

# **USER ACCEPTANCE TEST REPORT**

**From the Independent Evaluation of**

**Georgia's ATIS Kiosk System  
(TraveLink)**

September 13, 1997

**Prepared for the Kiosk Project Partners:**

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## **EXECUTIVE SUMMARY**

This research was conducted as part of the evaluation of the Advanced Traveler Information System (ATIS) Kiosk System. The user acceptance aspects of the TraveLink Kiosk System were evaluated using questionnaires, focus groups, observational studies, and expert evaluation. Examination of the demographic variables of the questionnaire respondents provides an overall description of users during the evaluation period. Qualitative ratings and comments concerning various kiosk features, changes made to travel plans, willingness to pay for kiosk services are described and compared. Observations made of users permit some insight into the amount of time and frequency the kiosks are used. Recommendations are given for a variety of issues such as user interface design and information content. The results and recommendations for future enhancements are reported.

## **CREDITS AND DISCLAIMERS**

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Any opinions, findings, conclusions or recommendations expressed in this publication are those of the author(s), and do not necessarily reflect the views of the Federal Highway Administration.

## LIST OF ACRONYMS AND TERMS

ARC	Atlanta Regional Commission, the Metropolitan Planning Organization for the Atlanta Area.
ATIS	Advanced Traveler Information System, a type of ITS.
ATM	Automatic Teller Machine, used by banks to allow customers to electronically deposit and withdraw account funds and access account information.
CD ROM	Compact Disk-Read Only Memory, a storage media for digital information
CCT	Cobb Community Transit, the public transit bus system for Cobb County.
Chi-Square (x2) Analysis	A statistical analysis technique applied to independent sample sets to determine if the observations differ significantly from what might be expected by chance.
Coefficient Alpha	A statistical analysis technique for determining the reliability of items within a scale (or test). Only subscales with an Alpha of 0.65 or above were used here.
EX	Extendibility, one of the evaluation goals for the Kiosk FOT.
FHWA	Federal Highway Administration, one of the Kiosk FOT partners.
FOT	Field Operational Test, a field test of ITS technologies or systems to determine their readiness for deployment.
GDOT	Georgia Department of Transportation, one of the primary FOT partners.
GTRI	Georgia Tech Research Institute, the organization responsible for evaluating the System Performance goal of this FOT.
IB	Institutional and Business Issues, one of the evaluation goals for this FOT.
ITS	Intelligent Transportation Systems; i.e., advanced technology aids for transportation functions.
IVHS	Intelligent Vehicle Highway Systems, the earlier name for ITS.
MANCOVA	Multivariate Analysis of Covariance, a particular statistical technique for analyzing relationships between multiple independent random variables.
MARTA	Metropolitan Atlanta Regional Transit Authority.
Mean	The arithmetic average of a set of numbers, also the expected value of the set.
Median	The most central value in a set of numbers.
Mode	The most frequently occurring member(s) of a set of numbers.
MOE	Measure of Effectiveness, a specific measurement indicative of an evaluation objective.
N	The overall number of members in a set (of individuals, questionnaires, etc.)
n	The number of members in a set that satisfy specified criteria.
P	A probability value between 0 and 1, where a value of 1 represents a certain event and a value of 0 represent an impossible event.
SD	Standard Deviation, a standard measure of the variability of a random variable (such as the parameters measured in this FOT).
SP	System Performance, one of the evaluation goals for this FOT.
SPSS	Statistical Package for the Social Sciences, a statistical analysis program.
TR	Transportation System Benefits, one of the evaluation goals for this FOT.
Travelink	The name of Georgia's ATIS kiosk system.
UA	User Acceptance, one of the evaluation goals for this FOT.

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# 1. INTRODUCTION

This document was to be one of four Test Reports generated from the evaluation of Georgia's Advanced Traveler Information System (ATIS) Kiosk System. The four areas involved in the evaluation were (1) user acceptance (UA), (2) transportation system benefits (TR), (3) system performance (SP), and (4) institutional and business (IB) issues. This document presents only the results of the user acceptance evaluation'.

## 1.1 PURPOSE

The purpose of this report is to discuss the results of the user acceptance evaluation of the ATIS Kiosk System, which was named Travelink by the Field Operational Test (FOT) partners. User acceptance was evaluated for the Travelink kiosk system at locations throughout the state of Georgia.

## 1.2 FOT OVERVIEW

This Field Operational Test (FOT) was performed as one of several ATIS projects being accomplished under the Intelligent Transportation Systems (ITS) Program. The kiosk system was designed to provide information to travelers using any mode; e.g., walking, automobile, airplane, AMTRAK, or by the two major transit systems in the urban Atlanta area - Metropolitan Atlanta Rapid Transit Authority (MARTA) and the Cobb Community Transit (CCT).

## 1.3 SCOPE OF REPORT

This report details the scope of effort employed to meet the goal of assessing user acceptance of the ATIS Kiosk System. A summary of the planned and final evaluation and test schemes are presented in Section 2, in terms of the planned and actual methods of data collection, processing, and analysis. The evaluation results, organized by objectives, are provided in Section 3 of this document. Section 4 documents quality assurance efforts. Conclusions and recommendations are provided in Section 5.

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<sup>1</sup>Due to a last minute cut in the evaluators' funds (by the prime contractor through which the funds were received), this is the only Test Report prepared for the Kiosk evaluation.

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## 2. USER ACCEPTANCE TEST DESCRIPTION

This section describes the planned and actual evaluation and test schemes. The evaluation scheme is the conceptual plan for addressing the identified evaluation goals and objectives. The test scheme is the more specific plan for data collection, processing and analysis.

### 2.1 SUMMARY OF THE UA EVALUATION SCHEME

The user acceptance evaluation goal was to determine the degree and parameters of user acceptance, overall and for each specific service of the kiosk. The following evaluation objectives were identified as appropriate to address this overall goal:

- User Acceptance Objective 1 (UA- 1) - Travelers' attitudes.
- User Acceptance Objective 2 (UA-2) - Extent of use.
- User Acceptance Objective 3 (UA-3) - Perceived value.
- User Acceptance Objective 4 (UA-4) - Estimates of preferences.
- User Acceptance Objective 5 (UA-5) - Impact on behavior.
- User Acceptance Objective 7 (UA-7)<sup>2</sup> - Environmental and ergonomic factors.
- User Acceptance Extendibility Objective 1 (EX-1) - Extendibility.
- User Acceptance Extendibility Objective 5 (EX-5)<sup>3</sup> - Improvement.

Because of expected differences in user populations and uses of kiosk information, the evaluation was planned to address these objectives for both the Olympic and post-Olympic periods.

Structured questionnaires, focus groups, observational studies, kiosk transaction logs, expert evaluations, transportation system benefits manual data and secondary research were identified as the data collection methods applicable to this effort.

The final evaluation scheme sometimes differed from that planned due to the costs involved or difficulties encountered in executing the original scheme. In fact, both the Olympic and post-Olympic evaluation efforts were limited because of instabilities in the kiosk system. The post-Olympic field collection efforts were limited to a single location.

#### 2.1.1 Objective UA 1 - Travelers' Attitudes

This objective was designed to assess the travelers' attitudes toward the kiosk overall and for specific features.

##### 2.1.1.1 Planned Evaluation Scheme

The degree to which the kiosks influence user's attitudes are reflected in three identified Measures of Effectiveness (MOEs): user's descriptions of the kiosks, user's ratings of the kiosks,

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<sup>2</sup> User Acceptance Objective 6 was eliminated during the course of the evaluation.

<sup>3</sup> The apparently missing extendibility objective numbers applied to the other evaluation goals (system performance, transportation system benefits, and institutional and business issues).

### 2.1.8.1 Planned Evaluation Scheme

The improvement issues are reflected in three identified MOEs: user's descriptions of the kiosks, user's ratings of the kiosks, and user's rankings of the kiosks. The data to assess these MOEs would be collected via questionnaires, focus groups, observational studies, and expert evaluations.

### 2.1.8.2 Final Evaluation Scheme

This objective was addressed as planned.

## **2.2 SUMMARY OF TEST SCHEME**

The test scheme refers to the specific data collection, processing and analysis processes employed to implement the evaluation scheme. The following subsections discuss the planned and actual test schemes for the UA portion of the kiosk evaluation.

### **2.2.1 Objective UA-1 - Travelers' Attitudes**

#### 2.2.1.1 Planned Test Scheme

This objective and its MOEs were to be addressed via questionnaires and focus groups, with details of the data collection, processing and analysis provided below.

*Questionnaire Data Collection and Analysis* - The questionnaires would be distributed to a random sample of people at kiosks within seven categories of locations during and after the 1996 Atlanta Olympic games. These seven categories are as shown in the first column of "Table 2- 1. A total of 400 completed questionnaires were planned: 200 during the Olympic period (July/August, 1996), and 200 after the Olympic events (August/September, 1996) would be collected. Quantitative data would be entered into and analyzed using the Statistical Package for the Social Sciences (SPSS), a statistical analysis program. The questionnaire data would be analyzed for reliability of sub-scales (Coefficient Alpha), descriptive statistics (mean, median, mode, percentages) and relationship of the variables (Multivariate Analysis of Covariance).

*Focus Groups Data Collection and Analysis* - The location of data collection for the focus groups was to be determined based on cost and availability of the facility. The time to complete each focus group session was planned to last no longer than two hours. A touch screen monitor and computer with the kiosk software installed would be used to facilitate discussion. To account for differences in the participant's knowledge of the Atlanta **area** and opportunities for exposure to the kiosks, different sessions would be conducted for residents of the Atlanta area, travelers to the Atlanta area, and those with little or no knowledge of the Atlanta area. The moderator was to use the moderator's guide of pre-determined topics to lead the discussion for each focus group session.

A total of three focus groups would be conducted: one group of 8-10 experts of the Atlanta area on or around September 17, 1996, one group of 8-10 people with novice and intermediate experience of the Atlanta area on or around July 2, 1996, and one group of 8- 10 people who live outside the Atlanta area on or around July 9, 1996.

The qualitative data from the focus groups would be analyzed using content analysis. Descriptive statistics would be applied to the quantitative data (ratings and rankings) from the focus groups. The scores would be entered into SPSS to obtain the following descriptive statistics: mean, median, mode, and standard deviation. Percentages would also be obtained to examine the frequency of items or responses.

2.2.1.2 Final Test Scheme

This objective and its MOEs were addressed via questionnaires and focus groups, with details of the actual data collection, processing and analysis provided below.

*Questionnaire Data Collection and Analysis* - During the planned data collection time and for an extended period thereafter, the kiosk system had several known problems. Neither the system nor the transaction logs became stable during this period. The evaluators were essentially on a day-to-day standby basis, waiting for the system to be stable enough to allow data collection. As a result, far fewer than the planned number of questionnaires were collected, and these were collected during periods of unstable system operation and unreliable transaction logs.

A number of questionnaires (86) was obtained during the Atlanta Olympic Game period, July 26 - August 5, 1996. Ten representative locations were selected from six of the seven identified categories, which were based on expected types of users and purposes of use. The categories, locations, and number of questionnaires actually collected are shown in Table 2-1. Additional questionnaire data (23 questionnaires) was obtained on November 16 and 23, 1996 from the Lavonia Tourist Center. These post-Olympic questionnaires were voluntarily collected by the TR evaluator, after the UA evaluators were out of funds for questionnaire collection.

Members of the evaluation team solicited volunteers to complete questionnaires at predetermined kiosk locations. As they departed from the kiosk, users were asked to complete a questionnaire if they had used the kiosk for at least two minutes. Respondents were given a small incentive (Olympic pin) for completing questionnaires.

Only questionnaires that were 80% complete were retained, reported in the above counts and used in this analysis. The quantitative data obtained from the questionnaires was entered into SPSS to obtain descriptive statistics. The assumptions required for higher level analyses were not met because of unequal and small sample sizes; therefore, these analyses were not conducted. The final synthesis of qualitative (i.e., written comments) and quantitative data was accomplished by two Concord evaluators and independently reviewed by another Concord researcher.

**Table 2-1: Location of Questionnaire Data Collection**

<b>Location Category</b>	<b>Location</b>	<b>Number Collected</b>
Multimodal Transportation Centers	Hartsfield Airport	23
	AMTRAK Station, Atlanta	6

Tourist Centers & Rest Areas	Ringold Welcome Center	20
	Suwannee (I-85 N & S) Rest Area	9
MARTA Stations	Kensington E & W (Atlanta suburb)	12
	Omni/Dome/Georgia World Congress Center (downtown Atlanta)	8
Tourist Destinations / Event Centers	Stone Mountain Park	3
	Underground Atlanta	1
Office Buildings, Corporations, Institutions	Northpark Town Center Bldg. 400 & 500	2
Hotels	Doubletree Hotel at Concourse	2
Miscellaneous	None	0
<b>Total</b>		<b>86</b>

*Focus Group Data Collection and Analysis* - The planned numbers of potential users were recruited to participate in the three focus groups: 1) Non-Atlanta residents who rarely or never visit Atlanta, 2) Expert travelers of Georgia and the Atlanta area who commute at least 40 miles every day; and 3) Intermediate/Novice travelers of Georgia and the Atlanta area who commute between 10 and 40 miles every day. The focus group sessions were conducted on June 24, 1996, August 5, 1996, and August 6, 1996, respectively. Each session lasted 2 hours and was audio and videotaped. A professional note taker was also present.

The moderator of the focus group lead the sessions following the format of predetermined topics outlined in the moderator guide. Participants took turns completing several tasks using scripted scenarios with the kiosk. Several types of user acceptance data were captured: think aloud protocols as the participant completed tasks, ratings about each information category and the overall system, and discussion of reactions after worksheet completion. In addition, background information and informed consent forms for audio and videotaping were completed by each participant.

The focus group sessions were conducted in two locations. The Expert and Intermediate/Novice sessions were held in Atlanta. The Non-Atlanta session was conducted at a focus group facility in Chattanooga, Tennessee. The equipment used during the sessions conducted in Georgia was the actual Travelink kiosk with on-line data connections. In Chattanooga, no complete kiosk was available; thus, participants interacted with the same computer system, but not within the kiosk shell. The moderators provided detailed descriptions for functions that were not receiving on-line data (i.e., traffic, weather, and airport). In addition, the entire "Airport Guide" information category was not accessible for this focus group. This function was explained through use of the Help function. All other procedures that were followed during the focus group sessions were the same.

The transcription of each focus group session was independently analyzed by two Concord evaluators. The findings were compared and any discrepancies in the content analysis discussed until consensus was reached. The quantitative data obtained from the participant worksheets was entered into SPSS to obtain descriptive statistics. The final synthesis of qualitative and quantitative data was accomplished by two Concord evaluators directly involved in the focus group sessions and independently reviewed by another Concord researcher.

## **2.2.2 Objective UA-2 - Extent of Use**

### 2.2.2.1 Planned Test Scheme

This objective and its MOEs were to be addressed using the transaction logs, TR field observation data, observational studies, and focus groups, with details of the data collection, processing and analysis provided below.

*Transaction Log Data Collection and Analysis* - The transaction log would be collected by the SP evaluator during the test conduct period. The transaction log data concerning extent of use and screens accessed would be provided to the UA evaluator for analysis and evaluation. Quantitative data would be entered into SPSS to obtain descriptive statistics.

