Evaluation of the Lewis and Clark Travel and Tourism Information Kiosk

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ABSTRACT

Interactive touch screen kiosks can be a useful access point for people seeking information. However, the design of both the hardware and the software of a kiosk can restrict access to information if the physical appearance is not inviting or the touch screens are not laid out in a fashion that matches the inductive leaps the user makes. The Montana Department of Transportation (MDT) has installed two kiosks and plans to purchase more kiosks to be installed in rest areas and other tourist locations in preparation for the expected jump in tourism travel brought by the Lewis and Clark Bicentennial from 2004 through 2006. These kiosks are able to direct tourist visitors to shopping, dining, lodging, and event locations, as well as display road conditions, weather forecasts, maps, and other local information.

Though the kiosks will be able to display all of this information, tourists must want to use them for the kiosks to be successful. The MDT will only pay for and install additional kiosks across the state if they are likely to be popular –or at least functional. The Western Transportation Institute (WTI) has evaluated the initial two kiosks and provided conclusions about their appearance, functionality, and usability. These observations and conclusions may be used to guide decisions concerning whether investment in a statewide system of kiosks will be an effective way to get travel information to tourists.

The recommendations of the evaluations were that:

- The LCK be fielded for broad traveler use after the completion of specific design improvements, and

- Additional testing of the LCK should be completed once it is installed in a highway rest area or a tourist visitor center.

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LIST OF ABBREVIATIONS

CRT……Cathode Ray Tube
GYRITS……..Greater Yellowstone Regional Intelligent Transportation System
HDTV……...……High Definition Television
ITO……...Information technology office
LCD…….Liquid Crystal Display
LCK……..…….Lewis And Clark Kiosk
MDT…….….Montana Department of Transportation
MIA……..…Missoula International Airport
MSU……Montana State University
SPM……...Southgate Plaza Shopping Mall
UMM……..…University of Montana, Missoula
WTI……..Western Transportation Institute

1. INTRODUCTION

Interactive touch screen kiosks can be a useful access point for people seeking tourism information. The Montana Department of Transportation (MDT) has successfully installed a network of traveler information kiosks under the Greater Yellowstone Regional Intelligent Transportation System (GYRITS) program.

MDT is now installing tourism information kiosks in rest areas and other tourist locations in preparation for the expected jump in tourism travel brought by the Lewis and Clark Bicentennial from 2004 through 2006. The initial two Lewis and Clark kiosks have been installed in Missoula and more kiosks will be installed later. Building upon the success of the GYRITS network, these kiosks are able to direct tourist visitors to shopping, dining, lodging, and event locations, as well as display road conditions, weather forecasts, maps, and other local information. However, the design of both the hardware and the software of a kiosk can restrict access to information if the physical appearance is not inviting or the user interface does not behave in a fashion that matches the expectations and assumptions made by the user (Clark and Barlow, 2000).

Though the kiosks will be able to display all of this information, tourists must want to use them for the kiosks to be successful. The MDT will only invest in additional kiosks across the state if they are likely to be used and useful. The Western Transportation Institute (WTI) was contracted to evaluate the kiosks' appearance, functionality, usefulness, and usability. MDT may use the observations and conclusions in this paper to decide whether investment in a statewide distribution of kiosks will be an effective way to get travel information to tourists.

WTI's overall objective is to evaluate how effective the kiosks are in a real-world tourism environment. An important but secondary objective is to provide the designers of the kiosk's hardware and software with recommendations of how to make future generations of kiosks more effective should the kiosks receive a positive evaluation. The evaluation of the kiosk's functionality, usability, and appearance and the recommendations for improving the kiosk's usability are based on laboratory and field studies.

The following were the four primary objectives of this project:

1. Test the Lewis and Clark kiosk (LCK) prototype to see if there are major problems that will interfere with field testing and use. Laboratory tests of the prototype were conducted to reveal any problems that needed to be corrected before the first set of LCKs were installed. This testing allowed the test evaluator to make last-minute recommendations to the LCK designers about any correctable problems that could harm the performance (and thus the chance of a positive evaluation) of the LCK during field-testing.
2. Evaluate the potential users' initial impressions of the kiosk. WTI observed and surveyed the users and potential users of the LCK to find out what its appearance advertises to tourists. We evaluated the kiosk based on whether potential users perceived it as a source of useful traveler information, or as a

machine with some other purpose. These field studies were conducted using a permanent configuration of the LCK that has been installed in public. The public's acceptance of the kiosk was measured by surveying people who saw the LCK and used it and surveying people who saw the kiosk and did not use it

3. Test the usability and functionality of the LCK. WTI observed the users of the kiosk as they navigated through it seeking information. We also surveyed users of the kiosks to learn how easy it was for them to access the information they sought. These field studies were conducted using permanent configurations of the LCK that had been installed in public.
4. Evaluate the usefulness of the LCK. WTI surveyed users of the kiosk after their trips were completed to determine whether information from the kiosk had affected their trip plans and whether they had found the information they received to be accurate and useful.

The ultimate conclusions were to:

1. Recommend that the LCK be fielded after the completion of some specific improvements, and

2. Recommend additional testing of the LCK once it was installed in a highway rest area or a tourist visitor center.

2. SUMMARY OF THE METHODOLOGY

Before evaluating the LCK kiosk, WTI examined and exercised both a LCK prototype and a GYRITS kiosk to become familiar with the characteristics and operations of the systems. The LCK kiosk prototype was shipped to WTI from the University of Montana and set up in a temporary configuration in the WTI offices. We traveled to the Bozeman Interstate-90, 19th Street Rest Area to use the existing GYRITS kiosk. We recorded qualitative observations about the LCK and GYRITS kiosk in this step. After finalizing the evaluation instruments, we conducted field evaluations of the first two deployed LCK kiosks at sites in Missoula, Montana.

2.1. Laboratory testing of LCK prototype

The purpose of laboratory testing was to collect data that would help refine the methods used in field-testing the LCK and to suggest any last minute changes that the LCK designers at UMM could make to improve the kiosk. Problems with the kiosk that became apparent in the lab testing were noted. The LCK's designers were notified of the problems, and addressed many of them before they permanently installed the kiosks in public. The prototype testing gave the LCK development team a preview of how the LCK would perform in the field, but prototype testing also allowed the LCK evaluators to subject the LCK to more scrutiny and become more familiar with its design philosophy, user interfaces, and information content.

Test subject comments and actions observed in the prototype testing influenced the development of the field evaluation surveys. The laboratory testing of the LCK prototype helped make the final drafts of the surveys more concise and streamlined. By de-emphasizing evaluation of the areas of the LCK prototype's user interface which lab test subjects liked or were able to operate proficiently, the test authors were able to focus on the areas of the user interface which gave test subjects the most problems.

2.2. Refining the survey instrument

After the LCK prototype testing, WTI turned our attention to refining the survey instrument. This was an important phase because reading about previous kiosk systems and other computer interface design issues, while providing a good base for evaluating the LCK, could not address the specific design features of the LCK.

The project's Evaluation Plan and a draft survey document created before the LCK prototype evaluation were used as starting points. The initial survey plan was to evaluate the initial impression, the functionality and usability, and the long-term impact the LCK had on people who used it.

In this step, the survey was tested, made to look more appealing, and augmented by a fourth, 'administrator' survey. The survey was tested for confusing or misleading questions using both the LCK prototype and the existing GYRITS kiosk. The draft survey forms and survey procedures were pilot tested using a convenience sample of visitors at the GYRITS kiosk site at the Bozeman I-90 rest area. The draft survey was then applied to a more attractive survey template, which allowed more questions to fit on each page. Finally an administrator survey was added to facilitate the test administrator's field note taking.

2.3. Administering the survey

The survey was administered during the first week of August, 2003, at the two locations in Missoula, Montana where the kiosks were first fielded. While collecting the surveys, the test administrator made qualitative observations on the features and operation of the LCK, and the limitations that were being placed on the findings of the survey due to less than ideal survey environments. The survey administrator also coded qualitative test subject behaviors and comments and prepared to convert them to quantitative data. Subjects were given a brief mail-in survey on a postcard to request information on how the LCK information subsequently affected their trip.

3. EXAMINATION OF THE LCK PROTOTYPE AND GYRITS KIOSK

The LCK is seen as a potential next generation of the existing GYRITS kiosks at a point in the future. To become familiar with the context of travel and tourism information kiosks in Montana, we visited the GYRITS kiosk at the 19th Street Rest Area in Bozeman. By examining both the LCK and GYRITS kiosks, we were able to make a number of comparisons between them, and evaluations of how well they work. These are summarized in the following sections.

3.1. Buttons/touch-screen interface

The buttons on the LCK prototype were too small to select easily by a finger tap. This problem was due in large part to the small active field area. The LCK prototype screen was smaller than the screen of the permanently installed LCK and that made it much harder to touch the buttons. In addition, the LCK prototype was a cathode-ray tube (CRT) touch screen monitor, which seemed more susceptible to calibration errors, while the permanent LCK is a flat screen. Buttons near the screen edge were especially hard to touch due to the pronounced edge that the plastic casing of the CRT screen interfering with the active areas of the screen.

There were touch-screen problems with the existing GYRITS kiosk as well. The screen, which was also CRT, was positioned very low (for compliance with the Americans with Disabilities Act). The low screen height forced viewers to look at the kiosk from an oblique angle, creating parallax that frequently caused them to touch the screen in areas that were not active.
The design of the buttons on the existing GYRITS contrasts with the design of the buttons on the LCK prototype. The LCK prototype used the "Sitekiosk" operating system, which is very similar to a web browser. The existing GYRITS interface was designed in the late 90s, and it reflects a lower level of ambient knowledge about how web browsers work. The scroll bars that are used in web browsers are still there, but there are additional scrolling buttons, and the interface does not look like a web browser. To people familiar with web browsers the existing GYRITS kiosk might appear to be a confusing assembly of buttons. The cleaner design of the LCK prototype seemed to work better (except for the problems stemming from its smaller screen size), but the reliance on hyperlink style text for navigating reduced the touchable area of the active fields even further.

3.2. Maps

The LCK prototype's menu link to "maps" only lead to one map. As illustrated in Figure 1, the digitized Montana highway map looked better than a typical MapQuest or Yahoo map, but it was not as flexible; users of the map could only pan from side to side or up and down, not diagonally. Some map programs, like "iMapLA" (available http://imapla.lacity.org/Viewer/GIS/Viewer.asp) offer a way of panning in any direction; the user drags the map towards where they want to go as if they were dragging a paper map across a desk. The restrictions on where the map can be panned made the map feature harder to use; most of the time we was panning the map, he was trying to follow a roadway or a geographic feature, which does not necessarily follow the strict North, South, East, and West panning options.

