews are as follows:

- In contrast to literature on dynamic ridesharing, potential riders said they would use the system to **find rides** much less frequently than potential drivers said they would use the system to **offer rides.** (This finding was born out in the subsequent demonstration.)
- Pagers were seen as an incentive to use the system for both riders and drivers.
- Drivers were more likely to offer a ride through the system well in advance than riders were willing to check for a ride; on the other hand, drivers were also less likely to call the system close to their departure time than riders were. Only one potential driver said he would call the system an hour before he planned to leave, yet some potential riders were willing to check the system for a ride offered up to 15 minutes before leaving.
- Although drivers were less likely to call the system and offer a ride close to their departure time, they were willing to accommodate a rider who contacted them up until 1 hour before they left.
- Drivers were less willing to delay their departure time to work to make a ride match than were riders. (Five out of seven drivers said they would not delay their planned departure time to work.) However, drivers were more willing to delay their departure time for the trip home; four out of seven said they would delay their departure time for the trip home, and three of these said they would wait half an hour to make a ride match.
- Riders were much more willing to wait past their desired departure time to make a ride match than were drivers (four out of nine said they would be willing to wait half an hour, and one said she would be willing to wait 15 minutes).
- Both drivers and riders were willing to go 10 to 15 minutes or 4 to 6 kilometers (3 to 4 miles) out of their way to make a ride match.
- Riders were willing to listen to five ride-offered messages. However, a few said they would be willing to read more than five messages on a pager, but would not want to have to listen to more than five over the phone.

FOCUS GROUP FINDINGS

In addition to the written surveys and telephone interviews, the research team held two focus groups to gather data from employees who did not participate in the survey. One focus group was held for employees of a major software developer at the test site to determine the interest level in and reactions to the proposed dynamic ridesharing program. The employees who participated in the focus group were **all** SOV drivers (nine men and three women).

Because the research team was considering existing carpools as a possible source of rides, the second focus group was conducted with people who worked in downtown Bellevue and participated in Bellevue TMA's ridesharing program. All of the participants in the second focus group (five men and nine women) were currently carpooling. This focus group was also held to determine the interest level in and reactions to the proposed BST ridesharing program from people who worked outside Bellevue Place.

Software Developer Focus Group

All software developer employees drove alone to and from work each day. Their reasons for not carpooling were consistent: all employees had flexible work hours, and their departure times were always subject to change. Participants also reported having little motivation to carpool, as they had daily access to free parking and usually commuted during non-peak hours.

The employees were not particularly interested in the technology offered; e-mail, pagers, and an interactive phone system were viewed as archaic. Pagers were not viewed as an incentive for participating in the program.

Although there was little interest in riding in a carpool, the focus group participants were willing to drive for a car-pool on the basis of a single ride offered in one direction. However, even as drivers, they were unlikely to use the system more than once if it was not trouble-free the first time they used it. For example, they did not want to wait more than 5 minutes for a rider. They also did not want to drive to an individual's house; they preferred to arrange pick-up points.

Participants were most concerned about security issues. Participants were willing to rideshare with people who did not work at the same company provided that they were pre-screened and that the system tracked the people who were riding together.

Bellevue TMA Focus Group

Unlike the employees of the software developer, the participants in the TMA focus group reacted positively to the pager. However, those who already carried a pager said they would be unwilling to carry a second pager.

Participants in this group were concerned about the same security issues as the software developer group. Pre-screening and tracking ride matches were important; however, this group was also interested in knowing the gender of other riders/drivers.

The most important issue to this group was having a guaranteed ride home. They were willing to go through a multi-step process to search for an alternative before exercising a guaranteed ride home option, but they were concerned about the extra time involved in the process. They refused to use an alternative mode of transportation, such as a bus, if it would take 25 minutes longer than their usual means of commuting.

SUMMARY OF SURVEY, INTERVIEW. AND FOCUS GROUP FINDINGS

From the results of the survey, telephone interviews, and focus groups, we determined user requirements, which are listed below. These requirements provided a basis for the development and design of the BST TIC prototype.

General Program Features

- A dichotomy exists between the desire to use the TIC information and willingness to use the TIC's likely technology. Lower income employees were significantly more likely to use the information offered by the TIC than were higher income employees; however, the lower income employees were also significantly less comfortable with various technologies. Therefore, system designers should not make assumptions about potential users' knowledge of technology and must make deliberate efforts to keep the system as simple to use as possible.

Ridesharing Component

- To create a truly dynamic ridesharing system that accommodates all users' schedules, a system that allows people to rideshare at any time of day would be ideal. However, if system limitations prevent a 24-hour-a-day system, then the system should minimally 'allow for ride matching between the hours of 6 and 10 a.m. and 3 and 7 p.m.; these hours would accommodate approximately 80 percent of the user audience.
- Given users' relative lack of knowledge regarding ridesharing programs, instructional information must be provided on how to use a ridesharing system, how it works, guidelines for contacting potential ride partners, and so'on.
- A guaranteed ride home must be provided for ridesharing participants. Rides should be given on a point-to-point basis rather than a door-to-door basis unless participants agree to do otherwise.
- Ride groups should be designed so that drivers/riders do not have to travel more than 6 kilometers (4 miles) to meet their ride match partner(s).
- The system should allow people to make a ride match up to one hour in advance of their departure. The system should also minimize the number of messages a rider would have to listen to.
- For security purposes, the system should pre-screen participants (minimally, they should be from selected employers), provide gender information, and record and monitor ride matches.
- For many users (particularly of higher socio-economic status), providing pagers and pager services would be a compelling incentive to use the system. Additionally, other tangible incentives should be provided to encourage carpooling/vanpooling; the benefits of time savings and pollution reduction alone do not provide sufficient incentive.

Transit

- Given users' relative lack of knowledge regarding bus use, the TIC should focus on providing users who are interested in commuting by bus with customized bus information.

CHAPTER 4. TIC FEATURES AND FUNCTIONS

On the basis of the user needs assessment, we designed and developed a BST TIC prototype. This chapter describes how the TIC worked. The chapter begins by defining the users and explaining the registration process and how ride groups were formed. It then describes the TIC's features and functions. Finally, this chapter describes the public kiosk, BST's "home," which also provided real-time traffic information. (Appendix I is an earlier but more detailed "System Features Document," which was also a milestone product of the project.)

TIC USERS

BST served two types of users: registered users and guest users. Registered users had access to all system features, as well as access to hand-held alphanumeric pagers or wrist-watch pagers. Guest users could access the system by touch-tone telephone, but they could not set up ride matches and had no pagers. Registered users were employees of downtown Bellevue companies. (For this project, the companies were all located in a four-square-block area).

REGISTRATION PROCESS

Registration was required for a user to be eligible for access to the TIC and for a pager (non-registered guest users could access a sub-set of general information). Registration was available to employees of companies that were participating in the BST demonstration project. In addition, certain project requirements had to be met for a user to become registered.

The application process consisted of filling out an application and sending it to the BST headquarters at the Bellevue TMA. (A copy of the brochure/registration form is in Appendix J.) The BST project team reviewed all of the applications and accepted or rejected applicants on the basis of their fit into a "ride group" (see below) and how likely they were to

use the TIC system and participate in dynamic ride matching. The registration application acquired the following information:

- Full name
- Gender
- Employer
- Washington state driver's license number
- Work and home addresses
- Work and home phone number
- Work days and hours and schedule flexibility
- Preferred arrival time to work and departure time from work
- Preferred pick-up points (three of them, selected from a list, in ranked order)
- Smoking and gender preferences
- Willingness to be a driver and/or a rider

TIC RIDE GROUPS

Registered users were divided into ride groups on the basis of where they lived. Groups were formed first according to zip codes and preferred pick-up/drop-off points, and next according to routes that members traveled and availability of park-and-ride lots along the routes. When registered users offered or sought rides, their messages were sent to only members of their ride group. This strategy was necessary to reduce the number and increase the relevance of messages members received, but it also reduced the size of the rideshare pool.

TIC FEATURES

This section describes (1) the TIC's automatic features and (2) features accessed directly by users.

The TIC automatically did the following:

- Maintained a database of registered users, including contact information
- Kept records of users who had called the system and the menus they had accessed
- Tracked ride groups on the basis of geographical location

- Prompted users to log rides
- Deleted ride-offer messages when the date and time of the ride had expired.

The remainder of the features were accessed directly by users. Users accessed the TIC either by touch-tone telephone (interactive) or hand-held alphanumeric pagers (non-interactive). The features available depended in part on the communication device being used. In addition to having telephone access, users with alphanumeric pagers could view a list of rides offered and current traffic reports. Users could elect to use a wrist-watch pager instead of an alphanumeric pager. However, while users who had wrist-watch pagers could alert each other when they were trying to arrange ride matches, they could not view a list of rides offered or current traffic reports (the watches were not alphanumeric and had a small screen). Table 9 lists these features, along with the group or groups that had access to them and the relevant communication devices.

Table 9. Features accessed directly by users with a touch-tone telephone (T) and/or alphanumeric pager (P)

Feature	Available to Registered Users	Available to Guest Users
Log on with an ID number and password to access all features	T	
Get help on any TIC feature	T	
Access a subset of features		T
Get help on a subset of TIC features		T
Offer rides	T	
Edit or delete ride offers	T	
Look for rides	T/P	
Obtain contact information	T/P	
Accept rides	T	
Log ride matches	T	
Obtain traffic reports	T/P	T
Obtain transit information	T	T
Send voice-mail messages to system administrator	T	T
Obtain information about the BST project	T	T

TIC ACCESS AND OPERATION

The following sections describe how registered users accessed and used the TIC.

Using the TIC with a Touch-Tone Telephone

There were many possible pathways for accessing and using the TIC by phone. See Appendix H for details on the menu structure of the telephone component.

Logging on. To access the TIC with a touch-tone telephone, users simply dialed the TIC phone number. A voice instructed them to either enter their user ID number and password (which were assigned at the time of registration) or how to log on as a guest user. A user who supplied a valid ID number and password was logged on as a registered user and had access to all TIC features. Guest users could access a subset of TIC features.

Offering a Ride. To offer a ride, registered users specified (1) whether they were offering a ride to work or to home, (2) which day the ride was offered, and (3) the departure time of the ride. The ride offer was then entered into the current list of rides for the appropriate ride group. A ride-ID number was assigned to that ride offer and was given to the user for eventually editing, deleting, or logging the ride offer if it was accepted.

Editing or Deleting a Ride Offer. Registered users edited or deleted a ride offer by entering the ride-ID number. If users chose to edit the ride, they were allowed to re-enter the ride information. Users who had not offered a ride were so reminded and returned to the main menu.

Looking for a Ride. To look for a ride, registered users specified (1) whether they were looking for a ride to work or to home and (2) which day of the week they wanted a ride. Then available rides were announced for that user's ride group. Each message announcing a ride gave the departure time and driver's first name. The user could press various numbers to replay or skip messages, as well as to get further information.

Exploring a Ride. If interested in a specific ride, registered users pressed a number to obtain the contact information, which consisted of the driver's full name, work place, contact phone numbers, and ride-ID number.

Obtaining Contact Information. Registered users could obtain contact information about another registered user in their ride group by entering the other user's home, work, or pager phone number. If users wanted to contact a driver, they could simply enter the ride-ID number. Contact information included the driver's full name; work place; work and pager telephone numbers; and home telephone number, if available (home telephone numbers were optional).

Accepting a Ride. If interested in a specific ride, registered users pressed a number to obtain the contact information, which consisted of the driver's full name; work place; work and pager telephone numbers; and home telephone number, if available. Actual arrangements were made "outside" the system by calling or paging the driver.

Logging a Ride match. To log a ride match, registered users first entered the ride-ID number. Drivers who wanted to log a ride match were prompted to enter the telephone number (either home, work, or pager) of the rider. The driver was also asked whether the ride should be removed from the system. Riders who wanted to log a ride match simply pressed a number-the system could identify the driver from the ride-ID number. Logging a ride match was optional, but this feature provided additional safety and allowed researchers to track the ride matches that were formed between registered users.

Obtaining Traffic Reports. This feature delivered a Puget Sound-area traffic report that covered congested areas of the freeway system, average freeway speeds, and estimated travel times to various destinations. This feature also compared travel times for the floating bridges, and for HOV lanes versus SOV lanes. This information was generated with the ***Traffic Reporter*** software. (Haselkorn et al., 1990, 1992)

Obtaining Transit Information. This feature provided transit information to users by connecting them with Seattle Metro's BUS-TIME or with TransManage. BUS-TIME provided automated bus schedule information, while TransManage provided personalized transit information (e.g., for users who did not know their bus number).

Obtaining BST Project Information. This feature briefly described the BST project, its purpose, funding sources, creators, and registration information.

Sending Voice Mail Messages. This feature allowed users to send voice-mail messages to the TIC system administrator.

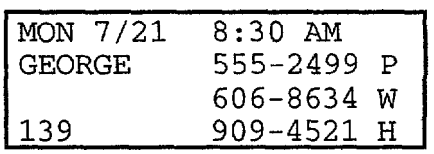
Using Heln. The help feature provided information regarding the feature being used.

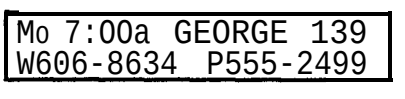
Using the TIC with an Alphanumeric Pager

Registered users who had hand-held alphanumeric pagers could access certain TIC information anytime and anywhere. TIC information received by a pager was integrated with other real-time information, including news, sports, weather, and business, as well as personal paging use. The following section describes how people used the TIC with a pager.

Looking for a Ride. Every hour, the TIC transmitted to the pagers a current list of rides offered. The rides were displayed on the pager's screen in a list format that the user could quickly and easily scroll through. (In the future, vanpools with available seating could also be listed.) The ride-offer list was displayed in two parts: rides to work and rides to home. Each ride-offer message contained the departure time and date of the ride, the first name of the driver, one or more of the driver's contact phone numbers, and the ride-ID number. Riders wanting to know more about the driver could call the TIC for further contact information.

Below are samples of two ride-offer displays. We began with the display to the left. The display to the right is the newer version, which reduced the ride-offer messages to two lines and allowed the pager to display more messages.





Accepting a Ride. Pager users, like telephone users, accepted a ride by calling a driver directly, using one of the contact phone numbers displayed on the pager's screen.

Obtaining Traffic Report Messages

Every 20 minutes, the TIC sent to the pagers a selected current traffic report (automatically generated by ***Traffic Reporter)*** for the Puget Sound-area freeway system. This message displayed travel times via the east/west bridges, areas that were congested, and time saved using an HOV lane. Below is an example of a traffic report.

```
------------------
North Bound I-5
Heavy at Boeing
Heavy at Northgate
Save 8 min. on HOV!
-------------------
```

OPTIONAL PUBLIC KIOSK

The TIC also provided resources for an (optional) public kiosk for the lobby of participating downtown Bellevue buildings. The kiosk ran the Traffic Reporter software which provided real-time traffic information for the Seattle area freeway system, including the following:

- Overview of freeways speeds for I-5, I-90, I-405, and SR-520
- Specific trip information including travel time, average speed, and savings on HOV lanes via a touch-screen interface
- Automatic cycling of popular trips when system was not being used

The kiosk contained a sign describing the BST project and the TIC. A telephone was also near the kiosk so that users could call the TIC phone number. The building was responsible for providing and maintaining the computer hardware (IBM compatible computer, monitor, modem, and phone line).

The kiosk was well received by the people that used it. The data available using the Traffic Reporter software was limited due to two main reasons. The software had programming errors, and the freeway traffic data sources were limited, especially on freeways surrounding Bellevue to the north, east, and south.

Maintenance of the kiosk computer was more extensive than desired. The system was hard to troubleshoot to determine whether problems were in the hardware or the software.

CHAPTER 5. USABILITY TESTING

After we had developed the BST TIC prototype, we conducted a role playing usability study to determine whether the prototype was effective and easy to use. This chapter describes and presents the results of the study. Most of the comments from the study were about the telephone processing system; Appendix H is a description of the telephone system after it was revised to include recommendations from this study.

Since the recommendations for changes in this section were by and large implemented in the final ‘version, this chapter is important not so much for understanding how the system works as for understanding the development process used to arrive at a usable system. This chapter also contains some recommendations that could not be implemented because of time constraints in the current project but that should be implemented in any future versions of the BST system.

TEST DESIGN

Eight people (four women and four men) participated in the BST usability study. Participants ranged in age from 27 to 58; the average age was 38. Their job titles, ages, and genders are listed below.

Title	Age	Gender
Industrial Designer	27	Male
Computer Networking & Support	30	Male
Facilities Manager	31	Male
Student/Technical Communicator	33	Female
Senior Clerk	34	Female
Environmental Health & Safety Technician	41	Female
Programmer	56	Female
Senior Principal Engineer	58	Male

Participants received a packet that contained instructions for their role in the study, including a pre-test questionnaire, an activity log, a post-test questionnaire, and a quick

reference card (QRC). (The participant's packet is in Appendix E. Bar charts summarizing the results of the pre-test and post-test questionnaires are found in Appendices F and G.)

For the first part of the study, participants offered rides and looked for rides offered by other members of the test group. Each participant was assigned a role and told which day and time they should either offer a ride or look for a ride. Twenty-two ride matches were possible. A ride match was considered successful if the participants made contact — that is, when the riders contacted the driver for a particular ride. Participants acting as drivers kept track of all riders who contacted them.

For the second part of the test, participants explored the system to see whether they could find any illogical sequences, glitches, or other problems. They were also encouraged to use TIC features that they did not use during the first part of the study. Participants recorded their interaction with the TIC in an activity log during both parts of the study.

Before beginning the study, participants rated their comfort level for using various technologies: a touch-tone telephone to access information, a voice mail system, and a computer. On a scale from 1 to 7 (1 being ***very uncomfortable,*** 7 being ***very comfortable),*** the average rating was 6.13 for using a touch-tone telephone, 6.00 for a voice mail system, and 6.00 for a computer. Participants also rated their frequency of use of these items on a scale of 1 to 7 (1 being ***very infrequently,*** 7 being very ***frequently).*** The average ratings were 4.38 for the touch-tone telephone; 4.63 for the voice mail system, and 6.63 for the computer.

Given their job titles and rated comfort and frequency of use of the above technologies, this test group appeared to be technologically sophisticated. Their familiarity with technology highlighted the importance of the usability problems they had and our need to pay attention to these problems — a less technologically sophisticated group would likely have had even more difficulty.

RESULTS

Out of 22 planned ride matches, 13 were made successfully. The low number of successful ride matches seemed to result from the following:

- One rider was unable to make any ride matches; she could not get the driver's contact information for any of the rides.
- One driver entered his rides and then "mistakenly" used the "confirm" option on the main menu to check if his rides were in the system. Two rides were inadvertently deleted this way.

Overall, participants felt the TIC was easy to use, and responses to the post-test questionnaire were mostly positive. Features that seemed to cause the most confusion were confuming rides and getting contact information. Issues that participants commented on in their activity logs are described below. Solutions are offered after each issue — many of these solutions were provided by the participants themselves. Suggestions for changes to the QRC are provided as well.

Issue 1: Number of main menu options

Several participants felt strongly that there were too many options on the main menu. A possible solution would be to put the ridesharing options (options 1 through 5) under one main menu option. The main menu could offer the following: Press 1 for carpooling options; press 2 to get traffic information, and so on. When users pressed 1 for carpooling options, they then would hear, "Press 1 to offer a ride; press 2 to look for a ride..."

Issue 2: Exiting: the system

One participant commented that the system never tells the user how to exit. To make this clearer, a note could be added to the QRC (and/or to the system) telling users they can exit the system simply by hanging up.

Issue 3: Pressing # key

One participant thought pressing the # key at the end of entries was annoying. He thought the system should know when an entry was finished.

Issue 4: Looking for rides/getting contact information

When listening to the list of rides offered, participants frequently missed their opportunity to press 4 to get contact information for the driver of the ride. Participants found this frustrating and wanted more information after each ride to make their selection. Apparently, one participant never successfully pressed 4 at the ride offered list and did not

notice the ride ID number. Then, when she had used option 5 at the main menu, listened to the list of participants, and pressed 4, she always got the statement, "I'm sorry that is not a valid user." At one point she got the statement, "There are no valid users for your ride group." (It is not clear where she was in the system or what she had pressed before she heard this statement.)

Many participants had difficulty using option 5 (getting contact information). In most cases, they did not know the other participant's ID number or the ride ID number. Instead, they pressed the # key to listen to the list of participants. However, when they heard the name of the participant they wanted information for and pressed "4," they heard "I'm sorry that is not a valid user." Nearly all participants had this problem; however, this particular issue seemed to be the result of a programming glitch rather than a usability problem.

When users were getting contact information, the system prompted callers to enter the other user's ID number (or the 3-digit ride ID); participants did not seem to realize that the other user's ID number was a phone number. One participant thought it was strange that the feature for "getting contact information" would ask for the other user's phone number (ID number) because if he had had the other user's phone number, he would not have 'been trying to get the contact information. In other words, the feature seemed to present a Catch-22.

Issue 5: ID number

The term "ID number" seemed confusing to participants. In some cases, participants confused their own ID number with their password. Participants would try to enter their password at the first prompt instead of their ID number. Also, one participant commented that it did not seem necessary to have both an ID number and a password.

Another participant suggested that instead of the term "ID number," we should use "ID phone number." Another option would be to simply call it a phone number.

Participants were also confused when the system referred to users' "ID numbers," as well as to "ride IDs." The term "ID" seemed to be used for too many concepts.

Issue 6: Ride ID number

Some of the difficulty participants had in getting contact information stemmed from the fact that they did not catch the 3-digit ride ID number when it was provided. One participant wrote, "In confirming the input, the number 154 was read back to me. I didn't catch what it was for." She later wrote, "I would like the announcement of the ride ID to be slightly louder." Another participant also commented that he did not know what the 3-digit ride ID number was for.

Solutions might include reminding participants at the beginning of the sequence to listen for the ride ID number and slowing down the section where the number is read back to them. The importance of the ride ID number should be more prominent in the QRC. (We might also want to remind users to listen carefully to the menus the first time they use the TIC.)

Issue 7: Reviewing rides offered

Drivers wanted to be able to review the rides they had offered to check the day and time, but they had difficulty doing so. One participant tried to use the confirm option to listen to the rides he had offered (more about this below). Another participant tried to use the "look for a ride" option to verify that his ride was in the list. However, when he did so, the system did not repeat the rides he had offered. One driver called back repeatedly using the "look for a ride" option to see whether his rides were in the system — because he did not hear them, he assumed they were not in the system.

Drivers could hear a list of the rides they had offered using the "change/remove rides" option. However, if drivers just wanted to make sure their rides were in the system (as they seemed to want to do), there was not any obvious way for them to do so.

Issue 8: Changing/removing rides

One participant commented that he did not get feedback when reviewing a ride. He wanted the system to repeat back to him which ride he had removed.

Issue 9: Confirming rides

The concept of confirming rides seemed confusing to test participants. In some cases, participants though it meant they could call back to make sure the rides they offered were in the system. It also seemed strange to participants that they had to call the system back to confirm a ride even though they had just talked with another participant. Participants were confused about who was responsible for confirming, who was supposed to initiate the confirmation process, and the purpose of the confirmation process.

One participant commented that he would regularly neglect to confirm rides in the system. Another participant commented, "Why does the person offering the rides have to confirm on the system when the people call on the phone to ask for the ride? The person offering should only have to change/remove a ride'." Several participants commented that they could not confirm a ride after the ride's day and time had passed; however, they thought they should be able to do so.

One participant used the confirm option to see whether his ride was offered in the system. He pressed the * key to return to the main menu, and the ride was apparently deleted. The following is excerpted from his notes:

> "CONFIRM A RIDE — expected to be able to confirm the time of the ride I offered; checked ride ID 158; canceled (using *) while it was in the middle of my user group; tried to confirm again, but ride #158 was not valid; when I tried to confirm ID 157, I canceled before the list was played and was able to re-confirm — it didn't lose the ride"

To correct some of the confusion over the purpose of confirming rides, the option's name could be changed to "logging rides."' The TIC and the QRC could make clearer the idea that people are only using this feature for demonstration tracking purposes. An additional option might be to require that only drivers confirm rides and indicate who is riding with them.

A more radical option might be to remove the confirm feature from the system altogether. It might be more effective to ask BST demonstration participants to keep their own logs of the rides they offer/take. First of all, because a ride was deleted once its day and

time had passed, participants could not confirm rides after the fact; thus, we lost data if participants forgot to confirm a ride before the ride took place. Second, as one participant pointed out, confirmation was something that could be easily neglected. Participants might find writing the information down easier (than calling the system back and going through the menus). Also, if participants forgot to log rides during the week, they could always write it down later, and we might lose less data. We could provide some sort of log notebook for this purpose. We could also solicit usability information — not only about the TIC but about the program in general — in this notebook.

Issue 10: System help

System help was not particularly popular. Three participants did not realize that any system help existed. Participants who used the system help did not find it helpful. One participant pressed "0" for help and remarked that the help seemed "useless." Another participant remarked that "help was no help" and later wrote," . . getting help about a specific problem was unclear to me." One participant commented that when he pressed "0" from within a section (e.g., looking for a ride), the system sent him back to the main menu. It was not clear if he could press "0" for help only at the main menu or throughout the system. He also felt that the help should be context-sensitive; that is, if he pressed "0" while looking for a ride, he wanted to hear help related to looking for a ride.

Since the help feature is not mentioned in the QRC, it should be added to let users know it is there. Making the system help context sensitive would probably be the best solution; however, time constraints might not allow it. Another option would be to review the content of the existing help.

Issue 11: Transit information feature

One participant who tried the transit information option was frustrated that he could not get back to the TIC without hanging up and re-dialing.

Issue 12: Additions/changes for the QRC

Participants liked the size of the QRC and seemed to think the card contained most of what they needed to use the system. The following are problems/suggestions that users made for improving the QRC.

- One participant pointed out that for main menu selection #7, "Get bus information" would be better.
- Information about the * key was not prominent enough; several participants missed it.
- The system help feature should be added to the card.
- The confirmation process should be clarified.
- A separate heading should be used for changing/removing rides.
- Some participants wanted to have a script they could use when calling a driver to form a ride match.

CONCLUSIONS

Seven of the eight participants were able to successfully make ride matches; they may not have made all of their ride matches but they made most of them. Their responses to the system were generally positive. For these seven participants, no obstacles completely prevented them from using the system. It is important to note that this group was fairly comfortable with the TIC's technology'before using the TIC.

As the commuter survey (discussed in Chapter 3) revealed, the people who most need BST's services are the least comfortable with technology. The usability participant who was completely unsuccessful using the TIC was also the least comfortable with its technology. Importantly, her comfort with technology was probabiy closer to that of the ideal BST TIC user population.

The features/concepts that participants seemed to have the most difficulty with were getting contact information and confirming rides. Clarifying these two tasks would greatly increase the TIC's usability.

CHAPTER 6. MARKETING

The first goal of the marketing plan for the BST project was to identify the target audience for participation in the TIC demonstration. Once the audience had been identified, the next goal of the marketing plan was to recruit participants, which we did in two campaigns. In both campaigns, the guiding factor was that the majority of the target audience have no knowledge of the TIC. This chapter focuses on the recruitment campaigns, beginning with a description of the target audience.

TARGET AUDIENCE

The first step in the marketing effort was to identify the target audience for participation in the TIC demonstration. We did this by gathering the following information about potential building and employer sites: (1) number of employees broken down by building site and by individual employers at each site, (2) incentives for employees to carp001 or take a bus, (3) percentage of employees who were SOV drivers, (4) monthly parking fees and whether they were subsidized by an employer, and (5) access to bus transportation .

We found that at most sites, transit riders and carpoolers who commuted by HOV on a regular basis had reserved parking, paid discounted monthly parking fees, and were entitled to two to four days of free parking when they drove alone. The typical SOV rate, when available, was around 79 percent. A poll of the largest employers at each site indicated a mix of employer/employee paid parking. Employees at these sites had access to bus transportation that was no farther than four blocks from their building. These findings are summarized in Table 10 (the bolded entries refer to data for an entire building site; the other entries refer to employers at each building site).

On the basis of the above analysis, we identified two groups for participation in the demonstration: (1) all TransManage (formerly Bellevue TMA) clients and (2) existing carpoolers and vanpoolers who were registered with TransManage.

TABLE 10. Data gathered on potential participants in the BST demonstration

Building Sites and Tenants	Number Employees	Transit/CP Incentives	SOV Rate (in percent)	Parking Data	Transit Availability
Bellevue Place	**1,700**	**Reserved Parking** 2 **mo. SOV park days**	**79**	**$75 month**	**1-4 Blocks**
Microsoft	**500**	$21 bus subsidy	N/A	Employer paid	
Hyatt Regency	275	$15 bus subsidy	79	Market rate	
Seafirst	89	50 percent bus subsidy	75	Market rate	
Koll Center	**1,252**	**2 mos. bus subsidy 50 -60% CP discount** **3 mo. SOV park days**	**N/A**	**$75 month**	**Adjacent Bellevue Transit Center**
HDR Engineers	130		65	Market rate	
Digital	**260**	100% bus subsidy	N/A	Employer paid	
US West	165		29	Market rate	
PACCAR	500	**Free CP parking** **3 mo. SOV park days**	**79**	**$35 mo. rate**	**1-2 blocks**
Plaza/ US Bank	**1,400**	**30% CP discount 4 mo. SOV park days**	**N/A**	**$55 month**	**1 block to Bellevue Transit Center**
Entranco	**80**	$21 bus subsidy	79	75% employer	
Ebasco	**220**	$15 bus subsidy 3 company vanpools	N/A	Employer paid	
US Bank	100	$15 bus subsidy	N/A	Market rate	
Skyline Tower	**1,100**	**5 0 6 0 % CP discount** **3 mo. SOV park days**	**N/A**	**$75 month**	**1 block to Bellevue Transit Center**
Security Pacific Plaza	**905**	**$10 CP discount** **2 mo. SOV park days**	**N/A**	**$80 month**	**1 block to Bellevue Transit Center**
CH2M Hill	**485**	**$40** travel subsidy $15 bus subsidy	**53**	Market rate	
One Bellevue Center	**1,000**	**$10 CP discount**	**N/A**	**$75 month**	**1 block to Bellevue Transit Center**
Puget Power	**1,000**	**$21 bus subsidy** **$25 gift certificate** **Free CP parking** **2 mo. SOV park days**	**69**	**$21 mo. rate**	**1 block to Bellevue Transit Center**
US West	**1,000**	**50-100% CP discount**	**29**	**Market rate**	**1 block to Bellevue Transit Center**

RECRUITMENT CAMPAIGN 1

Our first recruitment campaign consisted of holding meetings; creating a logo; distributing flyers, posters, and brochures; showing video tapes and slides; soliciting media coverage; and developing a guaranteed ride home program. We then selected the participants for the demonstration and held orientations.

Meetings

The first step in campaign 1 was to send introductory letters with background information on the BST project to transportation coordinators and property managers at the sites listed in Table 10. We subsequently met with them to explain how the TIC worked and to gain their support and cooperation for the demonstration. Most of the businesses agreed to allow flyers to be distributed, signs posted, and presentations held when the demonstration was ready to start.

Logo

We next created a logo, which represented the various travel destinations: work, home, and shopping facilities. The logo was used on the brochures, flyers, and posters. (See Appendix J for an example of the logo.)

Flyers/Posters

We created flyers and posters to introduce the TIC to employees at various TransManage events, such as transportation fairs and presentations at the building sites. These flyers emphasized that participants would be provided a free pager that would display ride match information, traffic information, other information (such as news and sports), and personal messages. The flyers included space for potential participants in the demonstration to request further information, and application forms were later sent to these individuals. Posters with similar information were placed in the lobbies of TransManage clients for one week.

While emphasizing free pagers was the most effective way to recruit BST participants, in retrospect, it had significant drawbacks. The problem was that previous

surveys had indicated that the people who were most excited about the technology were also the least likely to require BST's services.

Slide Presentations

Slide presentations introducing BST were shown at local board and community meetings. At these meetings, University of Washington, PacTel Paging, and TransManage staff were on hand to discuss the BST project and explain their respective roles. A number of people attending these meetings were later contacted to help promote the TIC.

Media Coverage

A press release introducing the TIC was sent to key newspapers and TV and radio stations. A number of radio talk-show hosts used the TIC as a topic for their shows, and two TV stations provided four minutes of coverage. The TV videos were subsequently used for a variety of informational and promotional purposes. A press conference was 'also held to demonstrate the TIC.

Brochures/Applications

The most elaborate publication developed to promote the TIC was a two color, fold-out brochure entitled Introducing Bellevue Smart Traveler: Increasing Your Commuting Options (see Appendix J). The brochure explained how the system worked and included a tear-off, postage-paid application form for people who wanted to take part in the demonstration. Applicants also could request entrance into Metro's Regional Ride match system and a list of potential regular carpoolers; about 75 percent of the people applying did so.

Guaranteed Ride Home

Results of the commuter survey (discussed in Chapter 3) showed that fear of being stranded and not having a ride home was a major concern to potential TIC users. To address this issue, we developed a guaranteed ride home program. Under this piogram, participants who could not find a ride home through the TIC had two options: (1) they could take a bus to their home or a park-and-ride lot; or (2) if a bus was not available, they could call

TransManage during regular business hours and request a cab ride home. Participants who needed to get a cab after regular business hours could call the cab company directly and then be reimbursed later by TransManage for the cab fare.

Ride Group Formations

In October 1993 we distributed approximately 7000 brochures to employees at the nine sites listed in Table 10. Distribution methods included direct delivery and placement in building management offices. In addition, posters were placed in the client lobbies.

By November 1993, 86 applications had been received. Applicants were identified on a large area map with colored pins coded to identify whether an applicant wanted to offer a ride, accept a ride, or do both. Based on this information, two ride groups were formed from selected participants-the Southend and Issaquah ride groups. (Many applicants could not be accommodated because they did not fit into a viable ride group.) Because the participants' homes in these two ride groups were so wide spread, park-and-ride lots were identified in addition to pick-up points along the participants' travel routes

The Southend group, with 27 applicants, seemed to have the most potential for being a successful rideshare group. The Issaquah group had only eight applicants, which was not considered a viable number for ridesharing purposes. However, we felt that this group could help us determine the minimum number of participants necessary for a successful ride group. (We expected membership in this ride group to increase during the demonstration, but that did not happen.) A third ride group of nineteen applicants, the Northend group, was formed in January 1994.

Orientations

We kicked off the demonstration with a special orientation for the first participants to show them how to use the TIC. Representatives from the University of Washington, PacTel Paging, the Washington State Department of Transportation, and TransManage each took part in a 45-minute, brown bag lunch presentation. Orientations during the remainder of the demonstration were conducted by TransManage staff in small groups of one or more.

Each participant received an informational foIder with details about park-and-ride locations, buses serving park-and-ride lots, pager use, and the guaranteed ride home program. In addition, participants received an identification tag to attach to the rearview mirrors of their vehicles, a wallet size quick reference guide for using the TIC, and free bus passes for emergency rides home or to a park-and-ride lot. Laminated ID cards were mailed to participants after the meeting, along with a signed form signifying agreement with the terms for use of the pager during the demonstration.

Participants were requested to attempt to make ride matches a minimum of once a week (preferably at least three) as a condition for using the pager. Because of the limited number of participants in each ride group, participants were warned to arrange both their trips to work and trips home at least one day before a ride.