*TR Field Data Collection and Analysis* - The TR field observation data would be collected by the TR evaluator during the test conduct period. The information concerning the frequency of kiosk use versus the opportunity of use would be made available to the UA evaluator for analysis and evaluation. Quantitative data would be entered into SPSS to obtain descriptive statistics.

*UA Observational Studies Data Collection and Analysis* - The UA observational studies would be conducted for 2-3 hour periods at random kiosk locations that incorporated at least one kiosk from each of the six categories of kiosk locations. The kiosk locations for observational studies would be coordinated with the TR evaluator's field data collection.

The evaluator would be positioned at a site close enough to the kiosk to record information on the data log sheet and record information (i.e., traveler behavior) in meticulous field notes about the traveler's interaction with the kiosk. Observational studies would be made during the Olympic games (on or around July 25-27; and August 15-17), and after the Olympic games (on or around September 4-6, 9-11, and 19-21). Quantitative data would be entered into SPSS to obtain descriptive statistics. Qualitative data would be analyzed using content analysis.

### 2.2.2.2 Final Test Scheme

This objective and its MOEs were addressed using TR field data collection, UA observational studies, and focus groups, with details of the actual data collection, processing and analysis provided below.

*Transaction Log Data Collection and Analysis* - The transaction log was collected by the UA evaluator throughout the FOT on a weekly basis, and were reviewed and discussed with the lead evaluator each week to determine if and when they could be used for the evaluation. These logs did not become complete nor reliable enough to be useful.

*TR Field Data Collection and Analysis* - Field observations were taken by the TR evaluator during the Olympic game period, July 26 - August 5, 1996. The data concerning the frequency of kiosk use versus the opportunity of use was made available to the UA evaluator for analysis and evaluation.

*Observational Studies Data Collection and Analysis* - The observational studies were conducted for 2-3 hour periods in conjunction with the TR evaluator's field data collection during the Olympic game period, July 26 - August 5, 1996. Observations were made at seven kiosk locations. Data were reviewed for average time of use, number of users, and gender of users as well as the kiosk functionality at time of data collection.

### **2.2.3 Objective UA-3 - Perceived Value**

#### 2.2.3.1 Planned Test Scheme

This objective and its MOEs were to be addressed via questionnaires and focus groups as described in Section 2.2.1.1.

#### 2.2.3.2 Final Test Scheme

This objective and its MOEs were addressed as described in Section 2.2.1.2.

### **2.2.4 Objective UA-4 - Estimates of Preferences**

#### 2.2.4.1 Planned Test Scheme

This objective and its MOEs were to be addressed via questionnaires, focus groups, transaction logs, and observational studies as previously described in Sections 2.2.1.1, and 2.2.2.1.

#### 2.2.4.2 Final Test Scheme

This objective and its MOEs were addressed as described in Sections 2.2.1.2 and 2.2.2.2.

### **2.2.5 Objective UA-5 - Impact on Behavior**

#### 2.2.5.1 Planned Test Scheme

This objective and its MOEs were to be addressed via questionnaires and focus groups as described in Section 2.2.1.1.

#### 2.2.5.2 Final Test Scheme

This objective and its MOEs were addressed as described in Sections 2.2.1.2.

### **2.2.6 Objective UA-7 - Environmental and Ergonomic Factors**

#### 2.2.6.1 Planned Test Scheme

This objective and its MOEs were to be addressed via questionnaires, focus groups, observational studies, and expert evaluation. The planned test scheme for questionnaires, focus groups,

observational studies are described in Sections 2.2.1.1, 2.2.2.1 and 2.2.3.1. Planned expert evaluations are described in the following section.

*Expert Evaluation and Analysis* - Two members of the Concord evaluation team would evaluate the interface and kiosk design using a heuristic<sup>4</sup> evaluation techniques to evaluate the user interface of the kiosk. Established guidelines and standards of good user interface design would be used in evaluation. Experts would “walk through” the design looking for usability problems and answer a set of questions about decisions that users would face when interacting with the system. The experts then would identify potential problem areas.

The results from the expert evaluations would be reviewed by both evaluators. The data reduction of the human factors and ergonomic guidelines and standards used for expert evaluation would involve the comparison of the evaluators judgments using a tally method and content analysis.

#### 2.2.6.2 Final Test Scheme

The objective and its MOEs were addressed via questionnaires, focus groups, and observational studies as described in Sections 2.2.1.2, and 2.2.2.2. The actual expert evaluation is described below.

*Actual Expert Evaluation and Analysis* - The expert evaluation was conducted on software versions 1.2 and 1.3 at various kiosk locations. The data were analyzed as planned.

### **2.2.7 Objective EX-1 - Extendibility**

#### 2.2.7.1 Planned Test Scheme

This objective and its MOEs were to be addressed in questionnaires, focus groups, expert evaluation, UA logbook, secondary research, and observational studies. Planned test schemes for questionnaires, focus groups, expert evaluation, and observational studies have been previously described in Sections 2.2.1.1, 2.2.2.1, and 2.2.6.1. The UA logbook and secondary research are described below.

*UA Logbook* - Concord evaluators would maintain a detailed test logbook for the duration of the user acceptance evaluation. The logbook would be used by all members of Concord and provide a current record of the status of the evaluation.

*Secondary Research* - The secondary research would consist of a review of current literature in the Intelligent Transportation Systems (ITS) field during the pre-test period.

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<sup>4</sup> Heuristic techniques refers to exploratory methods (as opposed to highly structured or rigorous) used by experts to address this type of problem.

### 2.2.7.2 Final Test Scheme

The objective and its MOEs were evaluated via questionnaires, focus groups, expert evaluation, and observational studies as previously described in Sections 2.2.1.2 and 2.2.6.2. The UA logbook and secondary research were conducted as planned.

## **2.2.8 Objective EX-5 - Improvement**

### 2.2.8.1 Planned Test Scheme

This objective and its MOEs were to be addressed in questionnaires, focus groups, observational studies, and expert evaluations as previously described in Sections 2.2.1.1, 2.2.2.2, and 2.2.6.1.

### 2.2.8.2 Final Test Scheme

This objective and its MOEs were addressed as discussed in Sections 2.2.1.2, 2.2.2.2, and 2.2.6.2.

### 3. EVALUATION RESULTS

Detailed analyses of the data collected and the users involved in questionnaires and focus groups are presented in Sections 3.1 and 3.2. These characterizations provide a context for the evaluation results for the UA objectives, which are presented in Sections 3.3 through 3.9.

#### 3.1 QUESTIONNAIRE RESULTS

Descriptive statistics (mean, median, mode, and standard deviation), frequencies, percentages, and Chi-Square ( $\chi^2$ ) analyses are reported for questionnaire ratings and respondent background information obtained during the Olympic time-period. Analyses of the data collected from the Lavonia Tourist Center during the post-Olympic period is presented for comparison. A summary of qualitative data (i.e., written comments) is also presented.

##### 3.1.1 Questionnaire Results - Olympic Period

###### 3.1.1.1 Background Information for Questionnaire Respondents

Questionnaire data were obtained from eighty-six respondents. Seventy percent of respondents estimated that they used the kiosk for five or less minutes. Radio and television were reported to be the most typical sources of travel information. Most respondents appeared to be familiar with different types of technology. A majority of respondents (82%) were comfortable with Automatic Teller Machines (ATMs). Only 37 % had never used an information kiosk. Over 50% of the respondents frequently used computers, facsimile (fax) machines, video games, Video Cassette Recorders (VCRs), and telephone answering machines.

The respondents' background information, summarized for the total number of respondents (N) answering the relevant questions, group membership, number (n) and percentage (%) of respondents in each group, is presented in Table 3-1 through Table 3-13.

**Table 3-1: Gender (N =86)**

	<b>Male</b>	<b>Female</b>
<b>n</b>	<b>41</b>	<b>45</b>
<b>%</b>	<b>47.7</b>	<b>52.3</b>

**Table 3-2: Age (N = 86)**

	<b>&lt;19</b>	<b>20 - 29</b>	<b>30-39</b>	<b>40-49</b>	<b>50-59</b>	<b>60-69</b>	<b>&gt;70</b>
<b>n</b>	<b>16</b>	<b>17</b>	<b>26</b>	<b>12</b>	<b>7</b>	<b>3</b>	<b>5</b>
<b>%</b>	<b>18.6</b>	<b>19.8</b>	<b>30.2</b>	<b>14.0</b>	<b>8.1</b>	<b>3.5</b>	<b>5.8</b>

**Table 3-3: Number Of Persons In Travel Party (N = 85)\***

	1	2	3	4	5	Over 5
n	26	21	15	10	3	10
%	30.2	24.4	17.4	11.6	3.5	12.9

\* Whenever N < 86, the difference is due to person(s) not responding to this question

**Table 3-4: Familiarity With Georgia (N = 86)**

	Very Familiar	Somewhat Familiar	Neutral	Somewhat Unfamiliar	Very Unfamiliar
n	29	27	5	13	12
%	33.7	31.4	5.8	15.1	14.0

**Table 3-5: Familiarity With Atlanta Area (N = 86)**

	Commute to Atlanta	First-Time Traveler	Experienced Traveler	Atlanta Resident
n	6	23	21	36
%	7.0	26.7	24.4	41.9

**Table 3-6: Purpose Of Travel Today (N = 85)\***

	Work Commute	Business Travel	Passenger / Goods Transport	Shopping	Recreation - Special Event	Recreation - Other	Other
n	11	15	2	2	37	13	5
%	12.8	17.4	2.3	2.3	43.0	15.1	5.8

\* Whenever N < 86, the difference is due to person(s) not responding to this question

**Table 3-7: Current Sources Of Travel Information (N = 86)**

	Car Radio	Home Radio	Television	Home Computer	Office Computer	En-route Car Display
n	52	17	58	17	7	2
%	60.5	19.8	67.4	19.8	8.1	2.3

**Table 3-8: Frequent Use Of Technologies (N = 85)\***

	Computer	Fax	CD ROM	Video Games	Car Phone
n	63	47	41	67	30
%	74.1	55.3	48.2	78.8	35.3

**-Table 3-8: Frequent Use Of Technologies (N = 85), Continued\***

	<b>ATM</b>	<b>VCR</b>	<b>Modems</b>	<b>Answering Machine</b>	<b>Touch Screen</b>
n	61	72	38	69	41
%	71.8	84.7	44.7	81.2	48.2

	<b>Keyboard</b>	<b>Mouse</b>	<b>Track Ball</b>
n	62	62	12
%	<b>72.9</b>	<b>72.9</b>	14.1

\* Whenever N < 86, the difference is due to person(s) not responding to this question

**Table 3-9: Comfort With ATMs (N = 85)\***

	<b>Very Comfortable</b>	<b>Somewhat Comfortable</b>	<b>Neutral</b>	<b>Somewhat Uncomfortable</b>	<b>Very Uncomfortable</b>
n	55	15	8	2	5
%	64.7	17.6	9.4	2.4	5.9

\* Whenever N < 86, the difference is due to person(s) not responding to this question

**Table 3-10: Number Of Times An Information Kiosk Was Used (N = 86)**

	<b>Never</b>	<b>1-2 Times</b>	<b>3-5 Times</b>	<b>6-10 Times</b>	<b>More than 10</b>
n	32	20	19	5	10
%	37.2	23.3	22.1	5.8	11.6

**Table 3-11: Primary Mode Of Transportation (N = 85)\***

	<b>Bus</b>	<b>Rail</b>	<b>Auto</b>	<b>Motor-cycle</b>	<b>Bicycle</b>	<b>Walking</b>
n	7	10	67	0	0	1
%	8.2	11.8	78.8	0	0	1.2

\* Whenever N < 86, the difference is due to person(s) not responding to this question

**Table 3-12: Highest Level Of Education (N = 86)**

	<b>High School</b>	<b>2 Year College</b>	<b>Technical School</b>	<b>Undergraduate Degree</b>	<b>Specialist Degree</b>	<b>Master's Degree</b>	<b>Ph.D.</b>
n	29	9	4	30	7	6	1
%	33.7	10.5	4.7	34.9	<b>8.1</b>	7.0	1.2

**Table 3-13: Adoption Of New Products (N = 85)\***

	<b>Purchase Immediately (Early Adopters)</b>	<b>Delay Before Purchasing (Cautious Adopters)</b>	<b>Long Delay Before Purchasing (Late Adopters)</b>
n	23	57	5
%	27.1	67.1	5.9

\* Whenever N < 86, the difference is due to person(s) not responding to this question

Chi-Square analyses were performed to investigate relationships between pairs of background variables of respondents (e.g., gender, Atlanta travel expertise, purpose for using the kiosk). The following statements summarize the significant findings.

- Business travelers were more likely to be Atlanta Area Residents and Pleasure travelers were more likely to be First Time Travelers,  $\chi^2 = 10.89$ ,  $p < 0.05$ .
- Business travelers were more likely to have used Travelink more than five times, and Pleasure travelers more likely to have used Travelink less than five times,  $\chi^2 = 15.60$ ,  $p < 0.05$ .
- Pleasure travelers were more likely to have a college (technical school through four years of college) education and Business travelers were more likely to have a high school education,  $\chi^2 = 6.15$ ,  $p < 0.05$ .
- Atlanta Area Residents were more likely to have used Travelink more than five times,  $\chi^2 = 6.23$ ,  $p < 0.05$ , and were more likely to be under 30 years of age,  $\chi^2 = 9.53$ ,  $p < 0.05$ .
- Respondents between the age of 30 - 39 were more likely to have college education (technical school through four years of college); respondents under 30 were more likely to have a high school education,  $\chi^2 = 20.43$ ,  $p < 0.05$ .
- Respondents in the Tourist and Rest Area locations were more likely to be 30 years or older; respondents in the MARTA locations were more likely to be under 30,  $\chi^2 = 19.52$ ,  $p < 0.05$ .

#### 3.1.1.2 Reliability of Questionnaire Items 1 - 21

The overall reliability of questionnaire items 1 through 21 was computed using Coefficient Alpha. The reliability of these items was 0.86. Scales were then constructed to facilitate analysis. These scales include an assessment of the value of the kiosk to the traveler (Value to Traveler) and the usability of the system (Usability). Table 3-14 presents the scale, item numbers included, and the reliability of each scale as represented by Coefficient Alpha.

**Table 3-14: Reliability of Questionnaire Scales**

<b>Scale</b>	<b>Item Numbers Included</b>	<b>Coefficient Alpha</b>
Value to Traveler	9, 11, 13, 15, 16, 17, 20	0.82
Usability	2, 3, 4, 8, 14, 18	0.75

Other questionnaire items (e.g., attractiveness of the kiosk, reliability of the information, currentness of the information, etc.) could not be combined to form reliable scales. These items are reported below as individual items.

### 3.1.1.3 Descriptive Statistics for Questionnaire Items 1 through 21

Questionnaire items 1 through 21 were rated on a 5-point scale that ranged from strongly disagree to strongly agree. The items alternated between positive and negative statements to prevent response bias. Data were re-coded so that higher numbers (i.e., 4 and 5) indicate more positive responses to the kiosk and lower numbers (i.e., 1 and 2) indicate less positive responses. Items that received a rating of 3 are viewed as a neutral response.