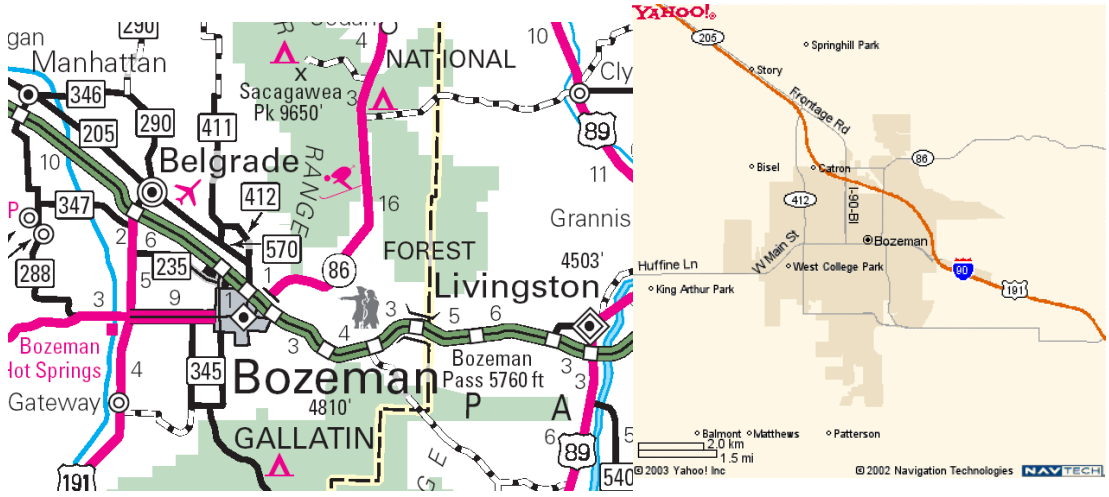

Figure 1: The map the LCK prototype used (left) is more graphically detailed than a web-based map (right), but since the LCK prototype map is fixed at one scale, it is not as dynamic or malleable as a web based map.

Users could not zoom in to the map to get more detail or zoom out to get a 'big picture' view. While the map was very useful for getting a view of what was in the general area, it did not provide the detail needed to navigate around cities. A locator map in the upper-right hand corner of the map page helped provide the evaluator with a sense of where the detailed view was in the state, but he still had to pan manually from one side of the state to the other. Had the locator map been interactive, we could have simply touched where he wanted to go and been taken there. An interactive locator map would have solved many of the LCK prototype's problems relating to map scale.

Though the map in the LCK had icons indicating where roadside Lewis & Clark historical markers were, it did not provide a link to information on those markers. A gray Lewis and Clark icon can be seen on Interstate 90 between Bozeman and Livingston Montana on the left-hand map in Figure 1.

We used the map feature for 15 minutes before realizing that every one of the cartographic dots on the digitized map that denote cities (again, they can be seen on the left-hand map in Figure 1) linked to a city homepage. Although the amount of content on the various city homepages varied, the interactive features of the cartographic city 'dots' were the best part of the map, but seemed to be understated in the way they were presented. The instructions on how to use the interactive dots on the map were buried in the fine print at the base of the map. We started to read the instructions, but the first sentence redundantly described how to pan the map. Since the evaluator had already intuited the panning feature from the self-explanatory green arrows pointing outward from each side of the map, he did not bother reading the rest of the fine print. Had we read the rest of the instructions, he would have come to the next sentence, which instructs the user to touch any city dot on the map for a detailed city home page.

The existing GYRITS kiosk offered maps at many different scales, but did not deliver on all of them. Most frustrating to view was a maps page, which offered links to six different regional maps of the Bozeman/Yellowstone area; none of the links worked. Still, a road reports map in the GYRITS kiosk used a regional map with color coded roads which warned of wet or icy conditions. The best map in the GYRITS kiosk was the one linked to the highway cameras. This was a statewide map with clearly illustrated links to the various highway camera locations placed in the corresponding map locations.

The LCK prototype was lacking in road report information, but we assumed for the time being that the content was still being developed. The road reports feature consisted of a grid containing pictures of roadways labeled by the name of the grade or pass they went through. For example, Lolo pass was listed by its name, but not by the highway that goes through it, or its geographic location in the state. We felt the LCK prototype's road reports feature would have been dramatically improved had it been as good as the map based GYRITS road reports features above.

The GYRITS kiosk's road reports, though superior to those of the LCK prototype, did confuse the evaluator on one point though; the road construction feature in the GYRITS kiosk was simply a list of road construction sites. The listing of road construction sites seemed to be organized, but it was unclear to the evaluator how they were organized since different segments of the same roadways were not listed contiguously. Even if the road construction sites had been organized by the roads they were taking place on, the text-only listing made it hard for the evaluator to understand where the sites were. Because it identified segments of roads only by the cities and junctions they traveled between, the road construction listing presumed knowledge that many travelers might not possess.

The map-based road construction listing provided by Meridian Environmental Technology Inc. for MDT on the Safe Travel USA website (http://www.safetravelusa.com/process.pl?state=mt) does a good job of clearing up the muddle of data found in the GYRITS kiosk without loosing any detailed information. The map pictured in Figure 2 has active roadway segments; when clicked, these segments link to text describing the extent and type of road construction site.

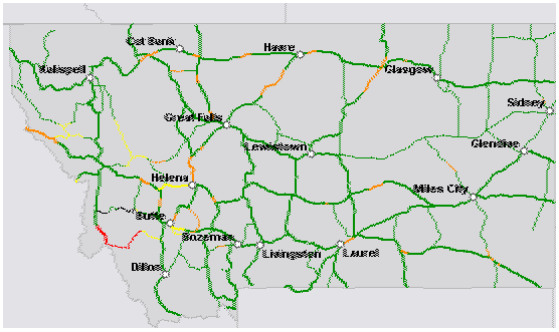

Figure 2: The map at SafeTravel USA explains where road construction sites are by changing roadway colors.

3.3. Weather

The evaluator's impression of the LCK prototype's weather feature was that it was simple and easy to get to. Aside from wanting a region or statewide perspective of the weather conditions and forecast, we had no complaints. We had trouble getting a forecast for a city other than Missoula because changing the homepage, and thus the weather forecast, required knowledge of where a city was, and then tapping the LCK prototype's cartographic city dots pictured in the map to the left of Figure 1 on the previous page.

The existing GYRITS kiosk had very detailed weather reports at a variety of levels of detail. There was a shortcut from the main page to the 'local forecast' feature where an animated bear on a unicycle would appear and read the weather. The evaluator was not particularly enamored with the animated bear's antics, but other kiosk users seemed to enjoy it. The weather conditions feature of the GYRITS kiosk got much more detailed than what the animated bear read. Readings such as barometric pressure, yearly averages, and dew point could be accessed from the kiosk. This enormous amount of information easily got out of hand for the evaluator due to the lack of precision with the CRT touch-screen and the lack of organization. The evaluator found himself accidentally selecting the wrong weather information, then being forced to return to the main homepage and start his search from the beginning again.

3.4. Services

Though the evaluator's experience in searching for other services was acceptable, some of the classification and organization schemes did not correspond with what he expected. The LCK prototype's "News" feature led to a useful listing of media sources, but we had expected actual news when we selected the link. In addition, we had problems searching under "shopping" for some types of stores, like bookstores. One particularly vexing classification problem was that when searching for a market, Conoco convenience stores appeared, but not supermarkets. We felt that convenience stores were sufficiently different from markets to warrant their own category. Overall, however, the LCK prototypes database was quite complete.

The GYRITS kiosk was more complete than the LCK prototype in two areas, but flawed in other areas. The GYRITS kiosk had a separate menu for camping accommodations while the LCK prototype had camping listed under the "Lodging" heading. Also, the GYRITS kiosk included contact information for many local attractions while these were hard to find in the LCK.

There were extensive problems with the GYRITS kiosk's various services listings. The events section provided a listing of one-time summer festivals and activities (such as the sweet pea festival in Bozeman on the first weekend in August, but they were listed without dates. There was also a stark difference between listings of public and private services; the private services on the GYRITS kiosks came complete with pictures, contact information, and adequate descriptions, but the publicly provided services lacked so much information they intimidating to use. Some National Forest trail listings only provided a United States Geological Survey map locator number as a starting point instead of road directions.

4. LABORATORY TESTING OF THE PROTOTYPE

Laboratory testing was conducted to both improve the LCK's chances of being positively evaluated in the field testing component of the evaluation, and to attune the evaluators to the difficulties that the permanently installed LCK might have. This step helped us recognize latent content to design the surveys for in the next stepi.

4.1. Prototype test subjects

Eight test subjects were chosen from the WTI offices to participate in the laboratory testing of the LCK prototype. Only two of the test subjects were Montana natives, and they did not give themselves exceptionally high scores for local area knowledge. One other subject had lived in Montana for several years, but she too did not consider herself exceptionally knowledgeable of the state. The remaining five test subjects were from out of state; of this group, only one person had lived out of state for more than six months, while the remaining people had recently arrived. The average age of the test subjects was younger than the average age of Yellowstone area tourists noted in McGowan's GYRITS study, and the ages were much more tightly distributed. Since WTI is located in the College of Engineering at Montana State University, seven out of the eight test subjects were in their twenties. The pool of test subjects was also male dominated; only two out of the eight subjects were female.

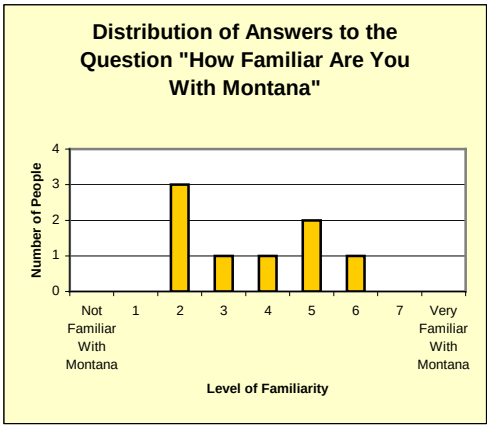

Figure 3: The distribution of the test subject's assessments of their knowledge of Montana.

4.2. Prototype test style

Instead of having the test subjects run through a list of random tasks, we tried to organize the test in a scenario that tourists on a road trip itinerary might follow. The first tasks were oriented towards more immediate local needs, while the last tasks were oriented towards where the hypothetical traveler was going or what they were doing a few days later and a few miles down the road.

4.3. LCK prototype test components

On the first and only question in the LCK prototype test, the test subject was asked to rate their own knowledge of the state of Montana on a scale of 1-7 (see Figure 3). The rest of the LCK prototype test was a series of tasks. Table 1 is a summary of the remaining portion of the test. The left column denotes whether the questions refer to the LCK prototype's starting homepage (because of the preset of the LCK prototype, the default homepage was always Missoula Montana), or to a task that required the test subject to search for information from another city's homepage.

Table 1: A summary of the tasks LCK test subjects were given.

Local area	Local weather forecast
	Area map
	Search for nearby services
	Find a source of media
Long distance	Find road reports
	Find another city's homepage
	Find general information and services in other cities

4.4. LCK prototype test findings

A copy of the LCK prototype test is included in Appendix A. All eight of the test subjects had problems completing two of the tasks, and most of the test subjects had problems completing more than two of the tasks. Figure 4 shows which tasks gave test subjects the most problems.

All eight of the test subjects had problems completing two tasks, which were intentionally designed to bring out shortcomings of the LCK prototype as perceived by the test author. To be able to complete either of these two tasks, the test subject would have needed detailed knowledge of Montana geography.

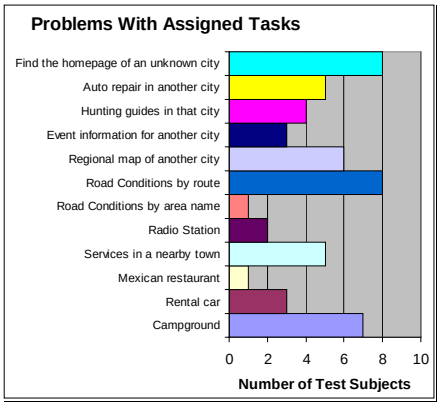

Figure 4: Tasks with which test subjects encountered difficulties.

4.4.1. Tasks Which Test Subjects Could Not Complete

Find the road conditions between Missoula and Bozeman.