RECRUITMENT CAMPAIGN 2

By January 1994, applications for participation in the TIC demonstration had dwindled, so we began the second recruitment campaign. We created new flyers and posters, and enlisted employers and property managers from the TransManage client sites to distribute them at their sites. We also sent flyers and posters to six new building sites and distributed brochures to about 3000 employees at those sites. Metro also placed posters and brochures at 27 downtown commuting information centers. This campaign produced 35 new applications and approximately 23 new rideshare participants.

CHAPTER 7. SYSTEM USAGE

The BST participants began using the TIC on November 23, 1993. There were two types of TIC users: registered users and guest users. Registered users had access to all system features, as well as access to hand-held alphanumeric pagers or wrist-watch pagers. Guest users could use the system by touch-tone telephone, but could not set up ridematches and had no pagers. (Table 9 in Chapter 5 summarizes the features accessible by various users.)

This chapter first presents statistics on how the TIC was used; these figures are taken from a log that the system automatically updated. This chapter also summarizes results from three telephone surveys conducted in the latter part of the demonstration. These surveys sought to determine users' reactions to the TIC.

STATISTICS ON USE OF THE TIC

Over the five-month demonstration period (late November 1993 to late April 1994), registered and guest users called the TIC 447 times: registered users called 299 times, and guest users called 148 times. People seeking traffic information called 110 times (30 from registered users and 80 from guest users). People seeking transit information called 40 times (6 from registered users and 34 from guest users).

At the program's peak, 53 users were registered. Of the registered users, 48 formed three ride groups: 23 from areas south of Bellevue (the Issaquah group), 10 from areas east of Bellevue, and 15 from areas north of Bellevue. Members from the ride groups offered 509 rides. By telephone, the 48 ride group members looked for 148 rides and accessed additional information on 33 specific rides. However, searching for rides by pager was more convenient than searching by telephone, and we had no way of tracking the number of times users looked at their pagers. Only six ridematches were logged. (Note that logging a ride was optional, so that ridematches could have occurred without being logged.)

Comments from ride-group members indicated that they liked the idea of dynamic ride sharing, but for various reasons they were either unable or unwilling to form ridematches. Some of these reasons included the limited ride-group sizes, which resulted in few ride choices; discomfort using the TIC's technology; and the inconvenience of ride sharing.

The low number of rides sought by telephone is deceiving, since looking for a ride was far easier with a pager. Even so, it appears that far more people were interested in inviting others into their car than they were in getting into someone else's car.

As is to be expected in a test of this kind, we had to address technical issues. The most serious issue was that the pager's screen was limited to 256 characters. The first message design allowed only four rides to be displayed at a time, two to work and two to home. Since we could not increase the number of characters, we redesigned the message format so that messages would use fewer lines, and we also deleted some nonride-share messages. This new design allowed 12 rides to be displayed, six to work and six to home. (See "Using the TIC with an Alphanumeric Pager" for a comparison of the two designs.)

Another issue was the difficulty in tracing pager usage. To address this, an exit survey asked BST participants about their pager usage (see Chapter 8, Completion Survey).

Finally, traffic reports were sometimes suspect because of problems with freeway source data from the WSDOT Traffic Systems Management Center. This problem should diminish as the state enhances its data delivery mechanisms. (The current plan calls for a shift from dial-in modems to direct internet delivery of source data.)

TELEPHONE INTERVIEWS

Bellevue TransManage staff conducted three sets of telephone interviews during the five-month demonstration period. (See Appendix K for a summary of data gathered from these interviews.) The purpose of these interviews was to identify difficulties with the system, inform participants about technical improvements, and obtain information about the use of the system not available through computer statistics.

Bellevue TransManage staff contacted employees at their place of employment during work hours, which necessitated short conversations with a limited number of questions. Every effort was made to contact individuals for each interview; however, some participants were unavailable for some of the interviews.

Interview 1

The first telephone interview was conducted in January 1994 (about two months after the demonstration had started). Although two ride groups had been active since November, all of December and most of January were needed to complete registration of participants for the ridesharing demonstration. The BST staff monitored the groups, especially the small Issaquah group, from the beginning of the demonstration to begin learning about the dynamics of a viable ride group.

The first telephone interview sought information about the participants' initial reaction to the system, particularly the ridesharing feature. Persons who had been offering to drive frequently complained that they had received few calls from riders. A common response from people who had not attempted to rideshare was "I have been too busy at work; I plan on car-pooling as soon as things settle down at my job." Several people commented that they were uncomfortable riding with someone they did not know. Three people were not clear about the use of the pager. None of the participants suggested that they would like to leave the demonstration.

Interview 2

The second interview was conducted in February 1994. This was a more extensive interview that asked questions covering more aspects of the ridesharing program, including pager use. The questions asked were as follows:

- Do you look at your pager to see what rides are offered?
- Approximately how many times a week?
- Have you seen rides offered that correspond to your work schedule?

- (If the participant answered yes) Have you contacted the driver offering the ride about forming a carpool?
- Approximately how many times?
- Have you formed any carpools that have not been confirmed through the TIC?
- Do you use your pager to receive messages from business associates, friends, or family?
- Do you find the traffic and other information services useful?

Bellevue TransManage contacted the three ridegroups, including the Northend Ride Group that formed in January. Members of this new group had experienced some technical difficulties with their pagers during the first three weeks of the demonstration. Consequently, responses from this group may not reflect an accurate assessment of the ridesharing feature.

Of particular interest were the number of times people used their pagers to check on rides offered and their decisions and actions based on that information, The interview revealed that the majority of participants checked their pagers daily for a variety of information. It also confirmed that many of the participants who said they were willing to accept a ride saw rides offered on their pagers that matched their schedules, but for a variety of reasons chose not to call a driver to form a carpool. We had expected that this interview would reveal people who wished to leave the demonstration because they had been unsuccessful in forming ridematches. Generally speaking, however, the participants thought the program was worthwhile and said they would still like to try forming car-pools. (Perhaps they wanted to keep their pagers.)

Telephone Interview 3

A final telephone interview was conducted in March 1994, about a month before the demonstration was due to end. The same questions were used as in the previous interview. In general, respondents to this interview were less enthusiastic about the demonstration than respondents had been to the previous interviews. These people were less confident in the ability of the program to provide them with ridesharing opportunities. Participants who had

consistently offered rides were discouraged by the lack of response and indicated that they now thought they were wasting their time.

Participants who had indicated a willingness to accept rides offered through the TIC at the beginning of the demonstration admitted that a variety of reasons had prevented them from accepting rides, even if the rides had matched their scheduled arrival or departure times. The most common reasons were that they were too busy at work, their life was too complicated, or their schedule was too erratic. The majority of these participants indicated they would probably be unlikely to accept rides in the future. Several participants said that they were ready to return their pager and leave the demonstration.

Despite the low number of ridematches, the majority of pager users indicated that they checked the pager information daily or weekly. The traffic information was most beneficial to people traveling from the southend, where better sensor data provided more accurate traffic conditions. Several people thought that route information on drivers offering rides should be shown on the pager or through the TIC telephone information about participants.

Conclusions from the Teleuhone Interviews

- Participants found it more convenient to offer rides than to accept rides.
- Participants who did attempt to form ridematches had difficulty finding people with compatible travel times to both work and home, which indicates that not enough rides were available to accommodate varied work schedules.
- Convenience and flexibility were the most mentioned obstacles to accepting rides. The time necessary to enter data into the TIC to offer a ride and the time necessary to coordinate a ridematch were other obstacles to using the ridesharing feature.
- The use of a pager, with its traffic, news and paging, was not enough of an incentive to motivate participants to change their driving habits. However, pagers as a method for sending information appears to be successful, as indicated by the high number of users who said they frequently looked at their pagers.
- Participants whose regular commute mode was to carpool or ride the bus were no more likely to use the system for ridematching purposes than were people who drove alone.
- The traffic information feature served a useful purpose when sufficient data were available to inform travelers of road conditions.

CHAPTER 8. COMPLETION SURVEY

In mid-April, just before the conclusion of the demonstration period, the study team sent questionnaires to all active participants in the BST program to help in its assessment of the BST program. The BST questionnaire (Appendix L) was developed jointly by the BST team and the ATIS Assessment team.[1] Together the teams developed a questionnaire containing five sections. The first section of the joint survey included questions designed to develop an audience profile of BST's participants. The second section of the survey concerned the participants' use of the BST system. Section three of the survey focused specifically on the BST participants' ridesharing activities. Questions in section four of the survey closely followed the assessment taxonomy developed by the ATIS Assessment team. The initial questions were directed at the ability of BST to achieve its goals: Did information about traffic congestion influence drivers to change their routes, departure times, or modes? Did information about traffic congestion and HOV lanes influence SOV drivers to change to HOV modes? The remaining questions investigated the usefulness of BST's information, the convenience of the locations in which BST's technology could be used, the helpfulness of BST's technologies, and the usability of BST's format. Participants were also asked to rate the usefulness of other types of information, the convenience of other locations, the helpfulness of other technologies, and the usability of other formats. The final section of the survey asked participants for demographic information.

Twenty-eight BST participants responded to the survey. Chi-squares were used to test for significant differences (at an alpha-level of .05) in the number of responses in each category or ranking scale. The purpose of these tests was to ensure (with 95 percent certainty) that trends evident in the responses were genuine and not merely random variation. Here we will report chi-square test results only in cases where the tests were significant.

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[1] Spyridakis, Plumb, Haselkorn and Michalak, in review.

PART I: AUDIENCE PROFILE

When asked why they had registered for the BST program, approximately 61 percent of the respondents reported that they had wanted to find an occasional carp001 partner. Fifty-seven percent cited curiosity; 36 percent cited saving time by using the HOV lanes; '36 percent cited saving money by carpooling; 21 percent cited an interest in traffic congestion information; 11 percent reported that they had wanted a regular carp001 partner; 11 percent had wanted use of a pager; 11 percent cited an interest in the transit information; and 3.5 percent (one participant) reported an interest in the weather, sports, and news information available on the pager. Seven participants wrote in other reasons for registering: three participants said they were vanpool drivers looking for riders; two participants said they had wanted to save energy (one wrote that s/he had wanted to save energy and the other simply wrote, "conservation"); one wrote that s/he had wanted to help reduce congestion; and one wrote it was "socially responsible."

Of the 28 participants who responded to this survey, ten lived north of Seattle, seven lived in Issaquah, one lived in Seattle, and ten lived south of Seattle. All respondents worked in downtown Bellevue.

Respondents indicated whether they had rideshared before participating in the BST program. Fifty percent of them said yes. Of those who said yes, 21 percent had carpooled less than once per week, 21 percent 1 to 3 times per week, 36 percent 4 to 6 times per week, and 21 percent had carpooled over six times per week.

Respondents then indicated how they usually commuted to downtown Bellevue. The 'majority of them (46.43 percent) usually drove alone (see Table 11).

Only two of the respondents indicated that they had not used their usual mode of transportation to reach downtown Bellevue on the day they filled out the survey. The majority of respondents had used their usual mode of transportation.

Because BST's traffic congestion information is limited only to major freeways (I-5, I-90, SR-520, and SR-405), only travelers who reach downtown Bellevue using these routes

would benefit from the system. Approximately 89 percent of the respondents reported *always* or *usually* using a freeway to reach downtown Bellevue. A chi-square test revealed a significant difference in the number of responses on each point of the rating scale. Table 12 summarizes their responses.

Travelers who rarely or never encountered traffic congestion on the freeways might not find all of BST's information particularly useful. Therefore, a follow-up to the above question was, "How frequently do you encounter traffic congestion on the freeway?" Approximately 75 percent of the respondents reported encountering freeway traffic congestion *always* or *usually*. A chi-square test revealed a significant difference in the number of responses on each point of the rating scale. Their responses are summarized in Table 13.

Table 11. Usual mode of transportation to downtown Bellevue

Usual Mode	Count	%of Respondents
Single occupancy vehicle	13	46.43
carpool	6	21.43
Vanpool	4	14.29
Bus	5	17.86
Totals	28	100.00

Table 12. Frequency of travel to downtown Bellevue via freeways

Rated Frequency	Count	% of Respondents
Never	1	3.57
Rarely	1	3.57
Sometimes	1	3.57
Usually	1	3.57
Always	24	85.71
Totals	28	100.00

($c^2 = 19.14$, df = 4, critical = 9.49, $p < .05$)

Table 13. Frequency of traffic congestion encounters on freeways

Rated Frequency	count	% of Respondents
Never	0	0.00
Rarely	3	10.71
Sometimes	4	14.29
Usually	15	53.57
Always	6	21.43
Totals	28	100.00

(c^2 = 23.07 df = 4, critical = 9.49, $p < .05$)

PART II: SYSTEM USAGE

Respondents were asked how many times they had used the BST phone system to participate in ridesharing (either to look for a ride or to offer a ride), get traffic information, or get transit information. Forty-eight percent of respondents reported never having looked for a ride; nearly 26 percent had looked for a ride less than once per week; and 22 percent reported having looked for a ride one to three times per week. However, respondents reported offering rides more frequently: 50 percent reported having offered rides one to three times per week; 25 percent had never offered rides; and 21 percent had offered rides less than once per week. As for the other information available through the BST phone system, 50 percent of respondents reported having called at least once to get traffic congestion information; however, only 22 percent had called to get transit information. Chi-square tests revealed significant differences in the number of responses on each point of the scale for each of the activities (see Table 14).

Respondents were also asked how many times they had referred to their BST pagers to look for a ride, get traffic congestion information, and get other information (such as weather and sports). Respondents appeared to have used the pager more frequently than the phone system to look for rides and to get traffic congestion information. Fifty-six percent had referred to their pagers to look for a ride at least once per week (compared to 26 percent who reported having used the phone system for the same task at least once per week). Sixty-

one percent of respondents had referred to their pagers to get traffic congestion information at least once'per week. Nearly 70 percent had referred to their pagers at least once per week to get sports and weather information. Table 15 summarizes the results. Chi-square tests did not reveal any significant differences in the number of respondents on each point of the rating scale for any of the three types of information.

The study team was also interested in the locations from which respondents most frequently used the BST phone system. Respondents reported having called the phone system most frequently from work: 52.17 percent of respondents reported having called the phone system one to three times per week from work, compared to 17.39 percent who had called one to three times per week from home. Respondents had called the phone system second most frequently from home. Respondents had rarely called the phone system from other locations, such as shopping centers, or from in their cars. Chi-square tests revealed significant differences in the number of responses on each point of the rating scale for each of the four locations (see Table 16).

Table 14. BST phone system usage reported by participants

No. of times/week participants called the BST phone system to:	Look for a ride		Offer a ride		Get traffic congestion information		Get transit information	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
None	13	48.15	7	25.00	14	50.00	21	77.78
Less than 1	7	25.93	6	21.43	3	10.71	0	0.00
1- 3	6	22.22	14	50.00	3	10.71	2	7.41
4- 6	1	3.70	1	3.57	7	25.00	3	11.11
Over 6	0	0.00	0	0.00	1	3.57	1	3.70.
Totals	27	100.00	28	100.00	28	100.00	27	100.00

(Look for a ride: $c^2 = 20.22$, df = 4, critical = 9.49, $p < .05$)
(Offer a ride: $c^2 = 22.36$, df = 4, critical = 9.49, $p < .05$)
(Get traffic congestion information: $c^2 = 19.14$, df = 4, critical = 9.49, $p < .05$)
(Get transit information: $c^2 = 23.07$ df = 4, critical = 9.49, $p < .05$)

Table 15. BST *pager* usage reported by participants

No. of times/week participants referred to their pagers to:	Look for a ride		Get traffic congestion information		Get other information (e.g., sports, weather)	
	Count	Percent	Count	Percent	Count	Percent
None	9	33.33	8	28.57	3	13.04
Less than 1	3	11.11	3	10.71	4	17.39
1- 3	8	29.63	8	28.57	5	21.74
4- 6	3	11.11	5	17.86	5	21.74
Over 6	4	14.82	4	14.29	6	26.09
Totals	27	100.00	28	100.00	23	100.00

Table 16. Location of phone system use

Times/week participants called BST phone system from:	Home		Work		In-car		Other locations (e.g., shopping centers)	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
None	9	39.13	5	21.74	19	90.48	20	95.23
Less than 1	10	43.48	3	13.04	1	4.76	1	4.76
1- 3	4	17.39	12	52.17	1	4.76	0	0.00
4- 6	0	0.00	2	8.70	0	0.00	0	0.00
Over 6	0	0.00	1	4.35	0	0.00	0	0.00
Totals	23	100.00	23	100.00	21	100.00	21	100.00

(Home: $c^2 = 19.83$, df = 4, critical = 9.49, $p < .05$)
(Work: $c^2 = 16.78$, df = 4, critical = 9.49, $p < .05$)
(In-car: $c^2 = 65.43$, df = 4, critical = 9.49, $p < .05$)
(Other locations: $c^2 = 74.48$, df = 4, critical = 9.49, $p < .05$)

Respondents then indicated how often they had referred to the pager while at various locations. Respondents had referred to their pagers most frequently while at work and second-most frequently while at home: 78.26 percent had referred to their pagers while at work at least once per week, compared to 56.51 percent who had done so while at home. Chi-square tests revealed significant differences in the number of responses on each point of the rating scale for in-car and other locations (respondents had referred to their pagers at

these locations very little). Chi-square tests did not reveal significant differences for at home or at work (see Table 17).

Of the two means of receiving information, respondents had used the pager more frequently than they had used the phone system. For example, only 4.76 percent of respondents reported having called the phone system from other locations, such as shopping centers, whereas 3 1.83 percent reported having referred to the pager while at other locations. Similarly, only 9.52 percent reported having used the phone system from their vehicles, whereas 59.10 percent reported having referred to their pagers while in their vehicles. Only 17.39 percent reported having used the phone system one or more times per week while at home, whereas 56.51 percent reported having used their pagers one or more times per week while at home. As for use while at work, 78.26 percent reported having used their pagers while at work, and 65.22 reported having called the phone system while at work. It appears that even when telephones were readily available, such as at home or work, respondents still used their pagers more frequently.

To further determine user preferences for delivery of BST's information, the questionnaire asked respondents which of the system media-the phone system or the pager-they thought was most useful for ride matching. Out of the 22 respondents who answered this question, 13 indicated that the pager was more useful, three indicated that the phone system was more useful, and six respondents had no opinion.

PART III: RIDESHARING

In Part III, respondents answered specific questions about their ridesharing activities throughout the life of the BST project. First, respondents indicated how many times they had looked for a ride (using either the phone or pager) during the project. Seventeen respondents (61 percent) reported having looked for a ride at least once. Of those 17, eight had found a potential ride. Of the eight respondents who had found a potential ride, five of them had

Table 17. Location of pager use

Times/week participants referred to pager while:	At home		At work		In-car		At other locations (e.g., shopping centers)	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
None	5	21.74	4	17.39	9	40.91	15	68.18
Less than 1	5	21.74	1	4.35	5	22.73	1	4.55
1- 3	7	30.43	4	17.39	5	22.73	3	13.64
4- 6	3	13.04	9	39.13	0	0.00	1	4.55
Over 6	3	13.04	5	21.74	3	13.64	2	9.09
Totals	23	100.00	23	100.00	22	100.00	22	100.00

(In-car: $c^2 = 9.82$, df = 4, critical = 9.49, $p < .05$)

(Other locations: $c^2 = 32.55$, df = 4, critical = 9.49, $p < .05$)

Table 18. Participant-reported ridesharing activity

Ridesharing Activity	None	1 - 5	6 - 10	10 - 20	Over 20
No. of times participants looked for a ride	11	5	2	5	5
Of the above, no. of times participants found a potential ride	9	7	1	0	0
Of the above, no. of times participants called the driver offering the ride	3	5	0	0	0
No. of times participants offered a ride	5	7	4	5	7
Of the above, no. of times participants received a call from an interested rider	22	1	0	0	0

called the driver offering the ride. As for offering rides, 23 of the 28 respondents had offered at least one ride. Of the 23 respondents who had offered rides, only one had received a call from an interested rider. Table 18 summarizes the results.

Respondents were then asked how many times they had carpooled during the project. Of the 28 respondents, seven reported having formed carpools during the project. Each of these seven reported having carpooled only one to five times throughout the life of the BST demonstration. (Two of the 28 respondents had already been members of a vanpool and had

vanpooled regularly before and while participating in the BST project. The study team determined that they had not been influenced by BST to use an HOV mode because they had already been using an HOV mode when they started participating in the BST project; therefore, the study team did not include their responses.)

If respondents indicated that they had never formed a carpool either as a driver or as a rider, they were asked why. The most frequently cited reason was never receiving calls from interested riders. The second-most frequently cited reason was never finding a ride offered at a convenient time. A space was also provided for participants to write in other reasons for not carpooling. Comments that respondents wrote in included the following: "Many rides were offered only one way"; "[I have an] unpredictable schedule to and from work"; and "My schedule did not permit a fixed schedule that carpooling would require!" These comments reveal a tendency among the participants to view ridesharing as a fixed-schedule event rather than dynamic, which was what BST was trying to encourage (see Table 19).

Respondents were then asked what would have made them more likely to cat-pool. Four respondents indicated that getting to know other respondents before carpooling with them would have made them more likely to carpool; five respondents indicated that knowing where other ridesharing participants' homes were located in relation to their own would have made them more likely to carpool; and four respondents said that having pre-determined pick-up points would have made them more likely to carpool. Items that participants wrote in included: "having HOV lanes on my commute"; "also knowing participants' scheduled commute times"; "more 'user-friendly' pager and phone system"; and "higher flexibility in scheduling."

Next, respondents indicated how safe they felt or how safe they would feel ridesharing with other members of the BST program. Respondents indicated a strong sense of safety. A chi-square test revealed a significant difference in the number of responses on each point of the rating scale (see Table 20).

Table 19. Reasons for not carpooling

Reason	No. of Respondents
I offered rides but never received calls from interested riders.	15
I didn' t know other participants.	0
Carpooling took too much time/was inconvenient.	0
I always needed my car to run errands.	1
The logistics of deciding on a pick-up point was too complicated.	1
I never found a ride offered at a convenient time.	11
Other	7

Table 20. Perceptions of ridesharing safety

Scale	Count	Percent
1 Not very safe	0	0.00
2	**0**	**0.00**
3	**7**	**36.84**
4	6	31.58,
5 Very safe	6	31.58
Totals	19	100.00

(c^2 = 18.68, df = 4, critical = 9.49, p < .05)

Table 21. Ease of BST registration

Scale	Count	Percent
1 Not very easy	0	0.00
2	2	8.70
3	1	4.35
4	5	21.74
5 Very easy	15	65.22
Totals	23	100.00

(c^2 = 32.44, df = 4, critical = 9.49, p < .05)

Respondents then indicated how easy it was to register for the BST program. The most common response was 5 (very easy), selected by 15 respondents. A chi-square test revealed a significant difference in the number of responses on each point of the rating scale (see Table 21).

Respondents were then asked whether they felt the verification system was adequate, as Bellevue TransManage had verified only the employment of registered ride match participants. Of the 22 respondents who answered this question, 19 of them indicated "yes." Of the respondents who responded "no," all three indicated that participants' police records should be checked, and one of them also thought that residence and ID should be verified.

Finally, respondents were asked to tell us about any negative experiences they had had as a result of using the BST system. Three respondents wrote in the following comments: "Sometimes rides offered didn't show on pager"; "No calls or no one to call"; and "Very discouraged because no one called me to ride."

PART IV: GENERAL ASSESSMENT

Changes in Route, Departure Time, Mode, and/or Trip Frequency

Respondents were asked how many times per week they had changed their modes of transportation (from an SOV to an HOV mode), their departure times, their routes, or canceled their trips on the basis of the traffic congestion information provided by BST. Only 8 percent of respondents reported having changed to an HOV mode on the basis of BST's traffic congestion information. However, 37 percent had changed their departure times, and 44 percent had changed their routes. As for canceling their trips, approximately 7 percent (two respondents) said they had done so on the basis of the traffic congestion information available on BST. Chi-square test results revealed a significant difference in the number of responses on each point of the rating scale for each question (see Table 22).

Table 22. Ties/Week participants changed driving behavior on the basis of BST information

No. of times/week participants:	Changed to an HOV mode		Changed departure time		Changed route		Canceled a trip	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
None	23	92.00	17	62.96	15	55.56	25	92.59
Less than 1	1	4.00	5	18.52	7	25.93	2	7.41
1- 3	1	4.00	3	11.11	4	14.82	0	0.00
4- 6	0	0.00	2	7.41	1	3.70	0	0.00
Over 6	0	0.00	0	0.00	0	0.00	0	0.00
Totals	25	100.00	27	100.00	27	100.00	27	100.00

(Changed to an HOV mode: $c^2 = 81.20$, df = 4, critical = 9.49, n = 25, $p < .05$)
(Changed departure time: $c^2 = 33.56$, df = 4, critical = 9.49, n = 27, $p < .05$)
(Changed route: $c^2 = 26.89$, df = 4, critical = 9.49, n = 27, $p < .05$)
(Canceled a trip: $c^2 = 89.48$ df = 4, critical = 9.49, n = 27, $p < .05$)

If respondents indicated that they had never changed any aspect of a trip or canceled it, they were asked why. Respondents could check as many reasons as they felt applied to them and were also provided with an "other" category in which they could write in a response. Reasons given for not changing to an HOV mode were no bus service to the respondent's destination (three respondents); no rides available (five respondents); and the inconvenience of bus/carpooling (two respondents). Six respondents indicated that they could not change their departure times and two respondents reported that changing their departure time had been too inconvenient. Two respondents indicated that they could not change their routes, and one respondent reported that changing his/her route had been too inconvenient. Nine respondents indicated that they could not cancel their trips. Reasons provided in the other category included the following: "Too short notice"; "Info on pager was pretty sparse, i.e., SR 405 ave speed 25-but where?"; "Already carpooling"; "Vanpool leaves, arrives, and follows the same route/times"; "Was told not available in Bellevue"; "Information on the pager was vague and not specific to locations"; "Info for my route [was] not available due to construction"; "I take the bus everyday already"; "Information was inaccurate/inadequate"; and "Info was not related to my route home."

Congestion Level Needed to Affect Travel Plans

Respondents were asked how congested their route would have to be before they would change their travel plans (i.e., route, departure time, or mode). In response, 40 percent said that. their route would have to be severely congested. Only 15 percent said that they would not change their travel plans under any circumstances (see Table 23).

Usefulness of BST's Information

Respondents were asked to rate the usefulness of the information available through the BST phone system on a scale of 1 to 5 (5 best). First, respondents rated the usefulness of the system's ridesharing information: The most common rating was 2; however, the responses were fairly evenly spread across the scale (a chi-square test did not reveal a significant difference in the number of responses on each point of the rating scale). Next, respondents rated the usefulness of transit information available through the BST phone system. The most common response was 1: not very useful. A chi-square revealed a significant difference in the number of responses on each point of the rating scale. Respondents then rated the usefulness of the traffic congestion information available on the phone system, Here the most common responses were 1 or 2 (nine respondents selected 1 and nine selected 2). (Chi-square results also revealed a significant difference in the number of responses on each point of the rating scale for traffic congestion information. Table 24 summarizes the data.

Next, respondents rated the usefulness of the information available through the BST pager on a scale of 1 to 5. The most common rating for the ridesharing information available on the pager was 4; however, the responses were fairly evenly spread across the scale (a chi-square test did not reveal a significant difference in the number of responses on each point of the rating scale). Respondents then rated the usefulness of the pager's traffic congestion information. The most common response was 1: not very useful. A chi-square test did not reveal a significant difference in the number of responses on each point of the rating scale for traffic congestion (see Table 25).

Table 23. Congestion level required before BST respondents would change travel plans

Would change if:	count	% of Respondents
Stopped completely	8	29.63
Severe	11	40.74
Moderate	4	14.81
Would not change plans under any circumstances	4	14.81
Totals	27	100.00

Table 24. Rated usefulness of BST's phone system information

Scale	BST Phone System Information					
	Ridesharing		Transit		Traffic Congestion	
	Count	Percent	Count	Percent	Count	Percent
1 Not Very useful	5	20.00	11	42.31	9	34.62
2	8	32.00	8	30.77	9	34.62
3	4	16.00	5	19.23	3	11.54
4	6	24.00	2	7.69	4	15.39
5 Very useful	2	8.00	0	0.00	1	3.85
Totals	25	100.00	26	100.00	26	100.00

(Transit information: $c^2 = 15.15$, df = 4, critical = 9.49, $p < .05$)
(Traffic congestion information: $c^2 = 10.15$, df = 4, critical = 9.49, $p < .05$)

Table 25. Rated usefulness of BST's *pager* information

Scale	BST Pager Information			
	Ridesharing		Traffic Congestion	
	Count	Percent	Count	Percent
1 Not very useful	5	19.23	9	34.62
2	4	15.39	3	11.54
3	5	19.23	6	23.08
4	9	34.62	5	19.23
5 Very useful	3	11.54	3	11.54
Totals	26	100.00	26	100.00

Respondents then chose which of the information types in Table 26 they would find most useful, second most useful, and third most useful. As their first choice, 22 percent of

Respondents then chose which of the information types in Table 26 they would find most useful, second most useful, and third most useful. As their first choice, 22 percent of respondents selected detailed traffic congestion information. Traffic congestion for HOV lanes; traffic congestion for SOV lanes; information about one-time, on-demand carpooling; and information about carpooling or vanpooling were the second most popular first choices, each selected by 14.82 percent of respondents. As their second choice, 22 percent chose detailed traffic congestion information; 14.82 percent chose traffic congestion for SOV lanes; and 14.82 percent chose carpooling or vanpooling information. For their third choice, 19.23 percent chose traffic congestion for SOV lanes. (Chi-square test results revealed significant differences in the number of responses for first and second choices (see Table 26).

Convenience of BST's Location(s)

Next, respondents ranked the top three most convenient locations for receiving each of the types of information offered by BST. First, respondents ranked their top three choices for receiving ridesharing information (Table 27). Work and "portable" (e.g., pager) were the top two first choices for location, with 32 percent of respondents selecting each of them. (Obviously, a portable device is not a location; however, "portable device" implies that the information can be accessed wherever the user is.) As for their second choice, 56 percent of respondents selected "work." For their third choice, 32 percent of respondents selected home and 32 percent selected "portable." Malls and other commercial areas were ranked quite low; no one selected them as either a first or second choice for receiving ridesharing information. The number of responses between location preferences for receiving ridesharing information differed significantly for first and second choices, but not for respondents' third choices.

As for their choices of locations for receiving transit information, work was the first choice of 43.48 percent of respondents. The next most popular first choice of location for receiving transit information was home (30.44 percent). Work and home were the most popular second choices as well, as 34.78 percent of respondents choose each. For their third

Table 26. BST respondents' ranking of information types by usefulness

Information Type	1st Choice		2nd Choice		3rd Choice	
	Count	Percent	Count	Percent	Count	Percent
Traffic congestion for HOV lanes	4	14.82	2	7.41	3	11.54
Traffic congestion for SOV lanes	4	14.82	4	14.82	5	19.23
Detailed traffic information (why traffic is congested, what's being done about it, etc.)	6	22.22	6	22.22	1	3.85
Estimation of travel time for a particular trip	1	3.70	3	11.11	3	il.54
Help selecting the quickest route to destination	3	11.11	3	11.11	3	11.54
Help selecting the most direct route to destination	0	0.00	0	0.00	0	0.00
Detailed directions for finding destination	0	0.00	0	0 . 0 0	0	0.00
Information about business or services on route	1	3.70	0	0.00	1	3.85
General bus information (route, schedule, fare)	0	0.00	1	3.70	2	7.69
Trip-specific bus information (route,, schedule, fare)	.O	0.00	0	0.00	2	7.69
Real-time ("live") data about bus schedules and bus locations	0	0.00	1	3.70	2	7.69
Car-pooling or vanpooling information	4	14.82	4	14.82	2	7.69
Information about one-time, on-demand carpooling	4	14.82	3	11.11	2	7.69
T o t a l s	27	100.00	27	100.00	26	100.0

1st choice: (c^2 = 26.44, df=12, critical=21.03, p < .05)
2nd choice: (c^2 = 21.63, df = 12, critical = 21.03, p < .05)

Table 27. BST respondents' choice of locations for receiving ridesharing information

Locations	1st Choice		2nd Choice		3rd Choice	
	Count	Percent	Count	Percent	Count	Percent
Home	7	28.00	9	36.00	8	32.00
Work	8	32.00	14	56.00	2	8.00
In-Car	2	8.00	0	0.00	5	20.00
Malls and other commercial areas	0	0.00	0	0.00	2	8.00
Portable device (like a pager)	8	32.00	2	8.00	8	32.00
Totals	25	100.00	25	100.00	25	100.00

1st choice: (c^2 = 11.2, df = 4, critical = 9.49, p < .05)
2nd choice: (c^2 = 3 1.2, df = 4, critical = 9.49, p < .05)

Table 28. BST respondents' choice of locations for receiving *transit* information

Locations	1st Choice		2nd Choice		3rd Choice	
	Count	Percen	Count	Percen	Count	Percent
Home	7	30.44	8	34.78	5	21.74
Work	10	43.48	8	34.78	4	17.39
In-car	1	4.35	0	0.00	6	26.09
Malls and other commercial areas	1	4.35	2	8.70	4	17.39
Portable device (like a pager)	4	17.39	5	21.74	4	17.39
Totals	23	100.00	23	100.00	23	100.00

1st rank: (c^2 = 13.30, df = 4, critical = 9.49, $p < .05$)
2nd rank: (c^2 = 11.13, df = 4, critical = 9.49, $p < .05$)

Table 29. BST respondents' choice of locations for receiving *traffic congestion* information

Locations	1st Choice		2nd Choice		3rd Choice	
	Count	Percent	Count	Percent	Count	Percent
Home	6	23.08	4	15.39	8	30.77
Work	3	11.54	13	50.00	7	26.92
In-Car	13	50.00	2	7.69	6	23.08
Malls and other commercial areas	0	0.00	0	0.00	1	3.85
Portable device (like a pager)	4	15.39	7	26.92	4	15.39
Totals	26	100.00	26	100.00	26	100.00

1st rank: (c^2 = 18.23, df = 4, critical = 9.49, $p < .05$)
2nd rank: (c^2 = 19.77, df = 4, critical = 9.49, $p < .05$)

choice, 26.09 percent chose in-car and 21.74 percent chose home. Chi-square tests revealed significant differences in the number of responses on each point of the rating scale for respondents' first and second choices (see Table 28).

As for their choices of locations for receiving traffic congestion information, 50.00 percent selected in-car as their first choice, followed by 23.08 percent who selected home as their first choice. Work was the most popular second choice (50.00 percent chose it) followed by portable device (26.92 percent chose it). For their third choice, 30.77 percent chose home and 26.92 percent chose work. Chi-square tests revealed significant differences

in the number of responses on each point of the rating scale for respondents' first and second choices (see Table 29).

Helpfulness of BST's Technology

Respondents rated the helpfulness of the technologies employed by BST as a means for providing ridesharing, traffic congestion, and transit information. Respondents first rated the BST phone system. The most common rating of the phone system's helpfulness for delivering ridesharing information was 3; for delivering transit information, the most common rating was 4; and for delivering traffic congestion information, the most common rating was 1 (not very helpful). (Chi-square test results did not reveal a significant difference in the number of responses on each point of the rating scale for any of the information types (see Table 30).