Table 3-15 presents the descriptive statistics of each scale and individual item rating for questionnaire data. This summary table includes the number of respondents (N), mean, median, mode and standard deviation (SD) for each rating. Scales and individual items with less than 86 participants (N) reflect a non-response for at least one item included in a scale or for an individual item.

All data was reviewed to compare means and percentage of responses by the following respondent background variables: 1) gender, 2) age, 3) familiarity with Georgia, 4) Atlanta travel expertise, 5) education, 6) purpose of trip, 7) flexibility of travel, and 8) adoption of new products. Noteworthy trends are presented in the sections below.

**Table 3-15: Descriptive Statistics for Questionnaire - Olympic Period**

	N	Mean*	Median*	Mode*	SD
<b>Scale</b>					
Value to Traveler	81	3.89	3.86	3.86	0.67
Usability	85	4.15	4.17	5.00	0.74
<b>Item</b>					
Q1 Attractiveness of Kiosk	86	4.27	4.00	4.00	0.64
Q5 Understandability of Information	86	4.33	4.00	5.00	0.77
Q6 Currentness of Information	86	3.99	4.00	4.00	1.10
Q7 Reliability of Information	86	4.06	4.00	4.00	0.96
Q12 Future Change of Plans	85	3.21	3.00	3.00	1.16
Q19 Understandability of Graphics and Icons	86	4.26	4.00	4.00	0.81
Q21 Overall Satisfaction with Kiosk	85	3.93	4.00	5.00	1.31

\* 1 .0 is most negative, 5 is most positive, and 3 .0 is neutral

*Gender* - A review of mean ratings indicated no trends in differences in ratings between males and females.

*Age* - A comparison of mean ratings for respondents between the ages of “under 30,” “30 - 39”, and “40 and above” indicated that the younger respondents were slightly more likely to change travel plans in the future based on information from the kiosk. These ratings are shown in Table 3-16.

**Table 3-16: Comparison of Likelihood of Changing Plans Ratings by Age (N = 85)\***

Age	n	Mean**	Median* *	Mode**	SD
< 30	33	3.61	4.00	4.00	1.09
30 - <b>39</b>	26	<b>2.96</b>	3.00	3.00	1.25
>40	26	<b>2.96</b>	3.00	3.00	1.04

\* Whenever N < 86, the difference is due to person(s) not responding to this question

\*\* 1.0 is most negative, 5 is most positive, and 3.0 is neutral

*Familiarity with Georgia* - A review of mean ratings for respondents with various levels of familiarity with Georgia indicated no differences. These were analyzed by comparing each of the five categories of familiarity with each other and also by comparing those who reported being “very familiar” with Georgia with those less familiar.

*Atlanta Travel Expertise* - Data were combined to create three levels of Atlanta Travel Expertise. Those respondents who commuted to Atlanta or were expert travelers were combined into one group. First Time Travelers and Atlanta Area Resident groupings were not changed. A comparison of mean ratings of these three groups revealed that residents of the Atlanta area found TravelLink to be slightly more valuable than did other respondents. These ratings are shown in Table 3-17.

**Table 3-17: Comparison of Value Ratings by Travel Expertise (N = 81)\***

	n	Mean**	Median**	M o d e * *	S D
First Time Traveler	22	3.63	3.78	3.86	0.53
Experienced Traveler or Commuter	27	3.82	4.00	3.74	0.73
Atlanta Area Resident	32	4.12	4.00	3.86	0.64

\* Whenever N < 86, the difference is due to person(s) not responding to this question

\*\* 1.0 is most negative, 5 is most positive, and 3.0 is neutral

*Education* - Data were combined to create three levels of formal education - high school, technical school to 4-year college degree (College) and specialty degree to Ph.D. (Advanced). A comparison of mean ratings between the groups revealed that the respondents with more formal education were slightly more satisfied with the kiosk (see Table 3- 18).

**Table 3-18: Comparison of Satisfaction Ratings by Education (N = 85)\***

	n	Mean**	Median**	Mode**	SD
Hinh School	29	3.79	4.00	4.00	1.45
College	42	3.88	4.00	5.00	<b>1.27</b>
Advanced	14	4.36	5.00	5.00	1.08

\* Whenever N < 86, the difference is due to person(s) not responding to this question

\*\* 1.0 is most negative, 5 is most positive, and 3.0 is neutral

*Purpose of Trip* - Data were combined to create two categories of travel - business and pleasure. The business category consisted of responses to “Commuting to and from work,” “Business

travel/work activities,” and “Passenger or goods transport.” The pleasure category consisted of responses to “Shopping,” “Recreation - Special Event,” and “Recreation - Other.” The five responses of “Other” were placed into one of these two categories based on the respondent’s written explanation of “Other.” A review of mean ratings indicated no differences for respondents in these two groups.

*Flexibility of Travel Plans* --Data were combined to create two levels of the respondents’ flexibility in travel plans - flexible and inflexible. The flexible category consisted of responses of 4 or 5 to the question concerning travel plan flexibility, indicating that their travel plans were somewhat flexible. The inflexible category consisted of responses of 1, 2 or 3, indicating that their plans were not flexible. Twenty-one respondents were in the inflexible travel plans category. Sixty-four respondents were in the flexible travel plans category. A review of mean ratings indicated no difference for respondents in these two groups. A comparison of the groups indicated that 2 (9.5%) of respondents with inflexible travel plans and 15 (24.2%) of respondents with flexible travel plans altered their travel plans. This difference, however, was not significant when submitted to Chi-Square analysis.

*Adoption of New Products* --A comparison of mean ratings between respondents who typically purchase new products immediately (early adopters) and those who delay before purchasing (cautious and late adopters) revealed no difference in ratings.

**3.1.1.4 Respondents’ Description of TraveLink Usage**

Respondents were asked several questions about their use of TraveLink. These questions included their reason for use, the number of minutes used during their current visit, and the number of times used. Most respondents (66.7%) did not have a specific query when using the kiosk. A majority of respondents (62.4%) had not used the TraveLink kiosk before this encounter. Table 3-19 through Table 3-21 summarize their responses.

**Table 3-19: Reason For Using TraveLink Today (N = 84)\***

	<b>Specific Inquiry</b>	<b>No Specific Reason</b>
n	28	56
%	33.3	66.7

\* Whenever N < 86, the difference is due to person(s) not responding to this question

**Table 3-20: Estimated Number Of Minutes TraveLink Used This Visit (N = 84)\***

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>15</b>	<b>20</b>
n	2	8	14	6	29	1	1	2	15	3	3
%	2.4	9.5	16.3	7.1	34.5	1.2	1.2	2.4	17.9	3.6	3.6

\* Whenever N < 86, the difference is due to person(s) not responding to this question

**Table 3-21: Number Of Ties TravelLink Used (N = 85)\***

	1	2-4	5-7	8-10	Over 10
n	53	16	7	2	7
%	62.4	18.8	8.2	2.4	8.2

\* Whenever N < 86, the difference is due to person(s) not responding to this question

Respondents were also asked to identify the information categories that they used during their visit to the kiosk. Table 3-22 presents the information categories used, total respondents (N), and the number (n) and percentage of respondents (%) who reported using each category.

**Table 3-22: Information Categories Used This Visit (N = 76)\***

	Weather Conditions	Olympic Information	Travel and Tourism	Traffic	Metro Route Planning	MARTA Transit Schedule
n	39	38	35	27	23	22
%	51.3	50.0	46.7	35.5	30.3	28.9

	MARTA Itinerary Planning	Hartsfield Airport Airline Schedules	CCT Schedules	AMTRAK Schedules	Greyhound Schedules	ARC Information
n	13	10	3	2	2	2
%	17.1	13.2	4.0	2.6	2.6	2.6

\* Whenever N < 86, the difference is due to person(s) not responding to this question

After indicating which information categories they used, respondents were asked to rank the categories that they used according to their value. Table 3-23 presents the mean rating for each information category. N represents the number of respondents who assigned a value to an information category. Lower ratings (i.e., 1 and 2) are indicative of higher value to the respondent. Traffic, Olympic, and Weather were the most valued categories for these respondents.

**Table 3-23: Value Ratings Of Information Categories**

	Traffic	Olympic Information	Weather Conditions	Metro Route Planning	Travel and Tourism	MARTA Transit Schedule
N	46	46	43	38	46	36
Mean	2.33	2.74	2.98	3.53	3.63	3.94

**Table 3-24: Value Ratings Of Information Categories, Continued**

	<b>MARTA Itinerary Planning</b>	<b>Hartsfield Airport Airline Schedules</b>	<b>ARC Information</b>	<b>CCT Schedules</b>	<b>AMTRAK Schedules</b>	<b>Greyhound Schedules</b>
<b>N</b>	<b>29</b>	24	16	16	17	16
Mean	4.28	5.88	7.94	9.06	9.29	10.44

3.1.1.5 Willingness to Pay for TravelLink Use

Respondents were asked how much money they would pay per visit to the kiosk, with and without the print feature. Respondents were willing to pay slightly more for the print feature. Table 3-25 presents the amount respondents would pay per visit without and with printing.

**Table 3-25: Pay Per Visit (N = 86)**

		<b>0 cents</b>	<b>25 cents</b>	<b>50 cents</b>	<b>75 cents</b>	<b>\$1.00 &amp; up</b>
Without Printing	n	36	31	16	1	2
	%	41.9	36.0	18.6	1.2	2.3
With Printing	n	13	29	25	8	11
	%	15.1	33.7	29.1	9.3	12.8

3.1.1.6 Changes Made to Travel Plans

Respondents were asked if they made changes to their travel plans based on information from the kiosk. When asked how they had altered their plans, 67 (70.8%) indicated they had not altered their plans and 17 (20.2%) did change their plans in some way. Table 3-26 presents how travel plans were altered for these 17 respondents.

**Table 3-26: Travel Plans Altered (N = 84)\***

	<b>Did Not Alter</b>	<b>Delayed Trip</b>	<b>Canceled Trip</b>	<b>Changed Route</b>	<b>Change Travel Mode</b>	<b>Other</b>
n	67	1	0	8	6	2
%	<b>79.8</b>	1.2	<b>0</b>	<b>9.5</b>	7.1	2.4

\* Whenever N < 86, the difference is due to person(s) not responding to this question

Respondents who altered their travel plans responded more favorably to all of questionnaire items. Ratings that differed more than 0.5 are shown in Table 3-27. No other differences (e.g., purpose of travel, travel expertise, geographic familiarity) between groups were noted.

**Table 3-27: Change in Travel Plans - Comparison of Ratings (N = 84)\***

	Group	N	Mean**	Median**	Mode**	SD
Q6 Currentness of Information	Did Not Alter	67	3.82	4.00	4.00	1.15
	Altered	17	4.59	5.00	5.00	0.62
Q7 Reliability of Information	Did Not Alter	67	3.91~	4.00	4.00	1.00
	Altered	17	4.59	5.00	5.00	0.62
Q21 Overall Satisfaction with Kiosk	Did Not Alter	66	3.79	4.00	5.00	1.35
	Altered	17	4.35	5.00	5.00	1.06

\* Whenever N < 86, the difference is due to person(s) not responding to this question

\*\* 1.0 is most negative, 5 is most positive, and 3.0 is neutral

### 3.1.1.7 Kiosk Locations

Data were combined to group the kiosk locations into more meaningful categories for data analysis purposes. This reduced the ten locations into 3 categories: 1) Transportation Centers (Hartsfield Airport and AMTRAK station), 2) Tourist & Rest Areas (Tourist Centers, Rest Areas and Tourist Destinations), and 3) MARTA Stations. Data from two categories, “Office Buildings, Corporations, Institutions” and “Hotels,” were eliminated from this analysis because of their small sample size and lack of relationship with the other categories. A review of mean ratings indicated two questionnaire ratings that differed by at least 0.5. Respondents in the Tourist and Rest Area category rated the kiosk to be slightly less usable and the information less interpretable than did respondents at the MARTA locations (see Table 3-28).

### 3.1.1.8 Respondent Written Comments

Respondents were asked to comment on specific features that they liked and disliked and to make general comments about Travelink. Table 3-29 and Table 3-30 present a summary of the comments concerning the kiosk features. The number of favorable comments about the specific feature is reported as the value n.

**Table 3-28: Kiosk Location - Comparison of Ratings (N = 82)'**

	Location	N	Mean*	Median*	Mode*	SD
<b>Scale</b>						
Usability	Transportation Center	29	4.20	4.33	4.17 **	0.71
	Tourist & Rest Area	33	3.90	4.00	3.50	0.86
	MARTA	20	4.51	4.50	5.00	0.44
<b>Item</b>						
Q5 Understandability of Information	Transportation Center	29	4.31	4.00	5.00	0.81
	Tourist & Rest Area	33	4.15	4.00	4.00	0.88
	MARTA	20	4.70	5.00	5.00	0.47

+ Whenever N < 86, the difference is due to person(s) not responding to this question

\* 1.0 is most negative, 5 is most positive, and 3.0 is neutral.

\*\*Multiple modes exists; the smallest value is shown.

**Table 3-29: Kiosk Features Liked**

<b>Features Liked</b>	<b>n</b>	<b>Features Liked</b>	<b>n</b>
Icons, graphics	10	Everything	1
Weather	10	Confirmed travel plans	1
Touch screen	9	comfort	1
Easy to understand	6	Speed of kiosk	1
Maps	6	Availability	1
Easy to use	5	Directions easy to use	1
Olympic schedule	5	Helpful instructions	1
Traffic	4	Route Planning	1
MARTA routes, buses	3	Tourism and Travel	1
Printing maps, directions	3	Airportbanking	1
Amount of information	2	Presentation, screen layout	1
Directions	2		

**Table 3-30: Kiosk Features Disliked**

<b>Features Disliked</b>	<b>n</b>
Insensitive Touch screen	6
Slow Response Time	6
Lack of information (e.g., soccer, traffic, non-Atlanta information, MARTA map, school listings)	4
Scrolling and map movement	3
System problems (e.g., crashed, buttons disappeared, keypad didn't work)	3
Screen glare	2
Not widely advertised	1
No sound	1

### **3.1.2 Questionnaire Results - Lavonia Tourist Center, Post-Olympic Period**

Additional questionnaire data were collected on November 16 and 23, 1996 from the Lavonia Tourist Center. These 23 questionnaires were collected to provide additional information concerning the use of the kiosk during a non-Olympic period and after the kiosk system was more mature. This site was selected because of the relative importance of this category of location and the relative ease with which significant amounts of data could be collected.

#### 3.1.2.1 Background Information for Questionnaire Respondents

A review of respondent background information indicated few differences between the respondents at Lavonia, the respondents of the Olympic period, and a Tourist Center subset of the Olympic period respondents, i.e., the Ringold respondents. The only notable differences were in the respondents' descriptions of their trip purpose, education level attained, and previous experience with an information kiosk. Fifty-two percent of the Lavonia respondents reported that their travel that day was mainly for business in contrast to ten percent of the Ringold respondents

and thirty-two percent of overall Olympic period respondents. Forty-nine percent of the Lavonia respondents had a high school or two years of college in contrast to twenty percent of the Ringold respondents and forty-four percent of the overall Olympic period respondents. Fifty-two percent of the Lavonia respondents had never used an information kiosk before in contrast to twenty percent of the Ringold respondents and thirty-seven percent of the overall Olympic period respondents.