The first of the two tasks that none of the test subjects could complete asked the users to find road information on a highway heading away from Missoula: "Find out what the road conditions are like on the road from Missoula to Bozeman." The question seems simple enough, but it was designed to be difficult to answer because the LCK prototype's "Road Reports" page was organized only by the names of the various passes where roadside video cameras were located. If a tourist doesn't know which passes they will be going over on their way to Bozeman, they have no way of checking the appropriate road conditions. Even if the tourist knows the route number of the road they will be traveling (in this case, Interstate 90), they still cannot access road information because they may not know the pass name. Finally, if a tourist were to scan the map feature within the LCK prototype, they might or might not find the passes mentioned in the Road Reports, but the passes noted on the digitized map do not act as links to the road conditions page. The Road Reports page on the GYRITS Kiosk was superior to the Road Reports page on the LCK prototype.

Difficult Question About "Westby"

The second of the two tasks which no test subjects could complete instructed them to find out if it would be feasible to stop by a small Montana town without breaking too far away from a pre-planned road trip from Billings to Montana's Western border on Interstate 90. The question was:

"You are traveling from Billings towards Seattle and you hear about the town of Westby, which was settled by Danish Immigrants. Find out if it would be possible to stop by Westby and see the sights."

This question highlights the problems test subjects were having with the map-based interface of the LCK prototype. Even though the test subjects were given the name of the town they needed to look for, and even though the LCK prototype database included hundreds of town names and coordinates, there was no way for a LCK prototype user to find a town or its homepage when they did not already know its geographical location. Since the test author chose a town in northeastern Montana that no test subjects recognized, they could not complete the task. The lack of an index of towns did not allow the test subjects to feel confident about exploring some of the lesser-known reaches of Montana. Upon receiving the lab-testing summary, the kiosk designers at UMM notified WTI that they would include an index feature.

4.4.2. Tasks which four or more test subjects could not complete

The next group of five tasks could not be completed by a majority of the test subjects. The failure rate on these tasks indicated that the features the tasks explore are not intuitive to a considerable amount of users. Even though a substantial amount of test subjects could not complete these tasks, these questions were not engineered to shed light on LCK prototype's shortcomings according to the test author's perceptions.

Figure 5: When looking for camping, some test subjects tried to click the camping icons on the digitized map.

Campground

Seven of the eight test subjects could not find campground information, or needed help in navigating to the right page. Some test subjects who were aware of the interactive town features on the map tried to touch the triangle shaped camping icons portrayed on the digitized state map (This icon is shown in Figure 5). Other test subjects did not think to look under the "Lodging" link on the home page to find camping. Some test subjects correctly looked for camping from the "Lodging" link on the homepage, but they did not sort the lodging search results by type, so they had difficulty sifting through the list of all lodging facilities for a campground. When an LCK prototype user refined their lodging search using "Sort by type," they get an excellent sorted list of all types of lodging, such as Hotels, Motels, Resorts, Cabins, National Forest Service Managed Campgrounds, and Private Campgrounds.

Restaurant in Nearby Clinton, Montana

Some test subjects looked for restaurants in Clinton, Montana (since Clinton is a small town, there are only three restaurants in the database) by scrolling through the listings for Missoula restaurants and picking one out. The restaurant search for any city apparently includes cities within thirty minutes of the search city as a default. This worked, but it involved more strain and time on the part of the user than if they had refined their restaurant search by city.

Two test subjects who noticed the "Sort by City" option on the restaurant search result page commented that they expected the cities to be sorted alphabetically when they ended up being sorted by distance. In the case of doing a restaurant search by city with Missoula as the homepage, Missoula (the city from which the restaurant search originates) has scores of entries; this wealth of entries make the test subject feel that Clinton is not within 30 minutes, when in fact, it is just buried at the bottom of the page. Test subjects must scroll down to get Clinton's three entries. The test subjects suggested alternative methods of sorting the restaurants by a city's first letter, and by number of entries (smallest number to largest). There are three ways test subjects can select a restaurant by city: by touching a "Nearby Cities" button from the homepage of a nearby city, by selecting the "Dining" link from the homepage, or by panning to the digitized map and selecting a city's cartographic dot. However, when test subjects first selected the city of Clinton, they still got a dining list filled with entries for Missoula –which obscured Clinton's three entries. One test subject, after selecting the "Dining" link from the Clinton homepage and finding a crowded page of Missoula restaurants, recommended "Small towns should only have restaurants from the town."

Regional Map of the Billings Area

Six test subjects had problems accessing this map. Five subjects wanted to be able to touch the small locator map in the upper right-hand corner of the map page to get from one side of the state to the other without panning all the way from Missoula to Billings. One test subject, indicating part of the locator map where Billings was, said, "I know it's right here, but [tapping the map] it doesn't work." Another test subject expressed his frustration with the pan feature over long distances by saying "How do you zoom out? *Can* you zoom out?" These test subjects may have been used to more user-friendly and widespread mapping software such as MapQuest; they expected to be able to change the scale of the map and get from one detailed map to another easily.

The test subjects had problems with finding the homepage for a city other than the one the kiosk is programmed to use as its homepage (in the case of the LCK prototype, Missoula). The map was the only way to get to another city's homepage, but there was no mention of this except for in fine print below the map. Some test subjects did intuitively touch the cartographic city dots that were on the digitized map, hoping for them to link to more information; other test subjects did not think to look for interactivity in the city dots. Since they are not animated or colored, the dots look like simple cartographic markings with no links to city homepages. One test subject noted, "The instructions need to be bigger; on top . . . I normally read instructions, but they didn't catch my eye, so I started doing 'trial & error.'"

In summary, the wealth of local information in the LCK prototype was difficult for most of the test subjects to access since they had to have a working knowledge of Montana geography to get to the homepages for even the largest cities. Outside of the directions at the base of the map in small print, there is no signal to the user that they must pan the map and touch a city's dot to get to its homepage that is farther away than the homepages listed under the "Nearby Cities" feature. When the test subject did get to a map view of another city, there were no visual cues to touch the city dots on the map. One test subject touched the name of the city –which did nothing—but did illustrate that the LCK display should better inform users about the interactive qualities of the city fields on the map.

Helena Hunting Guides

There are three types of problems the test subjects encountered when they tried to complete the task instructing them to look for a hunting guide in Helena: problems with the heading of the "Guides" search page, problems with going to the wrong search page, and problems with not sorting the guides by type. Though they had learned how to access the homepages of distant cities through the map from the previous tasks, several of the test subjects had problems finding Helena on the map because they did not know where it was.

One test subject selected the "Guides" link from Helena's homepage, but she seemed disoriented: "It's confusing when I'm in 'guides' and [the webpage title] says 'search food & beverage." Though the LCK prototype user might be searching for services or guides, the page title remains on food and beverage. This confused two test subjects while they were completing various tasks.

Two test subjects needed a hint to sort the guides by type so they could more easily find a hunting guide. Test subjects not sorting by type was not only a problem in the hunting guides question; more than half of the test subjects did not immediately sort by type even when doing so would have saved time reading many entries, and two test subjects did not sort by type until the test administrator suggested they do it towards the end of the test. One test subject noted "My personal preference would be to have the default be to sort by service type."

Helena Auto Repair

There were three types of problems test subjects had when looking for "a tow truck or auto repair place:" business listed under the heading "Service Stations" seemed to be convenience stores, there were not enough listings for auto repair nearby, and subjects would not think to look under the "Services" link. Two test subjects commented that the "Service Station" heading (which was the closest fit to auto repair and tow trucks) made them expect to find auto repair services when the gas stations listed did not mention auto repair or towing in their descriptions. Another test subject who was taking Test C couldn't find any auto repair listings near Polson, Montana, even when he expanded the reach of the search to cities within two hours (which included Missoula). Finally, one test subject looked under information and shopping and was stalled before the test administrator suggested he look under the "Services" link.

4.4.3. Tasks that Fewer than four Subjects Could Not Complete

NPR Radio Station

Two test subjects expected to find news headlines or a more sophisticated listing (perhaps with news report times) of media sources under the "News" link.

Road Conditions at Lolo Pass

One test subject expected to find a weather report and more text under the road conditions page.

Fourth of July Festivities in Butte

Two test subjects had trouble finding the city they needed to visit to find the Fourth of July festivities. Two test subjects accidentally touched the field over the cartographic dot of a nearby

Butte suburb and became confused (one of the subjects had tried to touch Butte's name instead of its dot since the close proximity of the dots was confusing to her).

4.4.4. Other Issues

Test Subjects wanted to look at more detailed or smaller scale maps when they were looking at city home pages and services. Though there may be licensing issues regarding linking tabular data to dynamic, web-based maps, these specialized maps would help give users a better picture of where they were in relation to the service they were searching for.
Test subjects wanted a better way to know when the page they selected was downloading; many test subjects did not notice the animated SiteKiosk icon in the upper right-hand corner of the display and sometimes waited for a response from the LCK after having touched the screen without the LCK acknowledge them.

Interactive map fields that did not work frustrated two test subjects. Gray gridlines, which appear on the digitized map, are there to isolate the overlap areas (which prevent users from becoming completely disoriented when they pan the map) from the active areas users to center the city dot before selecting a city field, but subjects did not realize that. Sometimes map fields did not select even when they were in the center of a map page, but did select when they were well off-center in the corner of another map page. The following is a list of problems with the interactive city fields that the test subjects had:

- The Butte field did not work on map F3, but did work on map F4
- The West Glacier and Apgar Village fields did not work on map B3, but did work on map B2.
- The Clinton field did not work on map D2, nor on E2, but did work on E3 –even though the field is very close to the edge of the map in E3 and is more centered on D2 and E2.

Search Results were organized in varying schemes. The "Events" page always seemed to be organized by date, but the "Lodging," "Food & Beverage," "Services," and "Guides" pages tended to alternate from alphabetical listing to listing by type –but without the type headings that normally accompany a user's "Sort by type" request.

4.5. Potential limitations on LCK prototype testing conclusions

The following is a summary of biases or errors in administering the LCK prototype laboratory test.

Technically, the LCK prototype could provide all of the information test subjects were required to find, but some tasks were designed to reflect the shortcomings of the features of the LCK prototype the test author found in his review of the prototype prior to designing the test. The test author also studied the existing GYRITS kiosk and held the LCK prototype to at least the same standard as the GYRITS kiosk met. For example, the existing GYRITS kiosk provided more information on road conditions than the LCK prototype provided, and more types of maps (even though many map links did not work) were available from the existing kiosk than were from the LCK prototype. In this way, the test was designed to both suggest that users access information

that the LCK prototype could provide, and to suggest that users try to find information in areas where the LCK prototype test author felt it was lacking.

The prototype version of the LCK kiosk was equipped with a small Cathode Ray Tube touch screen, while the permanently installed versions will have a larger, flat screen touch screen. Since the prototype screen was smaller, any areas on the screen that were linked to other pages such as buttons and hyperlinks were smaller by the same amount. Many of the touch-screen problems reported in the LCK prototype evaluation section evaporated when actual tourists used the full-sized touch screen.

The subject population was not representative of the tourist population. The ages of the test subjects may be considerably younger than the ages of average LCK users in the field. In addition, only two of the eight test subjects were female.

4.6. Conclusions from LCK prototype testing

These conclusions were sent to the University of Montana Missoula's Information Technology Office (ITO). The ITO corrected the problems mentioned here prior to the installation of the permanently configured LCKs:

1. Hyperlinks were replaced with larger buttons,
2. An index feature that listed the towns on the map with homepages was included,
3. The map's panning feature was improved by adding the option to pan diagonally,
4. The "food and beverage search" glitch was either fixed or not noticed,
5. The communication/downloading indicator which some test subjects did not notice was replaced with an audible clicking sound.