As for the pager, the most common rating for its helpfulness as a means for delivering ridesharing information was 5: very helpful. Chi-square test results revealed a significant difference in the number of responses on each point of the rating scale for the pager's delivery of ridesharing information. For its delivery of traffic congestion information, the most common rating was 4. Chi-square test results did not reveal a significant difference in the number of responses on each point of the rating scale for any of the traffic congestion information (see Table 3 1).

Table 30. Rated helpfulness of BST's *phone system*

Scale	BST Phone System Information					
	Ridesharing		Transit		Traffic Congestion	
	Count	Percent	Count	Percent	Count	Percent
1 Not very helpful	2	7.69	3	11.54	7	26.92
2	5	19.23	6	23.08	6	23.08
3	6	23.08	5	19.23	5	19.23
4	8	30.77	9	34.62	6	23.08
5 Very helpful	5	19.23	3	11.54	2	7.69
Totals	***26***	100.00	26	100.00	26	100.00

Table 31. Rated helpfulness of BST's *pager*

Scale	BST Paeer Information			
	Ridesharing		Traffic Congestion	
	Count	Percent	Count	Percent
1 Not very helpful	1	3.85	1	3.85
2	3	11.54	7	26.92
3	4	15.39	3	11.54
4	8	30.77	8	30.77
5 Very helpful	10	38.46	1	26.92
Totals	26	100.00	26	100.00

(Ridesharing information: $c^2 = 10.54$, df = 4, critical = 9.49, $p < .05$)

Respondents were then asked to rank the top three most helpful technologies for the delivery of ridesharing, transit, and traffic congestion information. For the delivery of ridesharing information, 36 percent of respondents selected portable device as their first choice; the next most popular first choice was computer (32 percent). Computer was the most popular second choice (28 percent). The next most popular second choice was phone with a touch-tone menu and synthesized voice, selected by 24 percent. For their third choice, 32 percent chose phone with live operator, and 28 percent chose phone with a touch-tone menu and synthesized voice. Chi-square results revealed significant differences in respondents' selections for first, second, and third choices (see Table 32).

For the delivery of transit information, 34.78 of respondents who answered this question selected computer as their first choice. The next most popular first choices were phone with a touch-tone menu and synthesized voice and portable device, each selected by 21.74 percent. For their second choice, 34.78 percent of respondents selected phone and touch-tone menu and synthesized voice, 26.09 percent chose computer. The most popular third choices were AM or FM radio and phone with live operator (21.74 percent selected each). Chi-square results revealed significant differences in respondents' selections for first and second choices (see Table 33).

Table 32. Respondents' ranking of various technologies by helpfulness for delivery of *ridesharing* information

Technology	1st Choice		2nd Choice		3rd Choice	
	Count	Percent	Count	Percent	Count	Percent
Computer	8	32.00	7	28.00	2	8.00
Regular TV	1	4.00	1	4.00	2	8.00
Cable TV	0	0.00	2	8.00	0	0.00
AM or FM radio	4	16.00	1	4.00	2	8.00
Short-distance highway advisory radio	0	0.00	2	8.00	0	0.00
Interruption of AM or FM stations for traffic information about your route	0	0.00	0	0.00	1	4.00
Phone-live operator	0	0.00	1	4.00	8	32.00
Phone-touch-tone menu with synthesized voice	3	12.00	6	24.00	7	28.00
Variable message signs	0	0.00	-0	0.00	2	8.00
Portable device (like a pager)	9	36.00	5	20.00	1	4.00
Totals	25	100.00	25	100.00	25	100.00

1st choice: (c^2 = 43.4, df = 9, critical = 16.92, $p < .05$)
2nd choice: (c^2 = 23.4, df = 9, critical = 16.92, $p < .05$)
3rd choice: (c^2 = 27.4, df = 9, critical = 16.92, $p < .05$)

Table 33. Respondents' ranking of various technologies by helpfuless for delivery of *transit* information

Technology	1st Choice		2nd Choice		3rd Choice	
	Count	Percent	Count	Percent	Count	Percent
Computer	8	34.78	6	26.09	1	4.35
Regular TV	0	0.00	1	4.35	2	8.70
Cable TV	0	0.00	3	13.04	1	4.35
AM or FM radio	3	13.04	0	0.00	5	21.74
Short-distance highway advisory radio	0	0.00	0	0.00	1	4.35
Interruption of AM or FM stations for traffic information about your route	0	0.00	1	4.35	1	4.35
Phone-live operator	2	8.70	2	8.70	5	21.74
Phone-touch-tone menu with synthesized voice	5	21.74	8	34.78	3	13.04
Variable message signs	0	0.00	0	0.00	0	0.00
Portable device (like a pager)	5	21.74	2	8.70	4	17.39
Totals	23	100.00	23	100.00	23	100.00

1st choice: (c^2 = 32.22, df =9, critical = 16.92, $p < .05$)
2nd choice: (c^2 = 28.74, df = 9, critical = 16.92, $p < .05$)

Respondents then ranked various technologies by helpfulness for delivery of traffic congestion information. For their first choice, 38.46 percent selected portable device, and 23.08 percent selected AM or FM radio. The most popular second choices were AM or FM radio (26.92 percent) and portable device (15.39 percent). The most popular third choices were computer (19.23 percent) and AM or FM radio (15.39 percent selected each). Chi-square results revealed significant differences in respondents' selections for their first choice only. Interestingly, only two people selected a form of telephone delivery as their first choice (see Table 34).

Understandability of BST's Format

Respondents rated the understandability of BST's phone system delivery of ridesharing, transit, and traffic congestion information on a scale of 1 to 5. The most common response for ridesharing information was 4, for transit information was 3, and for traffic congestion information was 4. Chi-square test results did not reveal significant differences in the number of responses on each point of the rating scale for any of the information types (see Table 35).

Respondents also rated how easy the phone system's menu selections were to follow on a scale of 1 to 5. The most common rating was 5 (very easy to understand). A chi-square test did not reveal a significant difference in the number of responses on each point of the rating scale (see Table 36).

Respondents then rated how easy the recorded voice was to understand. The most common response was 5 (very easy to understand). A chi-square test revealed a significant difference in the number of responses on each point of the rating scale (see Table 37).

Table 34. Respondents' ranking of various technologies by helpfulness for delivery of *traffic* congestion information

Technology	1st Choice		2nd Choice		3rd Choice	
	Count	Percent	Count	Percent	Count	Percent
Commuter	0	0.00	3	11.54	5	19.23
Regular TV	1	3.85	1	3.85	2	7.70
Cable TV	1	3.85	2	7.70	0	0.00
AM or PM radio	6	23.08	7	26.92	4	15.39
Short-distance highway advisory radio	3	11.54	1	3.85	1	3.85
Interruption of AM or FM stations for traffic information about your route	1	3.85	4	15.39	3	11.54
Phone-live operator	1	3.85	0	0.00	2	7.70
Phone-touch-tone menu with synthesized voice	1	3.85	2	7.70	2	7.70
Variable message signs	2	7.70	2	7.70	4	15.39
Portable device (like a pager)	10	38.46	4	15.39	3	11.54
Totals	26	100.00	26	100.00	26	100.00

1st choice: ($c^2 = 33.23$, df = 9, critical = 16.92, $p < .05$)

Table 35. Rated understandability of BST *phone* system's delivery of information

Scale	BST Phone System Information					
	Ridesharing		Transit		Traffic Congestion	
	Count	Percent	Count	Percent	Count	Percent
1 Not very easy to understand	1	4.00	2	9.09	0	0.00
2	3	12.00	2	9.09	4	16.67
3	5	20.00	7	31.82	5	20.83
4	9	36.00	6	27.27	8	33.33
5 Very easy to understand	7	28.00	5	22.73	7	29.17
Totals	25	100.00	22	100.00	24	100.00

Table 36. Rated understandability of phone system's menu selections

Scale	Count	Percent
1 Not very easy to understand	1	4.76
2	3	14.29
3	2	9.52
4	7	33.33
5 Very easy to understand	8	38.10
Totals	21	100.00

Table 37. Rated understandability of recorded voice

Scale	Count	Percent
1 Not very easy to understand	0	0.00
2	1	4.76
3	2	9.52
4	7	33.33
5 Very easy to understand	13	61.91
Totals	21	100.00

(c^2 = 26.38, df = 4, critical = 9.49, p < .05)

Table 38. Rated understandability of the BST pager's delivery of information

Scale	BST Pager Information			
	Ridesharing		Traffic Congestion	
	Count	Percent	Count	Percent
1 Not very easy to understand	5	19.23	9	34.62
2	4	15.39	3	11.54
3	5	19.23	6	23.08
4	9	34.62	5	19.23
5 Very to understandeasy	3	11.54	3	11.54
Totals	26	100.00	26	100.00

(Ridesharing information: c^2 = 15.04, df = 4, critical = 9.49, p < .05)

Next, respondents rated the understandability of BST's pager delivery of ridesharing and traffic congestion information on a scale of 1 to 5. The most common response for ridesharing information was 4; for traffic congestion information the most common response was 1 (not very useful). Chi-square test results revealed a significant difference in the number of responses on each point of the rating scale for ridesharing but not for traffic congestion information (see Table 38).

Respondents then rated on a scale of 1 to 5 how easy the pager's menu selections were to follow. The most common response was 4. A chi-square test did not reveal a significant difference in the number of responses on each point of the rating scale (see Table 39).

Table 39. Rated understandability of pager's menu selections

Scale	Count	Percent
1 Not very easy to understand	1	5.26
2	2	10.53
3	5	26.32
4	6	31.58
5 Very easy to understand	5	26.32
Totals	19	100.00

Respondents then ranked various delivery formats for ridesharing, transit, and traffic congestion information by their understandability. The most popular format for delivery of ridesharing information was text (52 percent). The second most popular first choice was speech (36 percent). The most popular second choice was speech (50 percent), and the next most popular second choice was text (37.5 percent). The most popular third choice was maps (66.67 percent), followed by charts or graphs (23.81 percent). Chi-square tests revealed significant differences in respondents' selections for their first, second, and third choices of format (see Table 40).

Table 40. BST respondents' choice of formats for delivery of *ridesharing* information

Locations	1st Choice		2nd Choice		3rd Choice	
	Count	Percent	Count	Percent	Count	Percent
Maps	3	0.00	1	4.17	14	66.67
Charts or graphs	0	12.00	2	8.33	5	23.81
Text (printed words)	13	52.00	9	37.50	1	7.76
Speech (spoken words)	9	36.00	12	50.00	1	4.76
Totals	25	100.00	24	100.00	21	100.00

1st choice: (c^2 = 16.44, df = 3, critical = 7.81, $p < .05$)
2nd choice: (c2 = 14.33, df = 3, critical = 7.81, $p < .05$)
3rd choice: (c^2= 21.48, df=3, critical=7.81, $p < .05$)

As for respondents' ranking of formats for delivery of transit information, 56.52 percent selected maps as their first choice, followed by 26.09 percent who chose text. For their second choice, 31.82 percent chose text, followed by 27.27 percent who chose speech. The most popular third choice was speech and text each selected by 27.27 percent. A chi-square test revealed significant differences in the number of responses on each point of the rating scale for respondents' first choices (see Table 41).

Table 41. BST respondents' choice of formats for delivery of *transit* information

	1st Choice		2nd Choice		3rd Choice	
Locations	Count	Percent	Count	Percent	Count	Percent
Maps	13	56.52	4	18.18	5	22.73
Charts or graphs	1	4.35	5	22.73	5	22.73
Text (printed words)	6	26.09	7	31.82	6	27.27
Speech (spoken words)	3	13.04	6	27.27	6	27.27
Totals	23	100.00	22	100.00	22	100.00

1st choice: ($c^2 = 14.39$, df = 3, critical = 7.81, $p < .05$)

Respondents then ranked formats for the delivery of traffic congestion information. Forty-four percent selected speech as their first choice, and 40 percent chose maps. Maps and speech were also the most popular second choices, as 29.17 percent chose maps and 29.17 percent chose speech. The most popular third choice was text, chosen by 45.83 percent. A chi-square test revealed a significant difference in the number of responses on each point of the rating scale for respondents' first and third choices (see Table 42).

Rating of BST's Phone System Interface

Respondents rated their satisfaction with the way the BST phone system responded to their input on a scale from 1 to 5. The most common response was 4. Chi-square test results revealed a significant difference in the number of responses on each point of the rating scale (see Table 43).

Table 42. BST respondents' choice of formats for delivery *of traffic congestion* information

Locations	1st Choice Count	1st Choice Percent	2nd Choice Count	2nd Choice Percent	3rd Choice Count	3rd Choice Percent
Maps	10	40.00	7	29.17	5	20.83
Charts or graphs	1	4.00	6	25.00	4	16.67
Text (printed words)	3	12.00	4	16.67	11	45.83
Speech (spoken words)	11	44.00	7	29.17	4	16.67
Totals	25	100.00	24	100.00	24	100.00

1st choice: (c^2 = 11.96, df = 4, critical = 9.49, p<.05)
3rd choice: (c^2 = 14.39, df = 4, critical = 9.49, p<.05)

Table 43. Rated satisfaction with BST's phone system interface

Scale		Count	% of-Respondents
Not at all satisfied	1	2	8.00
	2	1	4.00
	3	5	20.00
	4	9	36.00
Very satisfied	5	8	32.00
Totals		25	100.00

(c^2 = 10.00, critical = 9.49, p <.05)

Preference for Read-Only or Interactive Interface

Next, respondents indicated whether they preferred a read-only or interactive interface for the delivery of ridesharing, transit, and traffic congestion information. Ninety-two percent preferred an interactive interface for the delivery of ridesharing information (c^2 = 18.62, df = 1, critical = 3.84, p< .05). For the delivery of transit information, approximately 88 percent preferred an interactive interface (c^2 = 15.39, df = 1, critical = 3.84, p< .05), and nearly 77 percent preferred an interactive interface for the delivery of traffic congestion information (c^2 = 7.54, df = 1, critical = 3.84, p < .05).

Reliability of BST's Information

Respondents indicated on a scale of 1 to 5 their perceptions of the reliability of the three types of information provided by BST. Chi-square tests did not reveal any significant

differences in the number of responses on each point of the rating scale for either ridesharing or transit information. However, the same test for traffic congestion information did reveal significant differences (see Table 44).

Table 44. Rated reliability of BST's information

Scale	BST Phone System Information					
	Ridesharing		Transit		Traffic Congestion	
	Count	Percent	Count	Percent	Count	Percent
1 Not very reliable	1	5.26	1	6.25	6	31.58
2	2	10.53	1	6.25	3	15.79
3	3	15.79	8	50.00	6	31.58
4	7	36.84	4	25.00	3	15.79
5 Very reliable	6	31.58	2	12.50	1	5.26
Totals	19	100.00	16	100.00	19	100.00

(Traffic congestion information: $c^2 = 10.88$, df = 4, critical = 9.49, $p < .05$)

As already discussed, the pagers provided weather, news, stock reports, and personal paging services, in addition to ride matching information. Participants were asked whether they would participate in a future BST program if these additional services were not available. Of the 18 participants who answered this question, 14 said "yes."

Next, participants were asked whether they would be willing to pay for BST's services. Of the 22 participants who answered this question, only eight said "yes" (the remaining 14 said "no"). If they answered "yes," they indicated how much they would be willing to pay for use of the telephone system per call and for use of the pager on a monthly basis. On average, the eight participants who said they would be willing to pay $0.50 per call for use of the phone system and $8.75 per month for use of the pager.

PART V: DEMOGRAPHICS

In the fifth and final section of the survey, respondents answered questions regarding their ages, individual and household incomes, number of people in their households, and whether they were sight or hearing impaired. This survey section was optional.

Respondents averaged 37 years of age (SD = 8.38 years, n = 23). Respondents averaged 3.27 people per household (SD = 1.16, n = 22).

Respondents indicated their yearly individual and household incomes. Individually, the majority of respondents (42.86 percent) earned between $40,000 and $59,999 annually. The majority of household incomes (38.89 percent of respondents) fell between $60,000 and $79,999 annually (see Table 45).

Respondents were also asked whether they were hearing or sight impaired. One respondent indicated that she was sight impaired but that it was correctable.

Table 45. Respondents' individual and household incomes

Income	Individual Income		Household Income	
	Count	Percent	Count	Percent
Under $20,000	0	0.00	0	0.00
20,000-39,999	6	28.57	0	0.00
40,000-59,999	9	42.86	3	16.67
60,000-79,999	5	23.81	7	38.89
80,000-99,999	0	0.00	4	22.22
Over 100,000	1	4.76	4	22.22
Total	21	100.00	18	100.00

(Individual income: $c^2 = 19.86$, df = 5, critical = 11.07, $p < .05$)
(Household income: $c^2 = 12.00$, df = 5, critical = 11.07, $p < .05$)

CHAPTER 9. CONCLUSIONS AND RECOMMENDATIONS

The general impression from the BST study is that participants liked the idea of dynamic ridesharing, liked the presentation of the information, liked the technology, were willing to offer rides, and used BST to receive other forms of information; but for various reasons were either unable or unwilling to form ride matches. Some of the likely reasons were as follows:

- The limited size of rideshare groups resulted in insufficient rideshare choices.
- Participants were uncomfortable getting into another's car.
- A lack of HOV lanes in the Bellevue area (they were under construction) limited time saving incentives.
- Participants were recruited by their interest in the technology, but the more people were attracted to the technology, the less likely they were to require BST services, probably becuase they tend to work at well paying jobs, and so have no economic reason to carpool.
- Technological limitations, particularly the few number of rides that could be shown on the pager at one time, reduced the effectiveness of pager delivery.

Since dynamic ridesharing is a relatively new concept, we suspect that a longer time is needed to study and achieve the behavioral changes that would make it a viable transportation alternative. For now, we can confidently conclude that

(1) people prefer to offer rather than accept rides

(2) the factors that constitute a viable ride group need to be explored further.

These conclusions suggest that more work is needed to determine (1) how to encourage ride acceptance and (2) the dynamics of a viable ride group (e.g., number of members, geographic proximity, flexibility, location of park and rides). The rideshare group is a new social entity, and we know little as yet about what will make it successful.

In addition, incentives could have played a stronger role in a number of areas.

- Predetermined meeting places for carp001 pick-ups would add a time saving feature to potential ride matches. These pick-up points would be easy to establish in a small urban center or office/industrial park.
- Working with large companies or office/industrial parks to establish an internal network for the TIC could increase participation by increasing access to the employee population. Employees would also be more likely to feel "safer" carpooling with a fellow employee.
- Implementing more financial incentives to rideshare may be necessary in future demonstrations of the TIC. Working with a large company or group of companies could provide a source of additional funds for added incentives, for example, by paying employees for each day they rideshare.
- Management support and encouragement may be an incentive to employees in companies that are attempting to meet the goals of Washington State's Commute Trip Reduction Law.

In the end, it remains far too early to judge the viability of the Smart Traveler concept. This is because Smart Traveler is primarily a social experiment, and only secondarily a technical one. At this stage, the actual number of matches achieved is far less important than what we have learned, and need to learn, about rideshare groups, people's willingness to get in another's vehicle, and people's willingness to have others get in their vehicle. We can be assured, however, that if these questions are answered, the communication technology will be available to implement the solution.

TECHNOLOGY

Other conclusions and recommendations relate to the technology used to implement BST. These include the following:

- The capacity for showing more ridesharing messages on the alphanumeric pager screen is necessary to provide an optimum number of ridesharing possibilities to users.
- Two-way paging, which is expected to be introduced in 1995, will allow a potential rideshare participant to page acceptance of a ride directly to the person offering the ride.

This would expedite the matching process and reduce the time needed to form a ride match.

- Placing the BST TIC on the Internet would help people more easily obtain and respond to rideshare information. Messages could be more flexible; rideshare groups could be e-mail groups; and when a potential ride was identified, accepting the ride would be as easy as typing a mail message.
- Receiving real-time traffic information on a computer screen would give the user access to a more complete visual concept of traffic conditions, allowing the user to make an informed decision about departure time, or whether to carp001 and use the HOV lanes. @Thus, hand-held computers would have significant advantages over pagers.
- BST should be linked to other efforts to improve bus information, such as King County Metro's RiderLink project.
- Participants would benefit from map printouts or other ways to provide users with the directions to meet a potential carp001 partner. (Addresses should not be provided to protect participant confidentiality.)

IMF'LEMENTATION

Finally, tie present some recommendations for future implementations of the smart traveler ridesharing system.

- Select participants who require the service and adjust the technology accordingly. In the current demonstration, users were recruited by being offered a free pager. This provided willing participants in a short time frame, but those participants were less likely to require BST's services. These willing participants tend to work at well paying jobs, and thus have minimal economic reason to car-pool. The people who are most serious about forming car-pools tend to work in low paying jobs, so they have an economic reason to carpool. However, people in low paying jobs may need training and practice in the use of modern electronic technologies.

- Make the traffic congestion information provided on the pager more specific and timely. The pager is a technology worth pursuing for the delivery of both traffic congestion and ridesharing information. However, respondents' comments revealed that the traffic congestion information available on the pager was inadequate (i.e., it was not location-specific enough). Respondents also expressed some concern about the timeliness of the pager's information.
- Provide hands-on training (for example, walking users through the system using a speaker phone). Respondents' comments indicated that some of them found the phone system intimidating. We should perform additional testing of the phone system with more realistic users (our first usability study on the phone system had fairly technologically sophisticated participants) and make changes accordingly.
- Revise the menu structure and add additional features. Some participants expressed annoyance that they could not enter round trip rides (they had to enter the ride to work separately from the ride home). Further, participants who had fixed schedules also wanted to be able to enter their rides for the week in one step. In the current system design, users have to enter one ride at a time, so if users want to offer rides to and from work for each day of the business week, they have to tediously enter 10 separate rides.
- Stress even more strongly the dynamic aspect of BST (i.e., remind participants that having an erratic schedule should not prevent them from using the system and that the system is geared toward providing ride matches on a dynamic basis). Participants' comments revealed that they still viewed the system as a means of forming carpools on a fixed, regular schedule. This became apparent when participants gave reasons for not carpooling such as "my schedule is too erratic."
- Tie the next phase of BST (if there is one) to the opening of the new HOV lanes on I-405. Interest in using the new time-saving lanes will be highest when they open, and BST provides a mechanism by which people can try them out without committing to a permanent Carpool.

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BELLEVUE SMART TRAVELER
A REVIEW OF RELEVANT LITERATURE

APPENDIX A

BELLEVUE SMART TRAVELER: A REVIEW OF RELEVANT LITERATURE

by

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December 1992

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INTRODUCTION

Phase II of the Bellevue Smart Traveler (BST) project will create a prototype traveler information center (TIC) to be placed in a downtown Bellevue office building. The prototype will provide three types of information: real-time information, transit information, and ridematching information. By providing both real-time traffic congestion and other commuter information, the BST kiosk will emphasize the advantages of alternative commuting modes over SOV travel. The kiosk will also make existing transit and paratransit alternatives easier to access, more flexible, and safer. In addition, the BST kiosk will provide a new alternative: dynamic ridematching. Dynamic ridematching will allow commuters at the BST test site to rideshare to and from work on an occasional, on-demand basis. To make the information as accessible and useful as possible, the BST kiosk should ideally integrate all three information components into a Single, interactive interface.

This literature review describes relevant projects that provide one or more of the three types of information and that lend themselves to an information kiosk format.

RELEVANT DRIVER INFORMATION SYSTEMS

To help commuters make the best mode choices, the traffic information component of the BST kiosk will provide real-time traffic information in an interactive format. The information system used should be able to respond to specific requests for route information and be able to provide estimated driving times based on the user's travel origin and desired destination. Furthermore, to emphasize the advantages of using HOV modes, the system should ideally provide information regarding travel time savings if HOV modes are used.

It is important to note that there are a number of driver information systems that provide real-time traffic information via television and radio. For obvious reasons, radio does not apply to a kiosk format. Television technology could be used in a kiosk to display

information; however, television will not allow us to create an interactive interface that responds to specific requests for information. Therefore, television and radio-based systems are not considered here.

Greenway Plaza, Houston, Texas[1,2]

Infobanq, a commercial advisory traffic service, has placed 10 computer display terminals on various parking levels of the Greenway, Plaza, an office park that supports 12,000 employees. The Greenway Plaza dso serves as a transportation center: it is a transfer point for airport shuttles and for many bus routes. The display terminals provide real-time traffic information, as well as information about freeway construction and accidents. Infobanq uses a mainframe computer to compile traffic information that is provided by commercial and state sources. The computer then relays this information to a file server in Greenway Plaza; the file server forwards the information to the ten terminals. The system updates the information displayed on the terminals every five minutes, and the information is checked for accuracy every 15 minutes. Although this system provides real-time traffic information and could be used in a kiosk format, it is not interactive nor does it provide specific information about HOV facilities, which are both desired features for the BST kiosk.

INFORM, Rhode Island, New York[3,4]

INformation FOR Motorists (INFORM) is a joint project of the Federal Highway Administration (FHWA), the New York State Department of Transportation (NYSDOT), and the transportation agencies of Long Island. INFORM is a corridor traffic information system designed to obtain better use of highways in a 40-mile corridor on Long Island. The primary goal of INFORM is to manage traffic through the use of variable message signs (VMS) that reflect real-time conditions. The system combines electronic surveillance, communications, and signing to give motorists warnings and route diversion information and to control freeway ramps and signals. Various offices, department stores, and media

groups subscribe to the service. They access INFORM's system by modem and receive a computer-generated map that is color-coded according to the speed of various corridor sections. Some, like the Fortunoff department store, pass on this information to customers at information booths. If the subscriber has a dedicated line, the information on the map is updated once per minute. Otherwise subscribers simply update their information whenever they want by dialing in again. Estimated drive times and delay times are not yet available.

Houston Smart Commuter, Houston, Texas[1,5]

The Texas Transportation Institute (TTI) is currently conducting an operational test-known as the Houston Smart Commuter project-to examine means of encouraging more efficient use of Houston's highways by providing real-time traffic information to commuters at home and at work. The real-time traffic information is gathered from various sources, such as loop detectors embedded in the freeways, video cameras, and ramp metering. People at home will be able to access the traffic information via television and telephone technologies. The primary goal of Houston Smart Commuter is to provide information on alternative commute modes, and their operational test will consist of two components: one focusing on bus travel, the other on ridesharing. These components of Houston Smart Commuter will be further discussed in the next section.

Traffic Reporter, Seattle, Washington[6]

The Traffic Reporter (TR) prototype is a PC-based, graphical, interactive advanced traveler information system (ATIS) developed by the University of Washington in cooperation with the Washington State and United States Departments of Transportation. It receives traffic data from freeway detectors and converts that data into up-to-the-minute traffic information. TR displays a map of major corridors in the Seattle area; a color-coding scheme is used to reveal the average speed of traffic in each section of the corridors. A user can access specific trip information by using a mouse or touch screen interface. Upon request, TR provides the user with information regarding the best freeway routes available

between the user's origin and desired destination, providing estimates of driving time and travel speeds for each alternative route. TR also provides an estimated travel time savings if HOV lanes are used.

Summary

All of the systems described above provide real-time information, but TR is the only one that responds to specific trip requests and provides comparative information on SOV and HOV travel times. These features plus its geographic coverage give TR obvious application to the proposed Bellevue Smart Traveler TIC. Of the systems reviewed, TR is also best suited for a kiosk format because of its interactive menu and touch screen display.

RELEVANT TRANSIT INFORMATION SYSTEMS

The transit information component of the BST kiosk should offer schedule, route, and arrival and departure times for bus routes serving the kiosk site. To provide the most useful information, the kiosk should give information that reflects real-time transit operations. The system used should also be interactive or "menu-driven" (i.e., respond to specific information requests) so that users can access desired information quickly and easily. Furthermore, the ideal system would be accessible from home. Most current transit information systems are geared toward providing transit information over the telephone, which gives users access from home; however, relatively few have been devised that support a kiosk format.

ESDS, Berkeley, California[7,8]

Caltrans and the Regional Transit Association have sponsored the development of electronic schedule display systems (ESDS) for use in Regional Transit Information Centers throughout the San Francisco Bay area. An ESDS is located at 8 different transit stations around the city. The ESDS display looks similar to an arrival/departure information screen used at an airport. The screen provides the next two departure times for

each bus leaving the station, and it updates the information every 15-20 seconds. It is important to note, however, that the information provided is static (based on predetermined schedules) and does not reflect real-time conditions. Each ESDS stands alone (i.e., they are not networked) and consists of a Macintosh Plus computer. Each one is individually programmed and is apparently less expensive to operate than a centralized system. The only problems that have hindered the system so far have been hot weather and dust (problems not likely to be encountered by the BST kiosk). An informal survey was conducted of users of the system; users responded that they initially had difficulty reading the schedule, but once they understood the layout, they found the information very valuable.

Metro Vision of North America, Inc., Syracuse, New York[9]

Metro Vision of North America has developed a computerized transit information system (called Metro Vision) that uses color television monitors to display transit information as well as news, weather, sports, and advertising. Each monitor displays 40 still-frames or pages of information. It displays a page for 15 seconds and repeats all 40 pages every 10 minutes, 24 hours a day. Eighteen pages are dedicated to transit information; ten pages are dedicated to news, weather, sports, etc.; the remaining twelve pages are dedicated to advertising. Metro Vision of North America, Inc. installs the system at no cost to the transit authority; they generate their revenue by selling the advertising space. Thus far, several transit authorities-including transit operations in Rochester and Syracuse, New York, and in Long Beach, California-have had the Metro Vision system installed.

Such a system may be useful in the BST kiosk: the technology could be used to display only transit information specific to the work site, or a system could be devised that displayed transit information interspersed with a calendar of events taking place in Bellevue. This system is not interactive and the use of a television monitor may limit our

ability to make the other two types of information-ridesharing and real-time traffic—accessible from 'the same interface as the transit information.

CRIS, Salt Lake City, Utah[10]

Unlike ESDS and Metro Vision, the Computerized Rider Information System (CRIS) provides transit information that reflects real-time operations. CRIS, which was developed by the Utah Transit Authority (UTA), consists of an automatic telephone service that provides bus stop-specific schedule and service information to residents throughout UTA's service region. Potential riders call telephone numbers assigned to specific bus stops or groups of stops. A computer generated voice provides the arrival times of the next two or three buses serving that stop. The bus dispatchers have access to the dispatch/communication system as well as the CRIS; they monitor the bus drivers' reports of schedule deviations and enter this information into the CRIS. When delays or detours occur or when service is stopped, bus dispatchers can select messages that indicate the amount of delay, the reason for the delay or stoppage, and/or a telephone number to call for additional information.

Various factors inhibit the use of the CRIS system over the pre-existing customer service line. First, the CRIS system has many telephone numbers (nearly one phone number per bus stop), whereas the customer service department for transit users has only one phone number. Because of the many phone numbers involved in using CRIS, it is difficult to display this information-as well as details about the use of CRIS-on bus route schedules, route maps, etc. Furthermore, CRIS provides a much narrower range of service information than a rider could receive from calling the customer service line and talking to a human operator.

BusTime, Seattle, Washington[11]

BusTime, an automated rider information system similar to CRIS described above, was fully operational in Seattle on October 14, 1991. A vendor in Toronto, Teleride Sage,

provides the software used for the BusTime system. Like CRIS, individual bus stops/zones are represented by a phone number. When a potential rider calls one of the bus stop-specific numbers, an automated voice tells them when the next 2-3 buses will arrive at that stop. Although currently the information provided by BusTime is static, Metro's radio data project is developing automatic vehicle location (AVL) technology that could enable BusTime to provide real-time schedule information (although there are no plans to do so in the near future). The advantage that BusTime has over a printed schedule is that its information is zone specific; BusTime can interpolate between time points (i.e., it can provide departure times for a particular route for a bus stop that is not specifically listed in the printed schedule). BusTime has been marketed through Metro's operator assistance line (553-3000), but, like the CRIS system, it is difficult to market cost effectively.

To upgrade BusTime, Metro is currently working on an automated directory project, which will most likely be in place for public use in September 1993. The upgrade will make BusTime into an interactive, menu-driven system accessible via touch-tone telephone. With the upgrade, the caller will need to only know a single phone number and, through a series of voice prompts, will be guided to the information they need for a specific bus stop. Once the caller has accessed that information he or she would be given that bus stop's number for future calls to the system. Then the caller will simply have to punch in the bus stop number at the appropriate prompt rather than having to go through the entire menu again. The upgrade will also allow BusTime to provide special service information, fare information, or future bus schedule information (rather than being limited to giving information on the next 2-3 buses). However, the coordinators of the BusTime service stress that it is not a trip planning service; BusTime assumes callers already know what route they want and where their bus stop is.

TranStar, Commuter Transportation Services, Los Augeles[12,l3]

Two California transit authorities (Sunline Transit in Thousand Palms and Riverside Transit in Riverside) are using TranStar software-developed by Commuter Transportation Services, Inc. of Los Angeles-to provide their transit riders with accurate transit information that takes special rider needs into account. The transit rider calls in and provides her origin and desired destination, arrival or departure time, date of trip, customer fare category, wheelchair need and customer preferences (e.g., lowest fare, least travel time, shortest walking distances). A human operator gives the caller the following information: route and destination, boarding location, fare, scheduled time of departure, return route information, complete transfer information (if needed), and an optional printed itinerary of the route information, which can be sent to the caller's home.

In the next few months, Commuter Transportation Services, Inc., and IBM will be working jointly for the Southern California Air Quality Management District to devise interactive, walk-up kiosks that will offer transit information to tourists in Palm Springs. These kiosks will be in place by June 1993. The project will use IBM's multi-media kiosk design to develop a kiosk suited for relaying transit information. IBM's kiosk features can include a magnetic strip reader, touch screen, CD-ROM, printer, and modem. The proposed Palm Springs kiosk will tap into Commuter Transportation Services' central facility for the transit information. Initially, the user will refer to a list of landmarks rather than specific street addresses to obtain route and bus stop information.

Travlink, Minneapolis, Minnesota[14,15]

Travlink will test a system that integrates real-time automatic vehicle location (AVL) technology and a videotex-/audiotex-based traveler information system. Travlink will aid fleet management by providing real-time location data; it will also help ensure connections are made between feeder buses and express buses. Using videotex and audiotex

technology, Travlink will provide transit users and ridesharers with relevant real-time traffic and transit information at home, offices, park and ride lots, and transit terminals.

Several demonstration projects around the country are testing (or are planning to test) the effectiveness of videotex and audiotex systems to communicate real-time traffic, transit, and ridesharing information. Videotex and audiotex are relatively new interactive communications media that use telephone lines to transmit information. The user interface for a videotex system may take the form of a television screen or a PC; whereas an audiotex system is accessed by a touch-tone telephone. Teletel, a videotex system widely used in France, provides subscribers with a remote terminal called the Minitel to access a number of commercially-sponsored information services. The Minitel displays information using conventional television screens. Videotex systems are becoming more common in the U.S.; for example, the Prodigy system provides subscribers with the software and hardware needed to create a user-friendly link between a PC and a central facility via telephone lines. Information and services provided to Prodigy users include home shopping, travel information, electronic encyclopedias, etc. The advantage of videotex or audiotex is that they can integrate existing transportation information and provide a coordinated presentation of that information through a single interface. Instead of the user having to turn to different sources for different types of transportation information, a single videotex terminal could give the user access to all available transportation information.