### 3.1.2.2 Descriptive Statistics for Questionnaire Ratings

Table 3-3 1 presents the descriptive statistics for each scale and individual item rating for the questionnaire data from the Lavonia and Ringold Tourist Centers. This summary table includes the number of respondents, mean, median, mode and standard deviation for each rating. Note that all ratings for Lavonia were slightly lower than those at Ringold, although only “Overall Satisfaction” was the only rating that differed by 0.5.

**Table 3-31: Comparison of Tourist Center Ratings**

	Location	N	Mean*	Median*	Mode*	SD
<b>Scale</b>						
Value to Traveler	Lavonia	23	3.59	3.71	3.71	.46
	Ringold	19	3.68	3.86	3.86	.72
usability	Lavonia	23	3.83	4.00	4.00	.76
	Ringold	20	4.24	4.16	4.17	.58
<b>Item</b>						
Q1 Attractive Kiosk	Lavonia	23	4.04	4.00	4.00	.93
	Ringold	20	4.35	4.00	4.00	.49
Q5 Understandability of Information	Lavonia	22	3.68	4.00	4.00	.99
	Ringold	20	4.05	4.00	4.00	.89
Q6 Currentness of Info	Lavonia	23	3.83	4.00	4.00	1.11
	Ringold	20	3.95	4.00	4.00	.94
Q7 Reliability of Info	Lavonia	22	3.64	4.00	4.00	1.05
	Ringold	20	3.85	4.00	4.00	.88
Q12 Future Change of Plans	Lavonia	23	2.74	3.00	3.00	1.05
	Ringold	19	3.00	3.00	3.00	.94
Q 19 Understandability of Graphics and Icons	Lavonia	23	3.87	4.00	4.00	1.22
	Ringold	20	4.15	4.00	4.00	.37
Q2 1 Overall Satisfaction with Kiosk	Lavonia	23	3.48	4.00	4.00	1.27
	Ringold	19	4.05	4.00	5.00	1.13

\* 1.0 is most negative, 5 is most positive, and 3.0 is neutral.

### 3.1.2.3 Changes Made to Travel Plans

Of the 23 Lavonia Tourist Center respondents, 5 (17.3%) indicated that they made changes to their travel plans based on information from the kiosk. When asked how they had altered their plans, only 4 respondents provided information. One respondent indicated that they delayed their trip, and 3 respondents indicated a change in route.

As with the Olympic period respondents, respondents who altered their travel plans responded more favorably to most questionnaire items. Ratings that differed by 0.5 are shown in Table 3-32. No other differences (e.g., purpose of travel, travel expertise, geographic familiarity) were noted between those who altered their plans and those who did not.

**Table 3-32: Change in Travel Plans - Comparison of Ratings**

Scale	Group	N	Mean*	Median*	Mode*	SD
Value to Traveler	Did Not Alter	19	3.50	3.57	3.71	0.45
	Altered	4	4.00	4.00	3.86**	0.16
<b>Item</b>						
Q1 Attractive Kiosk	Did Not Alter	19	3.94	4.00	4.00	0.97
	Altered	4	4.50	4.50	4.00**	0.58
Q6 Currentness of Info	Did Not Alter	19	3.68	4.00	4.00	1.16
	Altered	4	4.50	4.50	4.00**	0.58
Q7 Reliability of Info	Did Not Alter	18	3.55	4.00	4.00	1.15
	Altered	4	4.00	4.00	4.00	0.00
Q12 Future Change of Plans	Did Not Alter	19	3.58	4.00	4.00	0.51
	Altered	4	4.75	5.00	5.00	0.50
Q21 Overall Satisfaction with Kiosk	Did Not Alter	19	3.37	4.00	4.00	1.26
	Altered	4	4.00	4.50	5.00	1.41

\* 1.0 is most negative, 5 is most positive, and 3.0 is neutral.

\*\* Multiple modes exists; the smallest value is shown.

#### 3.1.2.4 Respondent Description of TravelLink Usage

Respondents were asked to identify the information categories that they used during their visit to the kiosk. **Error! Not a valid bookmark self-reference.** presents the information category used, total respondents (N), and the number (n) and percentage of respondents (%) who reported using each category.

**Table 3-33: Information Categories Used This Visit(N = 23) - Post-Olympic Period**

	Weather Conditions	Olympic Information	Travel and Tourism	Traffic	Metro Route Planning	MARTA Transit Schedule
n	13	1	15	11	4	1
%	56.5	4.3	65.2	43.8	17.4	4.3

	MARTA Itinerary Planning	Hartsfield Airport Airline Schedules	CCT Schedules	AMTRAK Schedules	Greyhound Schedules	ARC Information
n	1	3	1	2	1	2
%	4.3	13	4.3	8.7	4.3	8.7

After indicating which information categories they used, respondents were asked to rank the categories that they used according to their value. Table 3-34 presents the mean rating for each information category. N represents the number of respondents who assigned a value to an information category. Lower ratings (i.e., 1 and 2) are indicative of higher value to the respondent. Traffic, Weather, and Travel and Tourism were the most valued information categories for these respondents.

**Table 3-34: Value Ratings Of Information Categories - Post-Olympic Period**

	Traffic	Olympic Information	Weather Conditions	Metro Route Planning	Travel and Tourism	MARTA Transit Schedule
N	12	0	17	11	17	0
Mean	2.08		2.12	3.00	2.17	

	MARTA Itinerary Planning	Hartsfield Airport Airline Schedules	ARC Information	CCT Schedules	AMTRAK Schedules	Greyhound Schedules
N	0	2	1	0	1	0
Mean	-	2.5	3.00		3.00	

## 3.2 FOCUS GROUP RESULTS

### 3.2.1 Background Information for Focus Group Participants

Data were obtained from twenty-one focus group participants, nine men and twelve women. Eight participants were in the Non-Atlanta group. Five participants were in the Intermediate/Novice (Inter/Novice) group. Eight participants were in the Expert group. Their background information, summarized by group membership, is presented in Table 3-35 through Table 3-45.

**Table 3-35: Focus Group Participants (numbers) by Gender**

Focus Group	Male	Female
Non-Atlanta	4	4
Inter/Novice	2	3
Expert	3	5

**Table 3-36: Focus Group Participants (numbers) by Age Category**

Focus Group	18-25	26-35	36-45	46-55	56-65	66-75
Non-Atlanta	1	3	2	2	0	0
Inter/Novice	0	0	2	1	2	0
Expert	1	1	3	2	0	1

**Table 3-37: Focus Group Participants (numbers) by Familiarity With Georgia Rating**

<b>Focus Group</b>	<b>Very Familiar</b>	<b>Somewhat Familiar</b>	<b>Neutral</b>	<b>Somewhat Unfamiliar</b>	<b>Very Unfamiliar</b>
Non-Atlanta	0	3	2	3	0
Inter/Novice	2	3	0	0	0
Expert	8	0	0	0	0

**Table 3-38: Number of Focus Group Participants by Familiarity With Atlanta Rating**

<b>Focus Group</b>	<b>Commute to Atlanta</b>	<b>First-Time Traveler</b>	<b>Experienced Traveler</b>	<b>Atlanta Resident</b>
Non-Atlanta	0	3	5	0
Inter/Novice	0	0	0	5
Expert	1	0	0	7

**Table 3-39: Number of Focus Group Participants by Frequently Used Technologies**

<b>Focus Group</b>	<b>PC</b>	<b>Fax</b>	<b>CD ROM</b>	<b>Video Games</b>	<b>Car Phone</b>
Non-Atlanta	6	4	4	7	2
Inter/Novice	2	2	1	2	1
Expert	8	8	6	8	7

<b>Focus Group</b>	<b>ATM</b>	<b>VCR</b>	<b>Modems</b>	<b>Answering Machine</b>	<b>Touch Screen</b>
Non-Atlanta	6	8	2	6	0
Inter/Novice	4	5	2	4	2
Expert	7	7	5	8	6

<b>Focus Group</b>	<b>Keyboard</b>	<b>Mouse</b>	<b>Track Ball</b>
Non-Atlanta	6	2	0
Inter/Novice	2	6	1
Expert	8	7	1

**Table 3-40: Focus Group Participants (numbers) by Comfort with ATMs Rating**

<b>Focus Group</b>	<b>Very Comfortable</b>	<b>Somewhat Comfortable</b>	<b>Neutral</b>	<b>Somewhat Uncomfortable</b>	<b>Very Uncomfortable</b>
Non-Atlanta	4	1	1	2	0
Inter/Novice	2	1	1	0	1
Expert	8	0	0	0	0

**Table 3-41: Focus Group Participants (numbers) by Number of Times an Information Kiosk Was Used**

Focus Group	Never	1-2 Times	3-5 Times	6-10 Times	More than 10 Times
Non-Atlanta	6	2	0	0	0
Inter/Novice	3	1	0	1	0
Expert	0	2	6	0	0

**Table 3-42: Focus Group Participants (numbers) by Primary Mode Of Transportation**

Focus Group	Bus	Rail	Auto	Motorcycle	Bicycle	Walking
Non-Atlanta	0	0	8	0	0	0
Inter/Novice	0	0	5	0	0	0
Expert	0	2	6	0	0	0

**Table 3-43: Focus Group Participants (numbers) by Highest Level Of Education**

Focus Group	High School	2 year College	Technical School	Undergraduate Degree	Specialist Degree	Master's Degree	Ph. D.
Non-Atlanta	0	2	1	1	1	2	1
Inter/Novice	1	0	0	2	0	2	0
Expert	0	2	0	3	0	3	0

**Table 3-44: Focus Group Participants (numbers) by Yearly Income**

Focus Group	< \$25,00	\$25-50,00	\$50-75,000	\$75-100,00	>\$100,00
Non-Atlanta	0	6	2	0	0
Inter/Novice	0	2	3	0	0
Expert	0	4	4	0	0

**Table 3-45: Focus Group Participants (numbers) by Adoption Of New Products Ratings**

Focus Group	Purchase Immediately (Early Adopter)	Delay Before Purchasing (Cautious Adopter)	Long Delay Before Purchasing (Late Adopter)
Non-Atlanta	2	6	0
Inter/Novice	0	4	1
Expert	6	2	0

### 3.2.2 Participant Worksheet Ratings

A participant worksheet (see the UA Detailed Test Plan) was used throughout the session to facilitate individual thinking about specific features and the overall system. The responses do not

lend themselves to stringent statistical analysis because of the small and restricted samples involved. These data provide indications of the participants' attitudes toward the kiosk, but can only be interpreted within the context of the qualitative data generated during discussion.

### 3.2.2.1 Reliability of Worksheet Data

Scales were constructed to facilitate the analysis of the ratings collected from the participant worksheets. These scales include general reactions to the information categories (e.g., Airport, Traffic, Help, etc.), usability of the system (Usability), overall reaction to the system (Overall System), a comparison of the kiosk with the participants' current sources of similar information (Better than Current Source), and ability to move through the system (System Navigation). The reliability of the scales were computed using Coefficient Alpha. The Coefficient Alpha values ranged from 0.72 to 0.93 (see Table 3-46).

**Table 3-46: Reliability of Worksheet Scales**

<b>Scale</b>	<b>Item Numbers Included</b>	<b>Coefficient Alpha</b>
Airport	29, 30A, 30B, 30C, 31, 32, 33	0.91
Directions	12, 13, 14a, 14b, 14c, 15, 16, 17	0.86
Help	34, 35a, 35b, 35c, 36, 37, 38	0.89
MARTA	43, 44, 45a, 45b, 45c, 46, 47, 48	0.81
Overall Bus/Rail	49, 50	0.86
Special Events	23, 24a, 24b, 24c, 25, 26, 27, 28	0.72
Traffic	18, 19a, 19b, 1c, 20, 21, 22	0.89
Travelink	2, 3a, 3b, 3c, 4, 5, 6	0.74
Visitor Information	51, 52, 53a, 53b, 53c, 54, 55, 56	0.87
Weather	7, 8a, 8b, 8c, 9, 10, 11	0.72
Overall System	70b, 70c, 70d, 70e	0.86
Better than Current Source	72a, 72b, 72c, 72d, 72e, 72f	0.93
Usability	64, 68, 69, 70a, 71	0.86
System Navigation	57, 58, 66	0.88

Other worksheet items (e.g., benefit to the traveler, reliability of the information, currentness of the information, etc.) could not be combined to form reliable scales. These items are presented as individual item ratings and reported accordingly.

### 3.2.2.2 Descriptive Statistics for Participant Worksheet Items

The worksheet items were rated on 5-point scales that ranged from negative reactions (1) such as not valuable, not satisfied, and strongly disagree to positive reactions (5) such as very valuable, very satisfied, and strongly agree. Items that received a rating of 3 are viewed as a neutral response.

*Combined Focus Group Statistics* - Table 3-47 presents the descriptive statistics of each scale and individual item rating for the participant worksheets across all three focus groups. This summary table includes the number of respondents, mean, median, mode and standard deviation for each

rating. Scales and individual items with less than 21 participants (N) reflect a non-response for at least one item included in a scale or for an individual item.

**Table 3-47: Combined Focus Group Statistics**

	N	Mean*	Median*	Mode*	SD
<b>Scale</b>					
Airport	18	3.98	4.14	5.00	0.92
Directions	18	4.27	4.31	5.00	0.65
Help	16	4.38	4.57	4.86	0.62
MARTA	18	4.19	4.13	4.00**	0.55
Overall Bus/Rail	20	4.58	5.00	5.00	0.59
Special Events	19	4.51	4.63	4.63	0.46
Traffic	18	4.13	4.29	3.14**	0.74
TraveLink	18	3.95	3.93	3.57	0.64
Visitor Information	19	4.49	4.63	5.00	0.49
Weather	19	4.61	4.71	5.00	0.43
Overall System	20	4.26	4.38	5.00	0.62
Better than Current Source	19	3.83	4.17	5.00	1.14
Usability	19	4.31	4.40	5.00	0.63
System Navigation	21	4.14	4.00	5.00	0.65
<b>Item</b>					
Q59 Current Information	21	4.29	5.00	5.00	0.90
Q60 Reliable Information	21	4.52	5.00	5.00	0.60
Q67 Attractive Kiosk	21	4.38	4.00	4.00	0.59
Q73 Future Change of Plans	21	3.81	4.00	3.00	1.08
Q74 Benefit to Traveler	21	4.43	5.00	5.00	0.68
Q75 Look Forward to Use	21	4.48	5.00	5.00	0.68
Q76 Value of Information	20	4.55	5.00	5.00	0.69
Q77 Satisfaction	21	4.52	5.00	5.00	0.60

\* 1.0 is most negative, 5 is most positive, and 3.0 is neutral.

\*\*Multiple modes exist; the smallest value is shown.

*Comparison of Worksheet Items by Participant Background Variables* - All data was reviewed to compare means and percentage of participant responses by the following categories: 1) group, 2) income, 3) gender, 4) adoption of new products, 5) age, and 6) education. Although these data are not statistically significant given the small sample size, noteworthy comparisons are indicated in the sections below.

**Group** - The Non-Atlanta Visitor group typically responded slightly more favorably to questions than did the other groups. Table 3-48 presents the N, mean, median, mode, and standard deviation of the scale and item ratings that differed more than 0.5.