Interactive Fields

Test subjects liked the interactive city fields on the digitized state map, but had difficulty moving the map and using the interactive features. The interactive features of the map should be expanded to include more than just city dots. Subjects clicked campground icons, Lewis and Clark Historical plaque icons, and city names hoping for the map to link them to something, but they were disappointed. All of the interactive city fields should be interactive on each page they are displayed. When a test subject touched a city dot that was not interactive, they tended to think that none of the city fields were interactive.

Some test subjects missed the instructions on how to use the map because they were written in fine print and buried under the instructions on how to pan the map. It was easy for test subjects to pan the map intuitively since there are bright green arrows on each side of the map; however, the interactive dots do not look as 'touchable' as the bright green panning arrows. If the map is to be touched, the instructions for users to touch the city dots should be more obvious in two ways: the instructions should be written in a larger font and placed in a more prominent location, and the map dots could also be made to 'appear' to be interactive by adding an animated, translucent, or iridescent quality to them.

Map Detail and Navigation

Users should be able to select more or less detailed maps depending on what they are trying to do. An interactive statewide map could help users get a map of the eastern portion of the state if they did not want to pan all the way from the western portion of the state. City maps and National park maps could help users locate local services without having to pan the digitized state map. The interactive map at http://imapla.lacity.org/Viewer/GIS/Viewer.asp can be *dragged* diagonally; this feature is easier to use and offers more control than arrows, which only allow a prescribed amount of panning at right angles.

Search Result Organization

Some users mentioned that since they did not know the services they are looking for by name, they would like them to automatically sort by type; this applies to "Lodging," "Services," "Guides," and "Food & Beverage," but not events –which appear to already be sorted by date. Currently, when these services are searched, they show up in apparently random order, or alphabetically.

Many test subjects did not immediately sort the services they were searching for by type even though sorting by type would have made it easier to find a rental car place among services or a Mexican restaurant among food and beverage listings. People did not notice that they had the option to sort alphabetically, by type, or by proximity. If the sort by type buttons were brighter or larger, they might use and benefit from this feature of the LCK more often.

When searching cities with a small amount of entries that were located within 30 minutes of cities with a large amount of entries, test subjects complained that the search results were swallowed up by a deluge of search results from the larger cities. The proximity searches are useful, but should employ strategies that prevent the larger city listings from burying the smaller city's. Some test subject and evaluator recommendations for how these searches might be displayed follow:

- Only display results for the small city and enable the user to widen the search to the standard 30 minutes.
- Sort the results by city size from smallest to largest; when sorted this way, the first few small city headings would be immediately visible. The small city results at the top could counter the problems some test subjects had with giving up their search when they saw scores of entries at the top from a large city.
- Only display city names with the travel time from the homepage and the amount of entries available under each city name; then allow the user to click on city names to view the listings.

Search Result Language

We assume that "Guides" have their own section because guides across Montana have organized and influenced Travel Montana (the compiler of the data) to allow them to have their own section. It may confuse more people than it helps to have the guides in their own section. Putting the guides in the services section might restrict LCK users from being able to sort their

searches by type of guide, but LCK prototype test subjects tended to look in the "Services" heading before they noticed the "Guides" heading.

People looking for service stations found self-service gas stations; while some people call gas stations service stations, to others, service stations have an "auto repair" connotation. Describing "Service Stations" as "Gas Stations/Convenience Stores" if they do not offer auto-repair might avoid the confusion that two of the test subjects expressed when they tried to find a service station in Helena, but their search turned up a list of gas stations with no mention of auto repair in their descriptions.

While some test subjects expected to find a listing of media sources under the "News" link, others expected headlines, news station listings, or news show times and information. The information provided from the news link is useful, but perhaps the link's title should be more descriptive (like 'Media Listings') so it does not disappoint people expecting to find news.

Several test subjects did not think of camping as a type of lodging, and were thus lost when it came to finding a campsite. It may be more convenient to have a page which allows the user of the LCK to choose between camping or lodging; this page would appear after the user selected "Lodging" but before the list of results appeared.

Search Result Glitch

When people were searching for services other than food and beverages, the search result page would still be titled "Food and Beverage Search." This glitch should be corrected because test subjects who search for non-food and beverage services jump to the wrong conclusion—that they are on the wrong page.

Other Recommendations

There is a clearly visible communication/downloading indicator (a revolving SiteKiosk orb much like the spinning planet icons on both Netscape and Explorer) on the LCK prototype. However, some users said that they could have used an even more obvious indicator. Other users demonstrated their need for a more obvious indicator by not understanding that their touch of the screen was not acknowledged.

5. DEVELOPING THE SURVEY

After the LCK prototype testing, the evaluators turned their attention to refining the survey instrument to address the specific information objectives of the LCK. The evaluators wanted to make sure the LCK was evaluated critically but fairly. If the survey did not take the capabilities of the prototype into account, it might be graded unfairly; on the other hand, the evaluators wanted to ensure that the LCK was held to a higher standard than the existing GYRITS kiosk, and that major problems found in the LCK prototype testing were not still present.

5.1. Draft LCK evaluation survey

Before the LCK prototype was delivered to Montana State University for testing, WTI designed a preliminary survey instrument based on early design plans and our assumptions about how they would be translated into the actual kiosk. We were contracted to provide evaluations in three main categories:

- The initial impression people had of the LCK
- And the functionality and usability of the LCK
- The usefulness of the information that the LCK provided

The "initial impression" category covers design issues with what the kiosk's appearance expresses to potential users, while the "functionality and usability" category covers problems with the LCK's interface users might have once they have started to use the kiosk. The "usefulness" category explores whether information from the kiosk had a positive impact on the users' trips.

The 'initial impression' section of the preliminary survey was designed to stand alone, and to be combined with the 'functionality and usability' of the preliminary survey, while the 'functionality and usability' section was designed to follow the 'initial impression' section of the survey. 150 LCK users were to fill out both sections, while 50 test subjects who decided not to use the LCK were to fill out only the 'initial impression' survey.

The form of the preliminary survey was retained through later revisions of the survey. The preliminary survey's content, while augmented to reflect the evaluator's greater familiarity with the LCK prototype, was not changed dramatically from the draft survey.

5.1.1. Initial impression

The 'initial impression' section of the preliminary survey used a Likert scale to gage the respondent's perceptions of the kiosk's appearance. These questions helped to determine if the kiosk was sufficiently advertising its purpose of providing travel and tourism information, or if it inadvertently advertised information it was not designed to provide.

A second Likert scale was used in the 'initial impression section' to gage the respondent's opinion of the kiosk. Polar opposite words were spaced by a seven point scale which the respondents were asked to circle the number that best approximated their response to the kiosk's appearance. This type of Likert scale is sometimes also referred to as an Osgood or Semantic Differential scale. While the first Likert scale was designed to explore test subject's impressions

of what they thought the kiosk was for when they first saw it, the second Likert scale was designed to explore whether test subjects liked the kiosk or if they found it unpleasant.

5.1.2. Functionality and usability

The 'functionality and usability' section of the preliminary survey was designed only to follow the 'initial impression' section, and not to stand-alone. Only people who decided to use the LCK were asked complete the 'functionality and usability' section since it asked about individual features within the kiosk. The purpose of this section of the preliminary survey was to ask the test subjects if they were able to get all of the information they wanted from the kiosk, and to flag any areas where test subjects had difficulties with the interface.

Though WTI designed the preliminary survey before the content of the LCK and its prototype was known, it provided a model for the later versions of the survey. In the preliminary survey, each feature of the LCK was given three basic questions and a generic Likert scale. The 'functionality and usability' section of the preliminary survey asked whether the LCK user found the information they were looking for, what information, if any did the subject have trouble finding, and an open-ended question asking the test subject to describe any trouble they had interacting with the interface. The Likert scale was used to determine how pleasant and enjoyable the experience of using each individual feature was for the test subject.

5.2. Survey instruments added after the LCK prototype testing

5.2.1. Administrator survey

It became immediately clear during the LCK prototype testing that the test subjects were providing a large amount of qualitative data that the test administrator was struggling to document. If a test subject hesitated, or selected the wrong feature while trying to complete a task during the LCK prototype test, the test administrator had to ask them to pause while they wrote down qualitative comments about their behavior. The documentation of this qualitative data is important to this project, but it had to be made easier and faster since the test administrator would be trying not to spoil the observational data by interrupting LCK users in the field. While summarizing the LCK prototype testing, we took the commonly made comments, and included them in a new 'administrator survey.' The administrator survey allowed the survey administrator to check a box when an LCK user was behaving in a way similar to one of the LCK prototype test subjects had before, and add brief written comments.

5.2.2. Mail-in surveys

A mail-in survey, called for in the kiosk evaluation plan, was developed after the LCK prototype testing. The evaluators were concerned primarily with how the LCK affected tourist and traveler visits to Montana, if at all. The 'Follow-up Survey' consisted of four questions which were printed on the back of an anonymous, business reply mail postcard which was given to people who filled out the long form LCK survey. The purpose of the follow-up survey was to collect data on how much the LCK actually affected people's travel plans. The questions on the mail-in survey asked if people changed their travel plans because of their interaction with the LCK, if the LCK gave them activity ideas or information, if the LCK provided enough information, and if there was an instance of the LCK providing bad information, to describe what was lacking.

5.3. Pilot testing the final survey

The administrator survey, the initial impression survey, and the functionality and usability survey were pilot tested at the existing GYRITS kiosk at the 19th street rest area in Bozeman, MT. Only the administrator survey and the functionality and usability survey were tested at the WTI offices using the LCK prototype. No initial impression surveys were tested using the LCK prototype because the prototype did not appear to be a travel and tourism information kiosk as permanently installed version of the LCK would (the LCK prototype was simply a desktop computer connected to a CRT touch screen.

The survey administrator watched people as they interacted with the existing GYRITS kiosk and with the LCK prototype and used the administrator survey to take notes. The test administrator also explored different strategies for getting people to approach the existing GYRITS without explicitly asking them if they would like to fill out a survey. The most successful technique was explaining why all of the clipboards with surveys were strewn about the rest area: this prompted the addition of a question in the functionality.

The testing served to highlight poorly worded test questions, and graphics problems, and formatting problems that made people fill out the survey incompletely or incorrectly. The surveys were tested in groups of five on two separate occasions at the existing GYRITS kiosk, and in one group of five on one occasion at the LCK prototype. The small group size and the act of pairing the surveys filled out by the kiosk users with the surveys filled out by the administrator helped isolate instances when the administrator had observed one behavior, but the kiosk users had reported the opposite behavior. In these instances, the test was examined to see why the test administrator's comment or the kiosk user's comments were not accurate.

5.4. Summary of the final survey

The surveys in the appendices are the final versions of the surveys. A brief description of each follows.

5.4.1. Final version of the administrator survey (Appendix A)

This survey has check boxes for LCK user behavior, demographics, problems with using the kiosk, and specific sections for the various features. The test administrator filled out 44 of these surveys as he observed people using the LCK. The administrator survey was designed to answer these questions:

6. What was the test subject's approximate age?
7. What problems did they have with the map feature?
8. What touch screen problems might they have had?
9. What ergonomic problems might they have had?
10. What were their reactions to the local homepages, weather features, and services features?