Houston Smart Commuter, Houston, Texas[1,5]

The Houston Smart Commuter project shares many goals with Bellevue Smart Traveler. As mentioned in the previous section, their demonstration will use real-time traffic information to encourage bus travel and ridesharing. They will focus specifically on bus travel on the I-45 north corridor and carpooling on the I-10 west corridor in Houston. The bus component of the project will deliver real-time traffic information and bus schedules to people's homes and offices. The carpooling project will test an employer-

based real-time carp001 matching service. The carpooling component may involve an in-vehicle ridematching information delivery system to allow for dynamic ridematching. Currently, the researchers involved in the Houston Smart Commuter project are considering using cable television and telephone technology to deliver information for both components of the project but have not made any firm decisions. Their project differs from BST because it isn't geared toward a kiosk format that provides all three types of information (real-time traffic, transit, and ridesharing) through a single interface; however, because our projects are trying to coordinate the same types of information for the same purpose (i.e., emphasizing alternatives to SOV travel), it will be important to monitor their progress.

Gateway, Overlake, Washington[16]

The recently proposed Gateway project will test a videotex ATIS in three different Seattle environments: an office park, a suburban city, and a residential area. The system will provide public access to transportation information, such as bus schedules, paratransit information, ride requests and matching, Washington State Ferry schedules, and traffic congestion information; however, the information provided will be specific to each test site. The project will provide the end-users in each of the three test sites with videotex terminals or the videotex software needed for connecting a PC to the system and free system connect time. U S West Communications will provide the videotex gateway through their Community Link service.

Summary

A combination of several technologies being used to provide transit information may prove useful for the Bellevue Smart Traveler kiosk. For example, we could install an ESDS in addition to providing participants with BusTime information, thereby enabling them to use the kiosk for transit information at their worksite (using the ESDS) as well as access transit information from home (using BusTime). An advantage of an ESDS, such

as the one used in Berkeley, is that it is easy to program and inexpensive compared to other transit information systems. The advantage that BusTime has for the Bellevue Smart Traveler project over other programs that use telephone technology is that it is already in use with information specific to Bellevue. We could simply provide participants at the kiosk site with information regarding the use of BusTime, or, assuming that we have access to the their addresses, we could provide them with the BusTime telephone numbers specific to bus stops near their work site and their home addresses.

Another option for the Bellevue Smart Traveler project is the use of videotex technology. The advantage of videotex is that it can combine transportation information from different sources into a single interface. It may be possible to place a videotex terminal in the lobby of the chosen building site. A drawback to videotex, however, is that its access from home is limited to those who own the appropriate equipment. Unlike the Gateway project, it is not within the scope of the Bellevue Smart Traveler project to provide videotex terminals to all of the building's employees. We could potentially provide the videotex software to those who already had PCs and modems, but previous research has shown that the individuals most likely to change commute mode are also least likely to be able to afford to have a computer and modem at home.

RELEVANT RIDESHARING SYSTEMS

Ridesharing can take various forms. The most common form is regular ridesharing, which means the commuter rideshares for the Monday through Friday home-work-home commute trip, and the commuter typically works an 8-hour day shift. In addition to regular ridesharing, BST will provide a means for dynamic ridesharing. Dynamic ridesharing refers to ridesharing that takes place on an occasional, unscheduled basis. The successful coordination of a ridesharing prograrn-whether accommodating regular or dynamic rideshating-requires attention to the following factors:

- Geocoding method, The geocoding method (i.e., placing employees in ridesharing zones) must provide zones large enough that there are enough employees within each zone to provide for matching.
- Alternatives to the ridesharing mode, To increase participants' confidence in the system, there must be alternative modes readily available in the event that a ride falls through.
- Screening methods, To ensure the safety of the participants, screening methods must be established. The screening may take the form of in-person registration, driving record checks, and verification of driver's insurance. Participants may also be given individual passwords or PINs that they must use to access the system.
- Database accuracy, The ridesharing database, especially one making dynamic ridematches, must be kept accurate. If old requests for rides or offers of rides are kept in the system too long, participants may no longer trust the information provided. Depending on the type of system, the information may need to be purged every week.
- Matchlist delivery, If a ridesharer is trying to set up a regular ridesharing situation for the daily commute, he or she may be perfectly willing to wait several days or even a week to receive a match. However, in a dynamic situation where, for example, a commuter just wants to rideshare on the following day, he or she will probably need the match information the evening before.
- Follow-up contact, The further success of a ridesharing system also depends on the timing of follow-up contact provided by the ridematch service. Programs that contact participants soon after the matchlist is provided have higher success rates.

- Driver incentive or compensation. People needing a ride tend to use a ridesharing system more aggressively than people who are able to offer rides. To attract drivers, we may need to give them special incentives to participate in a ridesharing program. One incentive would be a proposed "fare" schedule that not only compensates drivers but increases their level of interest in participating. Another incentive might be a special prize drawing for drivers who join the program and stay in it for a certain period of time (we may also want to use something like this for riders as well).
- Marketing, As one would expect, most ridesharing programs experience an increase in membership during marketing periods. We will need to devise a marketing plan that will attract and maintain interest in the program.
- Liability issues. The program must determine to what extent it could be held liable for various incidents (accidents, missed opportunities because a ride fell through, etc.). Typically, because participants use their own vehicles and the actual ridesharing occurs as an agreement between the ridesharers involved, programs have limited or no liability. However, programs that provide vehicles for vanpooling must run background checks on the drivers in addition to insuring the vehicles.
- System accessibility. To accommodate both regular and dynamic ridesharing, a ridesharing system must be accessible not only from the office but also from home.

The following projects have been included in this review because of the insight they provide into one or more of the above factors.

Ridesharing' Information and Mapping System (RIMS)[17]

The Ridesharing Information and Mapping System (RIMS) is an employer-based microcomputer program developed by University of Washington researchers to aid a

Transportation Coordinator in making ridematches quickly and accurately. The program provides detailed maps showing clusters of potential matches and possible routes for the ridesharing trip. RIMS is capable of providing tables and maps that describe the shortest possible routes between residences and the workplace. These maps are customized for a specific group of ridesharers and can be updated as the group changes (i.e., if participants drop out or others join).

The geocoding method employed for the demonstration of RIMS is the 7-digit ZIP code. The researchers found that it was fast and easy to have the U.S. Postal Service convert addresses containing only 5-digit ZIP codes into 9-digit ZIP codes (the Postal Service does not charge for this service). The first 7 digits of the 9-digit ZIP code is what the Postal Service calls a "sector," and a 5-digit ZIP code contains 50-150 of these 7-digit sectors. The research determined that the 7-digit ZIP code provided the appropriate amount of geographic detail for mapping employees' residences. The research assumed that most employers have an electronic list of employee addresses and that this list is continuously updated; the program then used this data to generate the maps of residence locations.

This method may prove useful to BST because it not only matches employee addresses, it also further provides customized maps, which may help ridesharers feel more comfortable driving in areas that they are not familiar with. Furthermore, the 7-digit ZIP code geocoding method may be more useful than the full 9-digit ZIP code. The 9-digit ZIP code often refers to only to a single apartment building or a single block-this level of detail is probably not useful for making ridematches.

Metro Regional Ridematch Program, Seattle, Washington[18,19]

Metro's Regional Ridematch program primarily provides regular ridematching. Metro maintains a database of Ring County residents interested in ridesharing (in 199 1 the database listed over 18,000 people). An individual who wishes to rideshare contacts Metro by either calling them directly or mailing in a Ridematch application. The application asks

for the person's home address (which is kept confidential), work or school address, work and home phone numbers, time of arrival and departure from work, and the name of the most conveniently located Park & Ride for the applicant. The individual is then added to the database. Within 3 to 5 days, the participant receives a list of names and phone numbers of people who have similar commute origins, destinations, and times. To keep its database accurate, Metro requests updated commute information by mail from the participants. At some point during the BST project, we may want to request updated information to keep our database accurate as well. Metro sends its first update card 3 months after a participant applies; another card is sent after 6 months and again after 12 months. If the participant does not respond during those 12 months, Metro removes him or her from the database.

Metro has also developed an efficient geocoding method that we may want to consider. They use a geograhic information system (GIS) based on the new TIGER file developed for use in the 1990 census. The GIS consists of a grid of 1 kilometer squares. Approximately eighty percent of applicants' addresses geocode automatically.

Metro Vanpool Program, Seattle, Washington[20]

Metro's Vanpool program provides a van, fuel, maintenance, staff support, and insurance to groups of 7 to 15 people who commute together. A volunteer drives the van, and another volunteer does the bookkeeping for the group. Metro runs a motor vehicle record check on the driver and a credit check on the bookkeeper. The driver of the van rides for free, and the other participants pay a monthly fee based on the commute's round-trip mileage and the number of participants in the vanpool. To increase the number of options made available through the BST project, we should also assist participants who want to form van pools.

RideShare Link (RSL), Fone-Link, Inc.[21]

Fone-Link, Inc. of Newport Beach, California, has developed a ridematching program, RideShare Link (RSL), that can accommodate both regular and dynamic ridematching using voice processing technology. RSL consists of an interactive voice response software system that answers telephone calls and performs ridematching 24 hours a day, 7 days a week. The first phone call takes about 6 minutes; subsequent calls take 3-4 minutes. When a potential ridesharer calls, the system obtains the following ridematch data:

- if desired, language selection
- type of ridesharing desired (i.e., regular, dynamic, or both)
- telephone number
- PIN identifier
- a company identifying code (if required)
- distance willing to travel to meet rides
- name of caller
- smoker/non-smoker
- driver, passenger, or both
- departure 9-digit ZIP code
- destination g-digit ZIP code
- days on which ridesharing is desired
- leave time
- return time
- special needs:
  - pickup sequence to allow dropping kids at school
  - handicap condition
  - situation where 9-digit ZIP code is not adequate

The method for determining the 9-digit ZIP code is not automated; however, Fone-Link can supply a program that lists all of the addresses in an area and provides the g-digit ZIP for each address. RSL determines the latitude and longitude of a 9-digit ZIP code: the latitudes and longitudes are then used to find the distance between other latitudes and longitudes thereby accurately calculating the distance between one rideshare participant and another.

A difficulty lies in the fact that callers must know their 9-digit ZIP codes before placing their first call to RSL; thus, the ridematching becomes a two-step process for the participant. For example, instead of simply supplying their address to a Transportation Coordinator and then receiving a ridematch list back, they must supply their address, wait

to receive their g-digit ZIP code, call the RSL system, and then receive their ride match. This method seems to place more of the initial burden on the ridesharer.

Loseff Voicemail Model[22]

Donald Loseff, a transportation consultant in Seattle, has developed a model for a ridematching system based on voicemail. In the proposed voicemail system, each participant receives a subscriber voicemail box and a distribution list associated with that mail box. The distribution list contains the voicemail boxes of all the participants within a particular ridesharing zone. When a participant needs a ride, he or she enters the message once, and it is sent to everyone on the distribution list. When an individual on the distribution list replies to the message, his or her response goes directly to the mail box of the participant who sent the initial message; thus, the participants create their own matches.

During the registration process, participants would need to be initially geocoded. Loseff suggests having the registrants geocode themselves by providing a map on the registration form so that they can place themselves within a ridesharing zone. Once the administrator has obtained all of the registration information, the administrator assigns voicemail boxes to each participant. Then a distribution list (consisting of the mail box numbers of participants within each individual's ridesharing zone) would be given to each individual. However, Loseff suggests that the administrator could simply allow the participants to create their own distribution lists. In this approach, the initial distribution list for each participant would consist only of the administrator's voicemail box. Then a printed zone list with all box numbers for participants within a particular ridesharing zone could be distributed along with instructions on how to add these numbers to the voicemail distribution lists. Participants could then create their own personalized distribution lists. In this way, they could add mail boxes of individuals who are not in their zone but are on their route to work, or they could delete mail boxes of individuals who may be in their ridesharing zone but still aren't conveniently located.

The ridesharing system that Loseff describes requires much less administrative effort because the participants not only geocode themselves but also do their own ridematching. Although the participants operate with little intervention from the administrator, the administrator can still closely monitor the ridematches being made by adding his or her own mail box to each distribution list.

A potential drawback to Loseff's suggested model is that the instructions for using the system and creating distribution lists may seem daunting to participants especially if they have had little previous, contact with voicemail technology. Another drawback, which Loseff acknowledges is that people needing a ride could be expected to use the system most. aggressively, whereas people able to offer rides may check the system only occasionally. A program that provided special incentives to drivers may be needed. Voicemail systems also require a large amount of computer memory, and Loseff recommends that the system be purged once a week. If the system is providing dynamic ridematching, requests for rides would become quickly out-of-date and purging the system once a week would be entirely appropriate. Voicemail ridematching has not yet been attempted; however, Loseff provides a detailed description of how a demonstration project might proceed.

Integrated Telephony[23]

Telephone-based approaches to ridesharing, such as those charactetized by RSL and Loseff's voicemail model, solve the problem of providing home access to the ridesharing system. However, the problem of presenting ridematching information at the Transportation Information Center (TIC) remains. Thus far, no project has attempted to provide a kiosk-based ridematching service; in existing TICs, the actual ridematching isn't performed at the kiosk site. Integrated telephony (i.e., the integration of telephone technology with personal computers) has been made possible through software provided as an extension to System 7 on Macintosh computers. The set of system 7 extensions is

called the Open Collaborative Environment (OCE) and provides users with a single mechanism for electronic mail, file sharing, and other collaborative work efforts. A software program, such as VISIT Voice developed by Northern Telecom, used in conjunction with OCE may make it possible to integrate the voicemail system suggested by Loseff with a computer interface at the actual kiosk. The ridesharing system could then be visually displayed and accessed at the kiosk, and participants could also access the system from home via their telephones and voicemail. Participants who happened to own PCs could access the system through them, but access would not be limited to only those who had this equipment.

California Smart Traveler, San Francisco, California[24]

The proposed California Smart Traveler (CST) project will evaluate the use of audiotex and videotex information systems as a user-friendly means of communicating information to drivers and riders so they can make informed travel decisions (whether they are using private vehicles or public transportation). The CST project will seek specifically to develop the use of single-trip carpools (i.e., parataxis) by using videotex and audiotex systems. The primary purpose of the CST project is to attract special trip commuters out of their single-occupant vehicles. Here it is important to make a distinction between the dynamic ridesharing that BST will provide and the single-trip carpools that CST accommodates. CST will focus on special trips that are not work-related. These trips are short distance, suburb-to-suburb trips and are generally in one direction. These single-trip carpools can also be formed at any time of day. On the other hand, BST will provide dynamic ridesharing for the home-work-home commute. Although it is dynamic in the sense that it is occasional and unscheduled, BST's dynamic ridesharing program will most likely accommodate 9 to 5 work hours and may often involve both directions of the trip.

Although BST will focus on the work-related commute trip, aspects of CST's parataxi research still apply. For example, CST uses a formula that was developed by the

University of Hawaii to determine a "'fare" schedule for ridesharing. The formula is based on a U.S. Department of Energy report, "Vanpool Options and Energy Savings Potential." The USDOE conducted a survey to determine how drivers' interest in providing carpool/vanpool rides increased with increased monthly compensation. CST used this information for setting an appropriate "fare" for driver compensation. Once the interest level of potential drivers in BST's ridesharing program is determined, we could apply such a formula to determine what an appropropriate compensation rate might be. CST recommends that "fares" be set at sixty cents per mile for the first two miles and twenty cents per mile for every mile thereafter.

CST has also devised a security system algorithm for screening drivers and riders who desire to participate in the program; this algorithm may provide an appropriate screening method for BST's ridesharing program. CST's security system will be based on standard touch-tone telephone equipment using audiotex technology (the features that CST outlines would be the same for a videotex system). Because the BST project involves a closed-group (i.e., employees of a single building), participants would only have to go through this procedure once.

Commuter Connection, Marin County, California[25]

This program tested the feasibility of flexible registered ridesharing in the Golden Gate commute corridor in the San Francisco Bay area. The program enabled commuters to share rides on an occasional basis as either drivers or riders. Someone needing a ride stood at a designated spot, usually near an established bus stop, and held out her Commuter Connection card until a driver participating in the program drove by and picked her up (the researchers referred to this form of dynamic ridematching as "institutionalized hitchhiking"). CC proved to be a workable mode choice for .7% of transbay commuters who commuted along the Golden Gate corridor to San Francisco.

CC's methods of ensuring safety, addressing liability issues, and establishing a fare schedule are all relevant to BST. All CC participants registered for the program in person and paid a $2 registration fee. As part of the registration process, CC photographed each participant and verified his or her place of work. One photo was affixed to the member's card, and a duplicate photo along with the application form and verification was maintained in the project files. Each participant was then given an ID card, which they were to show to other members when a match was made. The registration process served as a screening method that would assure members that all other pass-holding members were verified, authentic members. Each member then received a membership packet with an ID card, a plastic wallet, instructions on using the system, and a suggested fare schedule for drivers. During focus group discussions, members said the appeal of the program was related to the "personal, hands-on registration procedure." The findings on the issue of security were confused because, although all participants strongly supported in-person registration, most said they did not check the photograph on the ID cards. This behavior implies that the in-person registration, not the photograph, was the critical factor in ensuring that the participants felt secure In preparation for BST's ridesharing program, we may want to consider setting up in-person registration for employees of the test site. Although all the participants in the BST project will be employed in the same building, they won't necessarily know each other, and in-person registration may be a means of making participants feel more comfortable ridesharing. It may also help to assure them that "unscreened outsiders" will not be able to use the ridesharing system.

Another component of CC that is relevant to BST is their determination of liability issues Because CC did not operate the vehicles, they were unlikely to be found liable for a loss sustained by a driver or a rider; however, CC had a policy that provided $3,000,000 comprehensive general liability coverage. They also found that ordinary automobile policies provided the coverage needed for casual carpooling; the driver was covered as long as any "fares" paid by the riders constituted expense sharing. The screening process

employed by BST will need to check not only driving records but also insurance coverage of potential drivers.

Summary

Each ridesharing project discussed here brings relevant information for approaching at least one of the ridesharing factors discussed at the beginning of this section of the review. For example, we may want to employ the California Smart Traveler project's approach to setting up a fare schedule and screening participants, and we may want to employ the in-person registration used by the Commuter Connection program. Of the geocoding methods described, we may want to further explore using the 7-digit ZIP code, or we may want to use Metro's GIS approach.

The difficulty at this time with increasingly popular videotex systems is that people must have special equipment (e.g., a videotex terminal or a PC equipped with videotex software) before they can access the system from home. The following are possible options for incorporating a ridesharing interface that is accessible from home and work:

- to set up a videotex terminal at the site as well as introduce an audiotex system that allows people to access rideматching information from home,
- to simply display information about how to sign up for ridesharing on the kiosk and then utilize either RSL or Loseff's voicemail model as the means of ridematching,
- to set up an integrated telephony system (one that integrated a computer interface with a voicemail system) through which participants could use a computer at the kiosk site to make their ridematches or they could use their telephones at home, or
- to provide participants with the names and phone numbers of people within their ridesharing zone (similar to what Metro does) so that they can call them at home if a ride is needed for the next day. (However, people may not feel

comfortable calling someone they don't know on the spur of the moment and may prefer to contact him or her through a more formal means.)

These are only a few suggestions for approaches that we may want to consider; more possibilities will certainly come to light.

CONCLUSIONS AND RECOMMENDATIONS

The BST kiosk will provide real-time traffic information that emphasizes the advantages of using alternative commute modes over SOV travel. To enhance the use of these alternative modes, the kiosk will provide transit and ridesharing information. In addition, the information offered will accommodate dynamic ridesharing. To make this information as useful and accessible as possible, the three information types should ideally be integrated into a single interface that responds to specific requests for information.

To provide real-time traffic information, Traffic Reporter is the best option available; not only does it already provide information specific to Bellevue, it also provides travel time savings if HOV modes arc used. TR is also well-suited for a kiosk format because of its interactive menu and touch screen display. These features plus its geographic coverage give TR obvious application to the proposed Bellevue Smart Traveler TIC.

In our approach to providing transit information, a combination of several technologies may prove useful for the Bellevue Smart Traveler kiosk As mentioned earlier, we could install an ESDS in addition to providing employees with BusTime information; thus, employees would be able to use the kiosk for transit information at their worksite (using the ESDS) as well as be able to access transit information from home (using BusTime) Although the ESDS described earlier is not interactive, we may be able to enhance the software to provide an interactive format. The advantage that BusTime has for the Bellevue Smart Traveler project over other programs that use telephone technology

is that it is already in use with information specific to Bellevue. It is also likely to be menu-driven by September 1993.

For the ridesharing component, we must consider not only how to present the ridesharing information but also how to market the program, register and screen participants to ensure safety, geocode participants to provide useful ridesharing zones, give incentives to drivers, setting up a fare schedule, and following up to make sure rideматches have been made. We may want to employ the California Smart Traveler project's approach to setting up a fare schedule and to screening participants; we may also want to employ the in-person registration used by the Commuter Connection program. Of the geocoding methods described, we may want to further explore the 7-digit ZIP code or Metro's GIS approach.

To provide for dynamic ridematching, we must devise a ridesharing system that participants can access from home as well as at the kiosk. As already discussed, one possible option might be to integrate a voicemail system that participants can access from home with a computer system that they can use at the kiosk site. Another option would be to simply display information about how to sign up for ridesharing at the kiosk and then utilize either RideShare Link or Loseff's voicemail model as the means of ridematching. A third option might be to set up a videotex terminal at the site as well as introduce an audiotex system so that people could access ridematching information from home and work.

The options described in this review are only a few possible approaches that we may want to consider. They also serve as points of departure for further discussion.

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APPENDIX B

BELLEVUE PLACE COMMUTER SURVEY

Washington State Department of Transportation

University of Washington

Bellevue TMA

BELLEVUE PLACE

BELLEVUE PLACE COMMUTER SURVEY

Dear Bellevue Place Commuter:

The Bellevue Transportation Management Association (TMA) and the University of Washington are working to provide you with new information services to make your commute easier. Through this survey, we hope to gain an understanding of your commuting habits so that we can design services that best meet your needs. All responses will be kept confidential. If you have any questions, please call Susan Michalak (University of Washington) at 685-7979 or Robin Spero Eisen (Bellevue TMA) at 646-3663.

Directions

This survey contains four sections. Please respond to each question carefully, selecting the most appropriate answer for your situation. Feel free to add short comments to the right of your answer if it requires explanation. The entire survey takes approximately 15 minutes to complete. When you have finished the survey, please return it to the main receptionist in your office by Friday, March 26th. Thank you.

SECTION 1: WORK SCHEDULE AND COMMUTE CHARACTERISTICS

1. Which company or business do you work for in Bellevue Place?_____

2. What time do you usually arrive at and leave from Bellevue Place?

   Arrive at Bellevue Place _____:_____ am pm (circle one)

   Leave from Bellevue Place _____:_____ am pm (circle one)

3. By how many minutes can you *vary* the time you currently start and leave work?

   Start work _____minutes ☐ Can't vary time

   Leave work _____minutes ☐ Can't vary time

4. How many **hours per day** and **days per week** do you usually work at Bellevue Place?

   _____**hours per day** _____**days per week**

5. On a typical workday, how long does it take you to get from (door to door):

   Home to work: _____minutes **Work to home:** _____minutes

6. In general, how many days per week do you:

   a. Use your own vehicle to run errands during the workday? _____days per week

   b. Run errands or make side trips during your **home to work** commute? _____days per week

   c. Run errands or make side trips during your **work to home** commute? _____days per week

7. Which of the following transportation modes do you most frequently use for the longest part of your commute trip to and from work? **(Check only one.)**

   ☐ Driving alone ☐ Vanpooling ☐ Walking or jogging

   ☐ Carpooling with 1 other person ☐ Riding the bus ☐ Bicycling

   ☐ Carpooling with 2 or more other people ☐ Riding a motorcycle/moped ☐ Other_____

8. Do you ever use more than one transportation mode per commute trip? (For example, some people may drive alone to a Park and Ride lot and then ride the bus to work.) ☐ Yes ☐ No

   If yes, please describe:_____

MORE

ECTION 2: ALTERNATIVE TRANSPORTATION MODES: TRANSIT, CARPOOLS, AND VANPOOLS

. How many days per week do you usually commute by bus? _____days per week

If you commute by bus less than 3 days per week, please tell us why:_____

_____

. If you don't commute by bus, please rate how likely you would be to commute by bus if the following bus information were readily available to you at home and at work (if you commute by bus now, please tell us how likely you would be to increase your bus use):

	Very likely	Moderately likely	Slightly likely	Not at all likely
Scheduled bus departure time from your stop near home/work	1	2	3	4
Exact current location of your bus	1	2	3	4
Actual bus arrival time at your stop near home/work	1	2	3	4
Detailed route and transfer information between your origin and destination	1	2	3	4
Other (please describe):_____	1	2	3	4

. Check all items below that you are either familiar with or use (you may check both columns):

	Familiar with	Use
Park and Ride lot closest to your home	☐	☐
Route number of most convenient bus to work	☐	☐
Location of nearest bus stop		
To work	☐	☐
To home	☐	☐
Available carpooling/vanpooling programs	☐	☐
Departure time(s) of most convenient bus		
From work	☐	
From home	☐	
Arrival time(s) of most convenient bus		
At work	☐	
At home	☐	
Amount of transit fare needed to ride bus	☐	

. If you wanted to join a carpool/vanpool program, would you know how to sign up for it? ☐ Yes ☐ No

. How many days per week do you usually carpool/vanpool? _____days per week

If you carpool/vanpool less than 3 days per week, please tell us why:_____

_____

. Please rate how likely you would be to use the following carpooling/vanpooling modes if they were readily available in Bellevue Place:

	Very likely	Moderately likely	Slightly likely	Not at all likely
a. Carpooling/vanpooling:				
To or from work on a regular, scheduled basis	1	2	3	4
To or from work on an on-demand, flexible basis	1	2	3	4
For special trips on an on-demand basis (for example, doctor appointments, grocery shopping, etc.)	1	2	3	4

b. If you chose not at all likely for all three of the above carpooling/vanpooling modes, please tell us why you are not at all likely and then go to Section 3.

_____

_____

7. Please rate how important the following features would be in making your decision to join a carpool/vanpool. (If you already carpool/vanpool, please tell us how important these features are to you.)

	Very important	Moderately important	Slightly important	Not at all important
Saving money over current transportation mode	1	2	3	4
Saving time over current transportation mode	1	2	3	4
Knowing other participants	1	2	3	4
Meeting other participants before forming a carpool/vanpool	1	2	3	4
Participants being co-workers	1	2	3	4
Participants being pre-screened	1	2	3	4
Having your preferences met (for example, riding/driving in a non-smoking environment, listening to a certain radio station, etc.)	1	2	3	4
Having a guaranteed ride home in an emergency	1	2	3	4
Reducing pollution	1	2	3	4
Other (please describe):_____				

8. How would you prefer to sign up for a carpool/vanpool program:

- ❑ Mail
- ❑ In-person
- ❑ Interactive phone system
- ❑ Computer at home or office
- ❑ Interactive computer in Bellevue Place's lobby
- ❑ Other (please describe): _____

9. How would you prefer to receive ridematch information (that is, the names and phone numbers of potential carpoolers):

- ❑ Mail
- ❑ In-person
- ❑ Interactive phone system
- ❑ Computer at home or office
- ❑ Interactive computer in Bellevue Place's lobby
- ❑ Other (please describe): _____

	Very likely	Moderately likely	Slightly likely	Not at all likely
10. Please rate how likely you would be to:				
a. Carpool/vanpool if you were given special parking privileges as a member of a carpool/vanpool.	1	2	3	4
b. Drive for a carpool/vanpool:				
1. If you were fully compensated for your expenses.	1	2	3	4
2. If you were fully compensated for your expenses and you received special discounts at downtown Bellevue businesses.	1	2	3	4

SECTION 3: INFORMATION DELIVERY AND EFFECTIVENESS

1. How often do you use traffic information delivered by:

	Frequently	Sometimes	Rarely	Never
Television	❑	❑	❑	❑
AM/FM radio	❑	❑	❑	❑
Electronic message sign over freeway	❑	❑	❑	❑
Advisory radio indicated by freeway sign	❑	❑	❑	❑
Telephone	❑	❑	❑	❑
Other (please describe):_____	❑	❑	❑	❑

2. If up-to-the-minute traffic information were available to you at home and at work and that information indicated that your usual commute route was congested, how likely would you be to change the following:

	Very likely	Moderately likely	Slightly likely	Not at all likely
Departure time:				
From home to work	1	2	3	4
From work to home	1	2	3	4
Route	1	2	3	4
Transportation mode (for example, driving vs. taking the bus)	1	2	3	4

MORE ☞

Please rate how likely you would be to use commuter information (for example, traffic congestion information, bus information, and carpooling/vanpooling information) if it were delivered in the following ways (please assume you have easy access to the following items):

	Very likely	Moderately likely	Slightly likely	Not at all likely
Commuter information delivered by:				
Telephone (24 hours per day)	1	2	3	4
Computer at home or work (via modem)	1	2	3	4
Interactive computer in Bellevue Place's lobby	1	2	3	4
Hand-held message receiver (similar to a pager)	1	2	3	4

If commuter information were provided by an interactive computer installed in Bellevue Place, which of the following would be the most convenient location:

❑ First floor by the Seafirst concierge desk ❑ Second floor by Checkers ❑ Other:_____

	Very comfortable	Moderately comfortable	Slightly comfortable	Not at all comfortable
How comfortable are you using a:				
a. Touch-tone telephone to access information	1	2	3	4
b. Voice mail system	1	2	3	4
c. Computer	1	2	3	4

Do you have a computer at home? ❑ Yes ❑ No *If yes*, do you have a modem? ❑ Yes ❑ No

SECTION 4: DEMOGRAPHICS (OPTIONAL)

Please write in your home ZIP code—provide your 9-digit ZIP if you know it. (You might find your 9-digit ZIP code on a piece of mail at home.) _____

Are you: ❑ Female ❑ Male

What is your age? _____years

How many people (including yourself) live in your household? _____people

What is your annual income, before taxes, for yourself and for your entire household?

Yourself:		Entire household:	
❑ Under $20,000	❑ 60,000-79,999	❑ Under $20,000	❑ 60,000-79,999
❑ 20,000-39,999	❑ 80,000-99,999	❑ 20,000-39,999	❑ 80,000-99,999
❑ 40,000-59,999	❑ Over 100,000	❑ 40,000-59,999	❑ Over 100,000

Would you be willing to participate in a follow-up interview about your commute patterns? If so, please fill out the following information. **All information will be kept confidential.**

Name_____ Address_____

City/ZIP_____ Work phone_____ Home phone_____

Please let us know when we can contact you. Check both of the following if you have no preference:

_____I prefer to be contacted at work between the hours of_____ and_____.

_____I prefer to be contacted at home between the hours of_____ and_____.

Please provide additional comments about your commute or about information that would make your commute easier.

_____

_____

_____

Thank you for your participation.

APPENDIX C

BST TELEPHONE QUESTIONNAIRE: RIDERS

BST Telephone Questionnaire: Riders

NOTE: Only the survey respondents who said they would be very likely to use an on-demand carpool system will be contacted for this questionnaire.

Introduction

You recently responded to a commuter survey at Bellevue Place and, on that survey, you indicated that you would be tilling to participate in a follow-up interview. What I'd like to do now is ask you a few questions about how you would use an on-demand carpool system if you were participating as a rider in such a system; it will take about 5 minutes of your time. Do you have time right now to answer a few questions?

What our project hopes to do is make an on-demand carpool system available in Bellevue Place. An on-demand carpool system would allow people to form "instant" carpools; that is, rather than carpooling on a regular, set schedule, people would be able to form carpools informally. They might be able to form a carpool for the next morning by contacting each other the night before. Or they might be able to form a carp001 a half hour before they leave work. How the system will work depends on the feedback we get from our potential users.

On our survey, you indicated that you would be very likely to use an on-demand carpool system if one were readily available at Bellevue Place. We would like to know if you would use the system as a rider, and if so, how often you would use the system to find rides, how far in advance you would check for a ride offered, and so on.

1. On a scale from 1 to 5 (1 being never and 5 being frequently), please rate how frequently you would use the system to find rides:

   frequently never

   5 **4** **3** 2 1STOP

2. Would you ride to work in a carp001 without knowing whether you had a carpool for the trip home? yes no

   If no, would you ride to work knowing you had a guaranteed ride home? **yes** **no**

3. If YOU knew YOU needed a ride, how much in advance would you call the system to check for a ride offered? Would you call the system:

3 days before the day you needed the ride	yes	no
2 days before the day you needed the ride	yes	no
the night before you needed the ride	yes	no
8 hours in advance(in the morning to request a ride home in the evening)	yes	no
4 hours (in the afternoon to request a ride home in the evening)	yes	no
2 hours	yes	no
1 hour	yes	no
l/2 hour	yes	no
15 minutes	yes	no

4. Let's say you wanted to ride in a carpaol, but up until the time you wanted to leave, no one had offered a ride to your destination at the time that you wanted to leave. Wow long would you be willing to wait past the time you wanted to leave to see if there was a "ride offered" to your destination?

2 hours 1 hour l/2 hour 15 minutes 10 minutes 5 minutes

APPENDIX D

BST TELEPHONE QUESTIONNAIRE: DRIVERS

BST Telephone Ouestionnaire: Drivers

NOTE: Only the survey respondents who said they would be very likely to drive for a carpool if they were fully compensated will be contacted for this questionnaire.

Introduction

You recently responded to a commuter survey at Bellevue Place and, on that survey, you indicated that you would be willing to participate in a follow-up interview. What I'd like to do now is ask you a few questions about how you would use an on-demand carpool system if you were participating as a driver in such a system; it will take about 5 minutes of your time. Do you have time right now to answer a few questions?

What our project hopes to do is make an on-demand carpool system available in Bellevue Place. An on-demand carpool system would allow people to form "instant" carpools; that is, rather than carpooling on a regular, set schedule, people would be able to form carpools informally. They might be able to form a carpool for the next morning by contacting each other the night before. Or they might be able to form a carpool a half hour before they leave work. How the system will work depends on the feedback we get from our potential users.

On our survey, you indicated that you would be very likely to drive for a carpool or vanpool if you were fully compensated for your expenses. 'We would like to know how often you would offer rides, how far in advance, how long you would wait for a potential rider to contact you, **and so** on.