**Table 3-48: Comparison of Ratings by Focus Group**

	<b>Group</b>	<b>N</b>	<b>Mean*</b>	<b>Median*</b>	<b>Mode*</b>	<b>SD</b>
<b>Scale</b>						
Airport	Non-Atlanta	6	4.74	4.86	5.00	0.34
	Expert	8	3.41	3.43	3.43	1.01
	Inter/Novice	4	3.96	4.07	3.29**	0.49
Help	Non-Atlanta	8	4.68	4.86	4.86**	0.48
	Expert	4	4.07	4.21	4.86	0.94
	Inter/Novice	4	4.11	4.14	4.14	0.18
Overall Bus/Rail	Non-Atlanta	8	4.88	5.00	5.00	0.23
	Expert	7	4.29	4.50	4.00**	0.70
	Inter/Novice	5	4.50	5.00	5.00	0.71
Traffic	Non-Atlanta	8	4.54	4.64	4.29**	0.49
	Expert	6	4.19	4.29	4.00	0.76
	Inter/Novice	4	3.25	3.14	3.14	0.21
Travelink	Non-Atlanta	8	3.98	3.93	3.57**	0.36
	Expert	6	4.24	4.57	4.71	0.64
	Inter/Novice	4	3.46	3.50	2.29**	0.94
Visitor Information	Non-Atlanta	8	4.70	4.60	5.00	0.45
	Expert	7	4.41	4.12	5.00	0.56
	Inter/Novice	4	4.22	4.12	4.00	0.30
Weather	Non-Atlanta	8	4.88	4.93	5.00	0.16
	Expert	7	4.45	4.57	4.57**	0.48
	Inter/Novice	4	4.36	4.28	3.86**	0.49
Better than Current Source	Non-Atlanta	8	4.27	4.50	4.67	0.71
	Expert	7	3.43	3.33	5.00	1.57
	Inter/Novice	4	3.67	3.83	2.50**	0.88
Usability	Non-Atlanta	8	4.50	4.60	5.00	0.53
	Expert	7	4.29	4.40	5.00	0.74
	Inter/Novice	4	3.95	4.00	4.00	0.57
<b>Item</b>						
Q59 Current Information	Non-Atlanta	8	4.75	5.00	5.00	0.46
	Expert	8	3.88	4.00	5.00	1.13
	Inter/Novice	5	4.20	4.00	4.00**	0.84

\* 1.0 is most negative, 5 is most positive, and 3.0 is neutral.

\*\*Multiple modes exist; the smallest value is shown.

Income Level - Participants in the \$25,000 to \$50,000 range responded slightly more favorably to items in all cases with the exception of Usability and Visitor Information. Ratings that differed more than 0.5 are shown in Table 3-49. Further investigation showed that a higher proportion of lower income participants had no prior experience with a kiosk (75%) compared to the higher income participants (33%). In addition, a smaller proportion of lower

income participants reported frequent use of a touch screen (33%) compared to the higher income participants (83%).

**Table 3-49: Comparison of Ratings by Income Level**

	Income	N	Mean*	Median*	Mode*	SD
<b>Scale</b>						
Airport	\$25,000 - \$50,000	11	4.22	4.57	5.00	0.93
	\$50,000 - \$75,000	7	3.59	3.57	4.43	0.84
Traffic	\$25,000 - \$50,000	9	4.40	4.43	4.29**	0.58
	\$50,000 - \$75,000	9	3.87	3.57	3.14**	0.81
<b>Item</b>						
Q59 Current Information	\$25,000 - \$50,000	12	4.58	5.00	5.00	0.67
	\$50,000 - \$75,000	9	3.89	4.00	4.00**	1.05
Q74 Benefit to Traveler	\$25,000 - \$50,000	12	4.67	5.00	5.00	0.49
	\$50,000 - \$75,000	9	4.11	4.00	4.00	0.78
Q76 Value of Information	\$25,000 - \$50,000	12	4.75	5.00	5.00	0.45
	\$50,000 - \$75,000	9	4.25	4.50	5.00	0.89

\* 1.0 is most negative, 5 is most positive, and 3.0 is neutral.

\*\*Multiple modes exist; the smallest value is shown.

Gender - A comparison of mean ratings by gender revealed no differences greater than 0.5 with the exception of Q75 “Look Forward to Use.” The mean rating for males was 4.78; the female mean was 4.25.

Adoption of New Products - A comparison of mean ratings between participants who typically purchase new products immediately (early adopters) and those who delay before purchasing (cautious and late adopters) revealed that the early adopters tended to rate items slightly less favorably than the late adopters. Ratings that differed by more than 0.5 are shown in Table 3-50. Reactions to the Travelink information category was the only item rated

**Table 3-50: Comparison of Ratings by New Product Adoption**

	Adoption	N	Mean	Median	Mode	SD
<b>Scale</b>						
Travelink	Early	7	4.25	4.43	4.43**	0.58
	Late	11	3.77	3.86	3.57	0.64
Better than Current Source	Early	8	3.44	3.58	1.33**	1.41
	Late	11	4.12	4.33	5.00	0.85
<b>Item</b>						
Q59 Current Information	Early	8	3.75	4.00	4.00	1.04
	Late	13	4.62	5.00	0.65.00	
Q75 Look Forward to Use	Early	8	4.12	4.00	4.00**	0.83
	Late	13	4.69	5.00	5.00	0.48

\* 1.0 is most negative, 5 is most positive, and 3.0 is neutral.

\*\*Multiple modes exist; the smallest value is shown.

higher (0.5) by the early adopters. Further investigation showed that the early adopters consisted of 88% (7 of 8) women, six of whom were in the Expert (knowledge of Atlanta) group. Women formed 38% (5/13) of the late adopters group. A higher percentage of early adopters also used more technologies on a frequent basis, with the exception of VCRs. No relationship was apparent between the adoption of new products and income.

Age and Education - A review of the worksheet data revealed no trends in differences in ratings between age groups nor education levels.

### **3.2.3 Focus Group Discussion and Comments**

The following sections summarize the discussion and comments generated during the course of the focus groups. The sections include sources from which the participants generally receive similar travel information, participant expectations concerning what information the main menu categories contained, and general comments and recommendations for improvement.

#### 3.2.3.1 Sources of Traveler Information

The focus group participants used a variety of sources to obtain traveler information. These included TV, radio, visitor centers, maps, newspapers, in-vehicle display, travel agencies, Web sites, bus dispatchers, and personal communication. These sources were described as being useful for the following reasons: easy to obtain, availability of discounts and coupons, provision of detailed and timely information, and availability of event planning. Problems with these sources included the provision of too much information (Web sites), information provided in an untimely manner (i.e., radio traffic reports), and inaccuracy.

#### 3.2.3.2 Expectations about Kiosk Information Categories

##### *Main Menu*

- When describing their first impressions, the Expert and Intermediate/Novice group both indicated a preference for increasing the size of the menu and decreasing the size of the “i” logo.
- All groups felt that the menu seemed easy to use. Two participants in the Non-Atlanta Visitor group indicated that they had seen similar systems.
- A problem with glare on the screen was noted by the Expert group.
- The information categories that the groups thought they would use most frequently were as follows in order of median rating: Traffic, Directions, Weather, Visitor Information, Special Events, Airport, Bus/Rail, and About TraveLink.

##### *Traffic*

- All groups’ expectations of what they would find in this category were confirmed for the most part. They correctly expected accident and construction information, as well as traffic speed and congestion.
- They also expected alternate routes and detours, features that are not present in the current system.

### *Directions*

- Participants correctly expected to find a route planning program in this category, along with features like printed directions, maps, important locations, and distance between places.
- Incorrect expectations included mile markers and multiple routes to the same location.

### *Bus/Rail*

- This category offered almost all of the things participants expected, such as schedules and price information.
- Some participants expected to find directions to the terminals and stations, a feature that is found in the general directions section.

### *Visitor Information*

- Nearly all of the expectations were met for all groups. These included restaurants, lodging, phone numbers, entertainment, major attractions, and price information
- The only thing that was expected and not found was information on activities specifically designed for children.

### *Airport Guide*

- Again, nearly all expectations were met. Participants expected to find information on parking, airlines, schedules, gates, restaurants and prices.
- The Intermediate/Novice group incorrectly assumed that the guide would provide a list of all airlines serving the state as well as specific information for all airports.

### *Weather*

- Participant's expectations of the weather category that were confirmed included: current weather conditions for the state, forecasts, precipitation and temperature.
- The only features expected and not found was information on past weather and average temperatures.

### *Special Events*

- The Non-Atlanta Visitor group only expected to see Olympic information. The other groups expected this as well as other activities.
- Expected information that was not found included: sporting events, concerts, fairs, festivals, event locations, kids' activities, and future events.

### *About TravelLink*

- Participants correctly expected to find kiosk locations and information about the developers of TravelLink
- The Non-Atlanta group incorrectly expected to learn about information currentness and the software being used. The Intermediate/Novice groups expected a wider variety of information such as Help, a main menu for the sub-categories, the transportation available, and how different forms of travel work together.

### 3.2.3.3 Focus Group Comments

The following sections convey the main comments from the focus groups as obtained through discussion and open-ended questions on the participant worksheet. These comments are organized by content: General Comments, Interface Design, Additional Features Recommended, Information, and Suggested Kiosk Locations. Information that is presented in both quotes and italics represent direct quotes from participants. The source of the quote is noted in parentheses.

#### *General Comments*

- Participants expressed concern about having to wait in line to use the kiosks, and wanted enough kiosks in high traffic areas.
- Participants recommended that all of the kiosk locations be well lit and in highly populated areas.
- To make the public more aware of the kiosks, it was suggested that volunteers demonstrate how to use them. Also, the use of television commercials was recommended to accomplish this goal.
- Participants expressed concern that the system would not be accessible to handicapped people.
- The system response time was felt to be too long.
- Some participants suggested that a Lighter color would be more attractive for the kiosk shell.

#### *In terface Design*

- Participants wanted the Help icon to be more visible because they felt that it did not stand out from the other icons.
- The system should always give some type of feedback concerning the status/progress of the inquiry.
- Some participants felt that the pictures presented to the left of the menu categories were not clearly related to the information presented in the category.
- Several participants preferred that the main menu category icons be larger and the "i" symbol be less prominent.
- A few participants suggested that the computer screen should be larger.
- Audio feedback for correct button pushes was discussed and was met with general approval. They wanted to hear a tone each time a correct button was chosen, and possibly a different or "wrong" sounding tone for incorrect. screen touches.
- It was suggested that an automated message located in the Help directory could lead a person through the screens.
- Some participants suggested that a track ball be used to navigate throughout the system instead of the touch screen.
- Dissatisfaction with the scrolling feature was expressed by several participants.
  - One suggestion was to have the "up" and "down" arrows scroll an entire screen of text at a time, and then allow the user to select the desired item by touching it.
  - Some of the participants were more familiar with other systems that scrolled differently. They suggested that the direction of text flow be reversed when scrolling relative to the "up" and "down" arrow.

- A final suggestion recommended eliminating the scroll function when selecting a city (for directions or weather), and using an alphanumeric keypad to narrow the search. For example, selecting “A” to find Atlanta.
- The participants felt that some of the icons were confusing and should be more “international” but gave no specific suggestions.
  - The “Special Events” category was considered to be unintelligible. (e.g., “*looked like a spiderflying over a city*”; “*ice cream on a piece of pie that’s melting.* ” ) (Intermediate/Novice)
- “Short cuts” should be provided for experienced users to reduce the time required to get to specific information.

#### *Additional Features Recommended*

- A few participants wanted to see a specific button to use in the case of emergencies. Some suggested having a direct link to a 9 11 phone line.
- There was general approval for a “You Are Here” sign whenever a map was present to allow identification of the current location.
- Several people expressed the desire for the kiosks to print coupons.
- Participants suggested attaching a phone to the system to allow users to contact hotels and other places of interest (which are present at the Welcome Center kiosks).
- One individual requested a “*clear option for privacy.* ” (Expert)
- Several individuals expressed a desire to have kiosk information available by car, phone and television.

#### *Information*

- There were several requests for a listing of churches and phone numbers.
- One individual suggested a cross-reference in the “Visitor Info” category.
- Participants wanted a category for emergency information which would have different phone numbers to call, and/or advice on what to do in various situations.
- One individual requested a list of doctors and hospitals and ways to contact them.
- Ⓢ A request was made for a list of daycare services and phone numbers, as well as for information on food and restaurants.
- Ⓢ Participants felt that they would use the kiosks more frequently if there was more information on cities other than Atlanta.
- Participants thought that the category title “Special Events” was misleading. They wanted to see more than just Olympic information in that category and a clarification between that category and “Visitor Info.”
- A few participants felt that there was too much information on the system.
- There was interest in additional information about visitor attractions, such as admission prices and start and end time of events.
- Four individuals made comments about the airport maps. Two individuals “want a printed airport map,” another stated that “the airport map is very confusing,” and the fourth requested a “you are here” dot.

### *Suggested Kiosk Locations*

- Some suggested locations for the kiosks were:
  - Gas stations along Interstate highways
  - Malls
  - Restaurants (i.e., McDonalds)
  - Hotels and motels
  - Major office complexes
  - Grocery stores
  - Bars
  - Banks/ATM locations
  - Colleges
  - Airports
  - Six Flags and other parks
- There was a suggestion for a drive-through kiosk, similar to a drive-through ATM.
- Non-Atlanta participants were very interested in having similar kiosks in Tennessee.

## **3.3 OBJECTIVE UA-1 - TRAVELERS' ATTITUDES**

### **3.3.1 Questionnaire Results**

In general, questionnaire respondents responded positively to questions concerning TraveLink's user interface, information currentness and reliability, value to travelers and overall satisfaction. Mean questionnaire ratings collected during the Olympic period ranged from 3.89 to 4.33. The few differences in overall attitude ratings between respondents are as follows:

- Those with advanced education were slightly more satisfied with the kiosk overall.
- Atlanta Area Residents appeared to place more value on the kiosk. These respondents were more likely to be business travelers, to have used TraveLink more than five times and to be under 30 years of age.

The small sample of data collected from the Lavonia Tourist Center during the post-Olympic period revealed only slightly less positive reactions to TraveLink in comparison to the Ringold Tourist Center ratings and overall ratings collected during the Olympic period. It is unclear why these slight differences are present, although they may be possibly explained by differences in the respondents' purpose for travel, previous experience with an information kiosk, and time of data collection. A majority of Lavonia respondents were on business travel and had no previous experience with kiosks.

### **3.3.2 Focus Group Results**

The TraveLink kiosk was generally well-received by all three focus groups. Most participants felt that the information displayed was both current and reliable and were satisfied with their interaction with the kiosk. They considered the system to be quite usable in terms of understanding graphics and icons, screen layout, and their personal ability to use the kiosk. Navigation through the system was felt to be easy and information retrieval intuitive. However, when asked to describe the kiosk to a first time user, several participants indicated that it would be easy to use if the new user was persistent in getting familiar with the system.