5.4.2. Final version of the initial impression (short) survey (Appendix B)

This survey (referred to as the short survey) was the same as the first page of the survey filled out by the users of the kiosk. The short survey was the only survey filled out by the potential kiosk users who, after looking at the LCK, decided not to use it. The people who decided not to use the kiosk filled out an additional question, asking them to describe why they had not used the kiosk. The initial impression survey was designed to answer these questions:

11. What type of traveling the test subject was engaged in?
12. If the LCK was advertising itself as a source of tourism and travel information, or something else?
13. How positively or negatively the test subject reacted to the general appearance of the LCK?
14. Why they decided not to use the kiosk?

5.4.3. Final version of the functionality and usability (long) survey (Appendix C)

This survey (referred to as the long survey) was numbered and attached to the accompanying administrator survey (if any). The long survey included an initial appearance section on the first page that was identical to the first three points of the short survey above. After the first page, the long survey had two more pages where the test subject could rate how easy it was for them to use whichever features they accessed while they were using the LCK. The last two pages of the functionality and usability survey were designed to answer these questions:

15. Was each feature the test subject accessed easy for them to use?
16. Did each feature they accessed have the information they expected?
17. Were there any important pieces of information left out?
18. Were the touch screen's appearance and the content of each feature pleasing and/or informative?

5.5. Mail-in survey

The mail-in survey was numbered and attached to a long survey that shared the same number. It is hoped that when the mail in surveys are returned, they can be compared with the long surveys the respondents filled out. The mail-in survey was designed to determine: (a) whether information from the kiosk resulted in changes in the user's plans, and (b) whether the information from the kiosk was found to be complete and accurate.

6. ADMINISTERING THE SURVEY

The survey was administered during the first weekend of August, 2003, at two locations in Missoula, Montana. The test administrator noted problems with the LCK locations that may have skewed the data, and the improvements made upon the LCK prototype. 50 short surveys, 49 long surveys, and 44 administrator surveys were completed during this step.

6.1. LCK locations in Missoula

Each of the two locations where the LCK was installed had challenges that may have skewed the data collected from the surveys.

6.1.1. Missoula International Airport (MIA)

The LCK installed at the baggage claim of the MIA initially seemed to be the best prospect to administer the surveys but there were some problems.

19. Many of the people at the MIA were locals
20. There was an imposing sign for firefighter check-ins which partially blocked access to the LCK
21. The baggage claim area was deserted for most of the time, and only was full of people for about 20 minutes after passengers arrived at the airport
22. Most of the people in the baggage claim were more concerned with getting their baggage than interacting with a kiosk, much less a survey administrator

At the end of the first two days, the test administrator had not been able to complete more than ten long surveys at the MIA.

6.1.2. Southgate Plaza Mall (SPM)

It was much easier to administer surveys at this location since there were comfortable chairs and people who were more relaxed.

22. There were even fewer tourists than at the MIA
23. The LCK was included in a large Lewis and Clark exhibit, which probably changed what people were expecting it to do.

The bulk of the surveys were administered at the SPM.

7. FINDINGS

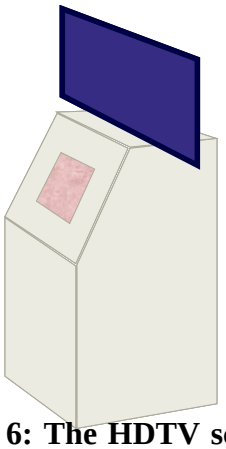

Figure 6: The HDTV screen is mounted on top of the LCK

7.1. Final LCK configuration

The LCK is a plain looking beige housing with a state-of-the-art high definition television (HDTV) Plasma screen bolted on top of it. The touch screen (the small square in Figure 6) is dwarfed by the HDTV display. It is possible to stand in front of the LCK and use the touch screen without obstructing other people's views of the HDTV screen.

In the SPM the LCK was set in the middle of a concourse, but at the MIA, the LCK was placed against the wall. Both the freestanding and wall placed LCK looked like they belonged in a public place, though some people expressed concern over vandalism of the HDTV screen and that the LCK did not look rustic enough, or that it looked "too industrial."

If the LCK overall is accused of not looking rustic enough, there is no danger of the same accusations being made regarding the LCK touch screen interface (see Figure 7). It appears to be written on an electronic version of a parchment scroll, and the color palette is similar to the palates in historical paintings.

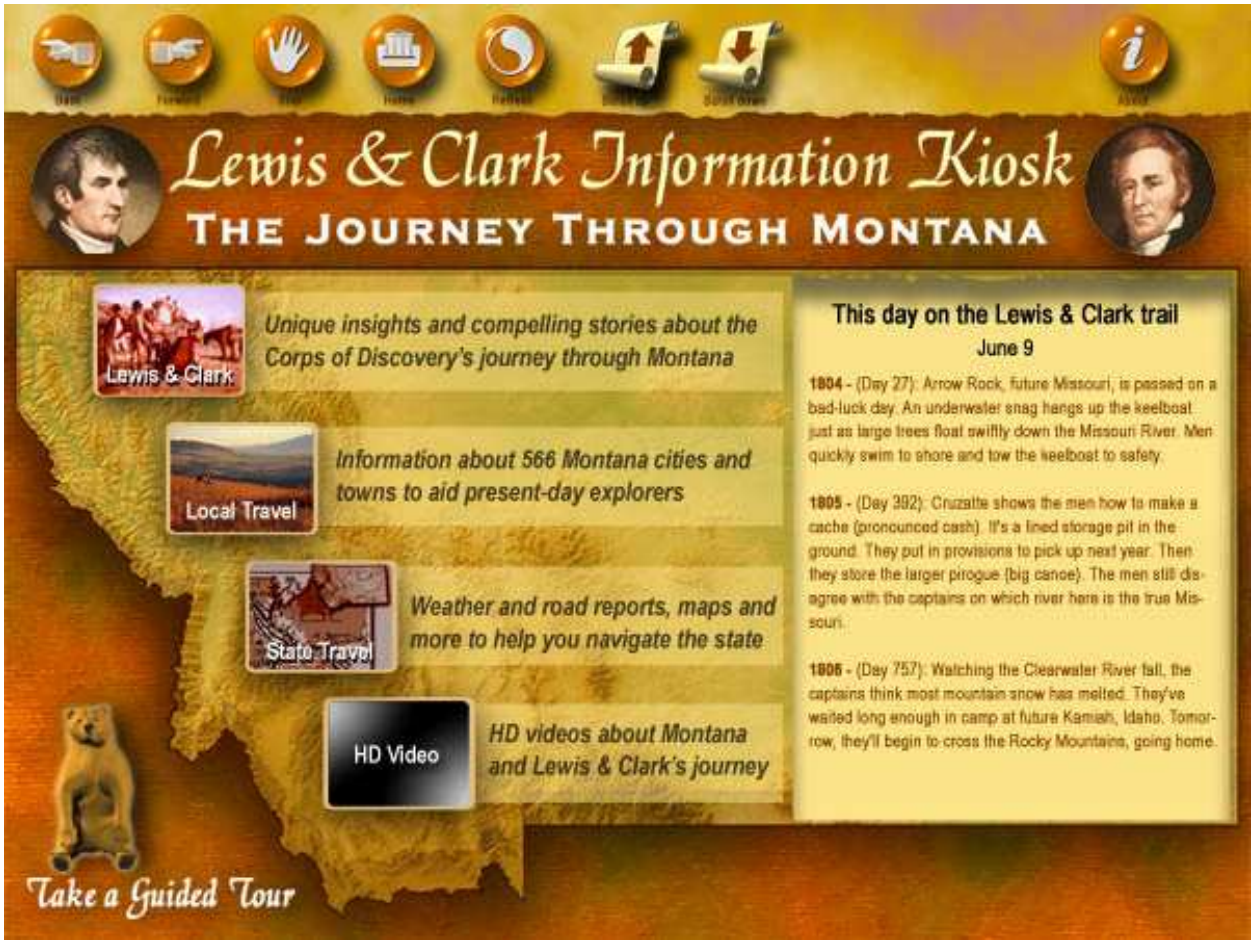

Figure 7: A screenshot of a menu for the LCK

The touch screen offers the typical web browser buttons across the top, and buttons to access its features in the homepages main field. The buttons, which access the LCK features have been reorganized. Previously, it was not clear how to get to another city, but now the "Local Information" button mentions that "566 Montana cities" are accessible from the LCK.

There is a new historical information feature, which has a variety of pages for curious tourists to look through. There is a trivia section for children and one for adults, a "this day on the trail" feature, a "points of interest" feature with maps and descriptions of sites along the trail, and a roster of military and civilian people who were part of the expedition. For the test subjects who used the touch screen part of the LCK, the historical information feature was the most popular feature by far. However, the most popular feature of all was not on the touch screen; it was the HDTV screen.

The dark button at the bottom of the LCK touch screen display (Figure 7 above) is the linkage between the HDTV screen and the touch screen. Pressing it takes the user to a page where they can play one of three movies:

24. Montana Carousel: a five-minute documentary movie with no words and a soundtrack featuring the scenery of the Montana area and some cultural content (bull-riding and UMM football)
25. Glacier National Park: a one-minute movie, also with no words and a soundtrack featuring the scenery of Glacier National Park
26. Traveler's Rest: a five-minute narrated documentary about archeologists who have found the Traveler's Rest camp of the Lewis and Clark Expedition

The default movie (which plays when no one is playing another movie on the LCK) is the Montana Carousel Video; it plays in tandem with an impressive introductory display; the introductory display shows graphics of a sextet, a riffle, and the state of Montana with the Lewis and Clark trail drawn in, interspersed with video of people reenacting the expedition.

7.2. Summary of data

The following information is condensed from the 50 short surveys, 49 long surveys, and 44 administrator surveys that were completed. The data summarized in this section is provided in a complete format in Appendix E.

7.2.1. General statistics from the first page of the long surveys and from the short surveys

Out of the 99 respondents, 73 selected "live here" or other from the question that asked them to select the best answer for their vacation plans. Since the 50 completed short form surveys did not provide "live here" as possible answer to the question, it is likely that most of those 73 responses were from people who lived in the area.

Likert scale responses to the general appearance of the LCK were favorable, but only slightly. On the Likert scale that asked if the LCK was properly advertising itself as a source of tourism

	Strongly Disagree			Neutral			Stro y Agr
a) You immediately noticed the information kiosk when you entered the building.	1	2	3	4	5	6	7
b) When you first saw the kiosk, you recognized its purpose.	1	2	3	4	5	6	7
c) You recognized that it was a free service when you first saw it.	1	2	3	4	5	6	7
d) You recognized that that the kiosk would give you travel information.	1	2	3	4	5	6	7
e) When you first approached the kiosk, it was immediately clear how to start using it.	1	2	3	4	5	6	7

Figure 8: The questions that asked if the LCK was advertising itself as a source of tourism and travel information, or something else.

and travel information (Figure 8), responses were generally positive with an average of about 5, but the standard deviations for those results had an average of almost 2. Even though there were more positive scores than negative, getting a score of as low as 1 would not be unusual with such a large standard deviation.

The Osgood scale in Figure 9 asked how the LCK appeared to respondents. It had a slightly stronger positive average of 2.7, while the average of standard deviations was slightly smaller, with an average of 1.9. The positive responses to this Likert scale were slightly stronger than to the one in Figure 8.

a)	Interesting	1	2	3	4	5	6	7	Ordinary
b)	Inviting	1	2	3	4	5	6	7	Offensive
c)	Pleasant	1	2	3	4	5	6	7	Annoying
d)	Attractive	1	2	3	4	5	6	7	Ugly
e)	Informative	1	2	3	4	5	6	7	Vague
f)	Valuable	1	2	3	4	5	6	7	Worthless
g)	Friendly	1	2	3	4	5	6	7	Intimidating
h)	Simple	1	2	3	4	5	6	7	Complicated
i)	Entertaining	1	2	3	4	5	6	7	Boring

Figure 9: The questions that asked how the LCK appeared.