1. On a scale from 1 to 5 (1 being never and 5 being frequently), please rate how often you would use the system to offer rides:

frequently never

5 **4** **3** **2** 1 STOP

2. If you had a ride to offer, we would like to know how much in advance would you call the ridesharing system to place a "ride offered". Would you call the system:

3 days in advance	yes	no
2 days in advance	**yes**	no
the night before (to offer a **ride for the next day)**	**yes**	no
8 hours in advance (for example, in the morning to **offer** a **ride home** in the evening)	yes	no
4 **hours (for** example, in the afternoon to offer a ride home in the evening)	yes	no
2 hours	**yes**	no
1 **hour**	**yes**	no
l/2 hour	**yes**	no
15 minutes	**yes**	no

3. If you called the ride system and offered a ride to work, how much time would you give a potential rider to respond--that is, how much time up until the time you plan to leave would you be willing to check the system or respond to a page?

day before you leave	yes	no
4 hours before you leave	yes	no
2 hours before you leave	yes	no
1 hour before you leave	yes	no
l/2 hour before you leave	yes	no
15 minutes before you leave	yes	no

4. If you offer a ride to work, are you willing to wait beyond your planned departure time for a rider to respond to your offer? yes no

   If yes, how long are you willing to wait:

   2 hours 1 hour l/2 hour 15 minutes 10 minutes 5 minutes

5. If you offer a ride home, are you willing to wait beyond your planned departure time for a rider to respond to your offer? yes no

   If yes, how long are you willing to wait:

   2 hours 1 hour l/2 hour 15 minutes 10 minutes 5 minutes

APPENDIX E

BELLEVUE SMART TRAVELER INFORMATION CENTER USABILITY STUDY: PARTICIPANT'S PACKET

Bellevue Smart Traveler Traveler Information Center Usability Study

Participant's Packet

Introduction

Thanks for agreeing to help us test and evaluate the Bellevue Smart Traveler (BST) Traveler Information Center (TIC). The TIC is a telephone-based traveler information system that provides current bus and traffic information and gives users help in forming on-demand carpools. An on-demand cat-pool is a ridesharing arrangement for a specific ride. Unlike a regular carpool arrangement, which usually takes place on a regular, scheduled basis, an on-demand carpool gives drivers and riders the opportunity to form a carpool on a one-time basis.

An on-demand carpool system has not previously been available in Washington State and our goal is to demonstrate the feasibility of such a program over a 6-month period in the Bellevue community. However, before we begin our 6-month demonstration, we need your help in making sure our system is working properly.

The study in which you are participating has two parts. The first part of the study involves role-playing. Each participant has been given the role of driver or rider (or sometimes both) and will be told on which days to offer or look for rides. The end goal of this part of the study is for participants to successfully form on-demand carpools. ***Please note that we do not expect any of you to actually carpool with the other test participants.*** We'd simply like you to make contact so that we can determine that a ride match was successfully made. This system is still under development so it may still have some glitches that need to be fixed. So, in the second part of the study, we'd like your help in debugging the system.

Your Tasks

- For both parts of the study, we'd like you to record your phone calls to the system in the activity log in this packet.
- When you record your calls, we'd like you make notes about your interaction with the system and any difficulty you have using it. For example, while you're using the system you may want to think about and comment on the speed of the system, clarity of system instructions, amount of system feedback, etc.
- We would-also like your comments regarding the attached quick reference card.
- After you have finished both parts of the study, we would like you to fill out the post-test questionnaire at the end of the packet. ***You may want to look at the questionnaire before you begin the study and keep the questions in mind while you're using the system.***

It's important for you to remember that we are not testing you-you are helping us evaluate the system. If you have difficulty using it, it's likely that others will, too. So,, please be as frank as possible when you fill out the activity log and questionnaire.

If you have any questions, please call Susan Michalak at 685-7979 (days) or 523-3251 (evenings). We will arrange to pick up the completed materials from you by Tuesday, October 26.

Instructions

Part I. Sunday, October 17 through Friday, October 22

Scenario. You currently drive alone to and from work each day. To cut your expenses, you have decided to try carpooling. You signed up to be a member of the Bellevue Smart Traveler ridesharing program. You will use the telephone-based Traveler Information Center (TIC) to offer rides to and from work to other members all of whom live in your geographical area or are on your route to work. (In this case, the other members are all participants in this study).

The other members will look for rides offered in the system. If you have offered a ride on the day they need one, they will use the system to get contact information for you and give you a call. If you're not available when they call, they have been instructed to leave their name(s) and the day and time of the ride(s) they're interested in. When you receive a call from a rider, please write their name(s) in the spaces provided below. You ***can only take two riders*** in ***your car.*** When you have enough riders for a particular ride, please remove that tide from the system.

You have decided to offer rides to work on the following days at the following times:

Tuesday	7:30 AM	_____ **Name of rider(s) who phoned you**
Wednesday	7:15 AM	_____ **Name of rider(s) who phoned you**

You will also offer rides home on the following days at the following times:

Tuesday	4:00 PM	_____ **Name of rider(s) who phoned you**
Thursday	4:30 PM	_____ **Name of rider(s) who phoned you**

Please enter these rides, by noon on Monday morning (October 19).

- The TIC phone'number is 685-4418.
- Your ID number is your home phone number.
- Your password is the first three letters of your first name.

1) Each time you call the TIC, please enter the day and time of your call into Part I of the activity log (which begins on page 4).

2) Record any difficulties you have using the system in the activity log. Please be as specific as you can. Sometimes it's difficult to catch what's happening the firs time around, so feel free to go through the menus or call the system back as many times as you need.

3) If you refer to the quick reference card, please write down what you were looking for and whether you found it. We'd also like your comments regarding the amount and relevance of information provided in the quick reference card.

Part II. Saturday, October 23 through Monday, October 25

For this part of the study, we'd like you to sit down for half an hour or more and see if you can find any glitches in the programming.

- Be creative but remember to keep track of what you're doing if you find a problem and write it down.

- Please enter the day and time of each call into Part II of the activity log (beginning on page 8), as well as any problems you encounter.

Post-Test Questlonnalre

After you have completed both parts of the study, please fill out the questionnaire at the back of this packet. We are very interested in your feedback so please be honest.

- If you can think of specific examples of wording, steps, etc. that you disliked or had trouble with, please write these down as well.

- If you have suggestions for improvements, please include those, too.

Activity Log

Part I. Sunday, October 17 through Friday, October 22,

Each time you call the BST TIC please make notes about your interaction with the system and any difficulty you have using it. For example, if the instructions aren't clear or if you have trouble navigating through the menus, please write it down. It's helpful to us if you can be as specific as possible. Please include comments regarding your use of the quick reference card.

We'd like you to log ***all*** of your calls to the system; however, you do not have to log your calls to other participants.

CALL #1 Date: _____ Time: _____

Notes (problems/comments/suggestions) _____

CALL #2 Date: _____ Time: _____

Notes (problems/comments/suggestions) _____

CALL #3 Date: _____ Time: _____

Notes (problems/comments/suggestions) _____

CALL #4 Date: _____ Time: _____

Notes (problems/comments/suggestions) _____

CALL #5 Date: _____ **Time:** _____

Notes (problems/comments/suggestions) _____

CALL #6 Date: _____ Time: _____

Notes (problems/comments/suggestions) _____

CALL #7 Date: _____ Time: _____

Notes (problems/comments/suggestions) _____

Fart II. Saturday, October 23 through Monday, October 25

For this part of the study, we'd like you to call the system and see if you can find any glitches in the program, any illogical sequences, etc. Feel free to explore other menu items that you did not use during the first part of the test. Please keep track of what you're doing so that if you find a problem, you can write it down. Please include any comments regarding your use of the quick reference card.

Do not begin this part of the study until Saturday, October 23.

CALL #l Date: _____ Time: _____

Notes (problems/comments/suggestions) _____

CALL #2 Date: _____ Time: _____

Notes (problems/comments/suggestions) _____

CALL #3 Date: _____ Time: _____

Notes (problems/comments/suggestions) _____

CALL#4 Date: _____ Time: _____

Notes (problems/comments/suggestions)_____

CALL #5 Date: _____ Time: _____

Notes (problems/comments/suggestions)_____

Post-Test Questionnaire

To provide us feedback about your impressions of the system, we'd like you to fill out this questionnaire. Please be frank. If you need to refresh your memory feel free to call the system back.

System Speed

1.	Overall, the system speed is too	slow						fast	
		1	2	3	4	5	6	7	N/A*
2.	The response time for entries is too	slow						fast	
		1	2	3	4	5	6	7	N/A
3.	The delivery speed of the system announcer is too	slow						fast	
		1	2	3	4	5	6	7	N/A

System Instructions

1.	The instructions for commands or choices are	confusing						clear	
		1	2	3	4	5	6	7	N/A
2.	The instructions for correcting errors are	confusing						clear	
		1	2	3	4	5	6	7	N/A
3.	Error messages clarify the problem(s).	always						never	
		1	2	3	4	5	6	7	N/A
4.	Correcting errors is	difficult						easy	
		1	2	3	4	5	6	7	N/A
5.	Use of terms throughout the system is	inconsistent						consistent	
		1	2	3	4	5	6	7	N/A
6.	Phrasing is	awkward						appropriate	
		1	2	3	4	5	6	7	N/A
7.	Computer terminology is used	too frequently						appropriately	
		1	2	3	4	5	6	7	N/A

Please write any specific suggestions for system instructions here._____

_____

_____

_____

* N/A = not applicable

System Feedback

1.	Performing an operation leads to a predictable result.	always						never	
		1	2	3	4	5	6	7	N/A
2.	The system keeps me informed about what it is doing.	always						never	
		1	2	3	4	5	6	7	N/A

Please write any specific suggestions for system feedback here._____

_____

_____

_____

Learning to Use the System

1.	Learning to operate the system was	difficult						easy	
		1	2	3	4	5	6	7	N/A
2.	Time to learn to use the system was	slow						fast	
		1	2	3	4	5	6	7	N/A
3.	Exploration of features by trial and error was	discouraging						encouraging	
		1	2	3	4	5	6	7	N/A
4.	Exploration of features was	risky						safe	
		1	2	3	4	5	6	7	N/A
5.	Discovering new features was	difficult						easy	
		1	2	3	4	5	6	7	N/A

Please write any specific suggestions for improving the learning process here._____

_____

_____

_____

Task Performance

1.	Tasks can be performed in a straightforward manner.	never						always	
		1	2	3	4	5	6	7	N/A
2.	The number of steps per task is	too many						just right	
		1	2	3	4	5	6	7	N/A
3.	The steps to complete a task follow a logical sequence.	rarely						always	
		1	2	3	4	5	6	7	N/A

4. The sequence of steps needed to complete a task is

unclear 1 2 3 4 5 6 7 clear N/A

Please write any specific suggestions for improving task performance here._____

_____

_____

_____

System Reliability

1. How reliable is the system?

unreliable 1 2 3 4 5 6 7 reliable N/A

System Help

1. Amount of help available is

inadequate 1 2 3 4 5 6 7 adequate N/A

2. Content of help is

unclear 1 2 3 4 5 6 7 clear N/A

3. Accessing help is

difficult 1 2 3 4 5 6 7 easy N/A

Please write any specific suggestions for improving the system help here._____

_____

_____

_____

Quick Reference Card

1. You referred to the quick reference card

never 1 2 3 4 5 6 7 always N/A

2. The information provided was

irrelevant 1 2 3 4 5 6 7 relevant N/A

unclear 1 2 3 4 5 6 7 clear N/A

3. I found what I was looking for

with difficulty 1 2 3 4 5 6 7 easily N/A

Bellevue Smart Traveler
Traveler Information Center
Quick Reference

Main Menu:
1) offer a ride
2) search for a ride
3) change/remove a ride
4) confirm a ride
5) contact information
6) traffic information
7) transit information
8) BST project information
9) send voice-mail to sysop

Time:
1) AM
2) PM

Days of the Week:
1) Monday
2) Tuesday
3) Wednesday
4) Thursday
5) Friday

List Functions:
1) replay previous item
2) replay current item
3) skip to next item
4) action

Miscellaneous Information:

The TIC phone number is 685-2232.

Your ID Number is your work, home, or pager phone number.

Your password is your first name.

Press the star key (*) at any time to return to the main menu.

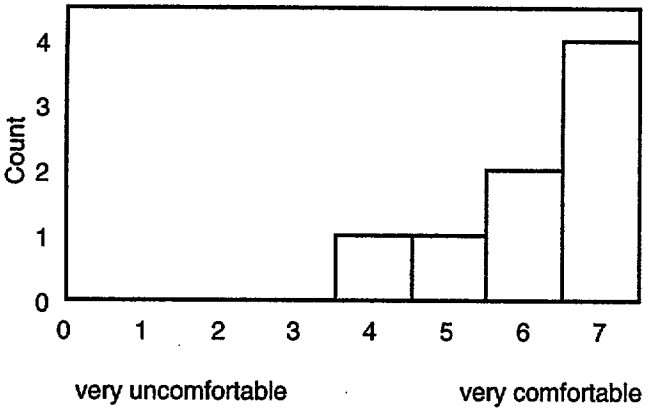
Most UW phones require you to press the pound key (#) twice.

APPENDIX F

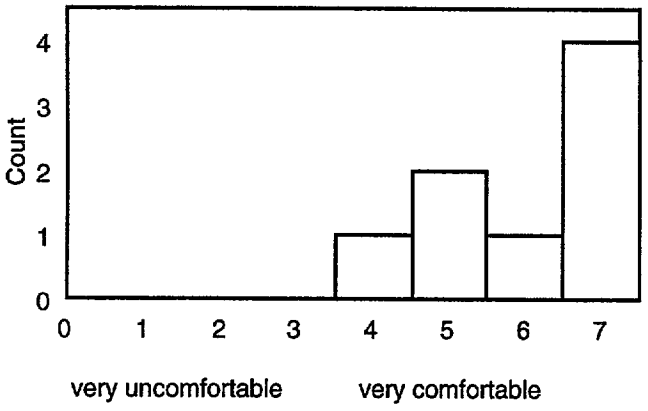
PRE-TEST QUESTIONNAIRE RESULTS

Pre-Test Questionnaire Results

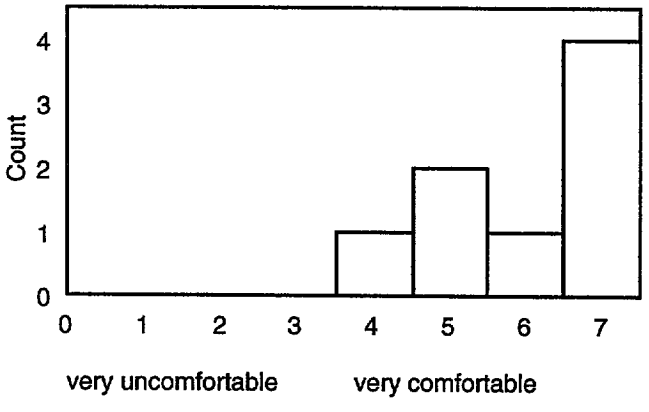
Q4. Rated comfort using a touch-tone phone to access info



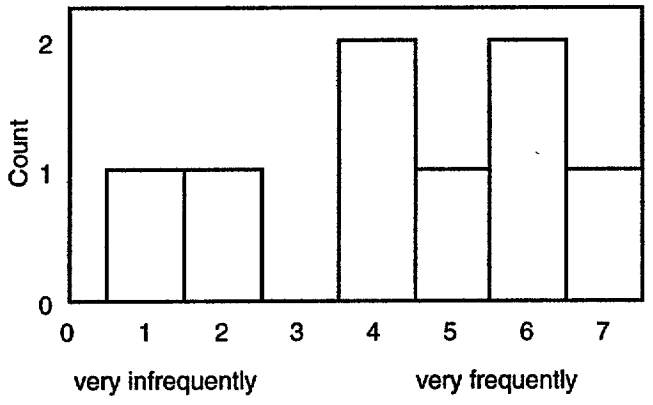
Q4. Rated comfort using a voice mail system



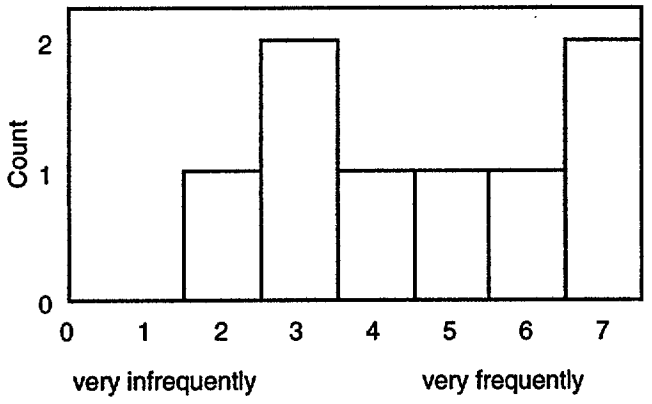
Q4. Rated comfort with a computer



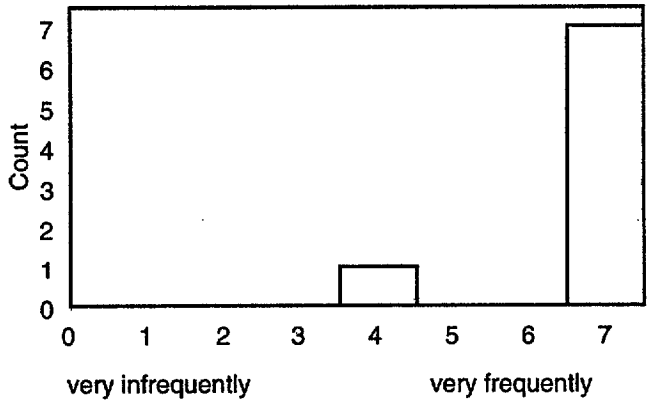
Q5. Frequency of use of a touch-tone phone to access information



Q5. Frequency of use of a voice mail system



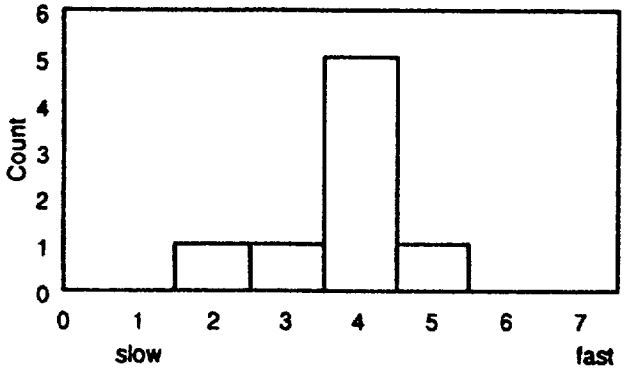
Q5. Frequency of computer use



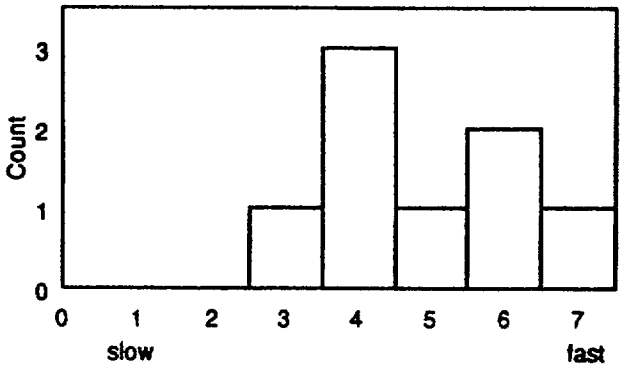
Post-Test Questionnaire Results

System Speed

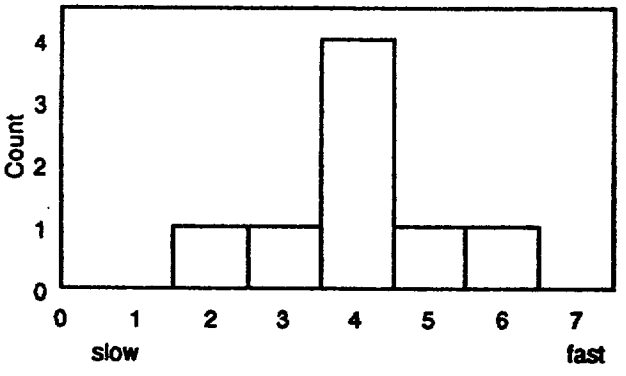
Q1. Overall, the system speed is too



Q2. The response time for entries is too

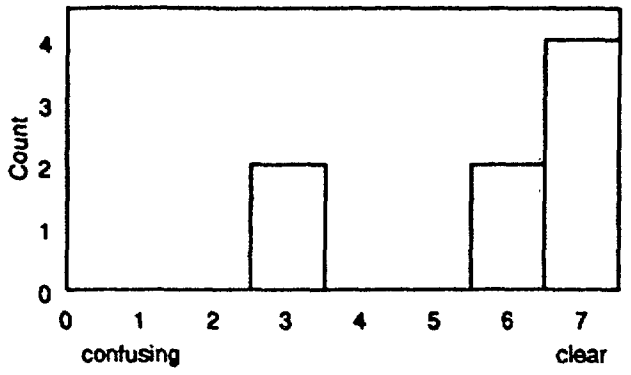


Q3. The delivery speed of the system announcer is too

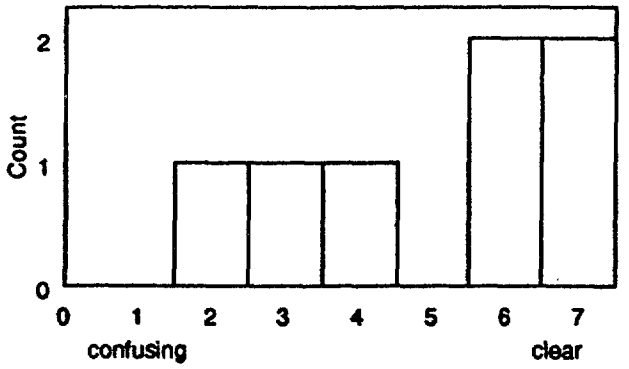


System Instructions

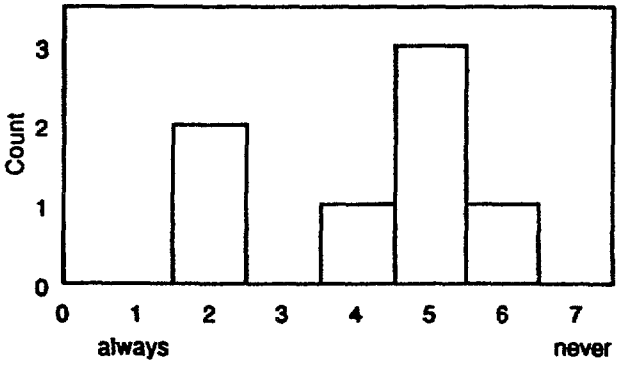
Q1. The instructions for commands or choices are



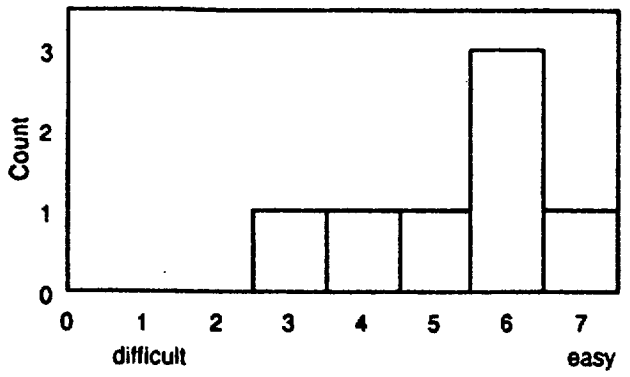
Q2. The instructions for correcting errors are



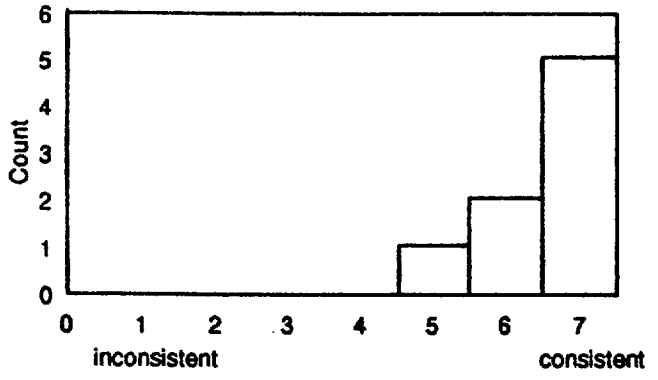
Q3. Error messages clarify the problems



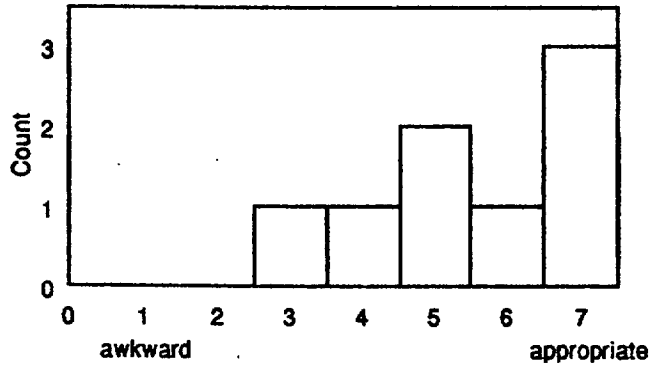
Q4. Correcting errors is



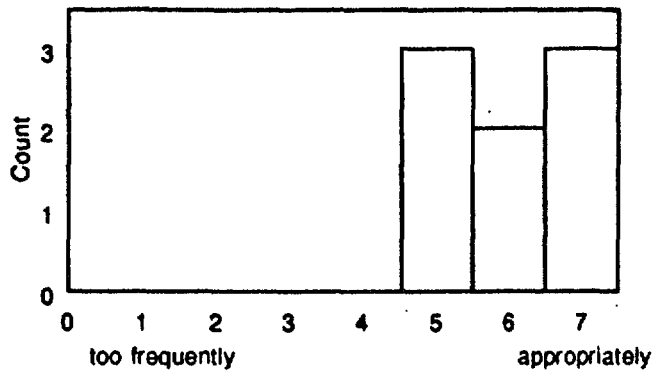
Q5. Use of terms throughout the system is



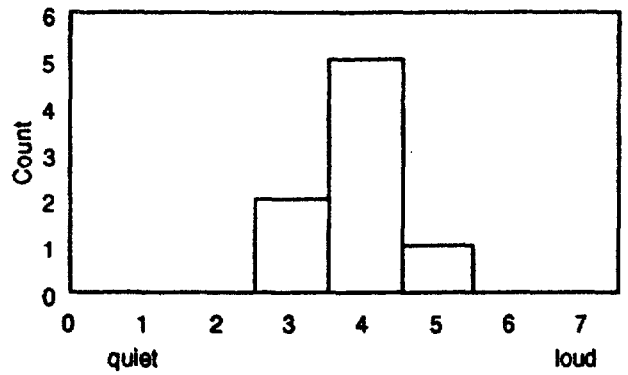
Q6. Phrasing is



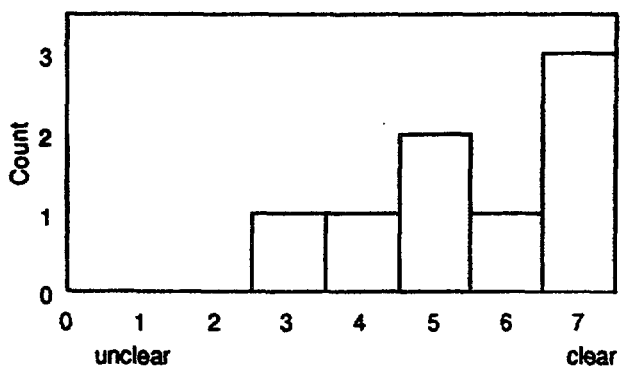
Q7. Computer terminology is used



Q8. The system announcer's voice is too

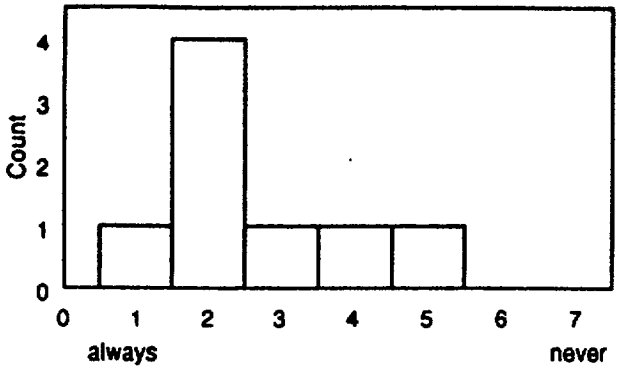


Q9. The system announcer's voice is

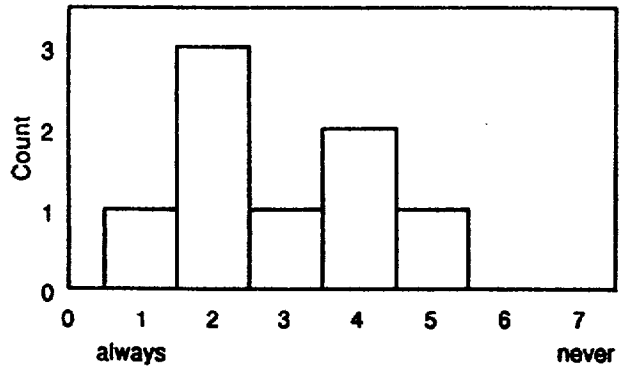


System Feedback

Q1. Performing an operation leads to a predictable result

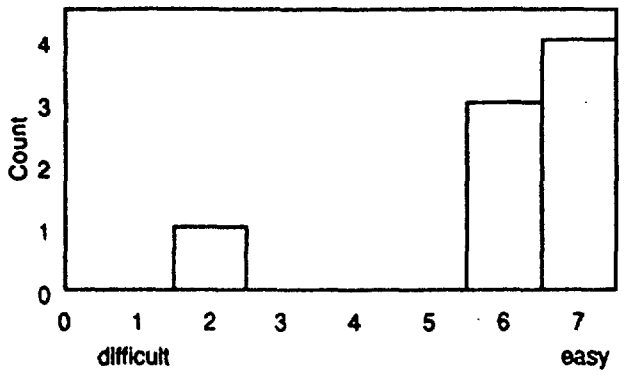


Q2. The system keeps me informed about what it is doing

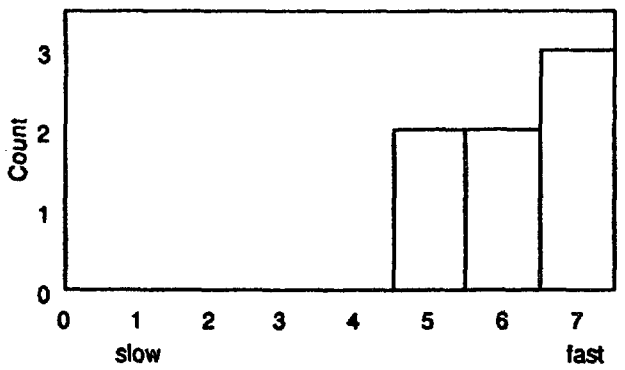


Learning to Use the System

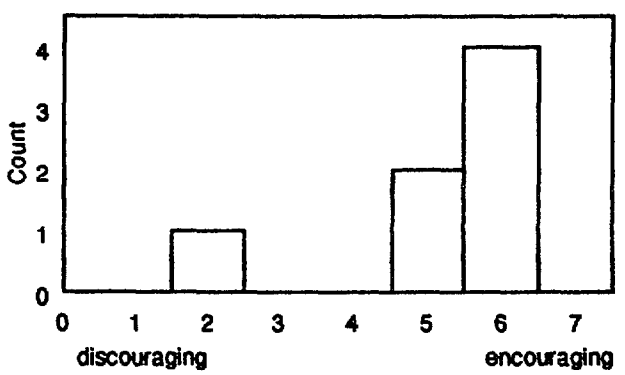
Q1. Learning to operate the system was



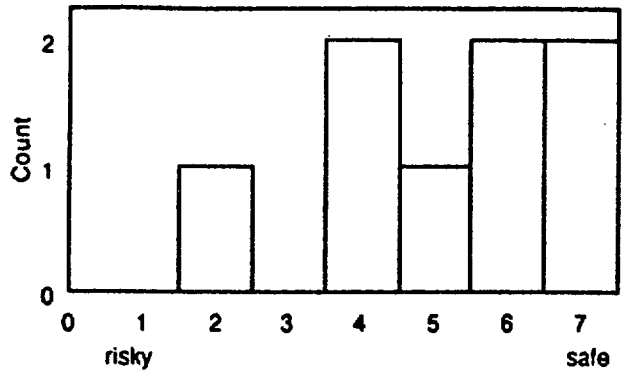
Q2. Time to learn to use the system was



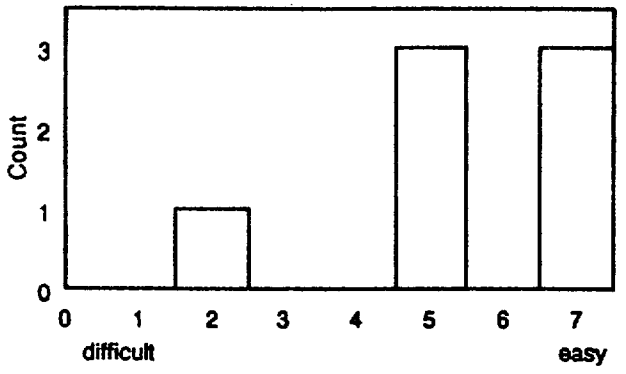
Q3. Exploration of features by trial and error was



Q4. Exploration of features was

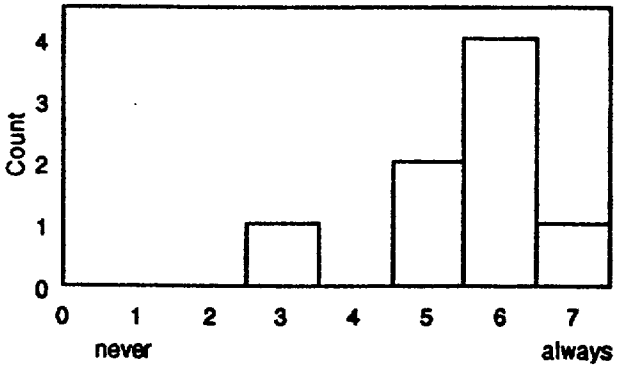


Q5. Discoverying new features was

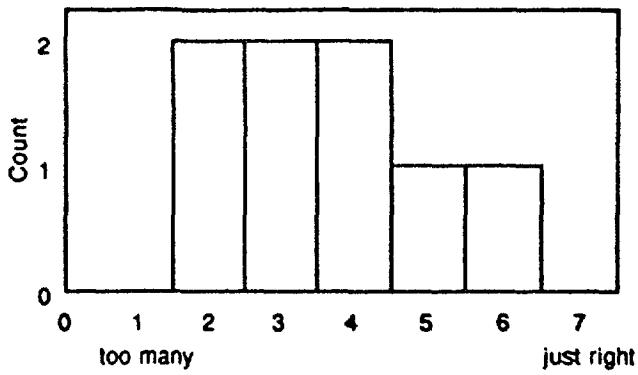


Task Performance

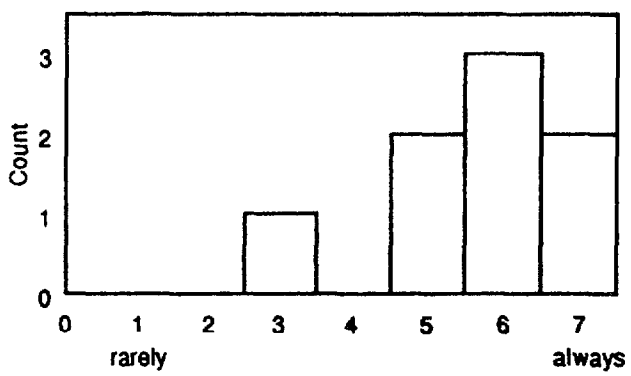
Q1. Tasks can be performed in a straightforward manner



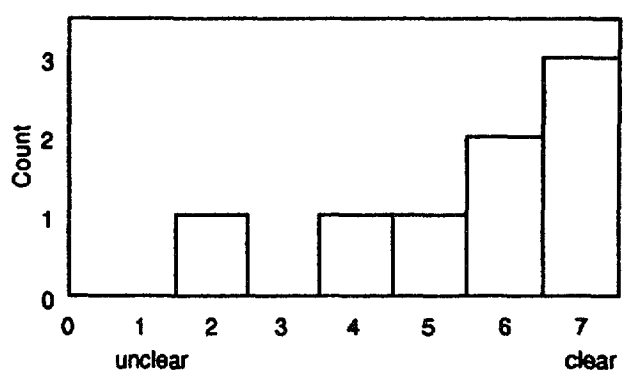
Q2. The number of steps per task is



Q3. The steps to complete a task follow a logical sequence

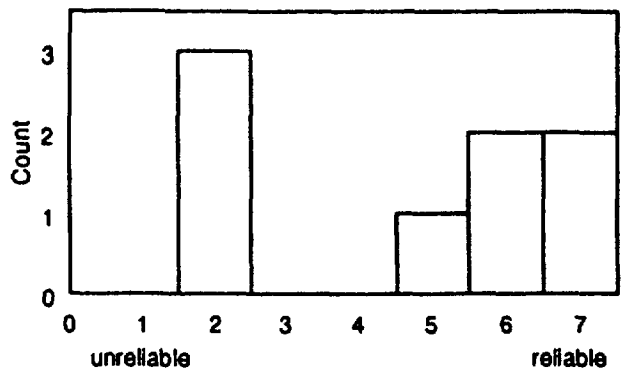


Q4. The sequence of steps needed to complete a task is



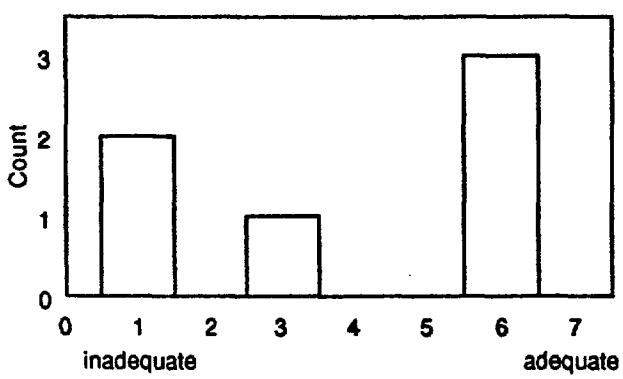
System Reliability

Q1. How reliable is the system?