- *“Be patient; good information will come; read all directions.”* (Non-Atlanta Visitor)
- *“Easy to use touch screen with plenty of explanation.”* (Non-Atlanta Visitor)
- *“Help might be needed.”* (Expert)
- *“Strange, but would try to get familiar with machine to get information you want..”* (Expert)
- *“Slow; easy to operate but unclear choices.”* (Intermediate/Novice)

A few group differences in attitudes toward the kiosk were noted. The Non-Atlanta Visitor group typically responded slightly more favorably to items on the participant worksheet. It may be that their reactions were strengthened by their geographic distance and lessened familiarity with the State of Georgia; thus, they may have an increased need for such travel information. The worksheet data suggests that this group felt that Travelink is a valuable tool for travel into the state and provides more information about Georgia than their current sources of travel information.

The participants with lower reported incomes (\$25,000 to \$50,000) responded slightly more favorably to most worksheet questions. These individuals appeared slightly more impressed with Traffic and Airport information and were slightly more positive about the currentness of information, benefit and value to travelers. The novelty of kiosks and associated kiosk technology for these individuals may be related to the slightly elevated ratings for Travelink.

The level of experience with technologies among focus group participants varied from 4 to 12 frequently used technologies. Sixty-six percent reported being very comfortable with ATMs. Only thirty-three percent of participants (7 of 21) had used an information kiosk more than three times. Participants identified as early adopters of new products typically rated the kiosk slightly lower than those who delay adopting new products. The early adopters rated information about the system (“About Travelink”) more positively, but were somewhat more critical of the currentness of information, were less impressed with the kiosk in comparison to their current source of travel information, and expressed slightly less desire to use the kiosk again. In addition, most of the early adopters were very familiar with the Atlanta area, traveled at least 40 miles a day, and used more technologies on a frequent basis. These individuals may hold somewhat higher expectations for Travelink based on their heightened familiarity with various technologies, the Atlanta area, and their expertise in travel.

### **3.4 OBJECTIVE UA 2 - EXTENT OF USE**

#### **3.4.1 Questionnaire Results**

Fifty-nine (70.2 %) of questionnaire respondents during the Olympic period estimated that they used the kiosk five or less minutes. Four (4.8%) of respondents estimated a usage length of six to eight minutes. Twenty-one (25%) of respondents estimated using the kiosk from 10 to 20 minutes. The average time of use across all respondents was approximately six minutes. As a qualification to average time of use, it must be recalled that respondents were not approached to complete a questionnaire unless they had used the kiosk for a minimum of two minutes. This procedure artificially inflates the average usage time so that this estimate may not accurately reflect average length of use for all Travelink users.

A majority of respondents (62.4%) had not used TraveLink before this visit. Approximately 19% of respondents had used the kiosk between 2 and 4 times; the remainder of respondents (19%) had used the kiosk over 5 times.

### **3.4.2 Focus Group Results**

In spite of the focus group participants' varied level of familiarity with different technologies, all participants indicated that they looked forward to using TraveLink again. Males responded slightly more favorably than females to this worksheet item; however, both means were above a rating of 4. Participants expressed a need for kiosks to be placed in very convenient locations. Unless the information was felt to be easily accessible, TraveLink would be less used and of less benefit to them. Participants indicated that TraveLink appeared to be slightly better than their current sources of travel information. A few participants also stated that their frequency of use might increase if more information on cities other than Atlanta were included

### **3.4.3 Observational Studies Results**

During the eight observation periods, TraveLink was used 95 times, averaging 11.9 uses per two hour observation period. At least 15 uses were accounted for by users under the age of 15 "playing." A total of 146 uses were observed, averaging 2 users per use. The average length of time in use was 2.9 minutes. Eighty-three males and sixty-two females were observed using the kiosk.

These observational results cannot be compared to other periods of TraveLink use since the transaction logs were not sufficiently reliable.

To allow the comparison of this data with the questionnaire respondents' estimates of length of time used, data of users who were observed to use the kiosk less than 2 minutes were eliminated. This resulted in a total of 39 uses over two minutes duration with 5.8 minutes average time of use. This average is consistent with the questionnaire respondents' estimate of time that they used the kiosk.

### **3.4.4 TR Observational Data Results**

Table 3-51 presents a summary of the opportunity for kiosk use in comparison to the number of actual uses for a given kiosk location. The observation date, kiosk location, number of opportunities for use, actual kiosk uses, and percentage of use (Uses divided by Opportunity for Use) is shown. The opportunity for kiosk use ranged from 167 to over 10,000 uses as estimated by the number of individuals with easy access to the kiosk. There were more opportunities for use at the MARTA stations; however, the percentage of actual use for kiosks at the Ringold Tourist Center and AMTRAK station were higher than all other locations. It may be that respondents at these two locations had more time to spare or were less preoccupied with their travel activities than other respondents. Thus, they were more willing or able to spend time exploring the kiosk. At no time were users observed waiting in line to use the kiosk.

**Table 3-51: Opportunity for Kiosk Use Versus Actual Use**

<b>Date</b>	<b>Location</b>	<b>Opportunity for Use</b>	<b>Actual Uses</b>	<b>% Use</b>
July 26	Ringold Tourist Center	280	24	8.6
July 29	Atlanta Hartsfield Airport	619	10	1.6
July 31	MARTA - Omni Station	> 10000	9	.1
August 1	MARTA - Kensington Station	1222	7	.6
August 2	North Park Town Center	311	2	.6
August 2	AMTRAK	167	12	7.2
August 4	Stone Mountain	643	19	3.0
August 5	Atlanta Hartsfield Airport	653	12	1.8

### **3.5 OBJECTIVE UA-3 - PERCEIVED VALUE**

#### **3.5.1 Questionnaire Results**

The mean rating of Travelink’s value to travelers was 3.89 across respondents during the Olympic period; however, Atlanta Area Residents rated the kiosk as being more valuable to travelers (4.12) than did First-Time Travelers (3.63) and Experienced Travelers or Commuters (3.82). It may be that these Atlanta respondents perceived more information to be relevant to their travel needs than did other groups. These Atlanta area respondents were more likely to be on business travel, have a high school education, be less than 30 years old, and have used Travelink more than 5 times.

The print feature was seen as a valuable asset to the kiosk. Respondents were willing to pay more for a kiosk visit if the print feature was available. Only 58% indicated that they were willing to pay to use the kiosk without printing; with printing, 85% were willing to pay at least 25 cents.

#### **3.5.2 Focus Group Results**

Although focus group participants found the information on the kiosk to be valuable and thought that it would be beneficial to travelers, almost half of the participants indicated that they would not pay to use the kiosk for one visit; the remaining half would pay between 25 and 50 cents; Only one individual indicated a willingness to pay \$1 (Intermediate/Novice).

### **3.6 OBJECTIVE UA-4 - ESTIMATES OF PREFERENCES**

#### **3.6.1 Questionnaire Results**

Weather, Olympic information (i.e., Special Events), and Travel and Tourism were the three information categories used by at least 45% of Olympic period respondents. Traffic and Route Planning were used by at least 30% of these respondents. Similarly, Weather, Travel and Tourism, and Traffic were the information categories used by at **least 47%** of the post-Olympic respondents.

Traffic, Olympic information, Weather, Route Planning, and Travel and Tourism were the information categories rated as being most valuable by Olympic period respondents. Similarly, Traffic, Weather, Travel and Tourism, and Route Planning were the most valued information categories for the post-Olympic respondents.

### **3.6.2 Focus Group Results**

The focus group participants indicated that they would probably use the following information categories most frequently (listed most to least frequently): Traffic, Directions, Weather, Visitor Information, Special Events, Airport, Bus/Rail, and About TraveLink. Ratings for all information categories were positive, ranging from 3.98 to 4.61.

### **3.6.3 Observational Studies Results**

No data collected during the observation studies provided information concerning this objective.

## **3.7 OBJECTIVE UA-5 - IMPACT ON BEHAVIOR**

### **3.7.1 Questionnaire Results**

Younger respondents (below age 30) appeared to be slightly more likely to change travel plans based on kiosk information. However, most respondents (80%) did not alter their travel plans during their kiosk visit. Most individuals who did change travel plans indicated that they either changed their route or mode of travel. The respondents who indicated a change in plans responded slightly more favorably across all questionnaire items and specifically with regard to the currentness and reliability of information and overall satisfaction with the kiosk. The respondents' flexibility of travel plans did not appear to affect actual travel changes.

Similar results were found from the post-Olympic sample of 23 respondents. Most respondents (82%) did not alter travel based on information from the kiosk. Of the four who did, 3 respondents indicated a change in route. As with the Olympic period respondents, respondents who altered their travel plans responded more favorably to most questionnaire items. They were more positive about the attractiveness of the kiosk, value to the traveler, willingness to change plans in the future, currentness and reliability of information, and overall satisfaction with the kiosk.

### **3.7.2 Focus Group Results**

Most focus group participants stated that they would probably not alter their travel plans based on information received from the kiosk. The Expert group was most emphatic. Participants indicated that they might do so if the information was extremely easy to access (e.g., place a phone call to get the information, a kiosk located at their place of business), or perhaps if they were going out-of-town (from the Atlanta area). One individual noted that she would change plans only for attraction visits. For instance, she might alter a visit if the attraction admission price was too expensive. Travel in Georgia appeared to be more costly in terms of planning and travel time for the Non-Atlanta Visitor group. Their specific concerns centered around timeliness and accuracy of information if accessing the information at a considerable distance (i.e., just across the Tennessee - Georgia state borders) from their destination.

## **3.8 OBJECTIVE UA-7 - ENVIRONMENTAL AND ERGONOMIC FACTORS**

### **3.8.1 Questionnaire Results**

Questionnaire item #3 asked about the respondents' perceived safety during kiosk use. Although this item was included in the scale "Usability," a review of this item's mean (4.53) indicates that respondents during the Olympic period felt very safe when interacting with the kiosk. Only seven (8 %) of respondents rated this item 3 or less. A review of the kiosk locations for these seven respondents shows no clear pattern for these neutral to less positive responses. The data indicates that four respondents were at the Atlanta airport, one at the Ringold Tourist Center, one at Underground Atlanta, and one at the Suwannee Out-bound Rest Area. However, six respondents were female and five were Atlanta Area Residents. Perhaps these two factors speak to the caution expressed in using the kiosk, regardless of location. Because questionnaires were obtained from 8 a.m. to approximately 3 p.m., no conclusions may be drawn about safety concerns during evening use at outside locations such as rest areas or some MARTA stations.

Comments about glare on the touch screen were made by two respondents at the Suwannee In-bound and Out-bound Rest Areas. Touch screen insensitivity and slow response time of the system were problems noted by twelve respondents. Kiosk location did not appear to be related to these comments; most comments were made from different locations.

### **3.8.2 Focus Group Results**

Personal safety during kiosk use was not a concern for focus group participants if the locations were well-lit and in highly populated areas. Although most participants were able to view the screen comfortably, some concern was expressed that handicapped individuals might have difficulty accessing the information, either by viewing and/or making selections using the touch screen. Participants in the Expert group commented on screen glare from the overhead lighting.

### **3.8.3 Observational Studies Results**

Most of the locations observed had good lighting with little glare present. However, excessive glare on the touch screen was noted at outside locations such as the rest areas and Underground Atlanta. The glare made kiosk use extremely difficult, if not impossible. An unexpected environmental factor which could affect kiosk usage was noted at the In-bound Suwannee rest area. Waste cans located near the kiosk produced a bad odor and a number of flies, which made standing at the kiosk (and observing nearby) very unpleasant.

A number of system problems were noted during the observational periods, each occurring at different locations: 1) the bottom menu buttons disappeared, disabling the ability to return to the Main Menu at two locations; 2) the attraction loop did not work at two locations; 3) the system "crashed" rendering the kiosk unusable at two locations; 4) the printer did not work at one location. In addition, connection wires were exposed and access and view of the kiosk was obstructed at Stone Mountain. These observations were consistent with those made by evaluators at various locations throughout the FOT.

### 3.8.4 Expert Evaluation

The kiosk hardware and software was reviewed for compliance with user interface guidelines. The following sections present a summary of the guidelines examined and observations made of specific hardware and software features. It should be noted that some of the comments concern specific information that is provided to the Travelink system and was not designed by Travelink developers.

#### Kiosk Shell

- The materials used in kiosk construction set the tone for the interaction between system and user and should be selected according to image or message to be conveyed. The kiosk shell (either green or gray) appears to be quite durable. However, neither color permits the kiosk to stand out from its surroundings.
- Kiosk placement must be carefully considered to allow for the most visibility and access without blocking pedestrian traffic.
- Measures to prevent the free-standing kiosks from toppling over should be taken, especially in locations of high pedestrian activity.
- The kiosk has no sharp or protruding edges which could harm users.
- The design allows more than one person to watch or use the system and does not obstruct viewing of the display or access to the touch screen.
- Power cords and network cabling are visible in some locations and may be subject to being accidentally (or deliberately) disconnected or damaged.

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#### Touch Screen

- The system responds to input when a finger touches the touch screen, except when zoom buttons are used. In this case, when a finger is placed on the map, the system does not respond until the finger is lifted. This reversal in operation may be confusing to some users.
- Because of the less than ideal locations in which the kiosks must be placed, glare is a serious concern that can greatly affect the use of the kiosk. The planning of future locations should consider this factor. If relocation of a kiosk with glare problems is not possible, a hood attachment should be considered.

#### Printer

- Reliability is the primary consideration-when choosing a printer for a public access system such as Travelink. The print function is vital to the usefulness of this system This function is particularly important when directions are requested and the result is a complex list of instructions which may not be easily written or remembered by the user.
- The total failure of the printer or even if incomplete instructions are printed (i.e., the bottom instructions are not printed) can cause frustration for the user and potentially user avoidance of the system.

#### Sound

- When present, the attraction loop music invites the potential user to approach the kiosk to find out more about its function. The music may become annoying over time if the kiosk is not in use and other activities must be performed in close proximity to the kiosk.

- The auditory “beep” in combination with the visual depression of the buttons provides feedback that the system has acknowledged the user’s input. Experimentation may hopefully determine a sound level that will attract users, not annoy others, and provide additional feedback for button selection to users.

### Attraction Loop Screen

- The purpose of kiosk is not immediately apparent to a first-time user. The attraction loop screen does not provide an initial indication that the information provided is for travelers and is free of cost.
- The attraction loop gives an attractive, pictorial indication of some of the information categories offered by the kiosk. The photographs are placed in a rectangular box in the center of the screen and is the focus of the user’s attention. There is a great deal of blank space around the photographs and box which could be decreased to enlarge the photographs and present other information.
- Additional information for the information categories is presented in the form of text in the comers of the center rectangle on moving circles. Not all words can be seen at once. The letters are a light color and do not stand out well from the background. Although this method of providing information is creative and eye-catching, the user must pay close attention to the text in the circles to understand what types of information will be provided within each category. A list or scrolling information might convey the information more clearly.
- The attraction loop appears to complete its cycle, the screen “blues-out” for approximately 15 seconds, and then the loop starts over. This blue-screen time-out length should be shortened to prevent potential users from assuming that the kiosk is not functioning.
- “Touch Screen to Begin” appears at the bottom of the screen. The font could be enlarged to draw attention to the instructions.