7.3. Test administrator notes

While administering the surveys, the test administrator wrote additional comments into his notebook about how the LCK performed. A summary of these comments follows.

7.3.1. LCK crashes

Ordering the LCK to do too many things at once by repeatedly tapping on the active fields on the screen would cause it to crash. The screen will remain on the page it was on, even though the clicking sounds the LCK makes when it has registered a touch remain. Fortunately, unlike the GYRITS kiosk, the LCK is able to tell when it has crashed and will restart itself. While the frequent crashing is not desired (it happened about once a day during the test administrator's four-day visit), it is not a big issue since the LCK does not remain frozen for days and weeks at a time (like the GYRITS kiosk does).

7.3.2. Touch Screen Problems

As the test administrator had expected when experimenting with the LCK prototype, the LCD touch screen interface was much easier to use than the smaller, CRT interface which the prototype used. There were still some problems with people touching objects too long, or missing particularly small interactive fields (like the interactive map dots), but the problems were

much less serious. Only five instances of LCK users having difficulties with the touch screen were recorded in 44 surveys.

7.3.3. Problems with dependent HDTV/touch screen behaviors

Perhaps the protocols that force the touch screen and HDTV to do strange things are there to prevent other, larger problems, but the test administrator noted them anyway because he could not find good reasons for the two screens to act at cross purposes. The following is a description of the different types of the strange behaviors the LCK exhibited:

The sound is muted when the touch screen is touched

Though it is understandable that the LCK designers did not want the HDTV movie sounds to overwhelm potential users who wanted to get information out of the kiosk, when automatic Montana Carousel movie sound cuts out, it penalizes all of those who were passively watching it. The test administrator's experience shows the most popular feature of the LCK is the HDTV display; when the sound is muted, fewer people tended to gravitate towards the LCK. Consequently, if there were a group of people attracted around the LCK and someone touched it, they would have 'ruined the show' for everyone else. Though the images remained on the screen, the well-scored music was no longer there. One father, who was watching the Montana Carousel video with his family, chastised his son for walking up and touching the touch screen, and then looked apologetically to the test administrator. If no one requests another movie, the LCK will stay silent for 5 to eight minutes after someone has touched the touch screen,

The touch screen does not return to the main menu after a movie has been played

If the kiosk's LCD touch screen were to return to the homepage when an ordered movie appeared on the HDTV screen, then people who looked at the LCD screen would be presented with the variety of choices the LCK offers. Currently, the LCD screen stays on the movie-ordering page. Some prospective users thought that the LCK was a device for ordering movies alone.

The HDTV screen steals the show

The loop that the HDTV screen plays while the kiosk is not being used does not acknowledge the kiosk enough. Every 5 to 8 minutes, three messages appear directing the viewer to use the kiosk for travel information. The messages first display a quote from the journals of Lewis and Clark which describes an arduous journey, a buffalo traffic jam, or a mosquito infested campsite; each quote is read by a voice actor, who is followed by an announcer stating that tourists should use the kiosk to avoid those same problems in modern day Montana. These messages are humorous and let people know that the kiosk does more than just play movies, but they might be more effective if they were presented more frequently.

The HDTV screen stays blank too long

If the HDTV screen is always showing a movie, people may not be willing to touch the touch screen. However, after movies are played, the HDTV screen sometimes stays blank for up to five minutes. The small LCD touch screen does very little to attract people to the LCK, so there should always be an image on the HDTV screen. The tightrope to walk here is that the HDTV screen should not be blank or have a still image on it because it will not pull potential users in, but it should not be so entertaining that it turns potential users into passive viewers.

7.4. Test subject comments

7.4.1. Map feature

"Yes it was easy to get detailed information about other towns by touching the map, but only after the interactive features of the map were pointed out [to me]."

27. When shown to test subjects, the interactive features of the map delighted them. The LCK did include a city home-page index, which was an improvement over the prototype, but the designers eliminated the poor map dot instructions instead of improving them.

7.4.2. Movie content

"There need to be shorter movies geared towards kids" "Check out the Fort Clatsop National Memorial kiosk."

28. The movies may be too long for kids to pay attention to. Shorter or segmented movies also might allow more plugs to use the LCK.

"Why highlight the Grand Canyon of the Yellowstone in Wyoming [in the Montana Carousel movie] instead of the Theodore Roosevelt Archway entrance to Yellowstone? The archway is in Montana, and it is the grandest entrance to the first national park –a cultural icon for all national parks everywhere."

7.4.3. Kiosk location

"These would be great for truck stops [travel plazas] and Wal-Marts"

29. This test subject was complaining about the poor location to administer surveys. Other test subjects suggested that the LCKs go in guarded public or quasi-public space to avoid vandalism of the six thousand dollar plasma screen.

7.4.4. Search features

"I liked the photos of each establishment"
"The tools to refine the search [the left pane which allows the LCK user to change from a shopping to a guides search] should scroll with the screen."

30. This comment follows Browns rule for graphical user interfaces; GUIs should have "invariant fields" which stay the same no matter where the user navigates.

7.4.5. Kiosk Construction

"There needs to be a seat for longer stays by older people."
"There should be a graphic on the side so it looks less like a video game."
"Needs to be 'rustic' –looks like something one would see in a hospital. Make it out of timbers or metal –something more 'Montana,' not a plastic composite!"

31. People liked the rich visuals of the touch screen and wished they extended to the kiosks exterior.

7.4.6. News feature

"I expected to see local news, but the [media] listings that are there are useful."

32. The news feature is a confusing title for a listing of media sources (not all of them are for news).

7.4.7. Historical content

"There should be more information on the Native American members of the party."

33. The test administrator noted that 2 LCK users wanted an interactive map like the map feature for the points of interest on the historical feature. Since the points of interest feature used the same map as the interactive map feature, people expected to be able to pan the point of interest maps.
34. The test administrator and test subject number 12 noticed a typo in the "Lewis and Clark for experts" page; trivia question #1 asked "What did Charbaneau baptized [on the trip in a nearby river]," but it should have asked "What did Charbaneau *baptize*…"

7.4.8. Road reports feature

"I did not recognize road choices beyond the interstates."

35. The all text road reports interface has only been aesthetically changed from the confusing textual interface of the GYRITS kiosk.

7.4.9. Plasma screen/touch screen linkage

"I expected to see Lewis and Clark information to pop up on the plasma screen [while I was using it]."
"I thought the [plasma] screen would be closer connected to the touch [screen]."

The HDTV screen was so popular that people wanted more content and were disappointed when they had watched all three movies.
"I think people hesitate to touch the screen because they fear they will interrupt the movie."

"Nice monitor [the plasma screen], but it could have a sign on it [the LCK] saying what it is"

"The kiosk looks fine, but it does not say anything about what it is. When it is with other passive displays, it [does not appear to be] different."

7.4.10. Hearing the movies

"I have seen a [kiosk] similar to this one which had plexiglass cones suspended from above; they made it easy to hear if you stood under the cone."

"The videos need to be captioned. I have a hearing loss and there is too much noise in the background from the mall."

7.4.11. Scrolling

Since he did not know to scroll, One test subject missed museums in the local attractions. The scroll buttons do not fade out when the user cannot scroll anymore in one direction. This caused confusion among the test subjects; if they pressed the wrong button, it would give them visual feedback that the LCK had acknowledged their command, but if there were no more page areas to scroll to, nothing would happen.

7.5. Assessment of functionality problems

The administrator survey revealed that there were seven relatively common functionality problems with the LCK; These problems have been listed in

Table 2. There are other problems listed in the complete survey data in Appendix D.

Table 2: The most notable functionality problems with the LCK.

Problem	Instances
Index organization (up-down)	3
Map dots not noticed	13
Road reports text	4
Default search results	8
Scrolling problems	3
Touchscreen problems	5
LCK froze up	3

Table 3 shows how severe the functionality problems are using the Ebling and John (2000) Severity scale . In the severity scale "1" is the worst rating; It means there are software functionality problems that no users can get past no matter what they do. There are no problems in Table 3 with a rating of "1."

Table 3: Severity of the functionality problems.

	Severity			
Source	1	2	3	4
Index organization (up-down)				x
Map dots not noticed				x
Road reports text		x		
Default search results		x		
Scrolling problems			x	
Touchscreen problems			x	
LCK crashes				x

A rating of "2"means that the functionality of the software is impaired to a degree where it is still possible to do something, but some people cannot do it. LCK software problems with a severity

rating of "2" were the text references to road reports and the default search results. LCK users need to have considerable knowledge of Montana's roadways to make the roadway feature work. The default search results are not sorted by type for businesses; this is a problem because when people are looking for a restaurant, for example, they may be looking for a family style restaurant, or a ethnic food restaurant. Or, when people are looking for lodging, they are overwhelmed by motels when they are looking for a campground.

Problems given a rating of "3" cause a minor delay, but the user can usually surmount them; these problems still cause frustration and delays, and should be fixed. LCK software problems with a severity rating of "3" were scrolling problems and touch screen problems. People would touch the screen with the wrong part of their finger, or they would touch the screen for too long. Some people did not understand the scrolling icons because of their placement, or because they did not fade out when the user could not scroll anymore.

Problems given a rating of "4" were minor; they do not need to be fixed, but might be kept in mind for next time. These problems straddle the line between functionality and usability; the lack of intuition or wrong intuition on the part of the user aggravates them. The problems given a rating of 4 were the left to right organization of indexes, the lack of interactive map dot cues, and the LCK system failing or "freezing up." These system crashes seem to warrant more than a rating of 4, but there is a program built into the LCK that restarts the kiosk within 10 minutes. This is such a big step beyond the GYRITS kiosk, which would stay frozen for days on end, that the evaluator has reduced the severity of the rating. If the map dots could be made more noticeable, LCK users would be able to enjoy more flexibility. Finally, three out of the four people the test administrator surveyed could not easily find the cities they were looking for on the "Local Travel" page of the kiosk because they were expecting up and down alphabetical organization, not left to right (see Table 4).

Table 4: Alphabetical Search Schemes: Default (Top) and Preferred (Bottom).

aa	ab	ac
ad	ae	af
ag	ah	ai

aa	ad	ag
ab	ae	ah
ac	af	ai

7.6 Usefulness of the information

Postcard surveys concerning the usefulness of the LCK were distributed to all users who completed the survey long form. These postcards asked four questions about the usefulness of the information obtained from the kiosk. These were returned by 22 users for a return rate of 45 percent.

Question 1 inquired whether the information obtained had an effect on the trip. Forty-five percent of the respondees agreed that the information caused them to see or do something they learned about on the kiosk. Fifty percent said that it had no effect. Several noted that they were from the local area and were aware of much of the information presented or had no immediate plans for tourism activities.

Question 2 inquired about specific kinds of information that the respondee might have gotten from the kiosk. Eighty-six percent felt that the kiosk had given them useful information. Seventy-two percent recalled learning about Montana history or geography. Sixty-two percent said that the information had given them ideas for future activities.

Question 3 asked whether the kiosk provided enough information to search for and locate a business that respondees wanted to visit. Seventy-one percent agreed that the information was adequate while eighteen percent felt that it was inadequate.