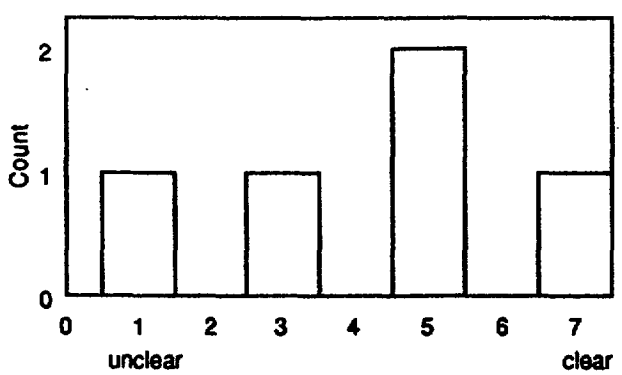


System Help

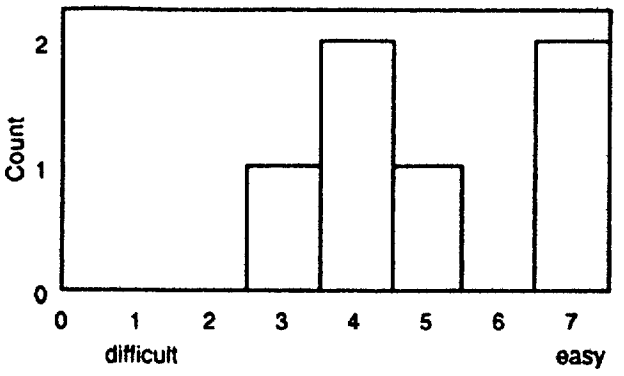
Q1. Amount of help available is



Q2. Content of help is

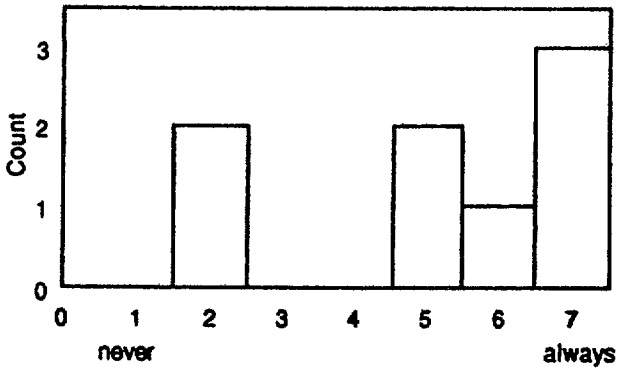


Q3. Accessing help is

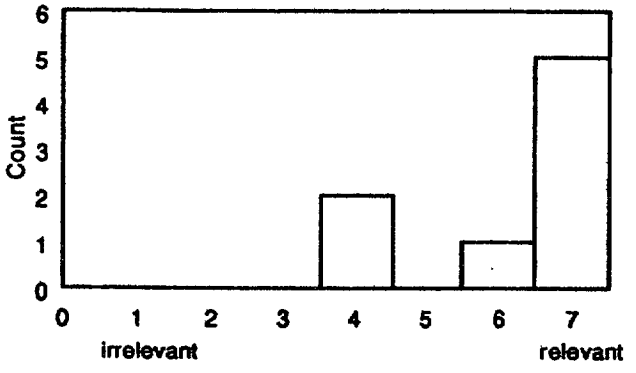


Quick Reference Card

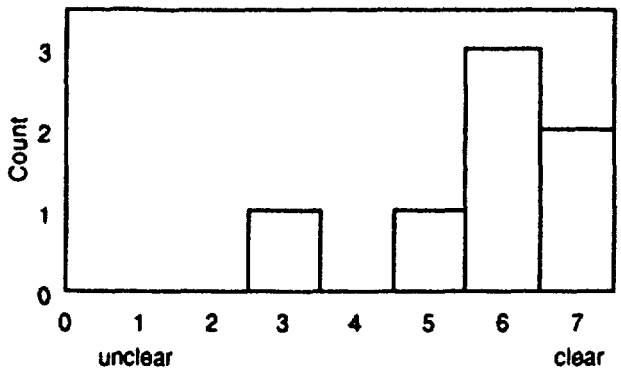
Q1. You referred to the quick reference card



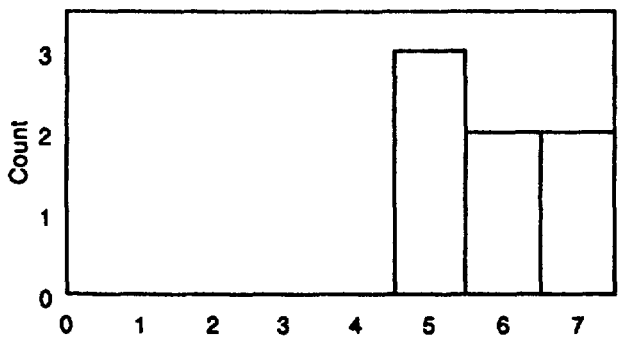
Q2a. The information provided (in the QRC) was



Q2b. The information provided (in the QRC) was



Q3. I found what I was looking for (in the QRC)



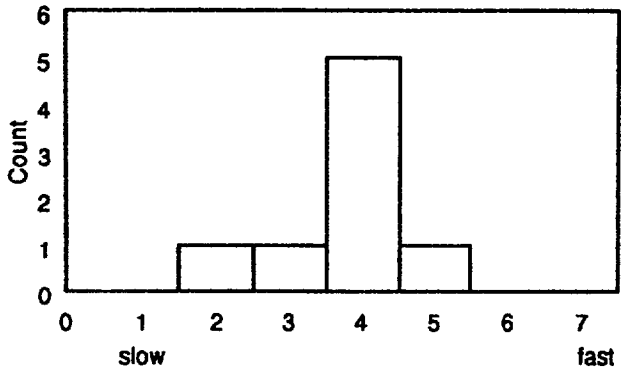
APPENDIX G

POST-TEST QUESTIONNAIRE RESULTS

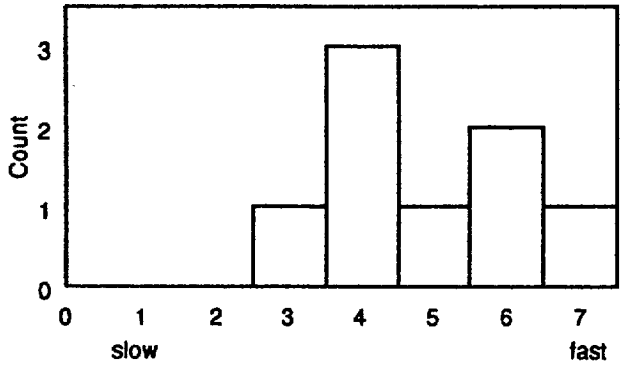
Post-Test Questionnaire Results

System Speed

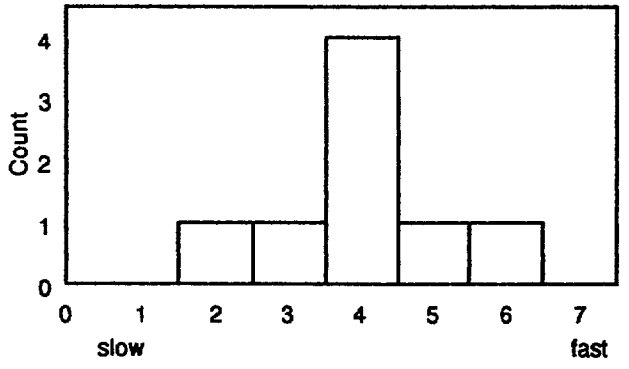
Q1. Overall, the system speed is too



Q2. The response time for entries is too

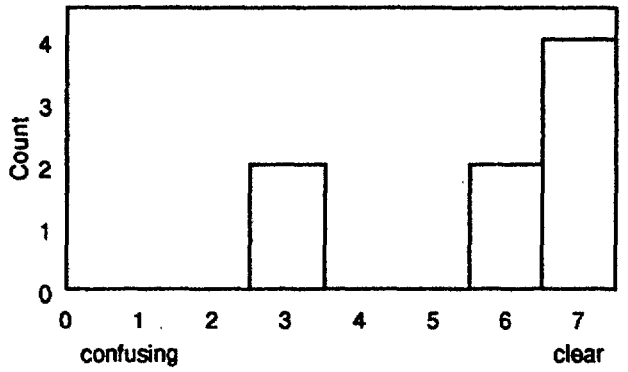


Q3. The delivery speed of the system announcer is too

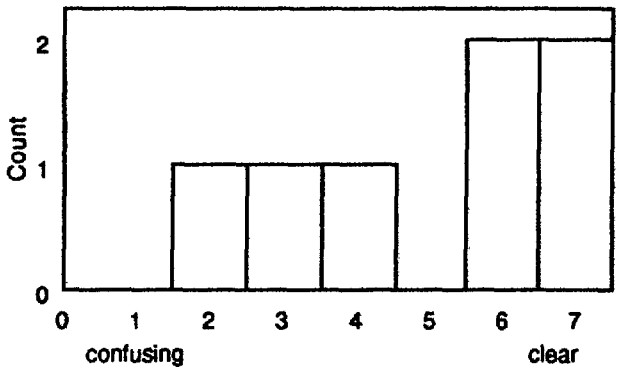


System Instructions

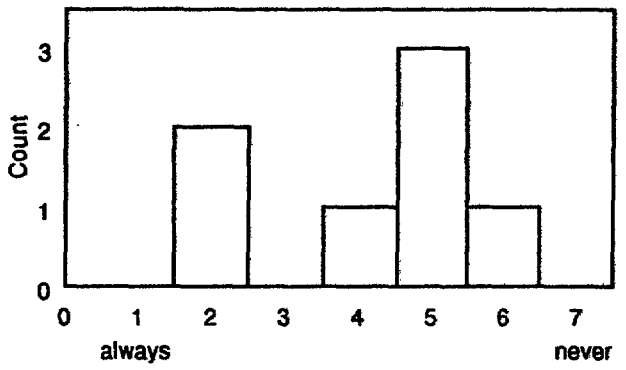
Q1. The instructions for commands or choices are



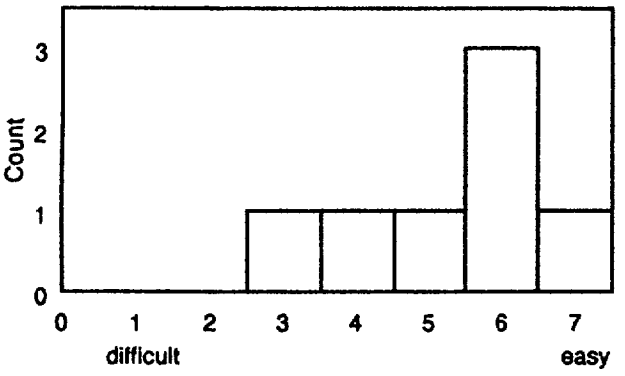
Q2. The instructions for correcting errors are



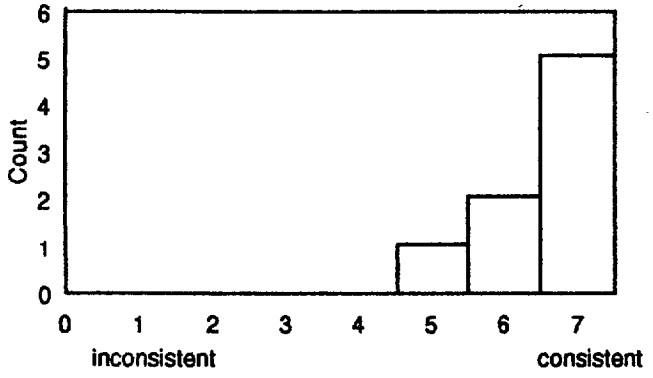
Q3. Error messages clarify the problems



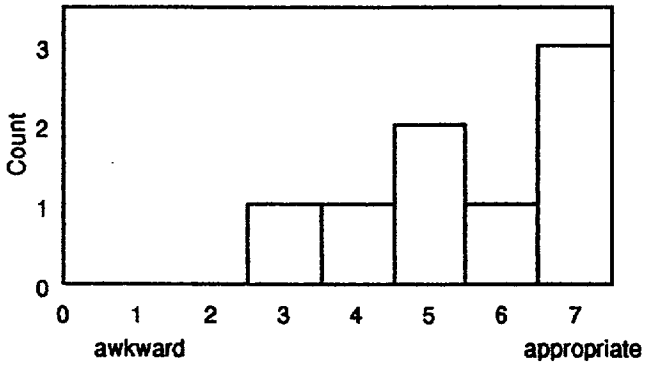
Q4. Correcting errors is



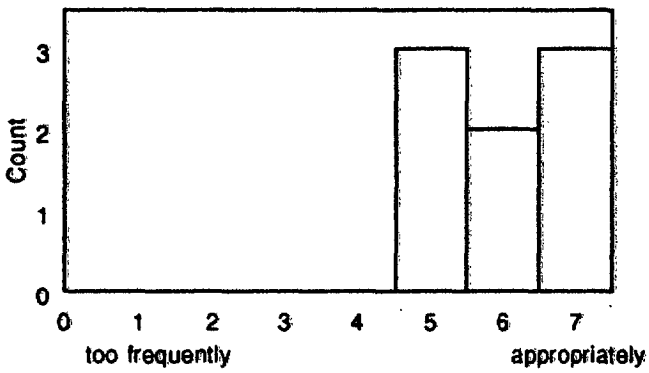
Q5. Use of terms throughout the system is



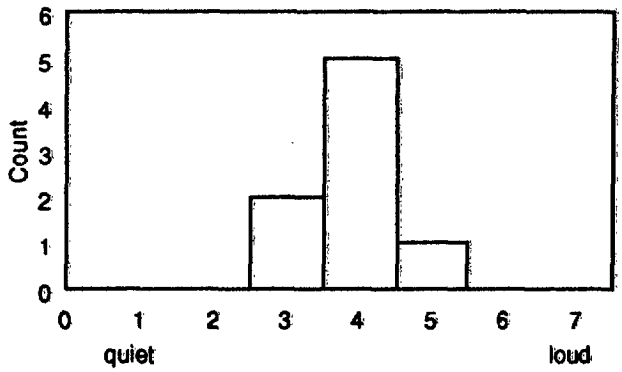
Q6. Phrasing is



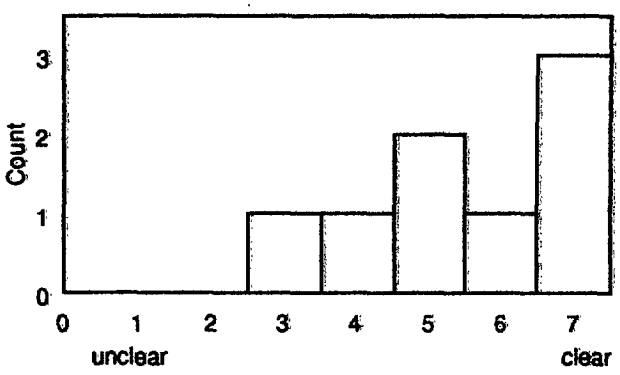
Q7. Computer terminology is used



Q8. The system announcer's voice is too

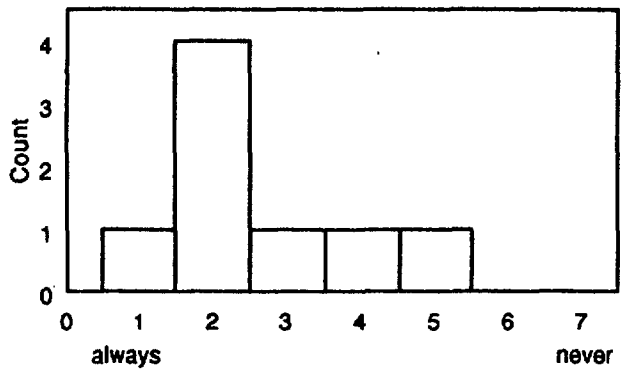


Q9. The system announcer's voice is

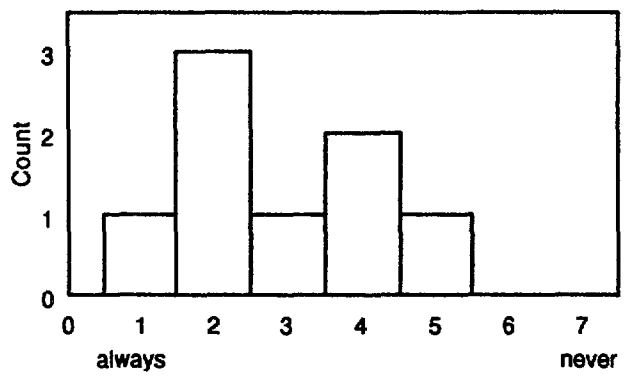


System Feedback

Q1. Performing an operation leads to a predictable result

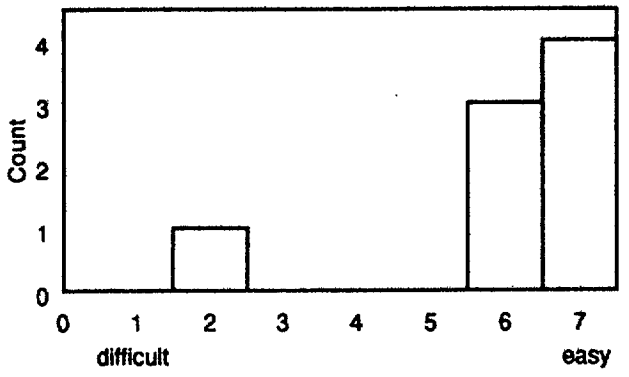


Q2. The system keeps me informed about what it is doing

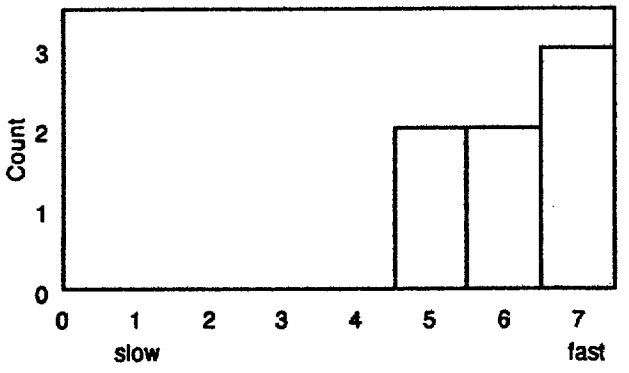


Learning to Use the System

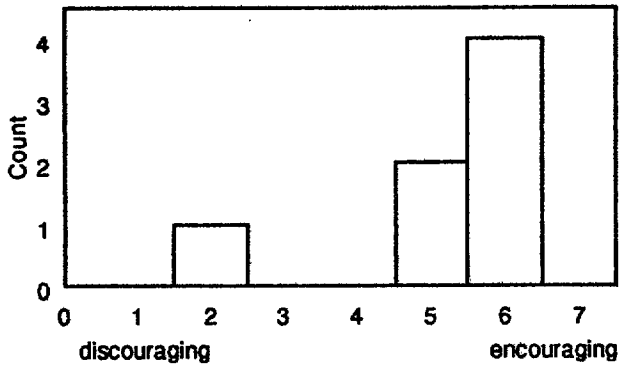
Q1. Learning to operate the system was



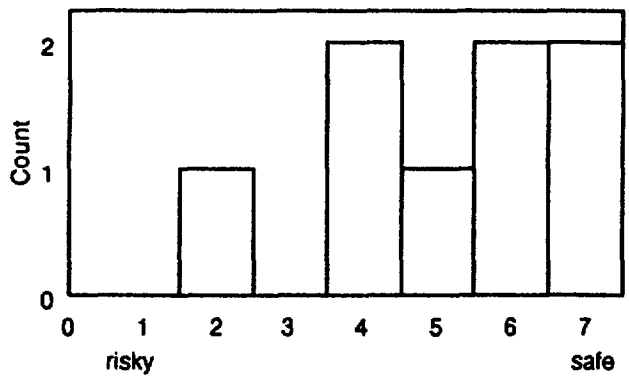
Q2. Time to learn to use the system was



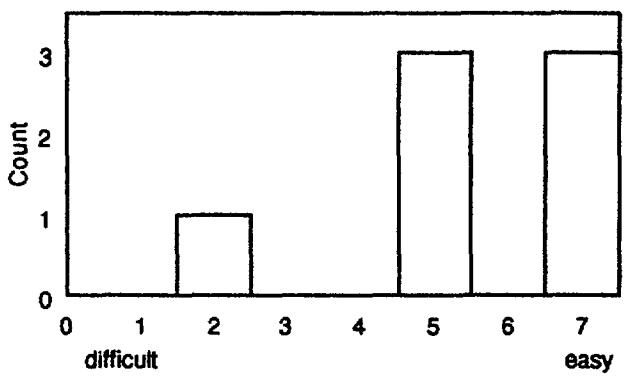
Q3. Exploration of features by trial and error was



Q4. Exploration of features was

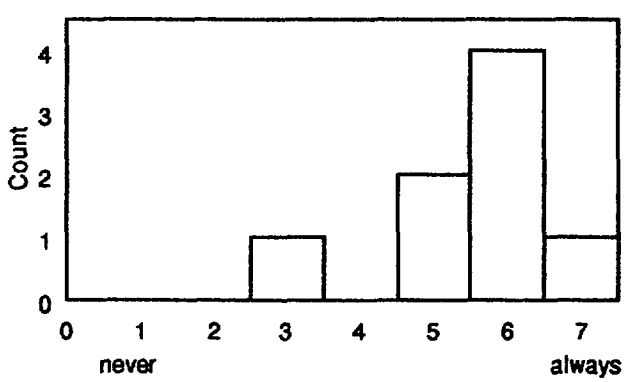


Q5. Discoverying new features was

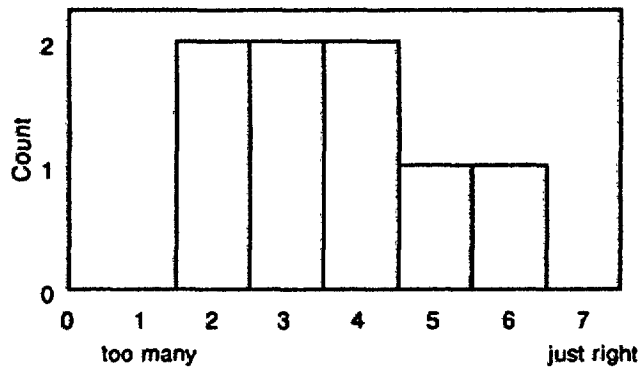


Task Performance

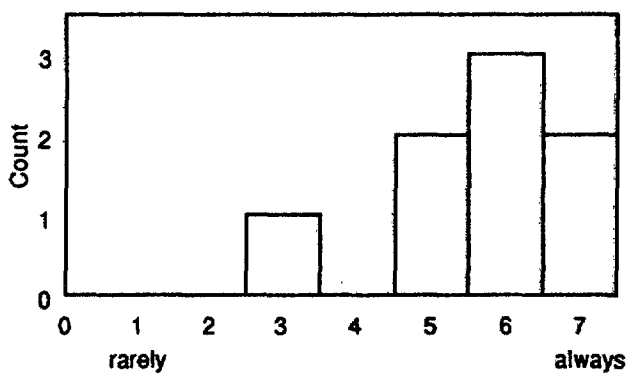
Q1. Tasks can be performed in a straightforward manner



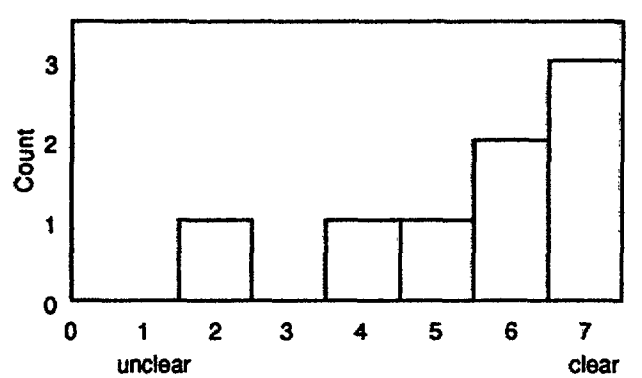
Q2. The number of steps per task is



Q3. The steps to complete a task follow a logical sequence

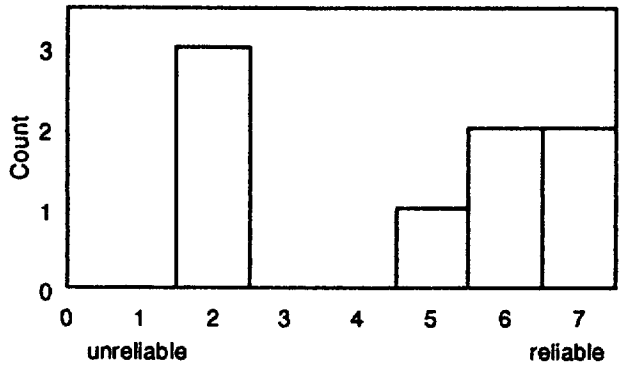


Q4. The sequence of steps needed to complete a task is



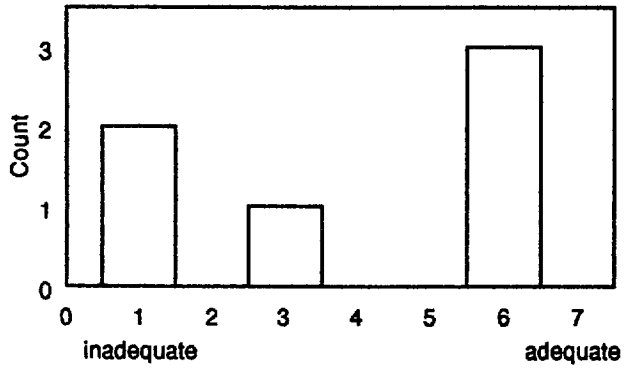
System Reliability

Q1. How reliable is the system?

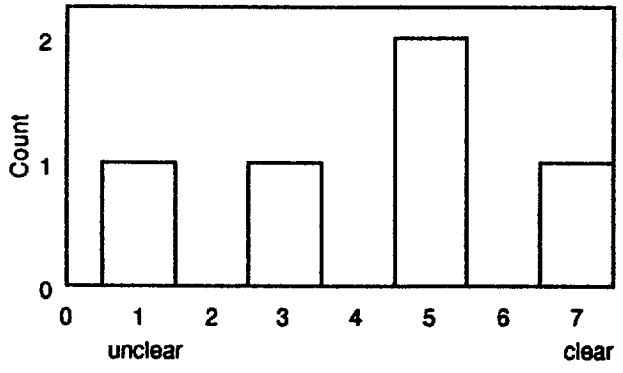


System Help

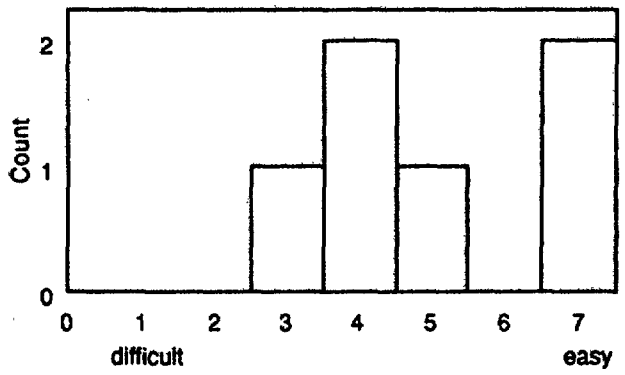
Q1. Amount of help available is



Q2. Content of help is

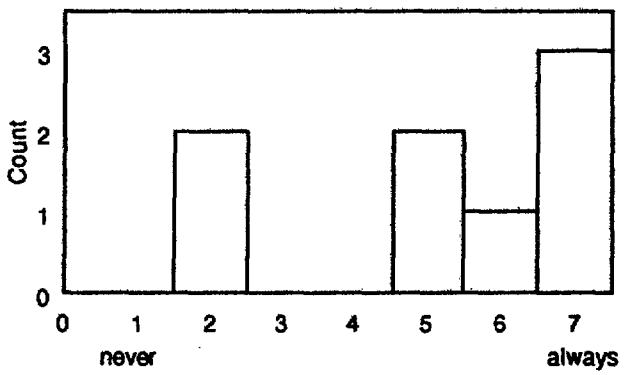


Q3. Accessing help is

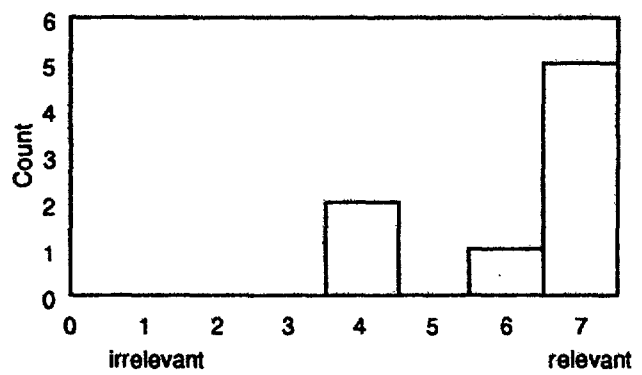


Quick Reference Card

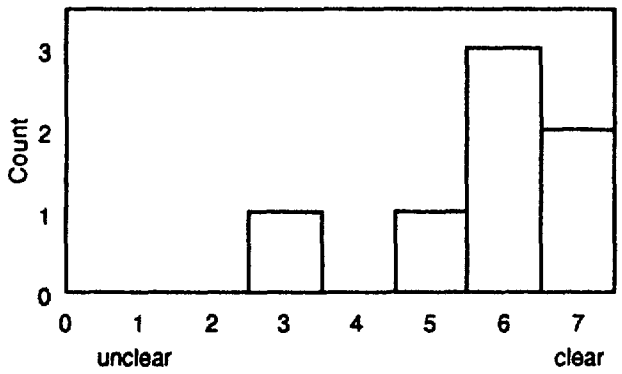
Q1. You referred to the quick reference card



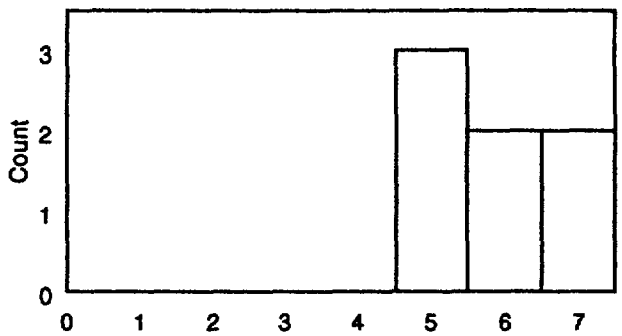
Q2a. The information provided (in the QRC) was



Q2b. The information provided (in the QRC) was



Q3. I found what I was looking for (in the QRC)



APPENDIX H

TOUCH-TONE TELEPHONE MENU STRUCTURE OF THE BELLEVUE SMART TRAVELER INFORMATION CENTER

TOUCH-TONE TELEPHONE MENU STRUCTURE' OF THE BELLEVUE SMART TRAVELER INFORMATION CENTER

The touch-tone processing system of the BST traveler information center had the following menu structure:

Top Level Menu - Registered Users

- "Press 1 to offer a ride"
- "Press 2 to search for a ride"
- "Press 3 to change or remove a ride"
- "Press 4 to confirm a ride match with another user"
- "Press 5 to get contact information about another user"
- "Press 6 for a Seattle area traffic report"
- "Press 7 for transit information"
- "Press 8 for information about the Bellevue Smart Traveler project"
- "Press 9 to send voice-mail to the system administrator"
- "Press 0 for help"

Top Level Menu - Guest Users

- "Press 1 for a Seattle area traffic report"
- "Press 2 for transit information"
- "Press 3 for information about the Bellevue Smart Traveler project"
- "Press 4 to send voice-mail to the system administrator"
- "Press 0 for help"

The following sections describe the sub-menus for each of the above features.

(1) Offer a ride menu

- "Press 1 to offer a ride to work"
- "Press 2 to offer a ride home"

1) offer a ride to work

"Select the day of the week you are offering a ride to work..."

- "Press 1 for [this/next] Monday the [date--e.g., 24th]""
- "Press 2 for [this/next] Tuesday the [date]"
- "Press 3 for [this/next] Wednesday the [date]"
- "Press 4 for [this/next] Thursday" the [date]
- "Press 5 for [this/next] Friday the [date]"
- "Press 6 for every remaining weekday this week"

"Enter a four digit departure time for your ride to work..."

User enters the departure time of their ride; computer rounds time to the nearest 5 minutes.

"Enter 1 for AM, 2 for PM..."

User enters appropriate number to select AM or PM for the departure time of their ride.

"You are offering a ride to work on [day] at [time]...if this is correct, press 1, if this is **incorrect, press 2...**"
If user enters 1, the ride is entered into the system, the computer generated Ride-ID is heard, and the user is returned to the main menu. If user enters 2, they are prompted to enter the ride information again.

2) offer a ride home

"Select the day of the week you are offering a ride home..."