### Main Menu Screen

- In general, the main information icons that are placed on the right panel of the screen are good metaphors. Their placement on the side throughout the screens is a great benefit to the usability of the system. The system provides a stable, consistent interface which users can rely on to easily navigate through the screens.
- The essence of most of the icons seems clear. Users may become confused about differences between the information in Special Events and Visitor Info. Weather may be better positioned closer to the top of the list, unless it is accessed less frequently than Bus/Rail and Visitor Info. Another potential source of confusion is the Airport Guide. Users may expect to find information about airports other than Hartsfield International in this category. This confusion may be avoided by re-labeling the icon, such as with “Hartsfield Airport Guide.”
- The "i" symbol on the left of the screen is very large, and the area allotted for the icons on the right is rather small in comparison. The icons could be made larger if the graphics area is reduced.
- As with the Attraction Loop, there is nothing on the Main Menu screen that indicates the kiosk is a free traveler-information service. Perhaps part of the graphics space could be used to relate what the kiosk does. Likewise, the "i" symbol is not self-explanatory.
- The date and time are very small. If the information is to be included, it should be more conspicuous.

- The Help icon is small and its location in the right bottom corner does not allow it to be easily noticed in spite of the red color-coding.
- All references to Special Events - Olympics (including in Help and Directions) should be removed or grayed-out until this function is replaced with other events and again populated with current information.

### Traffic Screens

- The actions required for the zoom-in/out functions can be confusing to perform, especially for infrequent users. A different mechanism is recommended to decrease the number of button presses. Perhaps a toggle switch function between “zoom-in” and “zoom-out” instead of the current two-step function would be helpful. That is, after pressing a zoom icon, the user may perform that zoom function by touching the screen repeatedly until system zoom limitations are met or the user wishes to perform the opposite zoom function, and presses the other zoom icon to reverse the process.
- As with the zoom functions, the actions required for obtaining more information on construction or traffic incidents can be confusing. The user must locate and touch an icon on the traffic map, and then touch a bar on the instruction panel to display text information. To reduce the number of button presses, a one-step mechanism is recommended. The text could be displayed automatically when the user touches the icon on the traffic map.
- The icons around the traffic map (i.e., up, down, left, right, zoom-in, and zoom-out) are in smaller font than the text located on the instruction panel. This increases the readability of the instructions, but decreases the usability of the icons on the map. One suggestion is to decrease the size of the Georgia Department of Transportation (GDOT) logo and increase the size of the zoom and scrolling icons.
- The presentation of system status information, as done when the kiosk is connecting to the traffic server, provides the user with a rationale for the delay. Although the delay may be lengthy, the status information will hopefully keep the user from thinking that the system is not working. However, if the traffic server cannot be contacted, a delay of approximately 30-35 seconds occurs before the user is informed that the function is not operational. This length of time is unacceptable by most standards and users may assume that other functions they desire are not operational and walk away. One of the critical performance characteristics of a public access system is quick response time. People usually expect the system to respond in less than a second.

### Directions Screens

- The user may choose origins and destinations by street address and by point-of-interest. The inclusion of these two features is most desirable, especially for those not intimately familiar with the state. Although the features are quite useful, they appear cumbersome.
- The “Points of Interest” function should be reviewed to insure that sites are appropriately grouped into categories
- A “Search” function would be beneficial to users unfamiliar with the state. For example, “Atlanta Underground” could be typed on a keypad to choose as either an origin or destination.
- No instructions are provided for “zooming.” These should be consistent with those for traffic. As with the Traffic zoom feature, a different mechanism is recommended. Perhaps there

should be only a toggle switch function between “zoom-in’ and “zoom-out” instead of the current two-step function.

- The instructions on how to scroll and select is difficult to read and should be made larger.
- The fourth component of selecting a street address is the selection of the street number. If the chosen street does not have street address information, a default choice of “Use an address range that is not shown” is listed as the only choice. Perhaps the system could use the default choice automatically or clarify the meaning of the text for the default choice.
- When the system displays a plotted trip, the plotted lines overlay the interstate signs, making it difficult to know what the signs are. A majority of users may be unfamiliar with the interstate numbers. Perhaps the traffic screen can be refreshed after the trip is plotted.
- The “Move Screen” arrows move a whole section of the map instead of panning. This can be very disorienting to the user. In addition, the icons and text around the map are small and need to be larger, as with the Traffic icons.
- It is unclear why some of the text for describing this category is in red.

#### Bus/Rail Screens

- In the trip planner, the method to indicate the time you want to leave and the date you want to leave is rather cumbersome. This is also true for the selection of inbound/outbound and selection of day. One button that allows the user to scroll or select each function, rather than two buttons, should suffice. In addition, the user can not loop from January to December (i.e., must press the button 12 times to get from January to December). Perhaps a keypad on the screen to enter the information directly would be more efficient.
- Within the “MARTA Bus Route” section, there is no mechanism for identifying where a particular route goes. The only information that is presented is tabular sheet of bus number by time of stop. This information may be inadequate, unless the user is in a MARTA station or is familiar with the system. In contrast to MARTA, CCT presents route information as a map with all the stops numbered on the map. On the right instruction panel, a list of the major stops along the route is presented.
- The bus routes are numbered so that route 10 is listed before routes 2 - 9. The preferred method is to list the numbers in ascending order.
- The CCT bus route maps are very hard to read. A “print” function would be useful for the CCT section.

#### Visitor Information Screens

- The inclusion of visitor information by statewide, region, and city provides an excellent method for users with varying levels of familiarity with the state to determine what type of information they need.
- Experts that are familiar with the state may categorize visitor sites much differently than infrequent visitors because their knowledge base is much broader and deeper. For example, is Stone Mountain a state park, amusement park, or historical site? The categories of visitor information should be closely scrutinized to identify items which should be included in more than one category or allocated to a different category.
- An additional “Search” function would be beneficial to users unfamiliar with the state.

- Under the Lodging section, “Bed and Breakfast” and “Cabins and Cottages” do not allow selection by City, Statewide, or Region. It is unclear why these selection features are not permitted.
- The timing for updates to the Visitor Information database should be carefully planned to insure currentness of information. A notation that indicates the most recent update would be useful to travelers.
- The kiosks reviewed for this evaluation did not have a telephone handset to make lodging reservations (they were not yet operational).
- “ETC” is a sub-category within “By Event Category” in “Visitor Information.” “ETC” contains information on eclectic topics such as pottery styles and techniques. The “ETC” icon provides little information as to the purpose of the sub-category and may be particularly unclear to foreign users.
- The use of “Category” in “By Event Category” is superfluous.

#### Airport Guide Screens

- The wealth of information that is provided by this category is most comprehensive and should greatly assist users unfamiliar with the Atlanta Hartsfield airport.
- The Print function would be a useful feature for the airport maps.
- Because of the size and complexity of the airport, “Maps” would be a useful primary icon within the airport guide, rather than a feature listed under “Other Information.”
- The airport maps provide an overview of all concourses and a “zoomed-in” section of a specific concourse. The lines that are supposed to outline the “zoomed in” region of the airport do not clearly delineate that two pictures being connected represent two views of same object. Users may have difficulty orienting themselves on the map because the two sections are not well-labeled as to their function.

#### Weather Screens

- The weather category presents the information in a clear and succinct manner.
- Consideration may be given to providing weather information for additional areas (e.g., North East US, Central US, West Coast) for users such as those at the airport who may be preparing for travel outside the southeastern US

#### About TravelLink Screens

- The Olympic Showcase information should be updated on a regular basis to reflect changes.

#### Help Screens

##### *General Comments*

- Help functions for public access systems should be included to remind people about things that have already been explained and provide additional information about options or system features. However, transactions in a public access system should not be so complex that they need extensive instructions. As a general rule, any function which requires a lot of help information should be redesigned.

- The icons at the bottom of the screen, such as Quit Help, are easily understandable. The placement of page number status and number of total pages on the subtitle bars increases the users' awareness of where they are in the system and gives them an idea of the scope of the information to be provided.
- The initial Help screen (after choosing a language) is located on a panel, which is smaller than Main Menu panel, on the right of the screen. Enlargement of this panel for this initial screen and all others may allow more Help information to be displayed per page and thus decrease the number of pages required.
- The title of the Help pages is "TRAVELINK Help" with TraveLink in all capital letters. This is inconsistent with TraveLink elsewhere on the system.
- The ability to move directly into Help from within an information category (e.g., Traffic) is an excellent feature to have for the novice user. A related feature would be to allow the user to go from a specific Help category directly to that information category.
- The touch screen buttons do not highlight when pressed and there is no auditory feedback for the button presses in Help as is the case for other information categories. These features should be added to provide consistently positive feedback.
- Typically within the Help screens, the explanations of the icons alternate from left to right; that is, the first icon is on the left and explanation on the right, and then the second icon is on the right and the explanation on the left. Although the alternation of the icons adds visual balance, it increases reading time and can be confusing to the user.
- It is recommended that if the system prompts the user with "More Time?" when in Help and "yes" is touched, the system should return the user to the point that the system was before "More Time?" appeared, rather than return the user to the Main Menu. Returning to the Attraction Loop if "no" is touched is an appropriate action. This occurs in all categories of Help.
- The beginning sentences in most Help categories provide a useful overview of the category and quickly informs the user of the nature of the category.
- The sentence found in several Help categories "Don't worry, on-screen instructions will tell you what to do" is a nice personal touch. Unfortunately, if the instructions on-screen were "intuitively obvious," there would probably be no need for Help. It is recommended that this friendly, but deceiving comment be deleted from the system. Users may be amused, but irritated if they quit Help and can't perform the functions they want to perform.
- The information in each Help category appears to have no clear delineation between subjects or functions. The use of left-justified section markers clearly identified (such as with a text underline, bold-type, and additional icon, if appropriate) would help provide structure for the reader.
- For Help categories with more than several pages, such as Directions, it may be useful to have a listing of information topics that provide page numbers for the specific information needed. With this feature, users may move ahead several pages to the topic they are interested in.
- The use of "(more..)" to indicate that there are additional pages of information is somewhat confusing. Perhaps "more" could be replaced by an arrow or "continued on next page."

### *Traffic Help*

- The actions required for the zoom-in/out functions can be confusing to perform for infrequent users. The instructions will require some modification if this function remains as it currently is constructed.
- As with the zoom functions, the actions required for obtaining more information on traffic problems is confusing. The instructions incorrectly describe the current method of obtaining the information.

### *Directions Help*

- The introductory sentences about the functionality of the Directions should eliminate “Directions to Olympic Venues” and indicate that it includes directions to both the Atlanta vicinity as well as many state-wide addresses.
- It is unclear why some of the text is in red.
- “Touch “OK” to get directions from here” might be more clear-with “from your current kiosk location.”
- On page 2, the instructions say “.TravelLink will print directions like those at left”; however, nothing is shown on the left of the screen.

### *Bus/Rail Help*

- The CCT and ARC icons are difficult to read. If the size cannot be enlarged, perhaps providing the text description beside the icon would assist users in associating the icon with the meaning.
- Each section for the various services should be identified by the icon at the top of the instruction for a particular service.
- The abbreviation for ARC should be explained before it is used again on the last page. Users will probably have forgotten what the abbreviation stands for by page 10.

### *Visitor Information Help*

- A miniature version of all the icons is present, but it is almost impossible to determine their meaning because they are small. Enlargement of the Help panel and increasing the size of the icons would alleviate this problem. Although the Airport Guide Help has 3 less icons, the icons are larger and more readable. Perhaps a similar format would be more advantageous for the Visitor Information icons in Help.
- “.on many topics” in the first sentence could be expanded to provide more detailed information if the icons can not be enlarged.

### *Airport Guide Help*

- “Other Information” uses the “?” icon, surrounded by a circle to represent information about airport Exhibits, airport history, etc. This icon is already used to represent Help. A different icon may be more appropriate so that the user is not confused about its function.

### *Weather Help*

- The length of this Help section may be reduced by combining the directions for selecting a city or state to receive current weather conditions and/or a five-day forecast.

### *Special Events Help*

- This icon should be “grayed-out” if it is not functional.

### *About TraveLink Help*

- The Olympic Showcase information should be kept current.
- The section is spread over three pages and may be condensed onto fewer pages.

## **3.9 OBJECTIVE EX -1 - EXTENDIBILITY**

### **3.9.1 Questionnaire Results**

Questionnaire respondents reacted favorably to most questionnaire items. However, First-Time Travelers to the Atlanta area and Experienced Travelers or Commuters rated the kiosk information as being less valuable to them than did Atlanta residents. The planning of similar systems may be enhanced by conducting a detailed exploration (such as conducted in focus groups) of the expectations and information needs of groups less familiar with a geographic area before actual system development begins.

### **3.9.2 Focus Group Results**

Advertisement of kiosk availability and function was mentioned by focus group participants as a requirement for increasing the frequency of use. They also recommended a number of new locations for kiosk placement. Suggested locations are as follows:

- Gas stations along Interstate highways
- Shopping malls
- Restaurants
- Grocery stores
- Bars
- Banks/ATM locations

Participants reported that the timeliness, accuracy, and ease of obtaining information are critical to the usefulness of travel information sources.

### **3.9.3 Expert Evaluation, Observational Studies, and UA Log Book Results**

The kiosk and similar systems clearly requires placement in locations where users may have easy and frequent access. The kiosk appears to be most used (according to opportunity for use) in areas where users have more time to make travel decisions or explore travel alternatives. Use of the kiosk may be increased also by alerting or informing potential users of its availability and function and providing an interface that reliably provides requested information. Care should be taken in choosing interface accessories such as display screens and printers to reduce the need for repeated calibration or excessive maintenance. Environmental factors such as lighting and humidity also must be considered during design and development of the system.

### **3.9.4 Secondary Research Results**

One of the key goals of Intelligent Transportation Systems (ITS) is to collect and distribute dynamic information that will improve the mobility of travelers (Schroeder and Green, 1995).

Smart traveler kiosks such as TraveLink are well suited to the goals of ITS. However, the realization of the vision of ITS may require the expenditure of over \$200 billion dollars over the next 20 years (ITS America, 1992). Many different users of the transportation system must want ITS products and services in order to achieve this level of funding. Because the success of ITS is dependent on user acceptance, it is critical to understand the needs, motivations and concerns of potential users (Zimmerman and Elliot, 1995). Although “user acceptance is often the pivotal factor determining the success or failure of an information system project” (Davis, 1993, p. 475), user reaction to ITS has not received as much attention as have the technological problems associated with implementation (Zimmerman et. al., 1995). Attention to the factors that affect whether users accept or reject a technology is necessary to ensure the success of smart traveler kiosks and their extension into other circumstances and locations, as well as the overall success of the ITS project.

#### 3.9.4.1 Theories Of User Acceptance

Investigations conducted by Davis, 1989, Goodwin, 1987, and other researchers, have identified two specific beliefs to be important user acceptance criteria. These beliefs are perceived usefulness and perceived ease of use. The basic findings indicate that, although ease of use is clearly important, the usefulness of the system is even more important. Users may be willing to tolerate difficult interfaces if the system helps people to perform their jobs. However, no amount of ease of use can compensate for a lack of usefulness. Awareness of these and similar research findings is especially important in planning and designing interfaces for public use.