Finally, Question 4 asked whether any of the kiosk information was vague or incorrect. Two subjects (10%) responded that it was. Both indicated that they have a hearing loss and could not understand the narration from the HDTV movies. Both suggested that captioning should be added to make the kiosk more universally usable.

8. LIMITATIONS ON CONCLUSIONS

8.1. Likert scale construction

The second and third questions in both the short and long surveys LCK test subjects filled out used the Likert scales shown below in Figure 10. The Likert scale in question 2 asks test subjects to circle the number that most closely approximates their level of agreement with a given statement. The test subjects were presented with a scale where '1' stood for "strongly disagree" and '7' stood for "strongly agree." The next scale (the lower scale in Figure 10) was an Osgood scale, whose paired opposites were the most positive to the *left* and least positive to

		Strongly Disagree			Neutral			Strongly Agree
a)	You immediately noticed the information kiosk when you entered the building.	1	2	3	4	5	6	7
b)	When you first saw the kiosk, you recognized its purpose.	1	2	3	4	5	6	7
c)	You recognized that it was a free service when you first saw it.	1	2	3	4	5	6	7
d)	You recognized that that the kiosk would give you travel information.	1	2	3	4	5	6	7
e)	When you first approached the kiosk, it was immediately clear how to start using it.	1	2	3	4	5	6	7

a)	Interesting	1	2	3	4	5	6	7	Ordinary
b)	Inviting	1	2	3	4	5	6	7	Offensive
c)	Pleasant	1	2	3	4	5	6	7	Annoying
d)	Attractive	1	2	3	4	5	6	7	Ugly
e)	Informative	1	2	3	4	5	6	7	Vague
f)	Valuable	1	2	3	4	5	6	7	Worthless
g)	Friendly	1	2	3	4	5	6	7	Intimidating
h)	Simple	1	2	3	4	5	6	7	Complicated
i)	Entertaining	1	2	3	4	5	6	7	Boring

Figure 10: The Likert scales may have confused some test subjects because the most positive and negative descriptions changed sides from scale to scale.

the *right.* This was a 'flip-flop' from the first scale. While we were entering the data from the surveys into a spreadsheet, we noticed that some extremely harshly graded Likert scales (receiving only grades of '6' or '7' in the lower scale in Figure 10) were followed by gushing positive open-ended comments. Out of 99 short and long surveys, we noted five tests that seemed to harshly rate the LCK immediately followed by positive, open-ended comments about the LCK. We did not notice any positive Likert scale ratings of the LCK that were followed by unduly harsh open-ended comments.

8.2. Some test subjects were asked to use the LCK

On the last of the four days of administering the survey, the survey administrator began to ask people to use the kiosk instead of simply waiting for someone to walk up and touch it. Test subjects who approached the LCK on their own volition are important to both the initial appearance evaluation and the functionality and usability evaluation of the LCK. When people were asked to initiate contact with the kiosk and complete a survey, their responses may have been more from rote and less genuine. Still, the test administrator decided that since so few people were approaching the LCK, it would be better to gather some data and try to reach some preliminary conclusions, than not gather enough data. Out of a total of 49 long surveys filled out, four test subjects were asked to approach the LCK.

8.3. Most of the surveys were completed by locals, not tourists

While more tourists passed through the Missoula International Airport (MIA) than the Southgate Plaza Mall (SPM), the MIA did not handle enough people to fill out a substantial amount of surveys. Though hundreds of people would pass through the baggage claim area at several times during the day, their baggage would arrive within 10 minutes of their arrival, and the area would clear out. While this environment might be adequate for the LCK to operate in, it did not provide a constant enough flow for the test administrator to administer more than 10 surveys in the first two days. Test subjects did not want to fill out their survey while waiting for their baggage, and the baggage would arrive before more than one could use the LCK, much less fill out a long survey.

The SPM, on the other hand, was filled with a constant stream of people who were waiting or milling about. Unfortunately, the SPM mostly served locals: 73 out of 99 surveys administered were to people who checked “live here” or “other” on question one of the short and long forms of the surveys.

8.4. Most of the surveys were completed at the Southgate Plaza Mall

The more comfortable, relaxed environment of the SPM made it much easier to administer surveys. There were comfortable chairs placed around the LCK at the mall; when combined with a constant stream of people strolling and waiting, the SPM LCK was in a much friendlier and less pressured environment for approaching people.
The surveys were administered during the time of the 2003 forest fires in Glacier National Park. At the MIA, a large official sign for fire fighters who were checking in was blocking the views of the kiosk, as well as people’s access to it from the baggage claim. Less than 10 long surveys and 20 short surveys were completed at the MIA.

8.4.1. The Southgate Plaza Mall LCK was indistinguishable from a Lewis and Clark exhibit

A large and comprehensive Lewis and Clark exhibit was at the SPM at the same time as the LCK. The LCK was not distinguishable from the content of the exhibit, and every test subject thought it was part of the exhibit. People may have been inclined to just sit and watch the HDTV movies if they expected the LCK to be just another passive feature of the larger exhibit.

8.4.2. Other touch screen exhibits in the SPM did not work

Though the LCK was not part of the SPM's Lewis and Clark exhibit, no visitors knew that. There were other, less sophisticated touch screen exhibits about Lewis and Clark at the SPM at the same time, but these were not functioning. Those people who noticed that the other touch screens were not functioning, may not have wanted to touch the LCK's touch screen.

9. CONCLUSIONS

The LCK is a vast improvement over the GYRITS kiosk, and it improves upon its prototype version as well. There are still problems with some of the functionality and usability problems, and there are still problems with its initial appearance –despite the HDTV screen.
The following are improvements that would greatly increase the value of the LCK on the criteria of appearance, usability, and functionality:

36. Problems with dependent HDTV/touch screen behaviors (section 7.3.3)
37. Improve LCK signage
38. Road reports feature (section 7.4.8)

The following are second tier improvements that would make the kiosk more fun to use and informative.

39. Map feature (section 7.4.1)
40. Hearing the movies (section 7.4.10)

9.1. Problems with dependent HDTV/touch screen behaviors

The HDTV screen needs to be programmed to relinquish its job of entertaining passersby more gracefully. Having the sound cut out when someone touches the screen is too abrupt. Placing speakers away from the touch screen users could avoid the need to cut out the sound, or simply turning the volume down smoothly could work. People are currently feeling that they are penalized for touching the touch screen.

The touch screen needs to advertise the LCK more, not just Montana in general. Some video of people using the kiosk, screenshots of lodging and events search pages, and more frequent references could all improve the linkage between the HDTV and the touch screen.

9.2. Improve LCK signage

The above paragraph could also be in this section. The HDTV should be used to enhance the signage for the interactive features of the LCK. More can be done without using the HDTV though.
The sides of the LCK have no interactive features, and no signage (see Figure 6, page 23); they are made of a smooth, modern-looking laminated material similar to the sides of arcade video games. However, arcade video games usually have descriptive graphics and words painted on their sides. The LCK could benefit from descriptive graphics and words painted on its sides.
The face of the LCK is also a desert around the touch screen. Tasteful signage could be used here, or at the very least, a lower-case '**i**', which could help mark the LCK as an information center.

9.3. The road reports feature

This feature is not useful to people who are visiting Montana. The road camera map from the GYRITS kiosk should be imported into the LCK, and that map should be expanded to link to touchable interactive road segments. The text-based interface for the road reports is too

confusing and requires a level of knowledge of Montana geography not consistent with the knowledge levels of the people who the LCK is being designed for: tourists.

9.4. Map feature

The map feature is truly ambitious, and has the potential to easily introduce browsers to nearby towns. If visual quality could be added to the cartographic city dots that lets people know they are interactive, people would easily be able to grasp that touching the dots could lead them to 566 different homepages. There may be concern about making the map look gaudy, but those concerns can be addressed by having the interactive dots pulse once every time the map view appears or has been changed. The interactive dots need not continuously pulse for an unwritten, clear instruction to touch them to be put across to the user.

9.5. Hearing the movies

Different speaker placements could be used to make the movies more audible, and captioning should be included to allow the hearing impaired to enjoy the content. A successful solution to the problems of hearing the movies would not only address the audibility issue, but would make people feel comfortable approaching the touch screen without being blasted away by the sound.

10. REFERENCES

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11. APPENDICES

Appendix A. The Administrator Survey

Appendix B. The Initial Impression (Short) Survey

Appendix C. Functionality and Usability Survey

APPENDIX A. THE ADMINISTRATOR SURVEY

HOW MANY searches?

- ❑ 1
- ❑ 2
- ❑ 3 or more_____

USER TYPE:

- ❑ Alone
- ❑ Group
- ❑ Group with kids
  - o Kids were first to use kiosk

MAP:

- ❑ EASILY ACCESSED other cities through map
- ❑ DID NOT RECOGNIZE other cities could be accessed through map
- ❑ Tried to TOUCH ICONS that were NOT INTERACTIVE

_____

- ❑ Expressed desire for OTHER MAPS, other scales:

_____

- ❑ Did not view other cities through map
- ❑ PANNED easily to other cities
- ❑ Used INDEX feature to get to other cities
- ❑ Getting to other cities was DIFFICULT for subject.

- ❑ Dots that did not work:

TOUCHSCREEN PROBLEMS:

IF Subject had PROBLEMS:

- ❑ Did not touch FINGERTIP (Fingernails)
- ❑ Touched too LONG (duration)
- ❑ Touched too SHORT
- ❑ Did not RECOGNIZE when touchscreen had NOT ACKNOWLEDGED their touch.
- ❑ Screen CALIBRATION
  - o ANGLE viewed
  - o Actual CALIBRATION

ERGONOMICS

- ❑ Did NOT look COMFORTABLE because of:
- ❑ Too low (KNEELING/HUNCHING)
- ❑ Glare (HARD TO SEE screen)
- ❑ Nearby OBSTRUCTIONS

HISTORICAL

- ❑ Used 'FOR KIDS'
- ❑ Used 'FOR EXPERTS'
- ❑ Used ROSTER feature
- ❑ Used 'POINTS OF INTEREST' feature

ROAD REPORTS

- ❑ Appeared DISSATISFIED because of:

- ❑ TEXT references
- ❑ Lack of SPATIAL organization
- ❑ Did not have BASE OF KNOWLEDGE to access

LOCAL HOMEPAGES:

HOW MANY visited___

Links ACCESSED DIRECTLY from page (not from the left side navigation bar)

- ❑ Events
- ❑ Nearby Cities
- ❑ Map

If subject looked for LOCAL ATTRACTION information described in city bio, did they find it?

- ❑ Yes
- ❑ No

WEATHER:

Level of DETAIL

- ❑ TOO MUCH –Subject was confused
- ❑ NOT ENOUGH –Subject looked for more
- ❑ JUST RIGHT

If subject SHIFTED from local to statewide/other reports, What was the LEVEL OF DIFFICULTY?