- "Press 1 for [this/next] Monday the [date--e.g., 2nd]"
- "Press 2 for [this/next] Tuesday the [date]"
- "Press **3** for [this/next] Wednesday the &date]"
- "Press 4 for [this/next] Thursday" the [date]
- "Press 5 for [this/next] Friday the [date]"
- "Press 6 for every remaining weekday this week"

"Enter a four digit departure time for your ride home..."

User enters the departure time of their ride; computer rounds time to the nearest 5 minutes.

"Enter 1 for AM, 2 for PM..."

User enters appropriate number to select AM or PM for the departure time of their ride.

"You are offering a ride home on [day] at [time]...if this is correct, press 1, if this is incorrect, press 2..."

If user enters 1, the ride is entered into the system, the computer generated Ride-ID is heard, and the user is returned to the main menu. If user enters 2, they are prompted to enter the ride information again.

(2) Search for a ride menu

- "Press 1 to search for a ride to work"
- "Press 2 to search for a ride home"

1) Search for a ride to work

"Select the day of the week you would like a ride to work..."

- "Press 1 for [this/next] Monday the [date--e.g., 24th]"
- "Press 2 for [this/next] Tuesday the [date]"
- "Press 3 for [this/next] Wednesday the [date]"
- "Press 4 for [this/next] Thursday" the [date]
- "Press 5 for [this/next] Friday the [date]"

"As you listen to the available rides, you may press 1 to replay the previous ride, 2 to replay the current ride, or 3 to skip to the next ride. When you hear a ride you are interested in, press 4."

The available rides for the user's ride group, from home to work, are heard. Each ride consists of the driver's first name and the departure time of the ride. The user can use the 1, 2, and 3 keys to control which rides are heard. If the user presses 4, contact information (Ride-ID, full

name, gender, company, smoking preference, and contact numbers) for the user offering the ride is heard.

2) Search for a ride home

"Select the day of the week you would like a ride home..."
- "Press 1 for [this/next] Monday the [date--e-g., lst]"
- "Press 2 for [this/next] Tuesday the [date]"
- "Press 3 for [this/next] Wednesday the [date]"
- "Press 4 for [this/next] Thursday" the [date]
- "Press 5 for [this/next] Friday the [date]"

"As you listen to the available rides, you may press 1 to replay the previous ride, 2 to replay the current ride, or 3 to skip to the next ride. When you hear a ride you are interested in, press 4."

The available rides for the user's ride group, from work to home, are heard. Each ride consists of the driver's first name and the departure time of the ride. The user can use the 1, 2, and 3 keys to control which rides are heard. If the user presses 4, contact information (Ride-ID, full name, gender, company, smoking preference, and contact numbers) for the user offering the ride is heard.

(3) Change or remove a ride menu

- "Press 1 to change a previously offered ride"
- "Press 2 to remove a previously offered ride"

1) Change a previously offered ride

"Enter the 3-digit Ride-ID of the ride you wish to change..."

After the user has selected the ride they wish to edit, they are prompted to re-enter the ride information.

2) Remove a previously offered ride

"Enter the 3-digit Ride-ID of the ride you wish to remove..."

After the user has selected the ride they wish to remove, the ride is deleted.

(4) Confirm a ride match menu

"Enter the 3-digit Ride-ID for the ride you are confirming..."

After the user enters the Ride-ID, there are two cases: 1) user is the driver or 2) user is a rider.

1) User is the driver of the ride match

"Enter the phone number of the person you are riding with..."

The user enters the home, work, or pager phone number of the rider they are confirming with. The ride confirmation request is logged by the system.

"Press 1 to remove this ride from the system...Press 2 to keep this ride in the system..."

If the user presses 1, the ride is removed from the system. If the user presses 2, the ride remains in the system.

2) User is a rider of the ride match

The ride confirmation request is logged. (Note that the system can determine who the driver of the ride is from the Ride-ID)

(5) Get contact information for another user

"Enter the phone number or 3-digit Bide-ID of the user you would like contact information for..."

The user enters the Bide-ID, home, work, or pager phone number of the user they want contact information for. Next, contact information including full name, gender, company, smoking preference, and contact numbers is heard.

(6) Puget Sound area traffic report

A sample traffic report might sound something like:

"Traffic is very heavy on northbound I-5 near Northgate. Traffic is moderate on southbound I-5 through the convention center. Traffic is heavy on eastbound 520. Traffic is moving well on eastbound I-90."

After the entire traffic report has been played (or if the user presses the # key), the user is returned to the main menu.

(7) Transit information

- "If you know your bus number, press 1 to connect to Metro's Bus Time"
- "If you do not know your bus number, press 2 to talk to a Bellevue TMA staff person"

If user selects 1, they are connected to Metro's Bus Time and disconnected from the TIC.

If user selects 2, they are connected to Bellevue TMA's customer service line and disconnected from the TIC.

(8) Information about the Bellevue Smart Traveler project

Information about the Bellevue Smart Traveler project might sound something like:

"The Bellevue Smart Traveler project is an effort to reduce the number of single occupancy vehicles commuting to and from downtown Bellevue. The project is being conducted by the Bellevue Transportation Management Association and the University of Washington. For more information, please call the Bellevue TMA at 453-0644."

After the message has been played (or if the user presses the #key), the user is returned to the main menu.

(9) Send voice-mail to system administrator

"At the tone, please leave your message for the system administrator. When you are finished, you may hang-up, or press the pound key to return to the main menu...[beep]"

User leaves a voice message and can either hang-up or press #to return to the main menu.

(0) Help information

Help information will be context sensitive. That is, the help information presented will be relevant to the current feature that the user is using.

Once the help information has been played, the original instructions for the current feature will be played again and the user can continue exactly where the left off.

APPENDIX I

BELLEVUE SMART TRAVELER: SYSTEM FEATURES DOCUMENT

BELLEVUE SMART TRAVELER:

System Features Document

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July 22, 1993

INTRODUCTION

Downtown Bellevue is an area with concentrated employment facilities and a high percentage of single occupancy vehicle (SOV) commuters. The Bellevue Smart Traveler (BST) project will encourage alternatives to SOV commuting--especially carpools, vanpools, and buses. To achieve this goal, the BST project team is developing a prototype Traveler Information Center (TIC) to help commuters at the test site quickly and easily obtain information about alternative high-occupancy vehicle (HOV) modes of transportation. The prototype TIC will provide three types of commuter information: dynamic ridematching information, up-to-the-minute traffic congestion information, and transit information. The dynamic ridematching information will allow commuters at the BST test site to carpool to or from work on an occasional, on-demand basis. The up-to-the-minute traffic information will emphasize the advantages of HOV travel over single-occupant vehicle travel. The transit component will provide easy access to bus information.

The BST project will provide participants with convenient off-site access to the TIC's information. Building employees will be able to obtain up-to-the-minute traffic congestion information, transit information, and carpool/vanpool ridematches using a telephone, and/or a hand-held alpha-numeric pager. Through the innovative integration of telephone, computer, and pager technology, the BST project team will explore the impact of valuable, real-time transportation information on a variety of users.

This document describes the features that will be implemented in the Traveler Information Center for the Bellevue Smart Traveler demonstration project.

USER POPULATION

From a system perspective, the user population will consist of two types: "registered" users and "guest" users.

Registered users will be employees of downtown Bellevue companies taking part in the Bellevue Smart Traveler demonstration project. To become registered, a user will be required to fill out a registration application (see "registration" section below) and meet certain project requirements. Registered users will have access to pagers in addition to the phone-based system and will be tracked to determine how they use the system and whether or not the system is effective in encouraging their use of HOV transportation options.

Guest users will be anyone who calls the phone-based system but is not a registered user. A guest user can call the TIC phone number from anywhere. Guest users will have access to only a subset of TIC features and will not be given pagers. Their use will not be tracked except to keep a record of the number of guest calls received.

APPLICATION PROCESS

Registration will be required for a user to be eligible to become a "registered" user in the Bellevue Smart Traveler project with full access to the TIC and eligibility for a pager (non-registered guest users will be able to access a sub-set of general information). Registration will be available to employees of companies that are participating in the Bellevue Smart Traveler demonstration project. In addition, certain project requirements must be met for a user to become registered.

The application process will consist of filling out an application and sending it to the BST headquarters at the Bellevue TMA. The BST project team will review all of the applications and accept (or reject) applicants based on how likely they are to use the TIC system and participate in dynamic ridematching.

The registration application will acquire information such as:

- Full name
- Gender
- Employer
- Washington state driver's license number
- Work Address
- Home Address
- Work phone number
- Home phone number (public or private)
- Work days
- Work hours
- Preferred arrival time to work
- Preferred departure time from work

- Schedule flexibility (in terms of time)
- Preferred pick-up points (three of them, selected from a list, in ranked order)
- Smoking preference
- Gender Preference (exclusive or non-exclusive)
- Willingness to be a driver (how often, how many seats available)
- Willingness to be a rider (how often)

Registered users who are willing to drive for dynamic carpools or ride in dynamic carpools are eligible to receive a hand-held alpha-numeric pager. The pager will make forming dynamic carpools, easier. Because pagers are a limited and expensive resource, they will only be given to registered users that are most likely to use them to form ridematches with other registered users.

In order to acquire a pager, a registered user must not only be deemed eligible by the BST project team but they must also agree to, the following terms:

- will notify TMA if pager is lost, stolen, or damaged
- will relinquish pager to TMA at any time if requested to do so by the BST project team
- will return pager to TMA when the project endst

RIDE GROUPS

In order to limit the information given to registered users to that which is relevant to their commute between home and work, registered users will be divided into "ride groups". All registered users will work in a four square block area of downtown Bellevue but will live throughout the Puget Sound area. Hence, ride groups will be based on where users live so that each ride group will consist of users that commute to and from the same general areas. This will allow the greatest potential for successful dynamic ride-matches, Each ride group must have enough users so that a reasonable number of ridematches are possible. However, each ride group cannot be so large that there are too many available rides resulting in an overflow of information for riders looking for rides. Ride groups must also cover a small enough geographical area so that drivers and riders can meet and be dropped off at convenient locations.

The initial formation of ride groups will be based on zip codes and preferred pick-up/drop-off points (as specified on the application).

TIC FEATURE LJST

The Bellevue SmartTraveler, Traveler Information Center (TIC) will provide features via touch-tone telephone, hand-held alpha-numeric pager, and public kiosk. The TIC will also perform certain operations automatically.

The TIC will have the following user features accessible via touch-tone telephone:

- Login with a password and access all TIC features (registered users)
- Login without a password and access a subset of TIC features (non-registered users)
- Offer rides to and from work (registered users)
- Search for rides to and from work (registered users)
- Edit or delete previously offered rides (registered users)
- Confirm a ridematch with another registered user (registered users)
- Access contact information about **other registered users (registered users)**
- Review a current traffic report for the Puget Sound area freeway system (all users)
- Review transit information (all users)
- Send voice-mail messages to the TIC system administrator (registered users)
- Access information about the BST project (all users)
- Access help on any TIC future (registered users)
- Access help on a subset of TIC features (non-registered users)

The TIC will provide the following features for registered users with alpha-numeric pagers:

- Send current list of "rides offered" to pagers based on user ride group (every hour)
- Send current traffic report to all pagers (every 20 minutes)

The TIC will also provide resources for an (optional) public kiosk for the lobby of participating downtown Bellevue buildings. The kiosk will be running the TRAFFIC REPORTER software which provides real-time traffic information for the Seattle area freeway system including:

- Overview of freeways speeds for I-5, I-90, I-405, and SR-520
- Specific trip information including travel time, average speed, and savings on HOV lanes via a touch-screen interface
- Automatic cycling of popular trips when system is not being used

The kiosk will contain informational signing describing the Bellevue Smart Traveler project and the TIC. There will also be a telephone near the kiosk so that users can call the TIC phone number.

Finally, the TIC will automatically perform the following functions:

- Delete expired ride offer messages
- Log system use for evaluation
- Maintain registered user database
- Maintain ride groups based on geographical location of user's homes
- Prompt users to confirm rides when necessary

The physical "home" of the TIC hardware will be in the most convenient, out-of-the-way location. Because almost all access will be remote (i.e., phone lines), the hardware can be situated in any place that has access to electrical power and phone lines.

TIC FEATURE DESCRIPTIONS - PHONE COMPONENT

The phone component of the TIC will allow users to call the system and access information from any touch-tone phone. Following are feature descriptions for the TIC phone component.

Login

To access the TIC from a telephone, users will simply dial the TIC telephone number. A voice will instruct them to enter their ID and password or to press 0 to login as a guest user. A user who successfully supplies a valid ID and password will be logged on as a registered user and have access to all TIC features. Users who enter 0 will be logged on as a non-registered, guest user and have access only to a subset of TIC features.

All users will have access to this feature.

Offering a Ride

To offer a ride via the TIC, registered users will specify the following information:

1. The direction of the ride (either to work or to home)
2. The day of the week of the ride (Monday through Friday)
3. The departure time of the ride (hour, minute, and AM or PM)

The ride will then be entered into the current list of rides for the appropriate ride group for that user. The 3-digit Ride-ID will be given to the user for future editing, deleting, and/or confirming of the ride.

Only registered users will have access to this feature.

Searching for a Ride

To search for a ride, a registered user will first specify whether they are looking for a ride to work or a ride to home. The user will then specify which day of the week they are looking for a ride.

Next, the user will hear the currently available rides for their ride group. Each ride message will consist of a driver's first name and departure time. The user can navigate using the phone buttons 1, 2, and 3 to replay the previous ride, replay the current ride, and skip to the next ride, respectively. If the user is interested in a ride, they can press 4 to obtain the contact information which will consist of the 3-digit Ride-ID, driver's full name, gender, company, car smoking rules, and phone numbers.

Only registered users will have access to this feature.

Editing or Deleting a Ride

First, the user will specify whether they want to edit or delete a ride. If the user is choosing to delete a ride they will also specie whether they are deleting the ride because the ride was canceled or because the ride offer was accepted. Next, they will select the specific ride they want to edit or delete by entering the 3-digit Ride-ID. If they chose to edit the ride, they will be allowed to re-enter the ride information.

If the user has not offered any rides, they will hear, "You have not offered any rides" and be returned to the main menu.

Only registered users will have access to this feature.

Confirming a Ride

To confirm a ride, the user will first enter the 3-digit Ride-ID. If the user is the driver of the ride, they will be prompted to enter the phone number (either home, work, or pager) of the user they are confirming with. If the user is not the driver of the ride--but a rider--the system will know, from the Ride-ID, who the driver is.

If the user confirming is also the driver of the ride, the user is asked whether the ride should be removed from the system. In cases where the driver has more than one seat available, the driver may opt to keep the ride offer message in the system in an attempt to frtl the remaining available seats.

Only registered users will have access to this feature.

Obtaining Contact Information

Registered users can obtain contact information about another registered user by entering that user's home, work, or pager phone number. Once this information has been entered, the contact information for that user will be heard.

As an alternative, the user could also enter the 3-digit Ride-ID and the contact information for the driver of that ride would be heard.

The contact information will include: full name, company, gender, car smoking rules, work phone number, home number, and pager number (note that the home phone number may be an optional piece of information).

Only registered users will have access to this feature.

Puget Sound Area Traffic Report

This feature will "read" a Puget Sound area traffic report to the user. The traffic report will consist of congested areas of the freeway system and/or travel times to various destinations. It will also have comparisons of travel times for the floating bridges and for HOV lanes vs. SOV lanes.

All users will have access to this feature.

Transit Information

This feature will allow the user to obtain transit information by connecting them with Metro's Bus Time system or with the Bellevue TMA. Bus Time is an existing Metro system that provides automated bus schedule information to callers. Callers respond to a voice prompt to select their route, the day, and time of day they wish to travel. Bus Time then "Speaks" two or three scheduled departure times for the route at their specific bus stop.

If users already know their bus number, they can instruct the TIC to connect them to Bus Time which can give them detailed schedule information. If users do not know their bus number, the TIC can connect them to the Bellevue TMA where TMA staff can help the user determine which bus (or buses) serve their commute. If the TMA is not available, the TIC will connect to Bus Time which does provide an option to talk with an operator who can help determine which bus to take for a particular commute.

All users will have access to this feature.

Sending Voice-Mail to System Administrator

This ftituae will allow the user to record a voice-mail message which will be sent to the TIC system administrator. Users can send a message regarding any topic they wish, for example, problems, comments, suggestions, information requests, etc.

All users will have access to this feature.

Bellevue Smart Traveler Project Information

This feature will allow the user to listen to information describing the Bellevue Smart Traveler project. Topics described might include: purpose, goals, funding sources, creators, and registration information.

All users will have access to this feature:

Help

The help feature will provide helpful information with respect to the feature that the user is currently using. This feature can be accessed by pressing 0 at any menu level.

All users will have access to help information for the features they have access to.

TIC PHONE COMPONENT MENU STRUCTURE

The touch-tone processing system of the TIC will have the following menu structure:

Top Level Menu - Registered Users

- "Press 1 to offer a ride"
- "Press 2 to search for a ride"
- "Press 3 to change or remove a ride"
- "Press 4 to confirm a ride match with another user"
- "Press 5 to get contact information about another user"
- "Press 6 for a Seattle area traffic report"
- "Press 7 for transit information"
- "Press 8 for information about the Bellevue Smart Traveler project"
- "Press 9 to send voice-mail to the system administrator"
- "Press 0 for help"

Top Level Menu - Guest Users

- "Press 1 for a Seattle area traffic report"
- "Press 2 for transit information"
- "Press 3 for information about the Bellevue Smart Traveler project"
- "Press 4 to send voice-mail to the system administrator"
- "Press 0 for help"

The following pages describe, in-depth, the sub-menus for each of the above features.

(1) Offer a ride menu

- "Press 1 to offer a ride to work"
- "Press 2 to offer a ride home"

1) offer a ride to work

"Select the day of the week you are offering a ride to work..."

- "Press 1 for [this/next] Monday the [date--e.g., 24th]"
- "Press 2 for [this/next] Tuesday the [date]"
- "Press 3 for [this/next] Wednesday the [date]"
- "Press 4 for [this/next] Thursday" the [date]
- "Press 5 for [this/next] Friday the [date]"
- "Press 6 for every remaining weekday this week"

"Enter a four digit departure time for your ride to work.. ."

User enters the departure time of their ride; computer rounds time to the nearest 5 minutes.

"Enter 1 for AM, 2 for PM..."

User enters appropriate number to select AM or PM for the departure time of their ride.

"You are offering a ride to work on [day] at [time]...if this is correct, press 1, if this is incorrect, press 2.. ."

If user enters 1, the ride is entered into the system, the computer generated Ride-ID is heard, and the user is returned to the main menu. If user enters 2, they are prompted to enter the ride information again.

2) offer a ride home

"Select the day of the week you are offering a ride home..."

- "Press 1 for [this/next] Monday the [date--e.g., 2nd]"
- "Press 2 for [this/next] Tuesday the [date]"
- "Press 3 for [this/next] Wednesday the [date]"
- "Press 4 for [this/next] Thursday" the [date]
- "Press 5 for [this/next] Friday the [date]"
- "Press 6 for every remaining weekday this week"

"Enter a four digit departure time for your ride home..."

User enters the departure time of their ride; computer rounds time to the nearest 5 minutes.

"Enter 1 for AM, 2 for PM.. . "

User enters appropriate number to select AM or PM for the departure time of their ride.

"You are offering a ride home on [day] at [time]...if this is correct, press 1, if this is incorrect, press 2.. ."

If user enters 1, the ride is entered into the system, the computer generated Ride-ID is heard, and the user is returned to the main menu. If user enters 2, they are prompted to enter the ride information again.

(2) Search for a ride menu

- "Press 1 to search for a ride to work"
- "Press 2 to search for a ride home"

1) Search for a ride to work

"Select the day of the week you would like a ride to work..."

- "Press 1 for [this/next] Monday the [date--e.g., 24th]"
- "Press 2 for [this/next] Tuesday the [date]"
- "Press 3 for [this/next] Wednesday the [date]"
- "Press 4 for [this/next] Thursday the [date]"
- "Press 5 for [this/next] Friday the [date]"

"As you listen to the available rides, you may press 1 to replay the previous ride, 2 to replay the current ride, or 3 to skip to the next ride. When you hear a ride you are interested in, press 4."

The available rides for the user's ride group, from home to work are heard. Each ride consists of the driver's first name and the departure time of the ride. The user can use the 1, 2, and 3 keys to control which rides are heard. If the user presses 4, contact information (Ride-ID, full name, gender, company, car smoking rules, and contact numbers) for the user offering the ride is heard.

2) Search for a ride home

"Select the day of the week you would like a ride home.. ."

- "Press 1 for [this/next] Monday the [date--e.g., 1st]"
- "Press 2 for [this/next] Tuesday the [date]"
- "Press 3 for [this/next] Wednesday the [date]"
- "Press 4 for [this/next] Thursday" the [date]
- "Press 5 for [this/next] Friday the [date]"

"As you listen to the available rides, you may press 1to replay the previous ride, 2 to replay the current ride, or 3 to skip to the next ride. When .you hear a ride you are interested in, press 4."

The available rides for the user's ride group, from work to home, are heard. Each ride consists of the driver's first name and the departure time of the ride. The user can use the 1, 2, and 3 keys to control which rides are heard. If the user presses 4, contact information (Ride-ID, full name, gender, company, car smoking rules, and contact numbers for the user offering the ride is heard.

(3) Change or remove a ride menu

- "Press 1 to change a previously offered ride"
- "Press 2 to remove a previously offered ride because it has been canceled"
- "Press 3 to remove a previously offered ride because it has been accepted"

1) Change a previously offered ride

"Enter the 3-digit Ride-ID of the ride you wish to change..."

After the user has selected the ride they wish to edit, they are prompted to re-enter the ride information.

2) Remove a previously offered ride because it has been canceled

"Enter the 3-digit Ride-ID of the ride you wish to remove..."

After the user has selected the ride they wish to remove, the ride is deleted.

3) Remove a previously offered ride because it has been accepted

"Enter the 3-digit Ride-ID of the ride you wish to remove..."

After the user has selected the ride they wish to remove, the ride is deleted.

"Enter the phone number of the person who accepted your ride..."

The user enters the home, work, or pager phone number of the rider they are confirming with. The ride confirmation request is logged by the system.

(4) Confirm a ride match menu

"Enter the 3-digit Ride-ID for the ride you are confirming..."

After the user enters the Ride-ID, there are two cases: 1) user is the driver or 2) user is a rider.

1) User is the driver of the ride match

"Enter the phone number of the person you are riding with..."

The user enters the home, work, or pager phone number of the rider they are confirming with. The ride confirmation request is logged by the system.

"Press 1 to remove this ride from the system...Press 2 to keep this ride in the system..."

If the user presses 1, the ride is removed from the system. If the user presses 2, the ride remains in the system.

2) User is a rider of the ride match

The ride confirmation request is logged. (Note that the system can determine who the driver of the ride is from the Ride-ID)

(5) Get contact information for another user

"Enter the phone number or 3-digit Ride-ID of the user you would like contact information for..."

The user enters the Ride-ID, home, work, or pager phone number of the user they want contact information for. Next, contact information including full name, gender, company, car smoking rules, and contact numbers is heard.

(6) Puget Sound area traffic report

A sample traffic report might sound something like:

"Traffic is very heavy on northbound I-5 near Northgate. Traffic is moderate on southbound I-5 through the convention center. Traffic is heavy on eastbound 520. Traffic is moving well on eastbound I-90."

After the entire traffic report has been played (or if the user presses the # key), the user is returned to the main menu.

(7) Transit information

- "If you know your bus number, press 1 to connect to Metro's Bus Time"
- "If you do not know your bus number, press 2 to talk to a Bellevue TMA staff person"

If user selects 1, they are connected to Metro's Bus Time and disconnected from the TIC.

If user selects 2, they are connected to Bellevue TMA's customer service line and disconnected from the TIC.

(8) Information about the Bellevue Smart Traveler project

Information about the Bellevue Smart Traveler project might sound something like:

"The Bellevue Smart Traveler project is an effort to reduce the number of single occupancy vehicles commuting to and from downtown Bellevue. The project is being conducted by the Bellevue Transportation Management Association and the University of Washington. For more information, please call the Bellevue TMA at 453-0644."

After the message has been played (or if the user presses the # key), the user is returned to the main menu.

(9) Send voice-mail to system administrator

"At the tone, please leave your message for the system administrator. When you are finished, you may hang-up, or press the pound key to return to the main menu...[beep]"

User leaves a voice message and can either hang-up or press# to return to the main menu.

(0) Help information

Help information will be context sensitive. That is, the help information presented will be relevant to the current feature that the user is using.

Once the help information has been played, the original instructions for the current feature will be played again and the user can continue exactly where the left off,

TIC FEATURE DESCRIPTIONS - PACER COMPONENT

Hand-held alpha-numeric pagers will allow registered users to access TIC information from anywhere at anytime. Following is a description of transportation information provided by the TIC that can be obtained from the pager. In addition, the pager also provides news, sports, weather, business, and other informational services.

Ride Offered Messages

Every hour, the TIC will transmit the current list of rides offered to the pagers. Each pager/user will be assigned to a specific ride group and the ride offered messages will be specific to that group. The rides can be displayed on the pager's screen in a list format that the user can quickly and easily scroll through to look for rides.

The ride offered list will consist of two sub-lists. The first list will contain rides from home to work. The second list will contain rides from work to home. Each ride offered message will contain the departure time and date of the ride, the first name of the driver offering the ride, one or more contact numbers to call to try to accept the ride with the driver, and the 3-digit Ride-ID.

Below is a sample list of rides offered as they would appear on the pager. Note that the pager's screen size is 20 columns wide by 4 rows high--enough for 80 characters per screen. In this example, page/screen breaks are denoted by dashes.

```
----------------------
   Bellevue Smart
      Traveler

 * Rides to Work *
----------------------
Mon 6/21  8:15AM
Brian     609-9190 p
          685-2131 w
```

```
141       322-7932 h
--------------------
Mon 6/21  8:30AM
Mark      609-9192 p
          543-2577 w
142       322-8461 h
--------------------
Tue 6/22  8:OOAM
Jan       609-9192 p
          543-1234 w
143       322-4321 h
--------------------
   Bellevue  Smart
      Traveler

   * Rides Home *
--------------------
Mon 6/21  4:30PM
Mark      609-9191 p
          543-2577 w
14s       322-1234 h
--------------------
Tue 6/22  S:OOPM
Brian     609-9190 p
          685-2131 w
146       322-7932 h
--------------------
```

Note that the only origin/destination information given is that the rides are either to work or to home. This is possible because each registered user with a pager will only receive rides for their ride group, which is specific to their commute to and from work (based on where they live).

People wishing to know more about the driver can call the TIC phone number and, by pressing 5 and entering the driver's phone number, can get the driver's ful1 name, gender, company, and car smoking rules.

Riders wishing to accept a ride can call the driver directly using one of the contact phone numbers given. If a ride-match is formed, both users have the option of calling the TIC phone number and

confirming the ride with the TIC; the driver will also have the option to delete the ride from the system.

Traffic Report Messages

Every 20 minutes, the TIC will send a current traffic report for the Puget Sound area freeway system to the pagers. User's with pagers can then quickly and easily view the traffic report on the pager's screen. On the pager, the traffic report might look something like the following (in this example, page/screen breaks are denoted by dashes):

```
   Bellevue Smart
      Traveler

 * Traffic Report *
--------------------
North Bound I-S
Heavy at Boeing
Heavy at Northgate
Save 8 min. on HOV!
--------------------
South Bound I-S
Heavy at U District
Heavy at South Centr
Save 14 min. on HOV!
--------------------
East Bound 520
Heavy at Montlake
Moderate across lake

--------------------
West Bound 520
Wide open


--------------------
East Bound I-90
Heavy through tunnel
Slow across lake
Save 9 min. on HOV!
--------------------
West Bound I-90
Wide open
```

TIC FEATURE DESCRIPTIONS - TRAFFIC REPORTER KIOSK

Buildings that are participating in the Bellevue Smart Traveler demonstration project will have the option of having a Traffic Reporter kiosk installed in their lobby. This kiosk is described in the paper entitled, "A Multi-Purpose, PC-based, Interactive, Graphical, Real-Time Advanced Traveler Information System," presented at the 1993 IVHS America conference.

The BST project team will provide the Traffic Reporter software and information signs about the BST project. The building will be responsible for providing and maintaining the computer hardware (IBM compatible computer, monitor, modem, and phone line).

Note that Traffic Reporter kiosk availability will be limited by reliability of source data from the Department of Transportation as well as the number of open ports on the DOT's computer.

TIC FEATURE DESCRIPTIONS - AUTOMATIC COMPONENTS

In addition to the many user features provided by the TIC, the system will also perform many tasks automatically in order to provide more efficient service to users.

Deleting Expired Messages

When a ride is offered into the TIC, it does not remain in the system forever. When the date and time of the ride have passed, the TIC will automatically delete the ride from the system. This will eliminate the chance of users accessing rides that are no longer valid.

Logging of System Use

The TIC will maintain an internal system log containing: 1) all the operations that the system has performed, 2) all users that have called the system, and 3) all features accessed by users. The log will serve as a gauge of how frequently the system and its features are used. This type of information will be useful for assessing and enhancing system.

Maintaining Registered User Database

The TIC will maintain every registered user on the system. This will include all of the information from the registration application as well as each user's pager number and ride group.

Maintaining Ride Groups

The TIC will maintain and track all the various ride groups that are created for the registered users. By maintaining all the ride groups, the TIC can provide user specific information to each registered user on the system This feature will eliminate the need for users to sort through information that is not applicable to their commute and informational needs.

Ride Confirmation Prompting

Ride confirmation prompting is an automatic feature that will attempt to complete a ride-match confirmation between two users once the confirmation request has been started. For example, if user A has requested a ride confirmation with user B, the TIC will automatically prompt user B to confirm (or not to confirm) the ride with user A as soon as user B logs on to the phone component of the TIC. This feature will help ensure that all requested confirmations are completed as soon as possible.

Complete confirmations will allow the TIC to track what ride matches are formed between registered users--for both statistical analyses purposes as well as for security reasons.

APPENDIX J

INTRODUCING BELLEVUE SMART TRAVELER: INCREASING YOUR COMMUTER OPTIONS

Bellevue Smart Traveler
GETTING YOU FROM HERE TO THERE

TMA
500 108th Avenue N.E.,Suite210
Bellevue, Washington 98004

PLACE
STAMP
HERE

INTRODUCING

Bellevue
Smart
Traveler
GETTING YOU FROM HERE TO THERE.

INCREASING YOUR COMMUTING OPTIONS

What is Bellevue Smart raveler (BST)?

BST is a program designed to offer you exibility in commuting to work or running our errands. This program provides rpool, bus and traffic information, and nables you to make smart travel decisions at could affect your time and money, and the nvironment. Highlights of the program include elp in forming on-demand or occasional carpools; access cut-rent bus and traffic information; news, sports, and eather at your fingertips; and the use of a free pager.

What is an on-demand arpool?

An on-demand carpool is a rideshare arrangement rmed for a specific ride. It differs from a regular carpool ecause on-demand carpooling is flexible and works with our changing schedule. On-demand rides will be limited participants who commute to and from a similar geo-raphical area.

How much does BST cost?

There is no cost to form a carpool or obtain formation.

Who can participate?

Any downtown Bellevue employee is eligible to partici-te in the program.

"Why should I participate?

Participating in the program has many benefits. One nefit is that you can receive a free pager to use for the emonstration period. This pager can put you in touch ith your family or office wherever you happen to be. It is our own personal messaging service and can be used up to 0 times a month. You can scroll through messages to see ho is offering a ride to your worksite or home. You can t current traffic information and satellite updated news, orts, weather and more. The information you receive will sist you in making informed travel decisions.

Another advantage of the program is that by forming an on-demand carpool you will be saving the environment by eliminating one more car from the road. And, depending on your route, you might be able to save time by driving in an HOV lane or by avoiding congested areas

How does BST work?

Application

Only downtown Bellevue employees are eligible to be registered participants. Registered participants can receive a pager and form on-demand carpools. However, anyone can call the system to receive bus and traffic information and learn more about the project.

To apply, all you need to do is complete the attached application form.

Registration

You will receive written notification including a Personal Identification Number (PIN) and a reference card that outlines the system's features. The card also provides a phone number for the system as well as numbers to access specific information by touchtone phone. (See below.)

To access the system by touch-tone phone

Simply call the phone number listed on the reference card, enter your PIN, and follow the various options.

These include directions on how to:

a) offer a ride
b) search for a ride
c) change or remove a ride
d) confirm a ridematch
e) obtain contact irtformation about another user
f) obtain a Seattle area traffic report
g) obtain transit information
h) obtain information on Bellevue Smart Traveler

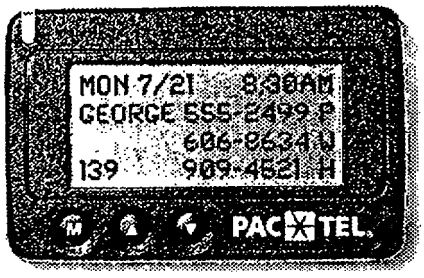
i) send a voice-mail message to the system administrator

j) obtain help

Some registered users can receive the information in f-j only.

To access the system from the pager

The pager displays rides offered and current traffic information. Two simple buttons allow you to read messages sent to you. The pager looks like:



The pager will receive only the information that is specific to the registered user's general commute.

You can scroll through the pager to receive current news, traffic, sports, weather, business. and other informational services. You can also use the pager for personal messages up to 200 times a month.

What do I do if

. . . I want to be a driver?

To offer a ride to another registered participant, you simply call the system one week to two hours before your trip to enter your departure date and time from home or work. Then wait for someone to call you to form a carpool. Once you have formed a carpool, just call the system to confirm your ridematch.

. . . I want to be a rider?

To look for a ride, you simply call the system and follow the directions, or scroll through your pager.

Bellevue Smart Traveler Flexible Ridesharing Application

Name: _____
Last First Middle Initial

Home Address (Confidential):

Number Street Apt. #Unit

City State Zip Code

Neighborhood

I can meet at this Park & Ride lot:

Specify which lot

Preferred Pick-up Point (Rank by number beginning with #I choice)

Home ___ Park & Ride Lot Other _____
(Please specify

Work Address:

Place of Employment

Number Street Suite #

City State Zip Code

Work Phone: _____

Home Phone: _____ **BST Release: Yes** _____ **No** _

Preferred arrival time at work _____ **AM**

Preferred departure time from work _____ **AM** _____

Is your schedule flexible by more than 30 minutes? Yes_ No

How do you currently get to work?

Bus Drive Alone ___Carpool _____Vanpool Other _____

As a BST participant, would you prefer to:

Mostly Drive _____ **Mostly Ride** _____ **Some of Both** _____

Approximately how many times a week do you expect to offer a ride? —— Accept a ride?_____

If you plan to offer rides, how many extra seats do you usually have available?-

In addition to accessing BST through the touch-tone phone, would y also like to use the free alphanumeric pager during the demonstratio Yes_____No_____

Comments: _____

_____

-Please also enter me into METRO's Regional Ridematch system send me a list of potential regular carpoolers.

Detach at fold and mail.

When you find a ride that meets your needs. call the dnvcr Once you have formed an on-demand carpool, just call the system to confirm your ride

It' s that simple

How do I meet my driver or rider?

When you discuss sharing a ride, you will determine when and where to meet. Remember, all participants work in downtown Bellevue and are located within about a four block area. In addition, all registered participants will have an ID card and a BST hang tag in their car when they drive

What if I can't find a ride?