#### 3.9.4.2 Smart Traveler Kiosks as a part of ITS

The major features of Smart Traveler Kiosks, such as TraveLink, fall into two categories: Direct and Ancillary Smart Traveler Functions. The following lists, constructed by Schroeder et al., 1995, provides a baseline for these areas. Direct Smart Traveler Kiosk Services may contain the following functions:

- Real-time traffic and road condition information
- Dispatch of dynamically routed public transportation vehicles
- Mass transit schedules and real-time schedule adherence
- Public and private vehicle route determination
- Emergency vehicle dispatch including, police, fire, medical and tow trucks
- private transportation mode ticketing including; planes, trains, etc.
- Servers of users needs and requests
- Fare calculation and collection through tickets, tokens, fare cards and smart cards
- Travel reservations
- Map printing and dispensing
- Accommodation, restaurants, and points of interest and other travel related information
- Road condition information.

Ancillary Smart Traveler Kiosk Services may contain the following functions:

- Emergency broadcast system information
- Event ticketing

- Vehicle registration
- Public service and safety announcements
- Weather information
- Event or business advertising
- Coupon distribution
- ATM functions

Travelink has many of the direct functions noted. Inclusion of additional functions such the update of fare cards or event ticketing may be favored by some developers, but potentially may distract from the main function of the kiosk which is to provide timely and accurate travel information to a wide variety of users and allow them to make intelligent changes to their travel plans as necessary. In addition, including more functionality before the system has had time to shown its full merit may do the entire system a discredit.

#### 3.9.4.3 A Northern Virginia Test Case

In the first part of a two part study, researchers at George Mason University explored the feasibility of a region-wide kiosk system, including ride-share and Washington Area Metropolitan Transit Authority (WMATA) transit information (Benson, Gifford, and Seest, 1995). In the second part of the study, researchers designed, built and implemented a kiosk system on George Mason campus. The study suggests that region-wide kiosk deployment may confront many institutional barriers. Among those confronted in this Northern Virginia study were:

- Identification of the proper role of the transit authority in such a project.
- The scope of the legal issues with respect to advertising and revenue generation.
- Lack of interest by potential investors/partners in the project because:
  1. Publicly located kiosks are difficult to maintain.
  2. The units are expensive to construct.
  3. High public expectations for new technologies and potential technological problems could create a backlash against the technology.

Difficulties with system maintenance and user requirements for reliable and current information are two concerns closely related to the user acceptance of Travelink during this FOT.

#### 3.9.4.4 References

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- Zimmerman, C. A. & Elliott, C. A. (1995). ITS user acceptance research at the U. S. Department of Transportation (pp. 941-945). Proceedings of the 1995 Annual Meeting of IVHS America.

### **3.10 OBJECTIVE EX-5 - IMPROVEMENT**

#### **3.10.1 Questionnaire Results**

Respondents commented on several kiosk features that they disliked. These include touch screen insensitivity, map movement, scrolling, system response time, and system problems that may have impeded their efficient use of the kiosk. Additional types of information were desired such as school listings and more information about areas of Georgia other than Atlanta.

#### **3.10.2 Focus Group Results**

The focus group participants correctly anticipated many types of information presented in the information categories. Information that was not found, but expected, included the following: 1) alternate traffic routes and detours, 2) mile markers and multiple routes to the same location, 3) visitor activities designed for children, 4) all airlines and airports serving the state, and 5) past weather and average temperatures. These types of information could possibly be included in future releases of kiosk software. The amount of participant confusion regarding the difference between the Special Events and Visitor Info categories suggests the need for a renaming or combining of these two categories.

The following types of information, including phone numbers, were requested for inclusion on the system; 1) listing of churches, 2) emergency information, 3) medical information, 4) day care services, and 5) activities for children, 6) hotel reservations, and 7) additional information about visitor attractions.

Several observations were made by the evaluators during the course of the participant interaction with the kiosk during the focus groups. Some participants had difficulty making selections using the touch screen. Typically, the finger placement was somewhat off the button to be pressed. Participants who used the maps had difficulty understanding the directions to zoom in and out correctly. Those who used the scroll feature and found themselves scrolling past desired inputs made several recommendation to improve this feature.

### **3.10.3 Expert Evaluation Results**

Recommendations for improvement are contained in Section 3.8.4.

### **3.10.4 Observational Studies**

Observations similar to those made during focus groups were made regarding touch screen selections, zooming, and scrolling. Recommendations for improvement are contained in Section 3.8.4.

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## **4. QUALITY ASSURANCE REPORT**

### **4.1 QUESTIONNAIRES**

Questionnaires were checked by a third-party member of Concord to ensure valid data entry. All quality issues regarding the effectiveness of this method of data collection, the process for distribution and collection as well as the content, wording and organization of the questionnaire items were addressed during the pilot test.

The developmental state of the kiosk during the FOT may have slightly deflated the ratings of user acceptance collected from those ratings expected if a fully functional and reliable kiosk were in place. The reduced number of users sampled with questionnaires (from that planned) and restricted time period for data collection (Olympic period) lessens the confidence with which these data may be applied to all users of Travelink. However, similarities in the data collected from Lavonia in the post-Olympic period suggest that the questionnaire data is an accurate representation of user acceptance of Travelink during the FOT.

### **4.2 FOCUS GROUPS**

In order to assure validity and reliability, two members of the user acceptance evaluator team compared samples of data that were individually categorized for each focus group. The note-taker's notes also were tested for validity and reliability during the pilot test session. The focus group data obtained are representative of the groups targeted in the test plan.

### **4.3 OBSERVATIONAL STUDIES**

To delete the effects of observer interference, the evaluator was located as far removed from the kiosk location as possible. The observational studies data were summarized by an objective evaluator to determine its completeness, validity and reliability during the pilot test. Although additional formal observations would have increased the database of locations observed, the observations that were made are consistent with the informal observations made by evaluators throughout the FOT.

### **4.4 EXPERT EVALUATION**

Concord evaluators assessed the kiosk independently using established guidelines and standards of good user interface and ergonomics. In order to assure validity and reliability, two members of the user acceptance evaluator team compared samples of data that were individually categorized. Any differences in ratings, scales, or opinions about the interface were discussed, consensus reached, and an overall evaluation of the interface determined.

### **4.5 SECONDARY RESEARCH**

The secondary research was conducted by reviewing the current literature in the ITS field that was assumed to be of good quality and validity.

#### **4.6 TRANSACTION LOG**

The UA evaluator monitored the transaction log to assure that it was functioning properly. If certain kiosks were functioning incorrectly, the data collection scheduled for that kiosk was to be postponed or another kiosk used in its place if possible. Data collection proceeded according to the best judgment of the evaluators. The transaction log never appeared to function properly; therefore, this data was never formally evaluated.

#### **4.7 TR FIELD OBSERVATION DATA**

The quality of the data concerning the number of kiosk users per 15-minute interval, background traffic per 15-minute interval, duration of each kiosk use, and queue length at 15-second intervals was the responsibility of the TR evaluator. The UA evaluator maintained communication with the TR evaluator to ensure that results satisfied the needs of the evaluation but was not directly involved in the actual data collection and reduction process.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

This section provides a summary for each user acceptance objective and final conclusions regarding the evaluation of user acceptance of Georgia's Advanced Traveler Information System Kiosk System.

### **5.1 OBJECTIVE UA 1-TRAVELERS' ATTITUDES**

Despite difficulties observed in initial delivery of full system capability and continuing maintenance of the system the TraveLink kiosk system was generally well-received by both actual users and focus group participants. Atlanta Area Residents were more likely to be business travelers and to have used TraveLink more than five times. These respondents placed more value on the kiosk than did questionnaire respondents who were first time visitors. The Atlanta Area Residents may have found more information relevant to their needs, but the difference in value also may be due to their more frequent use and need to use the system.

Kiosk features were typically rated slightly higher by the focus groups. These individuals were introduced to the system through a series of scenarios designed to allow their interaction with the system as if they were actual users. The enhanced setting of the groups may have contributed to the slight elevation in ratings. The Non-Atlanta Visitor group (located in Chattanooga, TN) typically responded more positively to items on the participant worksheet than did the Intermediate/Novice and Expert groups. Their geographic distance and lessened familiarity with the state of Georgia may have increased their need for such travel information and perception of its value. Additionally, they were enthusiastic about having a similar system in their state. Regardless of the slight differences between questionnaire respondents and focus group participants, most ratings indicate a general level of satisfaction with the usability and usefulness of the system.

### **5.2 OBJECTIVE UA-2- EXTENT OF USE**

Observations made of the amount of time the kiosk was used per visit are in agreement with questionnaire respondents' estimates of length of usage. Users who interacted with the system two minutes or more had an average length of use of six minutes per use, even though most questionnaire respondents (67%) indicated that they had no specific inquiry. More individuals (in relation to those with an opportunity to use the kiosk) appeared to make use of the kiosks that were located in areas conducive to a more relaxed, unhurried encounter.

### **5.3 OBJECTIVE UA-3 - PERCEIVED VALUE**

Approximately half of the focus group and questionnaire respondents indicated that they would be unwilling to pay to use the kiosk for a one-time visit. The print feature was regarded as a valuable asset in that 85% of the questionnaire respondents indicated that they would be willing to pay at least 25 cents if this feature were available. Before considering the implementation of a

“pay for printing” requirement, the reliability of the printer should be proven to be highly consistent across all locations.

#### **5.4 OBJECTIVE UA-4 - ESTIMATES OF PREFERENCES**

The information categories reported to be most used and most valued by study participants were Traffic, Weather, Travel and Tourism, and Metro Route Planning. The streamlining of the content and retrieval mechanisms for these particular categories should be given first consideration because of their use and value to many of the system users. Olympic information was also highly valued, but no recommendations are made because of its temporary status. However, a clear delineation should be made in the future with regard to what is contained in “Special Events” in contrast to “Travel and Tourism.”

#### **5.5 OBJECTIVE UA-5 - IMPACT ON BEHAVIOR**

Changes made to travel plans typically consisted of changes in route and mode of travel. Those who made changes to their plans expressed more overall satisfaction with the kiosk and expressed more trust in the currentness and reliability of the information. Perhaps the establishment of increased trust in the informational content of the system will increase the users’ willingness to alter their plans based on system information. This may occur as users become more familiar with the system’s capabilities, the entire system (e.g., printer function, traffic server contact) is demonstrated to be consistently reliable, and the content is kept current. As users become more experienced with technology, they may expect more from public information access systems and be less tolerant of errors and inconsistencies in operation.

#### **5.6 OBJECTIVE UA-7 - ENVIRONMENTAL AND ERGONOMIC FACTORS**

A number of enhancements may be made to the user interface as suggested by the expert evaluation, observational studies, and user comments. These improvements, naturally, should be made with the overall benefit to the system versus cost of implementation in mind. The usability of the system can be increased using these recommendations and may increase users’ willingness to use the system; however, the usefulness of the information also should be reviewed in accordance with user perceptions of needed or desired information. Accuracy and timeliness of information appear to be critical features to increasing user trust in the system and willingness to change travel plans based on this information. General conclusions regarding the kiosk interface are as follows:

- One fundamental design guideline is to minimize navigation within the system (i.e., transition from one activity to another). Navigating requires mental effort which directly effects perceived ease of use. Every effort towards reducing the amount of navigation should be made throughout the development of the interface.
- Feedback on the status of a request should be included whenever the mechanism for responding to the request creates a potential gap between the initiation and system response. For example, when initiating a print request, there is printing lag between the request and the

printout. The potential for lag time creates a need to inform users about the status of the print request during the apparent system pause.

- Users expect system functions and icons to work the same way throughout the interface. For example, if an icon represents “General Information” on the main menu, it should do so on all submenus.
- The system allows the users to control the pace of their interactions. This design feature accommodates those who read at different speeds or may need to interrupt their transaction for a few moments. The time-out feature which queries the user as to their need for additional time is a good technique to permit user control of the system.
- User responses should always be acknowledged immediately by the system. This system acknowledges responses (screen touches) by button highlighting (i.e., the button appears to be depressed) and with a “beep” if the sound is audible. If the processing of a response will take more than a few seconds, a feedback message or screen change should occur. In addition to the feedback message, an “in-progress” icon such as a clock or hourglass could be displayed to indicate that the system is processing the response.
- The display screens typically meet the guideline of not cluttering the screen with too much information such as text, graphics, or too many options. Rearrangement and clarification of text instructions on a few screens, as noted, will contribute to the attainment of this goal.
- Legibility of text and maps is an extremely important consideration for the usability of this kiosk. Legibility problems can result in incorrect or slower comprehension of the material presented or even result in non-use of the system. Most of the text and graphics on the system probably can be interpreted by those with normal eyesight from a viewing distance of one to two feet.
- The use of color to capture attention, highlight information, and convey realism in graphics on the screens appears to have been planned carefully. The screens are pleasant to view and should encourage users to investigate and use the information presented.
- The use of headings and numbering on screens helps users interpret the information on the current page and also determine their location within the system. Organizing information on one screen so that the user does not have to recall something from a previous page can be a difficult task. Most screens have achieved this goal. Some of the Help screens may be reorganized to increase the flow of information.
- Instructions should be carefully and simply worded. It is difficult, if not impossible, to make assumptions about the computer literacy of the user.
- The provision of redundant response options would allow users with different preferences access the information according to their needs or desires. For this system, a redundant response option might include either a keyboard or track ball. The addition of these features would naturally complicate both programming and hardware design, installation, and maintenance for this system, and the costs would need to be weighed against the benefits.
- The provision of a Help option greatly enhances the usability of a system if it is easy to access, always available, and not confusing. As noted previously, the Help function can be strengthened by implementing a few recommendations.
- The Travelink kiosk provides a sense of continuity from one screen to another with regard to consistency of screen design and function. It appears unavoidable that users may have difficulty judging the boundaries of the program. The depth of the content throughout the program varies because of information category requirements.

- All non-operational functions should be “grayed out.” The user should not be required to explore to ascertain whether a particular category is functional.
- All information presented on the kiosk should be kept as current as possible to provide the user with a sense of confidence in the information provided. For example, if a user finds information about an event that is several months old, an impression may be created that the kiosk information is out-of-date and therefore unreliable.

### **5.7 OBJECTIVE EX-1 - EXTENDIBILITY**

Focus group participants recommended a number of new locations for kiosk placement. These should be reviewed within the context of ease and frequency of access of potential users. A review of transaction logs (when these become more reliable) may indicate locations of highest use. Resources may be directed to these areas and the elimination of locations which are infrequently used should be considered. Before removing kiosks, however, a more in-depth study of frequency of use may suggest placement in higher pedestrian traffic areas (within a location) or the need for additional methods to inform potential users of Travelink’s availability and function. The addition of new functions is not recommended until the current system performs reliably.

### **5.8 OBJECTIVE EX-5 - IMPROVEMENT**

Improvements to increase user acceptance include enhancing the interface by making adjustments to information retrieval mechanisms (e.g., “zooming” functions), adding several types of information (e.g., children’s activities), and increasing potential user awareness of function and availability. Other improvements are suggested within the context of environmental and ergonomic factors.

### **5.9 FINAL COMMENTS**

The presence of nonfunctional or dysfunctional kiosks may have slightly deflated the positive ratings given by actual users. It is unclear how the presence of similar problems will affect usage of the Travelink kiosk system in the future. Unfortunately, the unreliability of a system, even if perceived to be useful, may discourage potential users and thus lessen the system’s effectiveness. Specific likes, dislikes, comments, and recommendations presented within the body of the results section should be noted by developers and sponsors.