- ❑ LOW –easy
- ❑ MEDIUM –Some difficulty
- ❑ HARD –Could not complete

❑ LODGING:

- ❑ TYPE of lodging they were searching for
  - o Room (HOTEL/MOTEL)
  - o Camping (PUBLIC/PRIVATE)
  - o Other

    _____
- ❑ Appeared DISSATISFIED
- ❑ LEFT search results to look at a business's page
- ❑ Experienced DIFFICULTIES with proximity search results
- ❑ DID NOT EASILY refine/reorganize search results.
- ❑ ORGANIZATION scheme problems:
  Proximity__, Type__, Alpha__, or City__
- ❑ PAGE HEADING was incorrect (Food & Beverage)
  - o Subject was CONFUSED
  - o Subject did NOT notice/was not confused

❑ Shopping:

- ❑ TYPE of Shopping they were searching for
  - o Outdoor Gear
  - o Food/Supplies
  - o Antiques/ Gifts/ Specialty/Other

    _____
- ❑ Appeared DISSATISFIED
- ❑ LEFT search results to look at a business's page
- ❑ Experienced DIFFICULTIES with proximity search results
- ❑ DID NOT EASILY refine/reorganize search results.
- ❑ ORGANIZATION scheme problems:
  Proximity__, Type__, Alpha__, or City__
- ❑ PAGE HEADING was incorrect (Food & Beverage)
  - o Subject was CONFUSED
  - o Subject did NOT notice/was not confused

News:

- ❑ Subject seemed to be surprised by information on page

Events:

- ❑ Appeared DISSATISFIED
- ❑ ORGANIZATION scheme problems: Proximity__, Type__, Alpha__, or City__
- ❑ LEFT search results to look at an Event's page

Food & Beverage:

- ❑ Appeared DISSATISFIED
- ❑ LEFT search results to look at a business's page
- ❑ Experienced DIFFICULTIES with proximity search results
- ❑ DID NOT EASILY refine/reorganize search results.
- ❑ ORGANIZATION scheme problems:
  Proximity__, Type__, Alpha__, or City__
- ❑ PAGE HEADING was incorrect (Food & Beverage)
  - o Subject was CONFUSED
  - o Subject did NOT notice/was not confused

Services

- ❑ TYPE of Service they were searching for
  - o Auto (SERVICE/RENTAL)
  - o Activity
  - o Transportation
  - o Other
    _____
- ❑ Appeared DISSATISFIED
- ❑ LEFT search results to look at a business's page
- ❑ Experienced DIFFICULTIES with proximity search results
- ❑ DID NOT EASILY refine/reorganize search results.
- ❑ ORGANIZATION scheme problems:
  Proximity__, Type__, Alpha__, or City__
- ❑ PAGE HEADING was incorrect (Food & Beverage)
  - o Subject was CONFUSED
  - o Subject did NOT notice/was not confused

Guides:

- TYPE of Guide they were searching for
  - Hunting
  - Fishing
  - Other

    _____
- Appeared DISSATISFIED
- LEFT search results to look at a business's page
- Experienced DIFFICULTIES with proximity search results
- DID NOT EASILY refine/reorganize search results.
- ORGANIZATION scheme problems:
  Proximity__, Type__, Alpha__, or City__
- PAGE HEADING was incorrect (Food & Beverage)
  - Subject was CONFUSED
  - Subject did NOT notice/was not confused

APPENDIX B. THE INITIAL IMPRESSION SURVEY

1. WHICH OF THESE TERMS best describes your TRAVEL PLANS?

- ❑ Passing through Montana
- ❑ Visiting a friend or relative in Montana
- ❑ Visiting a 'dude ranch,' resort, or other pre-planned activity
- ❑ Sightseeing
- ❑ Other:

_____

_____

2. For EACH STATEMENT, please circle the number that BEST DESCRIBES your response:

		Strongly Disagree			Neutral		Strongly Agree
a)	You immediately noticed the information kiosk when you entered the building.	1	2	3	4	5	7
b)	When you first saw the kiosk, you recognized its purpose.	1	2	3	4	5	7
c)	You recognized that it was a free service when you first saw it.	1	2	3	4	5	7
d)	You recognized that that the kiosk would give you travel information.	1	2	3	4	5	7
e)	When you first approached the kiosk, it was immediately clear how to start using it.	1	2	3	4	5	7

For EACH of the following pairs of words, please circle the number that best describes your opinion of the kiosk:

a)	Interesting	1	2	3	4	5	6	7	Ordinary
b)	Inviting	1	2	3	4	5	6	7	Offensive
c)	Pleasant	1	2	3	4	5	6	7	Annoying
d)	Attractive	1	2	3	4	5	6	7	Ugly
e)	Informative	1	2	3	4	5	6	7	Vague
f)	Valuable	1	2	3	4	5	6	7	Worthless
g)	Friendly	1	2	3	4	5	6	7	Intimidating
h)	Simple	1	2	3	4	5	6	7	Complicated
i)	Entertaining	1	2	3	4	5	6	7	Boring

Please write down any comments you have about the kiosk's appearance:

_____
_____
_____
_____

Why did you choose not to use the kiosk?

- ❑ Already familiar with the area
- ❑ The kiosk looked too complicated
- ❑ Prefer to ask a person
- ❑ Did not think that the kiosk would have the right type of information *(if so, what type of information)*

_____
_____

APPENDIX C. FUNCTIONALITY AND USABILITY SURVEY

WHICH OF THESE TERMS best describes your TRAVEL PLANS?

- ❑ Passing through Montana
- ❑ Visiting a friend or relative in Montana
- ❑ Visiting a 'dude ranch,' resort, or other pre-planned activity
- ❑ Sightseeing
- ❑ Other:

_____

_____

For EACH STATEMENT, please circle the number that BEST DESCRIBES your response:

		Strongly Disagree			Neutral			Strongly Agree
a)	You immediately noticed the information kiosk when you entered the building.	1	2	3	4	5	6	7
b)	When you first saw the kiosk, you recognized its purpose.	1	2	3	4	5	6	7
c)	You recognized that it was a free service when you first saw it.	1	2	3	4	5	6	7
d)	You recognized that that the kiosk would give you travel information.	1	2	3	4	5	6	7
e)	When you first approached the kiosk, it was immediately clear how to start using it.	1	2	3	4	5	6	7

For EACH of the following pairs of words, please circle the number that best describes your opinion of the kiosk:

a)	Interesting	1	2	3	4	5	6	7	Ordinary
b)	Inviting	1	2	3	4	5	6	7	Offensive
c)	Pleasant	1	2	3	4	5	6	7	Annoying
d)	Attractive	1	2	3	4	5	6	7	Ugly
e)	Informative	1	2	3	4	5	6	7	Vague
f)	Valuable	1	2	3	4	5	6	7	Worthless
g)	Friendly	1	2	3	4	5	6	7	Intimidating
h)	Simple	1	2	3	4	5	6	7	Complicated
i)	Entertaining	1	2	3	4	5	6	7	Boring

Please write down any comments you have about the kiosk's appearance:

_____

_____

Did you have any DIFFICULTIES starting to USE the kiosk? If so, DESCRIBE.

How would you DESCRIBE the SCREEN you STARTED on?

a)	Attractive	1	2	3	4	5	6	7	Ugly
b)	Interesting	1	2	3	4	5	6	7	Dull
c)	Inviting	1	2	3	4	5	6	7	Offensive
d)	Friendly	1	2	3	4	5	6	7	Intimidating
e)	Simple	1	2	3	4	5	6	7	Complicated

If you DID NOT USE the kiosk to search for ROAD REPORTS, please skip to Question 13.

Did you have any DIFFICULTIES USING the Road Reports feature of the kiosk? If so, DESCRIBE.

Did the Road Reports feature give you USEFUL INFORMATION?

- ❑ Yes
- ❑ No

Were you able to FIND all of the Road Report INFORMATION you wanted?

- ❑ Yes
- ❑ No

If not, what Road Report INFORMATION was DIFFICULT to FIND or MISSING?

Did information from the Road Reports feature AFFECT YOUR TRAVEL PLANS?

- ❑ Yes
- ❑ No

How would you DESCRIBE the Road Reports feature?

a)	Useful	1	2	3	4	5	6	7	Useless
b)	Interesting	1	2	3	4	5	6	7	Dull
c)	Valuable	1	2	3	4	5	6	7	Worthless
d)	Friendly	1	2	3	4	5	6	7	Intimidating

If you DID NOT USE the kiosk to search for a WEATHER REPORT, please skip to Question 17.

Were you able to FIND all of the Weather INFORMATION you wanted?

- ❑ Yes
- ❑ No

If not, what Weather INFORMATION was DIFFICULT to FIND or MISSING?

_____
_____

Did information from the Weather feature AFFECT YOUR TRAVEL PLANS?

- ❑ Yes
- ❑ No

Did you have any DIFFICULTIES USING the Weather feature of the kiosk? If so, DESCRIBE.

_____
_____

How would you DESCRIBE the Weather feature?

a)	Useful	1	2	3	4	5	6	7	Useless
b)	Interesting	1	2	3	4	5	6	7	Dull
c)	Valuable	1	2	3	4	5	6	7	Worthless
d)	Friendly	1	2	3	4	5	6	7	Intimidating

If you DID NOT USE the kiosk's MAP feature, please skip to Question 23.

Was it EASY for you to get DETAILED information about OTHER TOWNS by TOUCHING the map?

- ❑ Yes
- ❑ No

Did the map PROVIDE enough INFORMATION about the areas OUTSIDE of TOWNS?

- ❑ Yes
- ❑ No

Were you able to FIND all of the INFORMATION you wanted?

- ❑ Yes
- ❑ No

If not, what INFORMATION was DIFFICULT to FIND?

_____
_____

Did you have any DIFFICULTIES USING the Map feature of the kiosk? If so, DESCRIBE.

_____
_____

How would you DESCRIBE the Map feature?

a)	Useful	1	2	3	4	5	6	7	Useless
b)	Interesting	1	2	3	4	5	6	7	Dull
c)	Valuable	1	2	3	4	5	6	7	Worthless
d)	Friendly	1	2	3	4	5	6	7	Intimidating

If you DID NOT USE the kiosk to learn about HISTORICAL INFORMATION, please skip to Question 27.

Did the Historical Information feature help you recognize the HISTORICAL SIGNIFICANCE of the PLACES on your route?

- ❑ Yes
- ❑ No

Please write down any COMMENTS you have about the Historical Information.

_____
_____

Did you have any DIFFICULTIES using the historical information feature? If so, DESCRIBE.

_____
_____

How would you DESCRIBE the Historical Information feature?

a)	Attractive	1	2	3	4	5	6	7	Ugly
b)	Interesting	1	2	3	4	5	6	7	Dull
c)	Valuable	1	2	3	4	5	6	7	Worthless
d)	Friendly	1	2	3	4	5	6	7	Intimidating

Did you use the kiosk to search for ANY of the following business or event types? ***(Check all that apply)***

- ❑ Lodging
- ❑ Food & Beverages
- ❑ Events

- ❑ Outdoor Guides
- ❑ Shopping
- ❑ Other Services _____

If you DID NOT USE the kiosk to search for ANY OF THE ABOVE, please skip to Question 33.

Would you feel comfortable visiting a business or event from the amount of contact and location information the kiosk provided? ***(If you would like to see ADDITIONAL TYPES of CONTACT and LOCATION INFORMATION, please WRITE them BELOW)***

- ❑ Yes
- ❑ No

_____

Did you have any difficulties searching for businesses or events on the kiosk? If so, describe.

_____
_____

How would you DESCRIBE the business and event search feature?

a)	Useful	1	2	3	4	5	6	7	Useless
b)	Informative	1	2	3	4	5	6	7	Vague
c)	Valuable	1	2	3	4	5	6	7	Worthless
d)	Friendly	1	2	3	4	5	6	7	Intimidating

What was the reason that you chose to use the kiosk? ***(Check all that apply)***

- ❑ Curious about the kiosk
- ❑ Needed information
- ❑ Waiting/Resting
- ❑ Curious about the survey
- ❑ Were you looking for Local or Statewide information? *(Check all that apply)*
  - ❑ Local
  - ❑ Statewide
  - ❑ Other_____