Don't worry; BST has a feature called Guaranteed Ride Home. This feature allows registered participants to take a taxi home and be reimbursed for 90 percent of the taxi fare. You will be able to use this feature up to six times during the demonstration period.

Who is responsible for this project's success?

BST is sponsored by PAC TEL METRO USDOT

But, the program will only work if we have active participants, both drivers and riders. So in effect, the involvement of every downtown Bellevue employee will guarantee this project's success.

How do I sign-up?

Just fill out the attached application form and drop it in the mail.

For more information

call the

Bellevue Transportation Management Association

at 453-0644

BELLEVUE TMA
500 108th AVE NE.
SUITE 210
BELLEVUE WA 98004-9983

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 10919 SEATTLE, WA
POSTAGE WILL BE PAID BY ADDRESSEE

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

APPENDIX K

TELEPHONE INTERVIEW LOGS

SOUTHEND RIDE GROUP							
Active Participants	Start Date	Stop Date	Pager number	Accepted 1/14/94	Offerred 1/14/94	Carpool 1/14/94	Comments 1/26/94
	11/18/93		609-4793/PacTel		8		ID #202 didn't show on pager
	11/19/93		442-0537/Seiko		31		No calls/will keep offering
	11/17/93		609-4461/PacTel		0		
	11/17/93		609-4039/PacTel		0		Not comfortable - hasn't gotten into it
	1/25/94		609-4294/PacTel		0		Bus rider/wants more flexiblility/no license
	1/17/94		609-4294/PacTel		34	4	Offers frequently , 1 match
	11/18/93		609-4520/PacTel		0		Busy at work, will start offering
	11/17/93		609-4549/PacTel		6	2	Accepted ride once, easy to use
	2/1/94		609-4043/PacTel				
	12/7/94		609-4266/PacTel		0		Didn't understand pager was for offers
	1/13/94		609-4533/PacTel				Duke Strickland's carpool partner
	1/27/94		340-9028/Seiko				Martin Taylor's carpool partner
	11/24/93		442-0827/Seiko		19		Smaller van, less seats available
	12/14/93		609-4041/PacTel		2	1	Will be out of town 3 weeks
	11/24/93		442-0827/Seiko		19		Offered rides, no response
	2/1/94		609-4514/PacTel				
			Seiko				
	1/26/94		609-4783/PacTel		0		Didn't understand pager was rides offered
	1/27/94		609-4805/PacTel				Carpools with Ken Newman
	11/17/93		609-4225/PacTel		0		Showed her how to use system
Non-Pager Participants							
	11/23/93	12/7/93	609-4266/PacTel	0			Not convenient
	11/17/93	2/11/94	609-4537/PacTel	0			Doesn't fit with work schedule
	11/17/93	12/10/93	609-4533/PacTel	0			Prefers bus
	2/8/94						Occasional use

Telephone interview log 1

ISSAQUAH RIDEGROUP

Active Participants	Start Date	Stop Date	Pager Number	Accepted 1/14/94	Offered 1/14/94	Formed 1/14/94	Comments 1/14/94
	11/24/93		609-4216/PacTel		6		Busy at work/battery problem
	11/17/93		609-3960/PacTel		6		Busy at work/offered at start
	2/1/94		609-0945/PacTel				
	1/13/94		609-3963/PacTel				
	11/17/93		609-4312/PacTel				
	11/17/93		609-4302/PacTel		0		Wouldn't return phone calls
	12/14/93		447-8384/Seiko		17	0	
	1/20/94		609-4327/PacTel				
	11/24/93		609-3977/PacTel				Tried to accpt once
Left Program							
	11/17/93	1/20/94	609-4327/PacTel		19		9:30 to 6:00 shift/no matches

Telephone interview log 1

NORTHEND RIDEGROUP							
Active Participants	Start Date	Stop Date	Pager Number	Accepted	Offered	Carpool Formed	Comments
	1/27/94		609-8716/PacTel				
	1/25/94		609-7375/PacTel				
	1/18/94		609-2165/PacTel				
	12/14/93		609-1288/PacTel				
	12/14/93		609-8793/PacTel				
	1/26/94		609-5289/PacTel				
	2/3/94		609-3482/PacTel				
	1/25/94		609-1752/PacTel				
	1/27/94		609-0987/PacTel				
	1/18/94		609-3226/PacTel				
	1/25/94		609-0164/PacTel				
	1/19/94		609-3579/PacTel				
	1/4/94		609-2087/PacTel				
	2/1/94		609-3099/PacTel				

Telephone interview log 1

SOUTHEND RIDE GROUP												
Active Participants	Start date	Stop date	Rides offered	Received calls	Checked msgs	Schedule matched	Called to accept	Carpool formed	Traffic value	Info value	personal msgs.	Comments 2/11/94
	11/18/93		15	no	1x day	yes	driver	no	no	yes	yes	traf. msgs. same
	11/19/93		59	no	watch					yes	no	will keep offering
	11/17/93		0		no			no	no	no	no	sched too varied
	11/17/93		7	no	1x day		driver	no	ok	yes	yes	
	1/25/94		0		1x day	no			no	no	no	bus rider/try 1 mo
	1/17/94		42	no	1x day		driver	4	yes	yes	no	wanted to stop
	11/18/93		0		1x day	yes	no	no	yes	yes	no	busy at work
	11/1793		12	no	daily	yes	2x	2x	yes	yes	yes	will buy pager
	2/1/94		0		2x day	yes	no		good	ok	no	more 405 info
	12/7/94		0		3x week	no			no			
	1/13/94		6									
	1/27/94		0		watch					yes	yes	will offer
	11/24/93		19	no	watch					yes		ck lottery 3x
	12/14/93		2	1								out of town 2/20
	11/24/93		29	no								
	2/1/94		0									
			0									
	1/26/94		0		2x day	no			yes	yes	no	still will offer
	1/27/94		14	no	2x day	no			no	yes	no	wants origin & rt.
	11/17/93		6	no	2 x wk	yes	driver	no	no	occ	no	will offer
Non-Pager Participants												
	11/23/93	12/7/93		0								
	11/17/93	2/11/94		0								
	11/17/93	12/10/93		0								
	2/8/94											

Telephone inteiview log 2

ISSAQUAH RIDEGROUP												
Active Participants	Start date	Stop date	Rides offered	Received calls	Checked msgs.	Schedule matched	Called to accept	Carp001 formed	Traffic value	Other infor	personal msgs	Comments **2/1** l/94
	1 l/24/93		7									
	11/17/93		10									
	2/1/94		0									
	11/17/93		2									
	11/17/93		0						yes	yes	yes	business pager
	12/14/93		25	no								
	1/20/94		17									
	11/24/93		3	no	daily	yes	no	no	no	no	cell ph	prefers bus
Non-Pager Participants												
Left Program												
	11/17/93	1/20/94	19									
	1/13/94		0		daily	yes	no		no	yes	no	wants Redmon gr

NORTHEND RIDEGROUP												
Active Participants	Start date	Stop date	Rides offered	Received calls	Checked pg. msgs.	Schedule matched	Called to accept	Carpool formed	Traffic value	Other info	personl msgs.	Comments 2/11/94
	1/27/94		0		daily	am yes	no	no	weak	yes	no	
	1/25/94		0		2x day	no	no	no	yes	yes	no	too busy to offer
	1/18/94		10	0	1x day		driver	no	weak	no	no	traf. the same
	12/14/93		0		2x day	no		no	no	yes	no	prefers bus
	12/14/93		8		daily	yes	no	no	yes	yes	no	needed car
	1/26/94		0									
	2/3/94		0									out of town
	1/27/94		1	no	no		driver		no	no	no	cp/uses cell phone
	1/18/94		10	no	no				no	yes	yes	traf the same
	1/25/94		0									
	1/19/94		4									
	1/4/94		0									
	2/1/94		2	no	use ph	pm trip	yes	no	no	no	no	going wrong way
Left Program												
	1/25/94	2/15/94	0									not committed

Telephone interview log 2

SOUTHEND RIDE GROUP											
Active Participants	Start date	Start date	Rides **offered**	Received **calls**	Checked msgs	Schedule matched	Called to accept	Carpool formed	Traffic value	Info value	personal msgs	Comments
	1 l/18/93		20	no								TIC hard to reach; rides didn't appear on pager
	1 l/19/93		79	no	no	no	no	no	no	yes	yes	no
	1 l/17/93		0		yes	no			yes	yes	no	Schedule erratic/too bus
	2/15/94		***0***									
	1 l/17/93		13	no	yes	no	no	no	yes	yes	yes	No response to offers
	1/25/94		***0***									Not a good alternative t bus
	l/17/94		48	no	yes	no	no	not since Dec.	yes	yes	no	Stopped offering rides, listens to KIRO traf.
	1 l/18/93		0									
	1 l/17/93		15	no	yes			not since Dec.	no	OK	yes	Wants test to end Rides offered finally show
	2/l /94		***0***									
	12/7/94		2	no	5x/week	no	no	no	no			
	l/13/94		6	no								
	1/27/94		**0**									
	1 ***l/24/93***		19									
	12/l 4/93		6									
	11/24/93		63	no	no	no	no	no	no	no	yes	Test failed for her
	2/1/94		***8***									
					no	no	no	no	no	no	no	Awkward hours
	1/26/94				5x/week	no	no	no	yes	yes	no	Not checked rides in 2 wks/traf. useful
	l/27/94				5x/week	no	**no**	yes	no	no	yes	Ride msg. should includ rt. info.
Non-Pager Participants												
	1 ***1/23/93***	***12/7/93***		***0***								
	1 l/17/93	2/l l/94		0								
	11/17/93	12/l0/93		0								
	2/8/94											
Left the Program												

Telephone interview log 3

ISSAQUAH
RIDEGROUP

Active Participants	Start date	Stop date	Rides offered	Received calls	Checked msgs.	Schedule matched	Called to accept	Carpool formed	Traffic value	Other personal infor	msgs.	Comments
	11/24/93		7	NO	5x/week	no	no	no	OK	OK	no	Life too hectic/No response to offers
	11/17/93		10	No	10x/week	no	no	no	yes	yes	no	No response to offers/likes traffic info
	2/1/94		4	No								
	11/17/93		2	NO		no	no	no	yes	yes	some	Didn't work for him/erratic schedule
	11/17/93		0		no	no	no	no	yes	yes	yes	Carpools now but not due to TIC
	12/14/93		37	No	no	no	no	no	yes	yes	yes	No response to calls/like watch
	1/20/94		21	No	25x/week	no	no	no	yes	yes	some	No response to offers/saw me possible match
	11/24/93		3									
	11/17/93	1/20/94	19									
	1/13/94	2/16/94										wants Redmond

Telephone interview log **3**

NORTHEND RIDEGROUP

Active Participants	start date	Stop date	Rides offered	Received calls	Checked msgs.	Schedule matched	Called to accept	Carpool formed	Traffic value	Other infor	personal msgs	Comments
	l/27/94		0									
	l/25/94		0		no	no	no	no	no	no	no	Never used TIC, north 1405 traf. info, not good
	l/18/94		16	No	no	no	no	no	yes	yes	yes	No response to offers
	12/14/93		0		10x/wee k	n o	no	no	yes	yes	n o	Arrives too early
	12/14/93		8	No	yes	*no*	no	no	yes	yes	no	Batteries dead, liked traf. info
	l/26/94		***2***	**No**								
	2/3/94		***4***	***No***	4xweek	no	no	no	yes	yes	no	No response to offers/would use if HOV lane avail.
	1/27/94		***5***	***No***	no	no	no	no	no	no	no	Didn't understand TIC, never used pager
	l/18/94		12	No	no	no	no	no	no	no	no	Found ride to work, not home/ rides bus
	l/25/94		0									
	1/19/94		9	NO								
	1/4/94		***0***									
	2/1/94		17	No	***25x/wee*** k	n o	no	no	yes	yes	no	Tried once/didn' t work
	2/17/94		0									
Left Program												
	l/25/94	2/15/94										no commitment

Telephone interview log 3

APPENDIX L

BELLEVUE SMART TRAVELER (BST) COMPLETION SURVEY

Bellevue Smart Traveler (BST) Completion Survey

Dear BST Participant,

We'd like to thank you for participating in the Bellevue Smart Traveler demonstration project. Now that the project is nearly finished, we'd like you to fill out this survey and let us know how well BST worked (or didn't work) for you. Your input is very valuable to us; your feedback will help us make the BST system a more viable information source for Bellevue-area commuters.

We've included a certificate for a free beverage at Johnika's in Koll Center Bellevue. When you're finished, please fold your survey in thirds, tape it closed, and drop it in the mail by April 22. *Thanks again for your participation.*

PACTEL PAGER USERS: Please return your PacTel pagers to the TransManage office by April 22 (If you are using a Seiko Receptor watch, you do not need to return it). TransManage is located at 500 108th Ave NE, Suite 210, in Koll Center Bellevue in downtown Bellevue. Please call 453-0644 if you have any questions. Pager services for PacTel pagers will be discontinued after April 15; however, if you would like to continue using your PacTel pager, please contact "CJ" Charles Johnson, Jr. (l-800-678-2370 or 609-8889 (pager)) and identify yourself as a BST participant to receive special pricing.

Bellevue Smart Traveler Survey
Attn: Susan Michalak
Dept. of Technical Communication, FH-40
University of Washington
Seattle, WA 98195

l. Audience Profile

1. Why did you register for the BST program? Check all that apply.
   - I wanted an occasional carpool partner.
   - I wanted a regular carpool partner.
   - I wanted to save time by using the HOV lanes.
   - I wanted to save money by carpooling.
   - I was interested in the traffic congestion information available through the BST phone/pager system.
   - I was interested in the transit information available through the BST phone/pager system.
   - I was interested in the weather, sports, and news information available on the pager.
   - I wanted use of a pager.
   - I was curious about the program.
   - Other: _____

2. Did you rideshare before participating in the BST program? 0 Yes O No

If yes, how often? 0 Less than once per week 0 l-3 times per Week 0 4-6 times per week 0 Over6 times per week

3. How do you usually commute to work?

0 Drivealone
O Carpool with 1 other person
O Carpool with 2 or more other people
O Vanpool
0 Ride the bus
0 Ride a motorcycle/moped
0 Walk
O Bicycle
0 Other

4. How did you commute to work today?

0 Drove alone
0 Cat-pooled with 1 other person
0 Carpooled with 2 or more other people
0 Vanpooled
O Rode the bus
0 Rode a motorcycle/moped
0 Walked
0 Bicycled
0 Other

5. How frequently do you take a freeway to commute to work?

O Never 0 Rarely 0Sometimes O Frequently O Always

6. How frequently do you encounter traffic congestion on the freeway?

O Never O Rarely 0 Sometimes 0 Frequently 0 Always

II. System Usage

	Times per week				
	None	Less than 1	1-3	4-6	Over 6
1. On average, how many times per week did you:					
a. Call the BST phone system to:					
1. Look for a ride:	0	0	O	0	0
2. Offer a ride:	O	0	0	0	0
3. Get traffic congestion information:	O	0	0	0	0
4. Get transit information:	0	0	0	0	0
b. Use the touch screen kiosk Traffic Reporter, located at the concierge desk in Bellevue Place, to get traffic information?	O	O	0	0	0
c. Refer to your pager to:					
1. Look for a ride:	0	0	0	0	0
2. Get traffic information:	0	0	0	0	0
3. Get other information, such as sports and weather:	0	0	0	0	0
d. Call the BST phone system from:					
1. Home	0	0	0	0	0
2. Work	0	0	0	O	0
3. Your car (or other vehicle)	0	0	0	0	O
4. From other locations, such as shopping areas	0	0	0	0	0

	Times per week				
	None	Less than 1	1-3	4-6	Over 6
2. On average, how many times per week did you refer to your pager while:					
a. At home	0	0	O	0	0
b. At work	0	0	O	0	0
c. In your car	0	0	O	0	0
d. From other locations, such as shopping areas	0	0	0	0	0

III. Ridesharing

	None	I-6	6-10	10-20	Over 20
1. a. Overall, how **many** times did you look for a ride using the BST phone/pager system?	0	0	0	0	0
b. Of the times you looked for a ride, how many times did you find a potential ride?	0	0	0	0	0
c. Of the times you found a potential ride, how many times did you call the driver who was offering the ride?	0	0-	0	0	0
2. a. Overall, how many times did you offer a ride using the BST phone system?	0	0	0	0	0
b. How many times did you receive a call from a rider intersted in a ride you had offered?	0	0	0	0	0
3. Either as a driver or a rider, how many times did you form a carpool:					
a. To work	0	0	0	0	0
b. To home:	0	0	0	0	0

If you answered none to both a and b In the previous question (question 3), please answer questions 4 and 5. Otherwise skip to question 6.

4. Why didn't you participate in a carpool? (Check all that apply.)

0 I offered rides but never received calls from interested riders.

0 I didn't know the other participants.

0 Carpooling took too much time/was inconvenient.

0 I always needed my car to run errands.

0 The logistics of deciding on a pick-up point was too complicated.

0 I never found a ride offered at a convenient time.

0 Other:_____

5. Of the items listed below, please check which ones (if any) would have made you more likely to carpool. (Check all that apply.)

   O Getting to know other participants before carpooling **with them.**

   O Knowing where other ridesharing participants' homes were located in relation to yours.

   0 Having predetermined pick-up points.

   0 Other: _____

6. How safe did/would you feel ridesharing with other members of the BST program?

Not at all safe				Very safe
1	2	3	4	5

7. Which of the system media (telephone or pager) do you think is most useful for ridematching?

   0 Telephone 0 Pager 0 No opinion

8. How easy was it to register for the BST program?

Not at all easy				Very easy
1	2	3	4	5

9. Did you feel it was adequate that Bellevue TransManage verified only employment of registered ridematch users? O Yes O No

   If no, what additional background checks should be performed? _____

10. If you answered no to question 9 above, would you object to your suggested additional background checks being performed on you as a condition of registration? O Yes 0 No

11. Please tell us about any negative experiences you had as a result of using the BST system. _____

IV. Assessment

		Times per week				
	None	Less than 1	1-3	4-6	Over 6
1. a. On the basis of the traffic congestion information available on the BST phone/pager system, how many times per week did you:					
1. Change to an HOV mode (for example, from driving alone to carpooling or riding the bus)	O	O	0	0	0
2. Change departure time	0	0	0	0	0
3. Change route	0	0	0	0	0
4. Cancel a trip	0	O	0	0	0

b. If you answered none to any part of the previous question (question la), please tell us why. Check all reasons that apply.

_____ No bus service to my destination
_____ Could not find any rides
_____ Bus/carpooling too inconvenient
_____ Cannot change time I leave
_____ Changing time too inconvenient
_____ Cannot change route
_____ Changing route too inconvenient
_____ Cannot cancel trip
Other: _____

2. How congested would your route have to be for you to change your driving plans?

_____ Stopped completely (O-19 mph)
_____ Severely congested (20-34 mph)
_____ Moderately congested (35-49 mph)
_____ Wouldn't change plans under any circumstances

3. Please rate the usefulness of the information available through the BST:

	Not at all useful				very useful
a. Telephone system:					
1. Ridesharing information	1	2	3	4	5
2. Transit information	1	2	3	4	5
3. Traffic congestion information	1	2	3	4	5
b. Pager:					
1. Ridesharing information	1	2	3	4	5
.2 Traffic congestion information	1	2	3	4	5
3. Weather and news information	1	2	3	4	5
4. Financial reports	1	2	3	4	5

4. From the following list of transportation-related information, please rank the top three most useful types of information for you. Write a "1" next to the most useful, a "2" next to the second most useful, and a "3" next to the third most useful.

_____ Traffic congestion for diamond (HOV) lanes
_____ Traffic congestion for regular (SOV) lanes
_____ Detailed traffic information (why traffic is congested, what's being done about it, etc.)
_____ Estimation of your travel time for a particular trip
_____ Help selecting the quickest route to your destination
_____ Help selecting the most direct route to your destination
_____ Detailed directions for finding your destination
_____ Information about businesses or services on your route
_____ General bus information (how to catch, when to pay, transfers, etc.)
_____ Trip-specific bus information (route, schedule, fare)
_____ Real-time ("live") data about bus schedules and bus locations
_____ Carpooling or vanpooling information
_____ Information about one-time, on-demand carpooling

For questions 5-7 please put a 1, 2, and 3 in each column as in the example below.

Example:

Location for receiving information	Information Type		
	Ridesharing	Traffic congestion	Transit
Home	____	____	____
Work	____	____	____
In-car	____	____	____
Malls and other commercial areas	____	____	____
Portable device	____	____	____

5. From the list of possible locations below, please rank the top three most convenient locations for receiving each type of information. Use a "1" for the most convenient. You should have a 1,2, and 3 in each column.

Location for receiving information	Information Type		
	Ridesharing	Traffic congestion	Transit
Home	____	____	____
Work	____	____	____
In-car	____	____	____
Malls and other commercial areas	____	____	____
Portable device	____	____	____

6. Information about ridesharing, transit, and traffic congestion can be provided through a variety of technologies. From the list of possible technologies below, please rank the top three most helpful technologies for each type of information. Use a "1" for the most helpful.

Technologies for providing information	Information Type		
	Ridesharing	Traffic congestion	Transit
Computer (either your own or one for public use like TRAFFIC REPORTER)	____	____	____
Regular TV	____	____	____
Cable TV	____	____	____
AM or FM radio	____	____	____
Short-distance highway advisory radio ("for traffic info tune to...")	____	____	____
Interruption of AM or FM stations for traffic information about your own route	____	____	____
Phone--live operator	____	____	____
Phone-touch-tone menu with synthesized voice	____	____	____
Changeable highway message signs	____	____	____
Portable device (like a pager)	____	____	____

7. Information about ridesharing, transit, and traffic congestion can be provided in several formats. From this list of possible formats, please rank the top three that you would find easiest to understand for each of the information types. Use a "1" for the easiest.

Formats for providing information	Information Types		
	Ridesharing	Traffic congestion	Transit
Maps	____	____	
Charts or graphs	____	____	____
Text (printed words)	____	____	____
Speech (spoken voice)	____	____	____

8. Please rate the helpfulness of the following: technologies as a means for providing each type of information:

	Not at all helpful				Very helpful
a. Telephone system as a means for providing:					
1. Ridesharing information	1	2	3	4	5
2. Transit information	1	2	3	4	5
3. Traffic congestion information	1	2	3	4	5
b. Pager as a means for providing:					
1. Ridesharing information	1	2	3	4	5
2. Traffic congestion information	1	2	3	4	5

9. Please rate how easy it is to understand the BST:

	Not at all easy to understand				very easy to understand
a. Phone system's delivery of:					
1. Ridesharing information	1	2	3	4	5
2. Transit information	1	2	3	4	5
3. Traffic congestion information	1	2	3	4	5
b. Paper's delivery of:					
1. Ridesharing information	1	2	3	4	5
2. Traffic congestion information	1	2	3	4	5

10. How easy were/was the:

	Not at all easy				Very easy
a. phone system's menu selections to follow?	1	2	3	4	5
b. recorded voice to understand?	1	2	3	4	5
c. pager's menu selections to follow?	1	2	3	4	5

11. The BST phone system allows you to select the type of information you're interested in and also allows you to input information; for example, BST allows you to specify which day your are looking for a ride and the direction of the ride, home or work. Please rate your satisfaction with the way the BST phone system responds to your input.

Not at all satisfied			Vary satisfied	
1	2.	3	4	5

12. For each of the types of information below, would you prefer a phone system that allows you (the user) to specify what information you'd like to hear or one that plays automatically?

	User-specified	OR	Automatic
Ridesharing information	0		0
Transit information	0		0
Traffic congestion information	0		0

13. Iiow reliable did you feel the following types of information provided through the BST system were?

	Not at all reliable				Very reliable
a. Ridesharing information	1	2	3	4	5
b. Transit information	1	2	3	4	5
c. Traffic congestion information	1	2	3	4	5

14. In addition to ridematching information, the pagers provided weather, news, stock reports and personal paging services. Would you participate in a future BST program if these additional services were **not** available? 0 Yes 0 No

15. Would you be willing to pay for BST's services? 0 Yes 0 No

If yes, how much would you be willing to pay for use of the:

Telephone system (per call) $_____

Pager (monthly) $_____

V. Demographics (Optional)

1. Are you: 0 Female 0 Male

2. What is your age? _____ years

3. How many people (including yourself) live in your household?_____people

4. What is your annual income, before taxes, for yourself and for your entire household?

Yourself		Entire household	
0 Under $20,000	0 60,000-79,999	0 Under $20,000	0 60,000-79,999
0 20,000-39,999	0 80,000-99,999	0 20,000-39,999	*0 80,000-99,999*
0 40,000-59,999	0 Over 100,000	0 40,000-59,999	0 Over 100,000

5. Are you hearing or sight impaired? 0 Yes 0 No

6. Please provide any additional comments about the Bellevue Smart Traveler program._____

_____

_____

_____

_____

_____

Thank you for your participation.

Rough Draft

APPENDIX M

MARKETING THE TRAVELER INFORMATION CENTER

BELLEVUESMARTTRAVELER:

Marketing the Traveler Information Center

Cathy Blumenthal
Bellevue Transportation Management Association

March 22, 1994

BACKGROUND

A marketing plan for the Traveler Information Center (TIC) was developed following the completion of the System Features Document. The document provided the marketing team with enough information about the TIC prototype to begin introducing the proposed services to the public. An early introduction allowed project staff an opportunity to preview how the Center would be received by potential users and also developed early public name recognition for the TIC and the information services it would provide.

Key Planning Assumptions

There were a number of factors governing the marketing efforts:

- the majority of the target audience would have no prior knowledge of the TIC features.
- a budget of $2,900.00 was available to be used for printing and other promotional expenses.
- a consistent look would be maintained throughout the project, which included the use of a Bellevue Smart Traveler logo.

Objective

Using the statistical information received from the survey of Bellevue Place, a projection was made as to what likely percentage of persons would join high occupancy vehicles as a result of the TIC The projection was based on the results of primarily non-SOV respondents, who indicated a greater willingness to carpool if it was on an occasional basis and it was flexible. The Bellevue Place survey was used as an indicator for other sites in downtown Bellevue that would be included in the demonstration. It was determined that a 3 % increase could occur in the number of commuters leaving or entering downtown Bellevue in a high occupancy vehicle. (HOV) by the end of the demonstration period.

TARGET MARKETS

Early in the project an analysis was done of potential building and employer sites targeted for participation in the demonstration. Information was compiled for each site about the types of HOV incentives offered to employees, the number of persons driving alone (SOV rate), the prevalence of employer paid parking, and transit accessibility.

SITE CRITERIA/TRANSMANAGE CLIENTS

Building & Tenants	# of Employees	Transit/CP Incentives	SOV Bate	Parking Data	Transit Availability
BELLEVUE PLACE	**1,700**	**Reserved Parking** **2 mo. SOY park days**	*79%*	*$75* **month**	**l-4 Blocks**
Microsoft	500	$21 bus subsidy	**N/A**	Employer paid	
Hyatt Regency	**275**	$15 bus subsidy	79%	Market rate	
Seafirst	**89**	*50%* bus subsidy	*75%*	Market rate	
KOLL CENTER	**1,252**	**2 mos. bus subsidy** *50% -60%* **CP discount** **3 mo SOV park days**	N/A	**$75 month**	**Adjacent BTC**
HDR Engineers	**130**		**65%**	**Market rate**	
Digital	**260**	100% bus subsidy	**N/A**	**Employer paid**	
US West	**165**		**29%**	**Market rate**	
PACCAR	**500**	**Free CP parking** **3 mo. SOV park days**	**79%**	**$35 mo. rate**	**l-2 blocks**
PLAZA/ **US BANK**	**1,400**	**30% CP discount** **4 mo. SOV park days**	**N/A**	**$55 month**	**1 block-BTC**
Entranco	80	$21 bus subsidv	*79%*	*75%* employer	
Ebasco	*220*	$15 bus subsidy 3 company vanpools	N/A	Employer paid	
US Bank	100	$15 bus subsidy	N/A	Market rate	
SKYLINE TOWER	**1,100**	**50-60% CP discount** **3 mo. SOV park days**	**N/A**	**$75 month**	**1 block-BTC**
SECURITY **PACIFIC PLAZA**	*905*	**$10 CP discount** **2 mo. SOV park days**	**N/A**	**$80 month**	**1 block-BTC**
CH2M Hill	*485*	$40 travel subsidy $15 bus subsidy	**53%**	**Market rate**	
ONE BELLEVUE **CENTER**	**1,000**	**$10 CP discount**	**N/A**	**$75 month**	**1 block -BTC**
PUGET POWER	**1,000**	**$21 bus subsidy** **$25 gift certificate** **Free CP parking** **2 mo. SOV park days**	**69%**	**$21 mo. rate**	**1 block-BTC**
US WEST	**1,000**	**50-100% CP discount**	**29%**	**Market rate**	**1 block-BTC**

**BTC-Bellevue Transit Center

This table provides some background information about the property management and employers participating in the TIC demonstration. Names appearing in bold reflect information and statistics for the entire site. Non-boil names describe tenants at the site.

At most sites, transit riders and carpoolers who commuted by HOV on a regular basis received discounted monthly parking, free monthly parking days when they drove alone, and reserved parking. The typical SOV rate, when available was around 79%. A poll taken from the largest employers at each site indicated a mix of employer/employee paid parking. Employees at these sites had access to transit 4 blocks or fess from their building. Two main target groups were identified from these sites for participation:

1. Existing carpoolers and vanpoolers, who were registered with TransManage.
2. All TransManage clients.

MARKETING STRATEGY

Meetings with employee transportation coordinators (ETC's) and property managers from the client sites listed above were started in June 1993. The purpose of these meetings was to educate ETC's about the TIC and to gain their cooperation, acceptance and support for the system. Introductory letters were sent to most client contacts with background information prior to discussions about the project. The majority of businesses promised access to employees through flyers, signs and presentations when the demonstration was ready to start.

Logo development was started in July, using a free lance graphic designer who was willing to develop the logo at an affordable cost. The logo chosen to represent the project demonstrated all the varied travel destinations in its design, including work, home and shopping trips. The logo was used on a fold out brochure and other flyers and posters during project recruitment.

Beginning in July 1993, teaser flyers and posters were developed to introduce the traveler information center concept to employees at various TransManage events, such as transportation fairs, high rise lobby visits, and other employee presentations. Introductory flyers focused on the use of a free pager to assist with commuting decisions, information services, and free messaging use. Flyers included space for the name, employer and phone number of persons interested in joining the program or desiring further information. Application forms were later sent to these individuals. Posters with similar information were placed in client lobbies during a one week period.

Influential public and private individuals in the community were introduced to the Bellevue Smart Traveler project at local board meetings and at public meetings through a slide presentation. University of Washington, PacTel and TransManage staff were on hand to discuss the public/private nature of the project and their respective roles. A number of people attending these meetings were later contacted to assist with the promotion of the system, including introductions to businesses who were not TransManage clients, in order to promote the Traveler Information Center.

In September, a press release was sent to key newspaper publications, TV and radio stations, which included the announcement of a press conference to demonstrate the technology

used in the information center. The press conference produced excellent coverage of the new information system. Articles appeared in all the top newspapers with one front page article. Information about the ridesharing program appeared on two TV stations, which provided four minutes of on screen coverage. A number of radio talk show hosts used the on-demand ridesharing feature as a discussions topic for their shows. The two TV videos were made available to the project staff and were subsequently used for a variety of informational and promotional purposes during the course of the demonstration. The press coverage had a positive effect on the initial recruitment phase for rideshare participants by contributing to the name recognition and visiblility of the program.

The most elaborate publication developed to promote the TIC was a two color fold-out brochure entitled Introducing Bellevue Smart Traveler (logo), Increasing your commuting Options. The brochure explained how the system worked in a question and answer format and included appropriate graphics. A tear off application with guaranteed postage was available for persons wishing to apply for the program. Applicants had the option of requesting a METRO ridematch printout on the application. About 75% of the people applying requested a ridematch.

In October 1993, approximately 7,000 brochures were distributed to employees at nine client sites. Distribution methods included desk top delivery, brochures delivered by department, and brochures available at facility management offices. Posters announcing the program were posted simultaneously in the client lobbies. By November 4, a total of 86 applications had been received, and identification of applicants on a large area map had begun using colored pins to signify an applicants desire to offer a ride, accept a ride or do both. Based on this information, project staff identified two geographical locations to be targeted for the demonstration. Because the applicant's homes were spread out in each of the areas, it was decided to identify travel routes in conjunction with park and ride lots where participants could meet to form car-pools.

Of the two groups, the South end applicants offered the most potential for a sizable rideshare group with 27 applicants. It was decided to implement an Issaquah rideshare group at the same time, although their was concern that 8 applicants did not constitute a viable number for ridesharing purposes. The Issaquah group would provide a test of the minimum number of participants necessary to produce ridesharing results. It was expected that this group would eventually receive more participants during the demonstration, which did not happen, A third ridegroup with 19 applicants North of Bellevue was later started in January 1993

ORIENTATIONS

It was decided to kick-off the demonstration with a special orientation for the first ridegroup participants. The orientation was designed to inform the registrants about the system and how to use it. Representatives from the University of Washington, PacTel Paging, the WSDOT and TransManage each took part in the 45 minute brown bag lunch presentation. Orientations during the remainder of the demonstration were conducted by TransManage staff in small groups or one on one. Each registrant received an informational folder with detailed information about park and ride lot locations, buses serving park and ride lots, pager use, and the guaranteed ride home program. In addition, participants received a Bellevue Smart Traveler hang tag to attach to their review mirror to identify them when meeting riders, a wallet size quick reference guide for using the TIC, and free Metro bus ride tickets for emergency rides home or to the park and ride lot. Laminated ID cards were mailed to participants after the meeting along with a signed pager registration form signifying agreement with the terms for use of the pager during the demonstration.

Registrants were requested to attempt to rideshare a minimum of l-3 times per week as a condition for using the PacTel pager. Due to the limited numbers of participants in each ridegroup, it was recommended that participants arrange both their trip to work and trip to home at least the day before the ride.

Guaranteed Ride Home

To reduce the fear of being stranded if a return ride home was not available, a guaranteed ride home program was developed. Rideshare participants were given two options for a ride home if they could not find a carpool partner through the TIC. The bus option was for persons who had access to bus transportation to their home or park and ride lot during service hours. In the event the bus trip was not available, participants could call the TransManage office during regular business hours and request a cab ride home. If they needed a cab after hours, they could call the cab company directly and then notifiy TransManage staff on the next working day. Persons using the cab ride would be reimbursed by mailing the cab receipt to TransManage.

MARKETING CAMPAIGN II

By January, applications for participation in the ridesharing demonstration were dwindling and it was determined that a new informational campaign was needed to obtain additional participants. New flyers and posters were developed for distribution. Employers and property management from TransMange client sites were enlisted to assist with distributing and posting the newest materials. Six building sites, not involved in the first distribution, also received flyers, posters and Bellevue Smart Traveler Commuting; Options brochures. Information was provided to approximately 3,000 employees officed at these sites. Metro Sales and Promotion staff also placed posters and brochures at downtown commuting information centers (CIC boards) located at 27 sites. This second marketing effort produced 35 new applications and generated approximately 23 new rideshare participants for the ridegroups in the demonstration.

BSTMARKT.DOC-MS Word for Windows